2019

PHYSICS

In the previous exams

2006 UP TO 2018

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PHYSICS TEACHER

Nefertari schools

2006 First Session

[1]Mention one application based up on: Eddy currents

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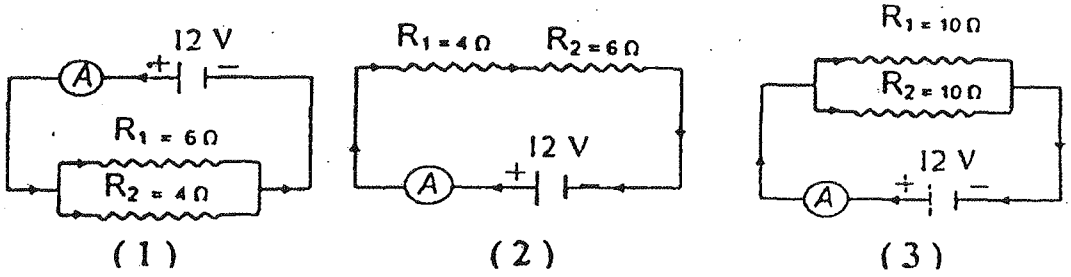
[2]The figure indicated three electric circuits (1),(2),and (3):



Write the number of the circuit in which:

a) The current intensity flows in one of the two resistances differ than the other?

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b) The ammeter reads high value.

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c) What will happen to the ammeter reading if the internal resistance of the battery is one Ohm?

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[3] Give reasons for:

It is preferred using digital electronics in the electronic systems than the analog electronics in the electronic equipment.

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[4]Give reasons for: The electrical conductivity of copper is high.

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[5] If the effective intensity of current in a circuit (I_{eff}) equals 2.828 Ampere. **Find the value of each of the following:**

a) The maximum value for current (I_{max}).

b)The instantaneous value of the induced current when the angle (θ) confined between the direction of velocity and the direction of the magnetic flux density = 30°.

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[6] Give reasons for: The potential difference across the cathode and anode in the electronic microscope is very high

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[7]What is meant by the effective value of the intensity of the alternating current and how to measure it?

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[8]What is meant by: The coefficient of self- induction for a coil equals one Henry.

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[9]A galvanometer has a resistance of 0.1 Ohm, and a current of 1 mA is required for full-scale deflection:

a) Calculate shunt resistance must be used to convert the galvanometer to an ammeter whose maximum range is 5 Ampere. Mention how the shunt is connected.

b) Calculate the multiplier resistance necessary to convert this galvanometer to a voltmeter whose maximum potential difference is 25 volt. Then mention how the multiplier resistor is connected.

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[10] Choose the correct answer:

The ratio of the electron energy in the atom to its energy when free

(a)Equals one (b) Greater than One (c) Less than One

[11]Compare between: The physical relation used in calculating the value of the magnetic flux density at the center of a circular loop and at a point on the axis of a solenoid which the current traverse in each.

	At the center of a circular loop carry current	**At a point on the axis of a solenoid carry current**
The physical relation to calculate the magnetic flux density		

[12]Compare between: The number of turns of the primary coil and of the secondary coil in each of step-up transformer and in step-down transformer.

	Step-up transformer	**Step-down transformer**
The number of turns of the primary coil and of the secondary coil		

[13] What will expect when it happens with interpretation (التفسير)when.....?
The replacement of the two metallic rings of the alternating current generator by metallic cylinder splatted into two halves insulated.

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[14] Explain with drawing a method to produce X-rays using Coolidge tube

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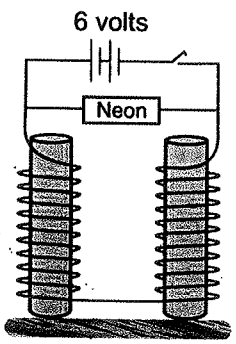
[15] What will expect when it happens with interpretation when.....?
The electric circuit is switched off, which illustrated in the front of you.



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[16] Mention why X- rays are used in studying the crystalline structure of materials?

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[17] Write an equivalent unit for the following unit, and then mention the physical quantity that is measured by it: **N/A.m**

	The equivalent unit	The physical quantity
N/A.m		

[18] What is meant by.....?
The work function (E_w) of a Zinc metal equals 6.89×10^{-19} Joule.

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[19] [Added] Egypt 1983: The resonant circuit of a receiver consists of a coil of inductance 10 milli-Henry, a variable condenser and a resistance of 50 Ohms. When the wireless waves of frequency 980 KHz fall on the aerial of this receiver, an induced e.m.f of 10^{-4} V is produced across the circuit. Find the value of the capacity required for resonance and the current produced in this case.

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[20] Mention without explanation the common elements (components) in the production of laser devices

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[21] Why the Helium - Neon have been selected in helium-neon laser?

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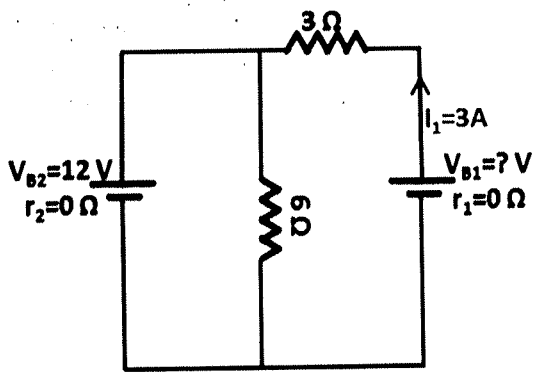
[22] What will expect when it happens with interpretation (التفسير)when.....?
A photon is incident from gamma (γ) - rays on a free electron.

[23] [Added] In the electrical circuit shown;
calculate:
i) The current passes through the 12V battery
ii) The e.m.f (V_{B1}).



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[24] Draw a circuit for a transistor as a switch (ON condition). Then calculate the value of the collector current I_c when V_{cc} = 1.5 volt and the voltage difference between the collector and the emitter V_{CE} = 0.5 volt and R_c = 500 Ω.

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[25] The acting force (F) on a wire of 6 meter in length placed perpendicular to a magnetic flux is recorded when the current intensity (I) followings in the wire is changed ; So the results indicated in the followings table :

F (Newton)	0.3	0.6	0.9	1.2	1.5	1.8
I (Ampere)	0.5	1	1.5	X	2.5	3

Draw the graphical relation between the force (F) on the y - axis and the current intensity (I) on the x - axis.

[26] <u>From the graph Find :</u>

a) Magnetic flux density.

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b) The value of X.

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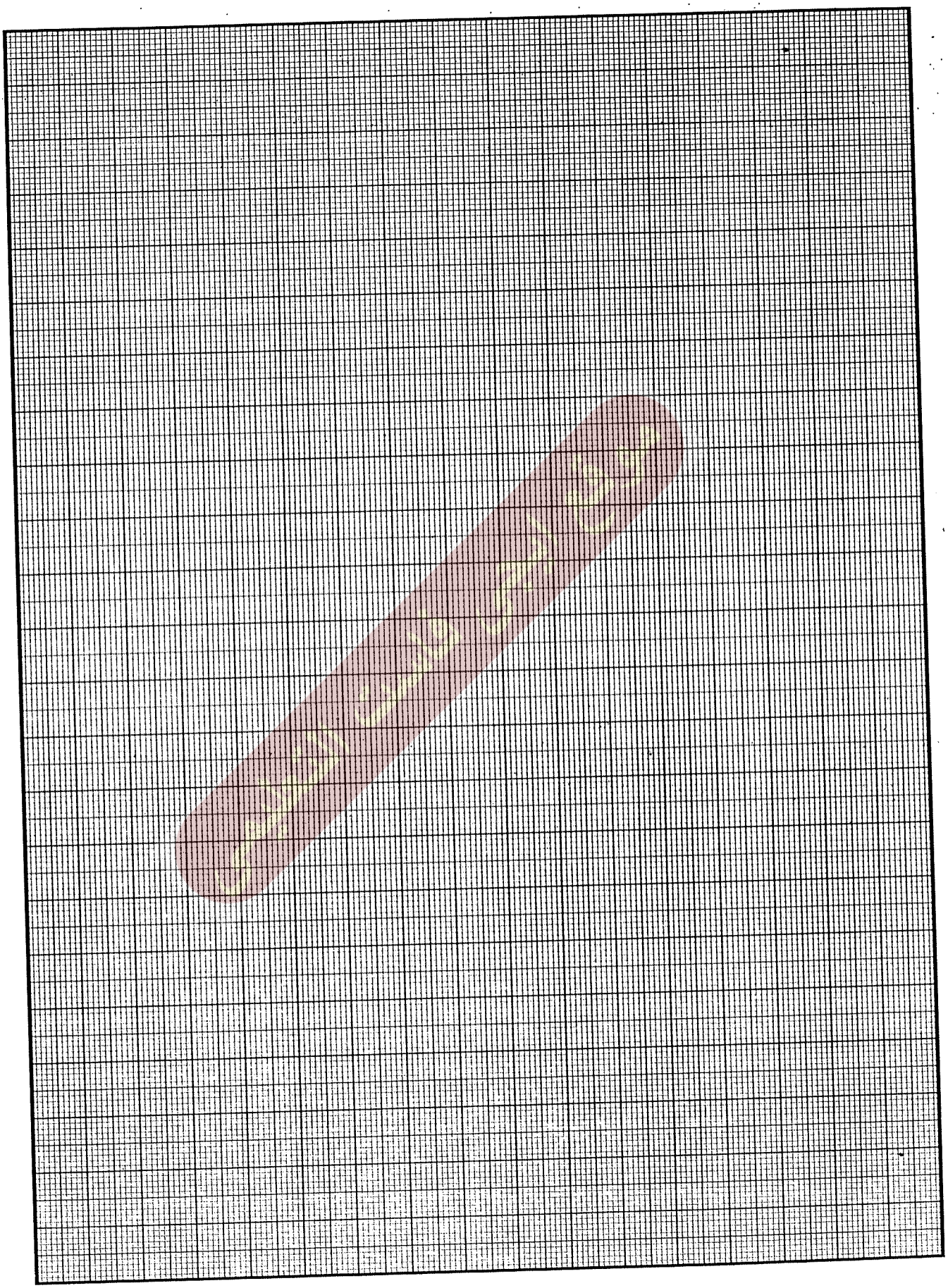

[27] (Added) What is meant by:

(a)The electromotive force of a cell is 1.5 V

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(b)The electric power of speaker is 500W

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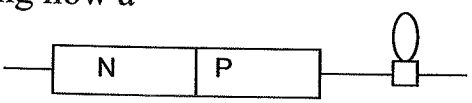
[28] (Added) i) Complete the electrical circuit indicating how a suitable battery is connected to the previous set, so that the lamp lights.



ii) Explain what happens to the light of the lamp if the battery is reversed.

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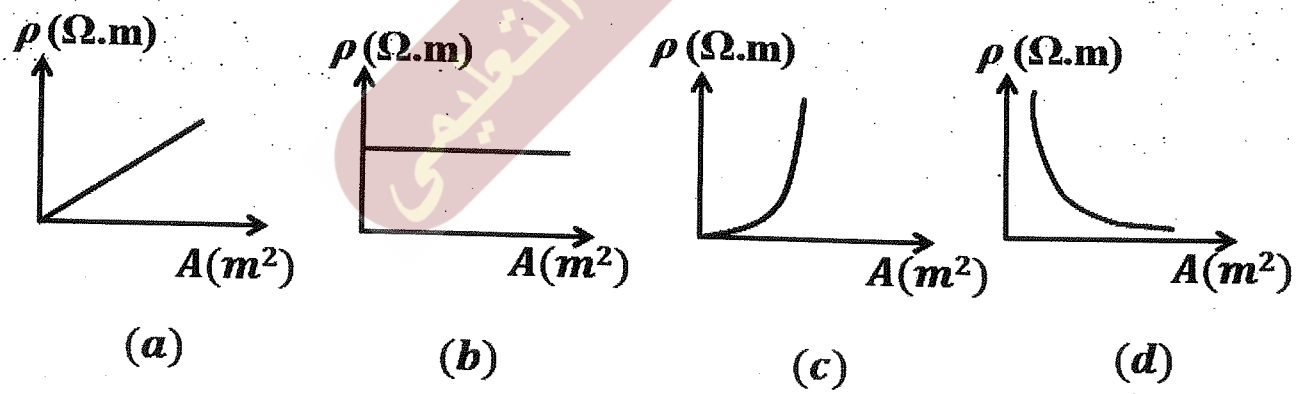
[29] (Added) Choose the correct answer: The relation between the specific resistances of several conductors of same material have same length and their cross sectional area at constant temperature can be represented graphically as....



[30] (Added) Find the binary code of the decimal number 59.

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[31] (Added) Choose the correct answer: A galvanometer of resistance 3 Ω is converted into ammeter by connecting a shunt resistance across it in order to double its range, the additional shunt resistance to be connected across it is ....

(a)3 Ω (b) 2.5 Ω (c) 2 Ω (d) 6 Ω

[32] (Added) Choose the correct answer: If the phase difference between the reflectred rays and the reference beam is 4π ;Then the path differnce is…

(a) 2λ (b) 0.5λ (c) λ (d) 4λ

[33] (Added) Choose the correct answer: A solenoid is connected to a cell of negligible internal resistance if a quarter of its length is removed and the rest of the solenoid is connected to the same cell then the magnetic density at the point on its axis becomes….

(a) 1/4 its value (b) 4/3 its value (c) 3/4 its value (d) 4 times its value

[34] (Added) i)What is the hologram

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what physics principle on which the holography is based?

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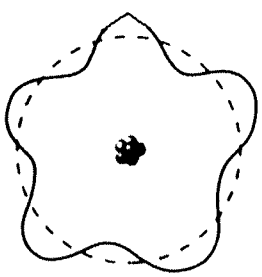
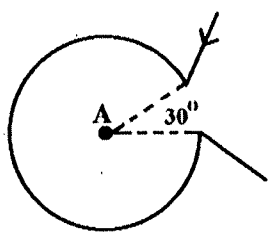
[35] (Added) Choose the correct answer: The wave length (λ) of the wave accompanying the electron in the orbit of radius (r) shown in the fig is given by:

(a) $\frac{\pi r}{5}$ (b) $\frac{2\pi r}{5}$ (c) $5\pi r$ (d) $10\pi r$



[36] (Added)A wire in the form of an arc of a circle of a circle of radius π cm as in the figure, an electric current of intensity $\frac{12}{11}$A passes in it. Calculate the magnetic flux density at point [A].then indicate its direction

Knowing that (For air $\mu_0 = 4\pi \times 10^{-7}$ Wb/Amp.m)



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[37] (Added) Calculate the smallest wave frequency of visible light produced from hydrogen atom

Given that($h = 6.6 \times 10^{-34}$ Js; $m_e = 9.1 \times 10^{-31}$ kg ;$C = 3 \times 10^8$ m/s ; $e = 1.6 \times 10^{-19}$ C)

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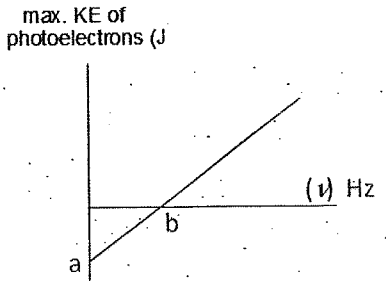
[38] (Added) The opposite figure shows the graph of the maximum kinetic energy of ejected electrons ejected from the surface of a metal versus frequency of the incident light.



i)What is the slope of the graph?

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ii) What does points (A) and (B) represent?

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[39] (Added) Give reason for: Hot wire ammeter has unequal divisions " its width of divisions increases as the current increase'

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[40] (Added) Choose the correct answer: A step down transformer from 110 volts to 35.2 volts. The ratio between its number of turns is 2 : 5, its efficiency is.....

(a) 90% (b) 80% (c) 12.8% (d) 20%

[41] (Added) Choose the correct answer: The instantaneous e.m.f equals **1/2** its maximum value when **the coil's plane** of the AC dynamo becomes....

(a)Parallel to the magnetic flux lines

(b)Inclined to the magnetic flux by angle 45°

(c)Inclined to the magnetic flux by angle 30°

(d)Inclined to the magnetic flux by angle 60°

[42] (Added) Choose the correct answer:

The ratio between the velocities of the scattered photon in Compton effect to that before collision is ... (a) Greater than one (b) Less than one

(c) Equal to one (d) May be less or more than one

[43] (Added) Prove that the term $\sqrt{\frac{L}{C}}$ has the same measuring unit of the resistance, where (L) is the self-induction coefficient of the coil and (C) is the capacitor capacitance.

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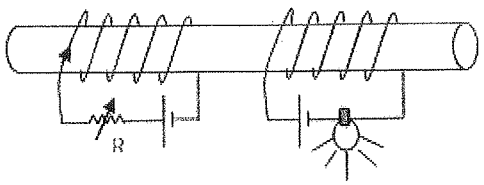
[44] (Added) Choose the correct answer: Resonant circuit has an ohmic resistance (R), a coil of inductive reactance (3R) and a capacitor of capacitive reactance (2R), so the phase angle between the total voltage and the current is .....

(a) 45° (b) 30° (c) 90° (d) 60°

[45] (Added) In the shown figure: What will happen to the lighting of the lamp if the resistance R is increased. (explain your answer)



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2006 Second Session

[1] A transformer of efficiency 80 % connected to a 200 volt AC power source, its e.m.f. 200 volt which gives 8 volt e.m.f. If the number of the turns of the primary coil 1600 turns and the intensity of current in the primary coil is 0.2 Ampere : Calculate :-
a) The number of turns of the secondary coil.
b) The intensity of current in the secondary coil.

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[2] Mention one use for: Microwaves

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[3] Why there is no a transformer has efficiency 100 % efficient?

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[4] Mention one use for: Spectrometer

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[5] Mention the scientific interpretation (التفسير العلمي) for:
The iron core of transformer is consisted of thin insulated sheets.

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[6] Choose the correct answer:
From the properties of a laser beam :
(a)A band of wavelengths (b) Monochromaticity (c)Spontaneous emission

[7] Three resistors (1,3,6) Ohm are connected to an electric current source. The intensity of the electric current flowing through each resistor is (0.3, 0.2, 0.1) Ampere respectively **: Illustrate by drawing** how these resistors could be connected - **Then calculate** the total resistance of the electric circuit.

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[8] Mention the physical relation used in the following physical quantity and write the measuring unit used: The electrical conductivity of a certain material.

	The physical relation	**The measuring unit**
The electrical conductivity		

[9] Choose the correct answer:

Series of atomic spectral lines for hydrogen atom which lies in the visible range is

(a) Pfund

(b) Leyman

(c) Balmer

[10] Mention the physical relation used in the following physical quantity and write the measuring unit used: The coefficient of mutual induction between two coils.

	The physical relation	**The measuring unit**
The coefficient of mutual induction between two coils		

[11] If you have an electric generator of 100 turns, and cross sectional area of the coil is 0.025 m^2. If rotates with frequency 700 cycles per minute in a magnetic field of flux density 0.3 Tesla. Calculate the induced emf when:

a) The plane of the coil is in a perpendicular position to the direction of the lines of the magnetic flux.

b) The angle between the direction of the motion of coil's plane and the lines of the flux is 90°.

c) Compute (أحسب) the effective value of the induced ($\varepsilon_{eff.}$) $(\pi = \frac{22}{7})$

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[12] Choose the correct answer:

The emission of electrons from the metallic surface (photo electric effect) depends on

(a) The intensity of the incident light

(b)The frequency of the incident light

(c)The exposure time

[13] Give reasons for: It is advisable to live away from high voltage towers .

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[14] Draw the equivalent circuit for an AND gate and deduce the table which realized it.

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[15] A milliammeter of resistance 4 Ohm has a coil capable of carrying a current of 30 milliampere. It is desired to use it as an ohmmeter using an electric cell of 1.5 V having an internal resistance 1 Ohm.

a) Calculate the value of the requited standard resistor.

b) Calculate the external resistance needed to make the pointer deflect to 10 mA

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[16] How a transistor may be used as an AND gate ?

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[17] Compare between: Shunt resistor and multiplier resistor from the point of view of the method of utilization for each.

	Shunt resistor	multiplier resistor
the method of utilization طريقة إستخدامهم		

[18] [Added] SS' book:

In the illustrated electric circuit; find:

i) The current intensity in each branch

ii) The potential difference between a,b

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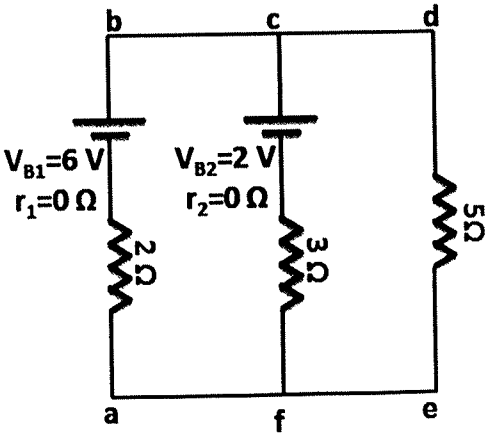

[19] What is the condition required in order to ..... ?
Obtain the characteristic line spectrum of an element.

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[20] [Added] Egypt 1984: An AC series circuit consists of a resistance of 60 Ω and a coil of inductance $\frac{14}{55}$ H and an alternating source of a frequency 50 Hz. If the potential difference across the terminals of the resistance = 120 V, find the total potential difference across the terminals of the resistance and the coil together

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[21] What is the condition required in order to ..... ?
Emit the atom a stimulated emission.

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[22] A straight wire of one meter length, carrying a current of 20 Ampere, is placed in an uniform magnetic field of flux density (B) , so the relation between the acting force on the wire by Newton (F) and the sinus (sin θ) angle between the direction of the field and the wire (sin θ) is indicated by to the following table :

F(N)	0.6	1.2	1.5	1.8	2.4	2.7	a
Sin θ	0.2	0.4	0.5	0.6	0.8	0.9	b

Draw a graph for the relation between (F) on the (Y) axis and (sin θ) on the (X) axis.

[23] <u>And from the graph find :</u>
a) The magnetic flux density B.
b) Find the value of a , b <u>when the wire is perpendicular to the magnetic field .</u>

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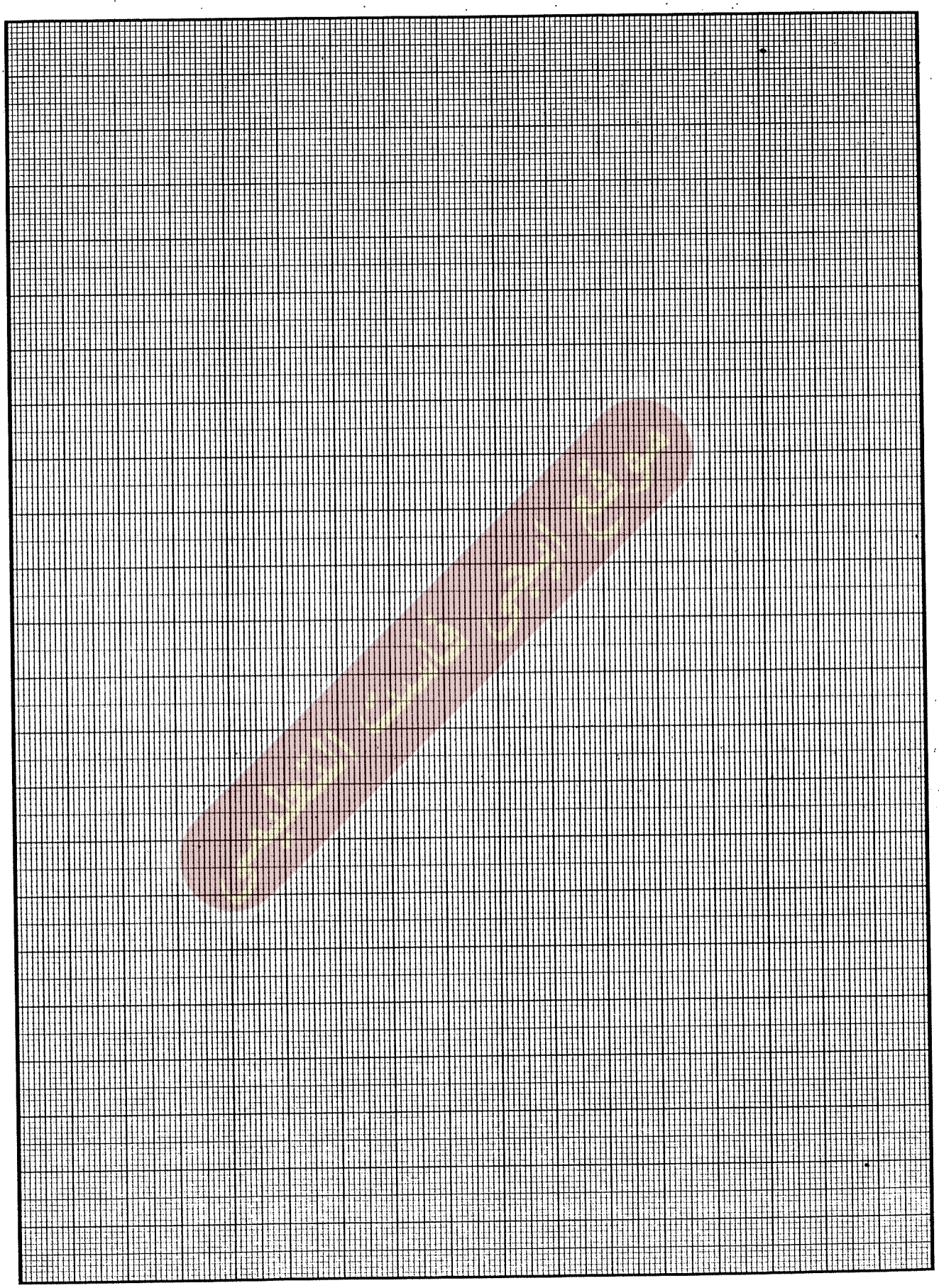

[24] Compare between :
Ordinary light beam and laser from beam the point of view of the diameter of the diameter of the emitted light beam during propagation for long distances .

	Ordinary light beam	LASER beam
The diameter of the diameter of the emitted light beam during propagation for long distances		

[25] Mention the scientific fundamental on which the [Electron microscope] **operate .**

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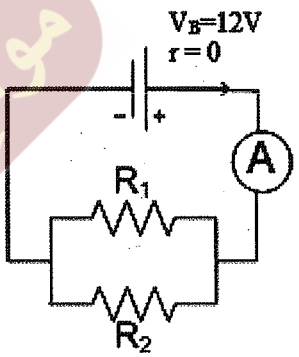
[26] (Added) Choose the correct answer
in the electric circuit shown in the figure. If the reading of the ammeter (A) is 5 Ampere and the current passing through the resistance R_1 is 2 Ampere then the value of the resistance R_2 is.....(a) 1/4Ω (b) 2 Ω (c) 4 Ω (d) 6 Ω



[27] (Added) i) State the importance of the resonant cavity in the laser devices

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ii) Mention two types of the resonant cavity

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[28] (Added) State one use for: L.R.C circuits

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[29] (Added) If electron or hole concentration in pure silicon is $1x10^{10}cm^{-3}$, phosphorus is added at a concentration of 10^{12} cm^{-3}, calculate the concentrations of electrons and holes in this case. Is this silicon n-type or p-type?
Then; calculate the concentration of aluminum to be added so that silicon returns pure.

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[30] (Added) Choose the correct answer: By increasing the temperature of a body; the radiation produced from it will be
(a) Higher intensity and longer wave length
(b) Lower intensity and shorter wave length
(c) Lower intensity and longer wave length
(d) Higher intensity and shorter wave length

[31] (Added) Mention the scientific idea of the oscillating circuits
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[32] (Added) If an electron and a **proton** travel at the same speed, **which** has the shorter de-Broglie wavelength?
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[33] (Added) Choose the correct answer: In the hydrogen atom:
(a) $(E_8 - E_2) > (E_2 - E_1)$
(b) $(E_8 - E_2) = (E_2 - E_1)$
(c) $(E_8 - E_2) < (E_2 - E_1)$
(d) It couldn't be detected

[34] (Added) Give reasons for:
a) Hot wire ammeter measures the intensities of A.C and D.C
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b) (D.C. circuit) containing capacitor is open circuit
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[35] (Added) Choose the correct answer: The continuity of rotation of the coil of the motor in same direction is because
a- Back e.m.f is induced during its rotation
b-The current is reversed in the coil each half turn
c- The inertia affects its rotation
d- DC source is used

[36] (Added) Choose the correct answer:
The electric potential of the semiconductor crystal when it was doped with phosphorous will be
(a) Positive (b) negative (c) still neutral (d) differ from case to another

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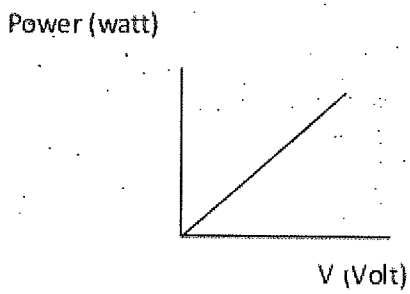
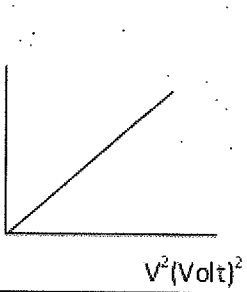
[37] (Added) Write down the expressing relation and what does the slope means in each of the following graphs:





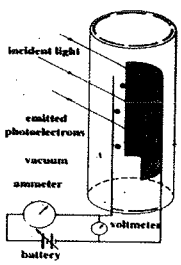
Expressing relation: ..... The slope:	Expressing relation: ..... The slope: .....

[38] (Added) If the work function of cesium is 1.9 ev

a) What is the threshold frequency of cesium

b) Why cesium is preferable in the photoelectric cells

c) Find the kinetic energy of the emitted photoelectrons when blue light of wavelength 400nm falls on it



($h = 6.625 \times 10^{-34}$ J.sec ; $e = 1.6 \times 10^{-19}$ C; $m_e = 9.1 \times 10^{-31}$ kg , $C = 3 \times 10^{8}$ m/sec

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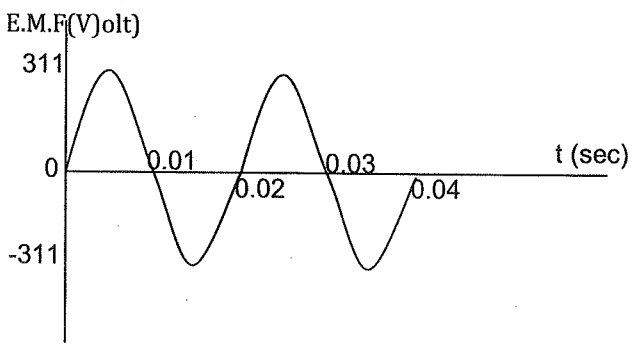
[39] (Added) By the aid of the following graph (Electromotive force -time) complete:



1- The maximum value of E.M.F. = ...

2-The mean value of E.M.F. during 1/4 turn =... ... ...

3- The effective value of E.M.F. = ...

4-The frequency = ...

[40] (Added) Choose the correct answer: In (He – Ne) laser the mixture of helium and Neon is in the ratio…

(a) 10 : 1 (b) 9 : 1

(c) 1 : 12 (d) 1:10

[41] (Added) Choose the correct answer:

A shunt resistance (R_s) connected in parallel to galvanometer (R_g) decreases its sensitivity to one tenth, then….

(a) $R_g=10R_s$ (b) $R_g=9R_s$ (c) $R_g=0.1R_s$ (d) $R_g=0.9R_s$

[42] (Added) Choose the correct answer: In the calibrated resistors the wires are double wounded:

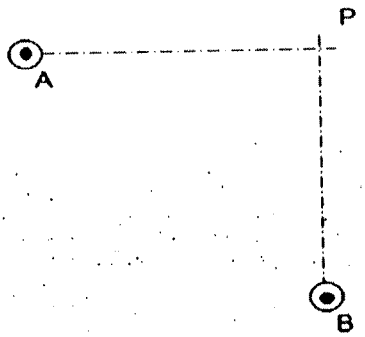
(a) To decrease the eddy currents

(b) To increase the resistance of the coil

(c) To cancel the effect of self-induction

(d) To increase the mutual induction

[43] (Added) The opposite figure shows two vertical wires (A) and (B) viewed from above. (A) and (B) are equidistant 10cm from point (P)



An electric current of intensity 2 Ampere flow through the wire (A) upwards (out of this paper) while current of intensity 1.5Ampere flow through the wire (B) in same direction

Ignoring the effect of the earth's magnetic field, calculate the total magnetic flux at the point (P)

Given that: The magnetic permeability of the air $\mu_o = 4\pi \times 10^{-7}\ Wb/Amp.m$

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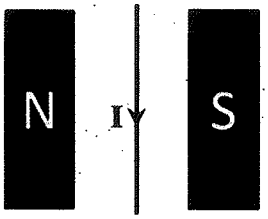
[44] (Added) Choose the correct answer:

The diagram shows a wire carrying a current between the poles of magnet in which direction does the wire tend to move ?



(a) Into the paper (b) out of paper

(c) Towards the south pole of magnet (d) towards the top of the page)

[45] (Added) An x-ray tube operates at a potential of 25 kv and a beam current of 30 mA with an efficiency of 2%. **Calculate:**

a) The minimum wavelength of the x-ray produced.

b) The electrical energy used by the tube each second.

c) The heat produced per second at the target

Given ($h = 6.6 \times 10^{-34}$ Js; $m_e = 9.1 \times 10^{-31}$ kg ;$C = 3 \times 10^{8}$ m/s ; $e = 1.6 \times 10^{-19}$ C)

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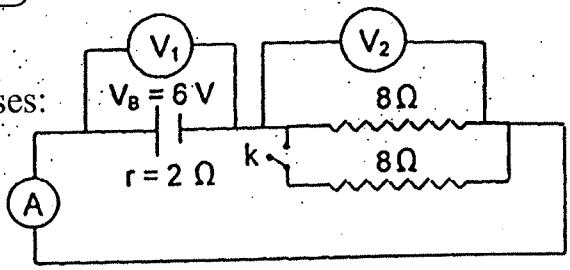
موقع أبجى فاست التعليمى

2007 First Session

[1] In the circuit shown in the opposite figure.
Find the reading of A , V_1 and V_2 in the following cases:
a) k is opened.
b) k is closed.



	R_{eq}	Ammeter(A)	Voltmeter(V_1)	Voltmeter(V_2)
The relation				
(k) is opened				
(k) is closed				

[2] Mention only one condition of those necessary for: Laser action to take place.
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[3] Give reasons for: A straight wire carrying an electric current does not move though placed freely in a uniform magnetic field.
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[4] Mention only one condition of those necessary for: The emission of electrons from a metallic surface.
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[5] Give reasons for: The permanent magnet's poles of the moving coil galvanometer are curved.
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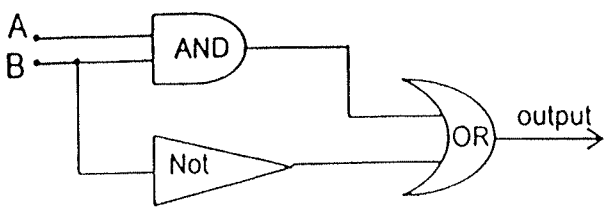
[6] The opposite electronic circuit represents combining gates for a special job.
Complete the following truth table for this circuit.

A	B	output
0	0	
1	0	
0	1	
1	1	



[7] Choose the correct answer:

The ratio between the number of coils to the number of segments of the commutator cylinder in the DC generator equals .....

(a) $\frac{1}{2}$

(b) 1

(c) $\frac{2}{1}$

[8] Compare between: Photons and electrons from the point of view of the mass of each.

	Photons	electrons
The mass.		

[9] A galvanometer of coil resistance 250Ω and full scale deflection of 400 μ A is connected to a cell (1.5 V)whose internal resistance is negligible and a fixed resistance 3000 Ω and variable resistor (R).

i) **Find:** The value obtained from the variable resistor to form an ohmmeter.

ii) **Find:** The value of a resistance connected to the terminals of the ohmmeter that causes the pointer deflects back to quarter of the scale.

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[10] Compare between: The continuous and characteristic x-rays from the point of view of the relation between the wavelength and the potential difference between the target and the hot filament in Coolidge tube.

	The continuous X-ray	The characteristic x-ray
The relation between the wavelength and the potential difference between the target and the hot filament in Coolidge tube		

[11] Compare between: The shunt and the multiplier from the point of view of its connection to the coil of the galvanometer.

	Shunt resistor	multiplier resistor
The connection to the coil of the galvanometer.		

[12] How can you distinguish between: Balmer series and Lyman series?

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[13] Compare between: Right hand screw rule and Fleming's left hand rule from the point of view of the function of each of them.

	Right hand screw rule	Fleming's left hand rule
The function		

[14] An electric current of intensity 5 Amperes flowing through a coil of 500 turns produces a magnetic flux of 10^{-4} Weber. If the current vanishes in 0.5 second,

a) **Calculate:** The induced emf generated in the coil.

b) **Calculate:** The self-induction coefficient of the coil.

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[15] How can you distinguish between: Traditional light and Laser?

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[16] How can you distinguish between: Ohmic resistance and (pn) junction?

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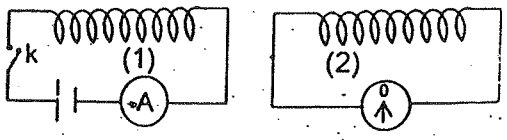
[17] In the circuit shown in the opposite figure, coil (1) is connected in series with a cell, a switch (k) and an ammeter.
Coil (2) is connected to a Centre Zero sensitive galvanometer.



a) State and explain what will be observed on the reading of the ammeter and the galvanometer in **the following two cases** :
i- The instant of closing the switch (k).

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ii- A rod of soft-iron is inserted into both coils then the switch (k) is closed .

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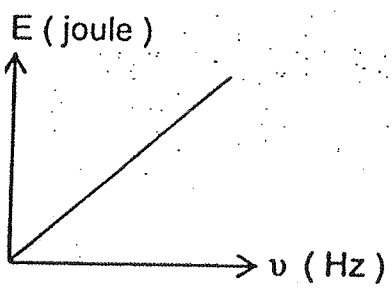
[18] Choose the correct answer:
The opposite graph represents the relation between the energy of photons (E) and its frequency (υ).The slope of the straight line equals .....
(a) the wavelength λ
(b) Planck's constant h
(c) the speed of light c



[19] Mention the name of an apparatus whose operation principle is based on the previous experiment above .

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[20] What is meant by: The copper resistivity = $1.8 \times 10^{-8} \Omega.m$

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[21] Choose the correct answer:
If a certain atom has four possible energy levels and an electron can jump between any two energy levels of the atom so the number of the different spectral lines could be emitted are ..... .
(a) 3
(b) 6
(c) 8

[22] What is meant by: The magnetic flux density at a point = 0.4 Tesla.
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[23] Mention only one function or use for:
Helium atoms in He – Ne Laser.
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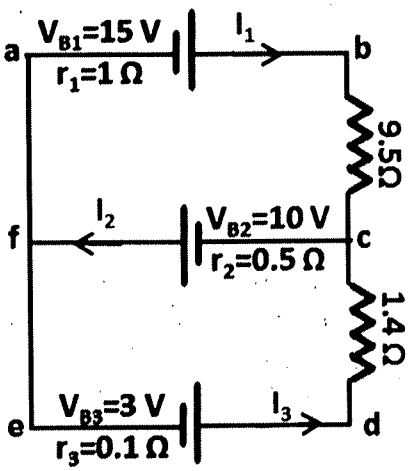
[24] [Added] SS' book:
In the illustrated electric circuit find:
The current intensities I_1, I_2 and I_3



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[25] (Added)Write down the scientific term:

It is a beam of parallel rays meet the reflected beam at the photographic plate, and interference takes place as they have the same wavelength.

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[26] (Added) State one use for each of the following:

(a) Resonant circuit

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(b) Oscillating circuit

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[27] [Added] Egypt August 1998:

An inductive coil of ohmic resistance 4Ω is connected in an electric circuit with an A.C source whose frequency (f) Hz can be changed, then measuring the voltage of the source, and the intensity of the current passing through the circuit one can calculate the inductive reactance (X_l) of the consider coil. The obtained results are tabulated as follows:

f (Hz)	7	14	21	28	35	42	Y
X_L(Ω)	4.4	8.8	13.2	17.6	S	26.4	30.8

Plot a graph relating the frequency (v) Hz on the abscissa and the inductive reactance (X_L) Ω on the ordinate

[28] Using the obtained graph find:

a) The values of S and Y

b) The self-induction of the coil L.

c) The capacity of the capacitor that if connected in the circuit with this coil makes the circuit at resonance when the inductive reactance of the coil is 30.8Ω

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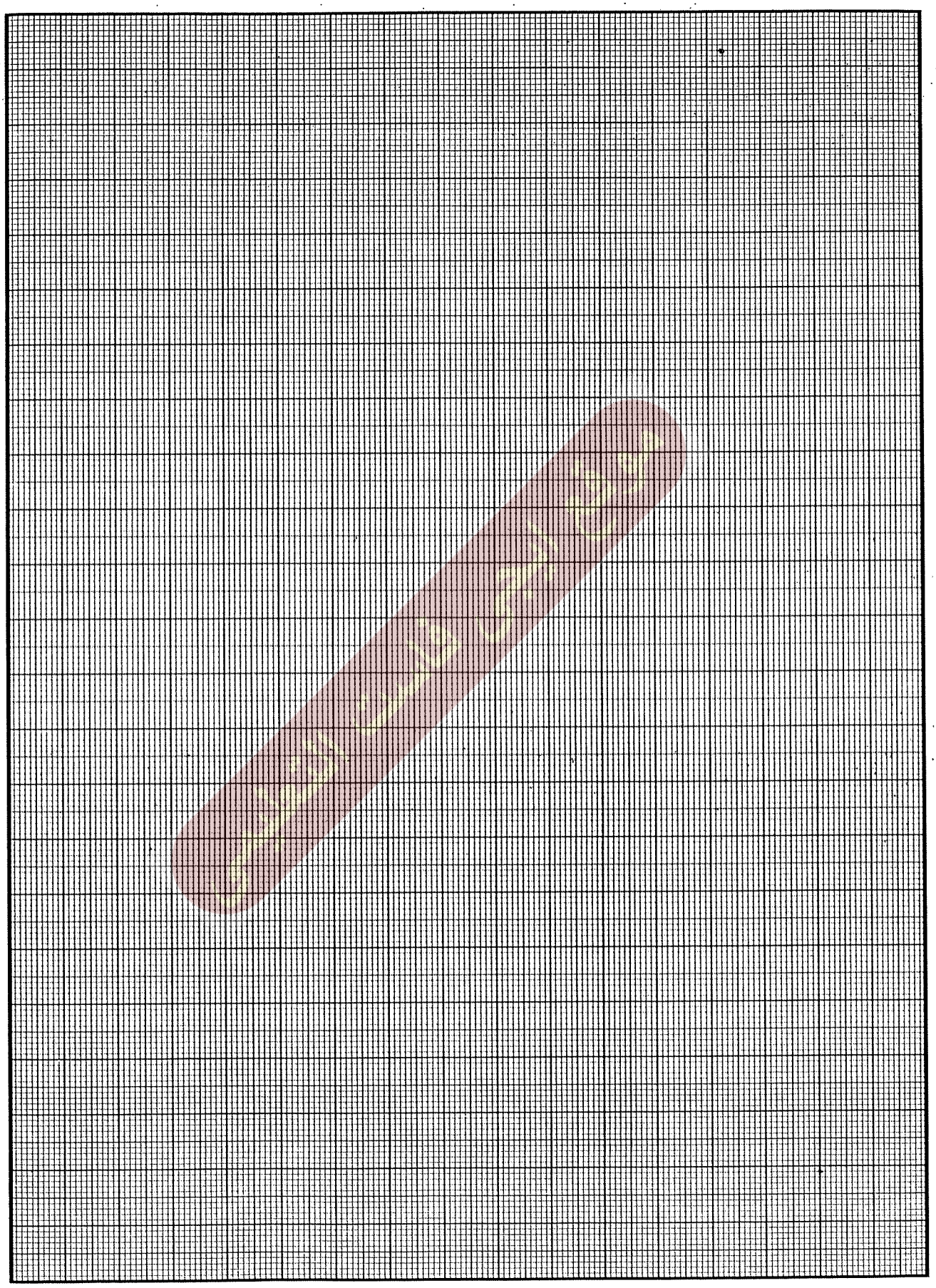
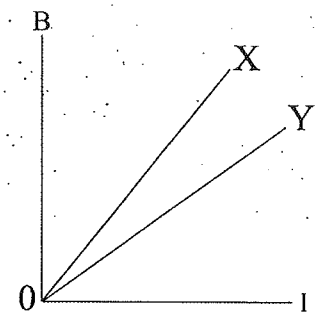


] **(Added)** Two point (X, Y) are elected around:**9[2**
Straight wire passes a current can be change its intensity (I). So the magnetic flux density will change at each point. The graph between two quantities at two points as shown.



i) Mention the slope of the graph.
ii) What the point (X, Y) is nearest to the wire? Why?
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[30] (Added) what is meant by: the self induction of a coil is 0.01H
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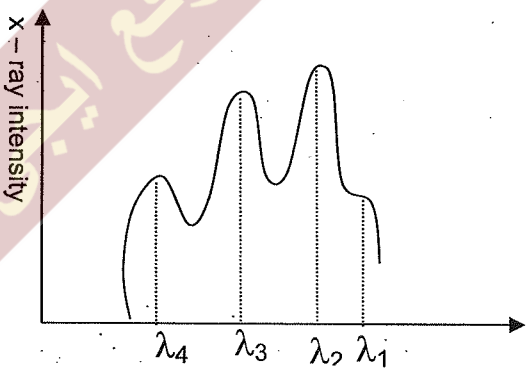
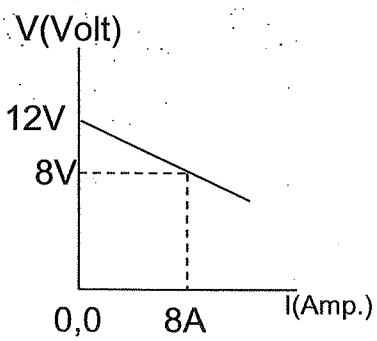
[31] (Added) Choose the correct answer**:**
The following figure represents the relation between x – ray intensity (emitted from a target in Coolidge tube) and its wavelength. The highest voltage difference between the target and the filament will produce x – rays having wave length equals:
(a) λ_1 (b) λ_2 (c) λ_3 (d) λ_4



[32] (Added) The opposite graph shows the relation between the terminal voltage of a battery and the current drawn from it, find :
a) The e. m .f of the battery?
b) The internal resistance?



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[33] (Added) Give reason for : AC circuit consists of an inductor considered as open circuit if the frequency of the current is very high
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[34] (Added) The energy of the electron in the 6th and the 2nd energy levels are (-0.38 and -3.4 *electron. Volt*) respectively. Calculate the wave length in Angstrom of the emitted spectrum when the electron travel from the 6th to the 2nd energy level

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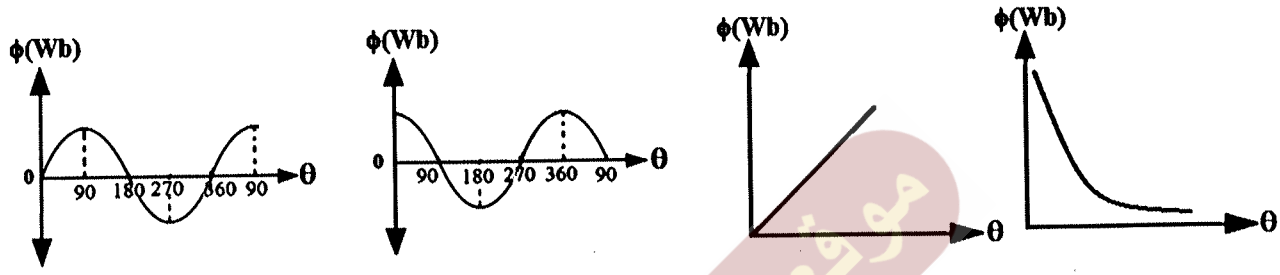
[35] (Added) Choose the correct answer: Rectangular coil is placed perpendicular to a uniform magnetic field then it is rotated; then the graphical relation between the magnetic flux through the coil and the angle (θ) between the normal to the coil's plane and the direction of the magnetic field will be ....



(a) **(b)** **(c)** **(d)**

[36] (Added) Choose the correct answer: The mass of the scattered photon in Compton effect is ... that before collision

(a) Greater than (b) Less than

(c) Equal to (d) May be greater or smaller

[37] (Added) Choose the correct answer: Rectangular coil of dynamo whose length is 15cm and breadth 7cm rotate between the two poles of magnet with linear velocity11m/sec ; So its frequency will be.... (a)314.2 HZ (b)3.14 HZ

(c)50 HZ (d)18000 HZ

[38] (Added) write down an equivalent unit for the measuring unit (Farad) then mention the physical quantity that is measured by it

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[39] (Added) An electronic microscope is used to investigate an object of length 18×10^{-12} m ; calculate the potential difference required to be applied between the its cathode and anode ($m_e=9.1\times10^{-31}$kg ; e= 1.6×10^{-19} C ; h = 6.625×10^{-34} J.s)

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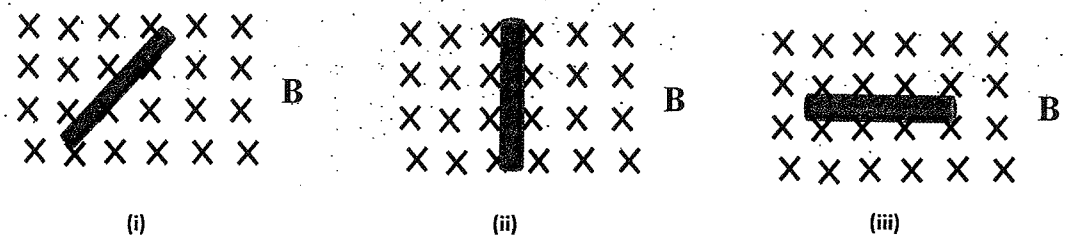
[40] (Added) Choose the correct answer: In the figures(i) ,(ii),(iii) a wire carry current (I) is placed in a uniform magnetic field of density (B) so it may be affected by a magnetic force So



(a) The force is maximum in the figure ii (b) The force vanishes in the figure iii
(c) The force still equal in the three cases (d) The force vanishes in the figure i

[41] (Added) how can you stimulate atom to relax before the life time is over

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[42] (Added) Choose the correct answer: x – rays are used to study the crystalline structure of materials because:

(a) x – rays can penetrate media easily (b) x – rays can ionize gases
(c) x – rays can be diffracted (d) Its speed = the speed of light

[43] (Added) What is the maximum and minimum e.m.f. can be obtained if you have alternating current dynamo, its e.m.f is 200 volts, and a transformer the ratio between the number of turns of its coils is 2 : 5
Then calculate its efficiency when it is used as a step up transformer if the ratio between the two intensities of the electric currents is 9 : 25.

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[44] (Added) What happens when?
The temperature of a black body is raised (with respect to the wavelength at which the intensity is a maximum).

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[45] (Added) Choose the correct answer: Cylindrical rod of cupper is reformed which its length increases to 3 times its original value, then its resistance becomes ... ... its original value.

(a) 9times (b) 3 times (c) same as (d) No correct answer

2007 Second Session

[1] Mention only one condition from those necessary for:
Obtaining attraction force between two parallel wires each carrying current.

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[2] What's the scientific basis on which the function : Using x-rays in studying the crystalline structure of material.

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[3] A transformer is required to step up a voltage from 10 v to 50 v.
a) Is this possible with an AC voltage or a steady voltage ? Why ?
b) If this transformer has a primary coil consisting of 80 turns, how many turns are needed to be in the secondary coil assuming that the efficiency of that transformer is 100 %.

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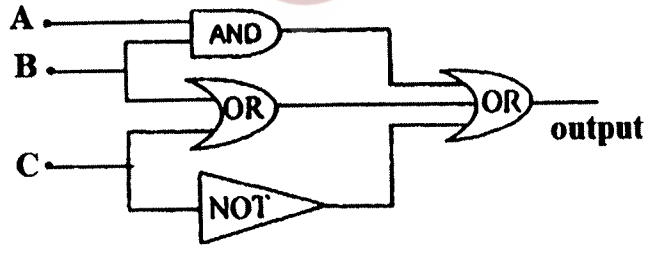
[4] The opposite electronic circuit represents combining gates for a special job. Complete the truth table for this circuit.



A	B	C	Out Put
0	0	0	
1	1	0	
1	0	1	
0	1	1	
0	0	1	
1	1	1	

[5] Suggest suitable materials which can be used to make each of the following:
a) The core of the transformer

.....

b) The primary and secondary coils.

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[6] What happens to ...?
The photo current, if the intensity of the incident light on the surface of the metal increases and its frequency is greater than the critical one (ν_c)

[7] A coil with 25 turns of wire is wrapped around a hollow tube with a cross-section area 1.8 cm^2. Each turn has the same area as the tube. A uniform magnetic field is applied at right angle to the plane of the coil. If the field increases uniformly from zero to 0.55 Tesla in 0.75 second.
a) Find the magnitude of the induced emf in the coil.
b) If the resistance of the coil is 3 Ω , find the magnitude of the induced current in the coil .

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[8] Compare between: Spontaneous emission and stimulated emission from the point of view of the propagation of the emitted photons.

	Spontaneous emission	**Stimulated emission**
The propagation of the emitted photons		

[9] A battery of emf 8 volts and internal resistance 2 Ohm is connected to a straight wire of length 20 cm , cross sectional area 3×10^{-8} m^2 and its resistivity 4.5×10^{-6} Ω.m. Calculate the magnetic flux density at a point which lies at normal distance of 10 cm away from the centre of the wire. ($\mu = 4\pi \times 10^{-7}$ wb / Amp.m)

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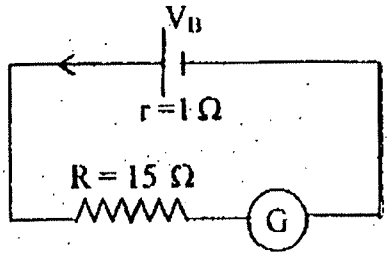
[10] Compare between: Pfund's series and Lyman's series from the point of view of the wavelength.

	Pfund's series	**Lyman's series**
The wavelength.		

[11] The opposite circuit consists of a battery (V_B) and internal resistance 1Ω connected to a fixed resistor 15 Ω and a galvanometer of resistance 20 Ω.



Find the ratio between the current passing through the circuit before and after connecting *a* shunt of 5Ω to the coil of the galvanometer.

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[12] Compare between: Electronic microscope and optical microscope from the point of view of the used rays.

	Electronic microscope	Optical microscope
The used rays		

[13] What's the scientific basis on which the function of the **induction furnaces** depends up on?

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[14] Compare between: the photon and the electron from the point of view of the rest mass.

	The photon	The electron
The rest mass		

[15] What's the scientific basis on which the function of the **electric motor** depends up on?

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[16] Mention only one function or use for: The resonant cavity in gas Laser.

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[17] What is meant by?

The work done to transfer an electric charge of 8 coulomb between two points in an electric circuit equals 64 Joule.

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[18] Mention only one function or use for: Spectrometer.

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[19] You have a moving coil galvanometer of a resistance R_g ohms and the maximum current that can flow through its coil is I_g Amp.

a) Explain how you can use it as an ohmmeter to measure the value of unknown resistance.

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b) Explain how you can use it as a voltmeter to measure potential difference $V > V_g$. Deduce the law used in the second case.

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[20] Give reasons for:

The choice of helium and neon as an active medium in (He - Ne) Laser.

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[21] [Added] AL- Azhar 1984: A coil of reactance 250 Ω is joined in series with a resistance of 100 Ω and a variable condenser is connected to (200 volt alternating current at $\frac{1000}{44}$Hz) The current in the circuit arrives to its maximum value in this case

a) **Find:** The capacity of the condenser

b) **Find:** The potential; difference between each of the terminals of the coil and the condenser

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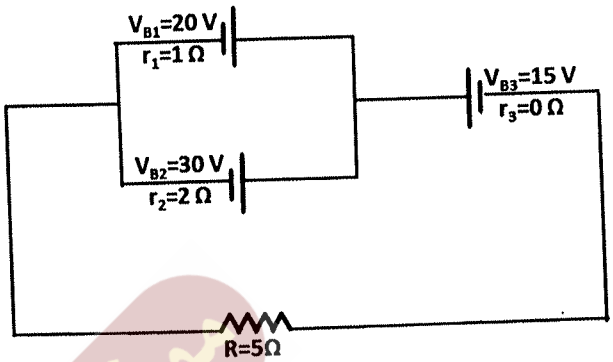
[22] Choose the correct answer:
The ratio of the energy of the photon to the velocity of light in air is the
(a) mass of the photon .
(b) momentum of the photon .
(C) kinetic energy of the photon .

[23] [Added] SS' book:
In the illustrated electric circuit; find:
i) The current intensity in each battery
ii) The potential difference across each battery
ii) The potential difference across the 5Ω resistor



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[24] (Added) What is meant by..
Specific resistance (Resistivity) of the cupper $=1.7\times10^{-8}$ Ω.m?
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[25] (Added) What is meant by...
The work function (E_w) of a Zinc metal equals 6.89×10^{-19} Joule?
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[26] (Added) Choose the correct answer: In hydrogen spectrum the spectral line in Balmer's series which has the smallest wave frequency in due to the transition of electron between the levels:

(a) $n = 4 \rightarrow n = 1$ (b) $n = 8 \rightarrow n = 2$

(c) $n = 6 \rightarrow n = 2$ (d) $n = 3 \rightarrow n = 2$

[27] (Added) Mention one example for using LASER in military applications

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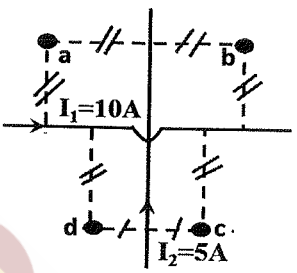
[28] (Added) Choose the correct answer: In the figure two perpendicular wires carrying currents of 10A and 5A as shown then the magnetic flux density is zero at point....



(a)a (b)b (c) c (d) d

[29] (Added)) Compare between the characteristic and continuous radiation of x – rays Concerning the factors affect their wave lengths

	Continuous spectrum of X-ray	**Line spectrum of X-ray**
Factors affecting it	.....	.....
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[30] (Added) Choose the correct answer: In the photoelectric effect, the work function E_w depends on:

a) The intensity of the incident light

b) The exposure time

c) The kind of material surface

d) The potential difference between the anode and cathode

[31] (Added) A current of 8 milli Ampere passes in a metallic conductor AB. When another conductor of the same length and same material is connected in parallel with it ,the current should be increased to 10 milli Ampere in order to keep the potential difference between A and B constant find the ratio between the diameters of the two wires.

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[32] (Added) Choose the correct answer: The AC voltage leads the current by angle 90° when the AC current passes through .....
(a) Inductive coil with negligible ohmic resistance
(b) ohmic resistance
(c) capacitor
(d) oscillating circuit

[33] (Added) State the factors affect the resonant frequency in LRC circuit
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[34] (Added) Choose the correct answer: A wire of a certain length carries a steady current is bent in form a circular coil of one turn then same wire is next bent to form circular coil of three turns the ratio of magnetic induction at the center of the coil in two cases....
(a) 3:1 (b) 9:1 (c) 1:9 (d) 1:3

[35] (Added) Choose the correct answer: The **rate with which the coil intercepts the lines of magnetic field** in the dynamo is maximum when.....
(a) The plane of the coil is perpendicular to the flux lines.
(b) The plane of the coil is inclined to the lines by an angle 30°
(c) The face area of the coil is minimum.
(d) The plane of the coil is parallel to the lines of the magnetic flux.

[36] (Added)) How many photons per second are emitted by one milli watt Xe-He laser produce light of wave length 633nm
knowing that C=3×10^{8} m/sec and Planck's constant h= 6.625×10^{-34} J.sec.
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[37] (Added) Give reason for: Standard resistor has constant value either it is connected with DC source or AC source
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[38] (Added) compare between : The specific resistance and the conductivity of a conductor concerning the effect of rising the temperature

	The specific resistance	The conductivity
The effect of rising the temperature		

[39] (Added) State one use for each of the following:

a- Coolidge tube

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b- The objective lens of the spectrometer

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[40] (Added) A wire is 50 cms long rotates around a perpendicular axis fixed at one of its ends at a speed of 1200 rotation per minute in a field of a magnetic flux density 3×10^{-5} Tesla. Calculate the potential difference between its ends.

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[41] (Added) Find the decimal number equivalent to the binary code $[10010011]_2$

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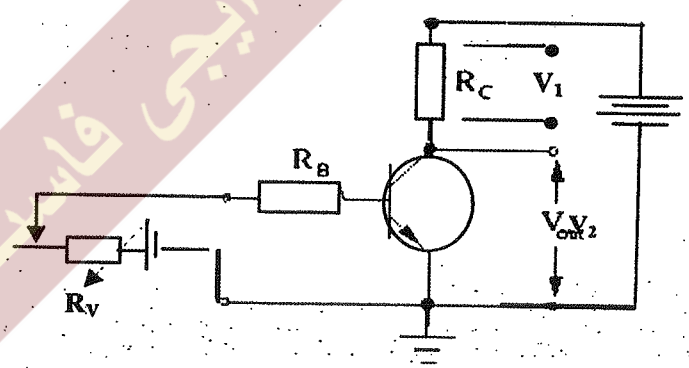
[42] (Added) The opposite circuit shows transistor has current gain (β). If the value of R_v is decreased. What will happen to:

1- The base current

2- (V_1) and (V_2)



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[43] (Added) A loop of cross-sectional area 0.1 m^2 and 100 turns, carries a current of 20A is placed at 30° between its plane and a magnetic field of flux density 0.5 T. Calculate the torque acting on the loop.

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[44] (Added) DRAW the circuit of transistor as An amplifier

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[45] (Added)

i-What is the kind of magnetic pole produced in the terminal (B) of the coil?

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ii- What is the effect of putting the soft iron cylinder inside the coil on the value of the instantaneous deflection of the galvanometer? Explain that?

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iii- Determine in the figure the direction of the induced current produces in the coil. What is the name of the rule which determine the direction of this current in the coil.

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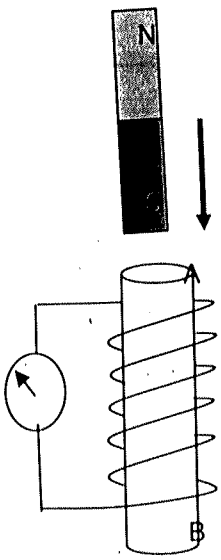
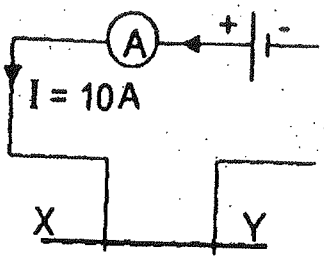


موقع أين فايت التعليمي

2008First Session

[1] An Aluminium wire XY of 1m length and 0.27 Newton weight is held horizontally while its terminals are in contact to the ends of an electric circuit as shown in the opposite figure. Find the direction and density of the magnetic flux that keeps the wires suspended without any external support



Given that the weight of the Aluminium wire=$\rho_{density}$ .A.L.g

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[2] In a photoelectric emission experiment, a metal surface in an evacuated tube was illuminated with monochromatic light of frequency greater than the critical one for such metal. If the experiment is repeated with light of the same wavelength, but of twice the intensity, what will be the effect of that on

(i) The photon energy

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(ii) The maximum kinetic energy of the photoelectron.

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(iii) The work function of the metal.

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(iv) The photocurrent.

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[3] The opposite graph (1) represents the relation between the torque (T) which acts on a flat coil of (N) turns and area (A) rotating in a uniform magnetic field of flux density (B) and the angle (θ) between the normal to the coil and the magnetic flux lines. Find :

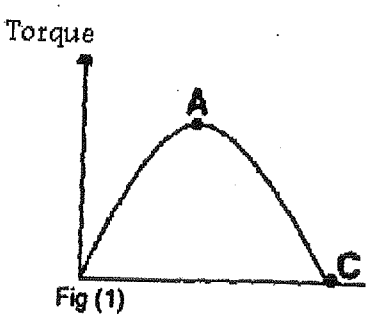

Fig (1)

i) The value of (τ)and (θ) at the point A.

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ii) The value of (τ) and (θ) at the point C.

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[4] Mention Einstein's assumptions to explain the photoelectric effect.

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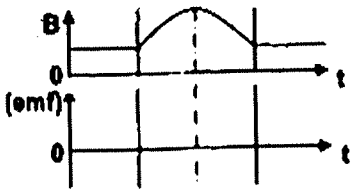
[5] If the magnetic flux density (B) crossing the coil is changing with the time as shown in the opposite figure. Draw the figure in your answer book. On such figure sketch the variation of the (emf) induced in the coil with the time.



[6] **Compare between** Spontaneous emission and stimulated emission by drawing only.

	Spontaneous emission	**Stimulated emission**
The drawing		

[7] Choose the correct answer:

If the resistance of the coil of a galvanometer is R so the shunt resistance which reduces its sensitivity to 1/4 of its original value is

(a) $\frac{R}{4}$ (b) $\frac{R}{3}$ (c) R

[8] Compare between: Forward bias and reverse bias connection of (N - P) junction.

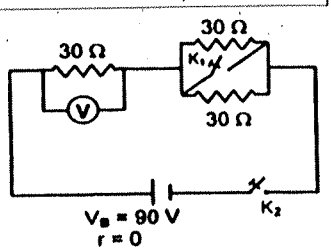
	Forward bias connection	**Reverse bias connection**

[9] In the opposite circuit. Find the reading of the voltmeter in the following cases:

i) K_2 is closed and K_1 is opened

ii) $K_2$is closed and K_1 is closed

iii) K_2 is opened and K_1 is closed



		$R_{eq.}$	I_t	V
	The relation			
(i)	K_2 is closed and K_1 is opened			
(ii)	$K_2$is closed and K_1 is closed			
(iii)	K_2 is opened and K_1 is closed			

[10] An electric transformer operates on potential difference 220 volts, has two secondary coils, one of them operates a small electric fan of (6volts, 0.4 Amp.), the other operates electric recorder of (12 volts, 0.35 Amp.). If the number of turns of the primary coil is 1100 turns. Find:

a) The number of turns of each secondary coil.

b) The current intensity that flows through the primary coil that operating the electric fan and the recorder at the same time.

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[11] What is meant by: Reference beam in producing the hologram?

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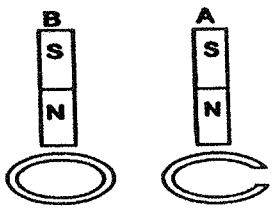
[12] In the shown figure, two identical magnets fall freely downwards through two iron rings from the same height one of the rings is opened and the other is closed. Which of the two magnets reach to the surface of the earth before the other? Explain your answer.



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[13] [Added] Azhar1985:

A tuning circuit receives a wireless wave of frequency 750 KHz. when the capacity of its condenser is 40Pico Farad (PF). If the coil of the circuit is replaced by another one of inductance equals five times that of the first one, and the capacity of the condenser is increased **by** 32 PF, find the frequency of the wave which the circuit can receive in this case. ***{remember :Pico means 10^{-12}}***

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[14] What is meant by: Wien's Law?

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[15] What happens when the target in Coolidge tube is replaced by another metal? **Explain briefly**

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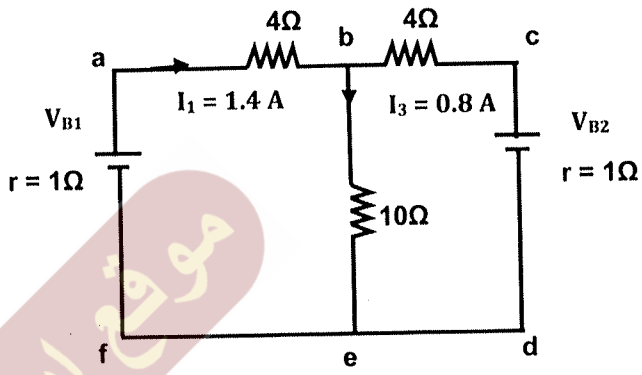
[16] [Added] SS' book:

Analyze the given circuit in the opposite diagram using Kirchhoff's laws to find:

a) V_{B1} and V_{B2}

b) The voltage drop across eb



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[17] What happens when free electrons with large kinetic energy penetrate the target in Coolidge tube? **Explain briefly**

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[18] What happens when X-rays pass through the atoms of a crystalline material? **Explain briefly**

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[19] Give reasons for : Digital signals are preferred in sending and receiving the wireless waves ?

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[20] Mention only one function for: Transistor.

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[21] Mention only one function for: The electric field of high frequency in He-Ne Laser.

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[22] Mention only one function for: The spectrometer.

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[23] (Added) Choose the correct answer: Two lamps have resistances R_1 , R_2 which $R_1 > R_2$ are connected in parallel with electric source so the lightening of.....

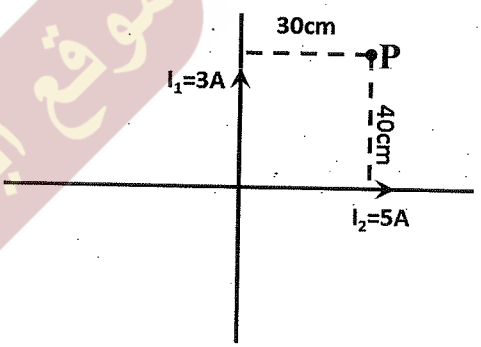
(a) $R_1 > R_2$ (b) $R_1 < R_2$

(c) $R_1 = R_2$ (d) can't be detected

[24] (Added) Two long insolated straight wires cross each other at right angles, as shown in figure, find:

a) The direction and magnitude of magnetic field at point [p] which lies in the same plane as two wires.

b) The net magnetic flux density at point [p]



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[25] (Added) Choose the correct answer:

The unit of measuring the capacitive reactance is .....

(a) V/A (b) J/C (c) Henry (d) V.s/A

[26] (Added) Choose the correct answer:

Laser beam differs from light ray in...

(a) The coherency of its photons (b) obey the inverse square law

(c) The color of the ray (d) the speed

[27] (Added) Give reason for: Ohmmeter scale is not uniform

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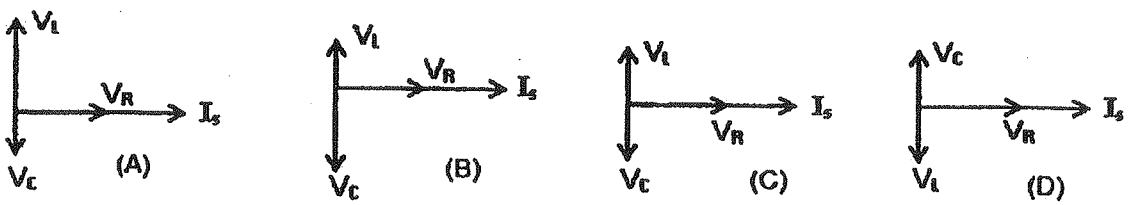
[28] (Added) Choose the correct answer:

Which of these figures represents resonance in RLC circuit



[29] (Added) mention two properties of X ray

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[30] (Added) What are the conditions necessary for laser action to take place?

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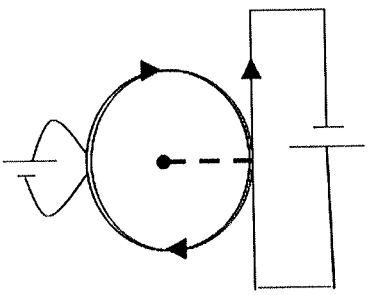
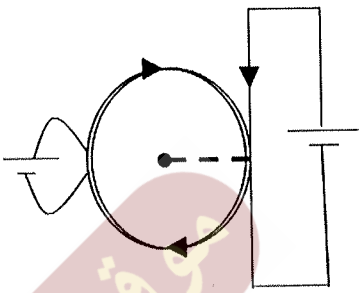
[31] (Added) At which arrangement, a compass at the centre of the coil may give no deflection



[A]



[B]

[32] (Added) If the energy of the electron in the fourth and third levels of the hydrogen atom are (-1.36×10^{-19}J) and (-2.41×10^{-19}J) respectively. Calculate for nearest Angstrom the wavelength of the emitted radiation as the electron transfer from the forth level to the third level

(Planck's constant $=6.625\times10^{-34}$ J.sec ; $C=3\times10^{8}$m/sec)

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[33] (Added) Choose the correct answer: As the resistivity of a conductor is 0.5Ω .m so its product with its conductivity equals ……..

(a)0.5 (b)1 (c) 2 (d) 4

[34] (Added) Two facing coils, when the current intensity in one of them is changed from 4Amperes to zero in 0.01 sec. An induced e.rn.f. equal 40volts is generated in the other coil. Calculate the mutual induction between the two coils.

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[35] (Added) Mention one use for: The negative grid in the CRT

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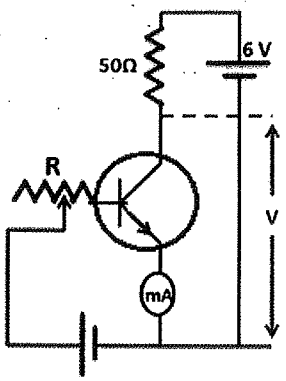
[36] (Added) Choose the correct answer:

The energy of each level in the Hydrogen atom....

(a) $E_n = \frac{-13.6}{n^2}\ Joule$ (b) $E_n = \frac{-13.6}{n^2}\ e.V$

(c) $E_n = \frac{-13.6}{n}\ e.V$ (d) $E_n = \frac{-13.6}{n^2} x1.6x10^{-19}\ e.V$

[37] (Added) The figure illustrates a transistor as a switch



1-is the transistor at [ON] or [OFF] position

2-If the milli-ammeter reads 100mA and the current gain of the transistor =49, find the voltage (V).

3-What happens to the voltage (V) when the resistor (R) is decreased?

Note (6V battery has negligible internal resistance)

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[38] (Added) A coil of a dynamo consists 350 turn , The cross sectional area of each is $200cm^2$. The coil rotates with frequency 50 rotations/ sec in a uniform magnetic field of flux density 0.5 Tesla; Calculate:

a-The maximum induced E.M.f generated

b- The instantaneous E.M.F after 1/600 sec from the position at which the coil's plane is normal to the magnetic flux lines

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[39] (Added) Choose the correct answer:

The maximum kinetic energy of emitted photoelectrons depends upon:

a) The intensity of the incident light.

b)The frequency of the incident light.

c) The time of exposing the metal to light.

d) Both the intensity and frequency of incident light

[40] (Added) State one use for the PN junction

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[41] (Added) Give reason for:
Digital electronics couldn't be affected by electrical noise

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[42] (Added) Give reason for:
There is no ideal transformer (of efficiency 100%).

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[43] (Added) What will happen:
1-If regular poles of magnet are used instead of the concave poles in the galvanometer

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[44] (Added) Mention one equivalent unit for the following measuring unit then write down the physical quantity that is measured by such measuring unit ....
V.Sec/Amp

	An equivalent unit	The physical quantity
V.Sec/Amp		

[45] (Added): A radio station emits a wave whose frequency is 2.4 MHz. Calculate the energy of each photon emitted from this station. Also, calculate the rate of photons ϕ_L. if the power of the station is 100 kW. ($h = 6.625 \times 10^{-34}$ J.sec)

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2008 Second Session

[1] What is meant by: The coefficient of self-induction of a coil 0.1 Henry

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[2] Mention the necessary condition for obtaining Sharp (pure) spectrum (monochromatic) by using spectrometer

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[3] What will happen when increasing the current passing in primary coil inside the secondary coil whose terminals are connected to galvanometer (with the zero point at the middle of its scale)? **Explain why**

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[4] Compare between: Lymans and Pfund series from the point of view of wavelength of emitted rays

	Lymans series	**Pfund series**
The wavelength of emitted rays		

[5] What will happen when using direct e.m.f in the primary coil of the transformer? **Explain why**

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[6] Compare between: The ordinary photography and holography from the point of view of the image information's which is recorded

	The ordinary photography	**The holography**
The image information's which is recorded		

[7] What will happen when straight wire carrying a current is placed normal to a magnetic field? **Explain why**

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[8] Mention one function of Reflected and semi reflected mirror in laser tube

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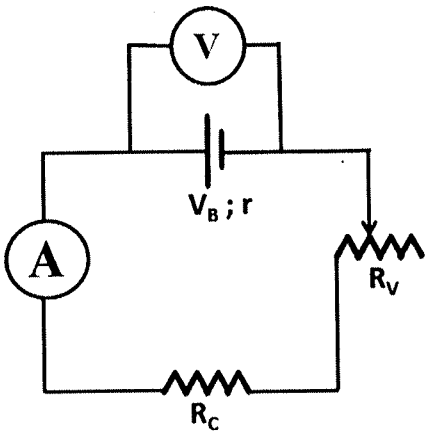
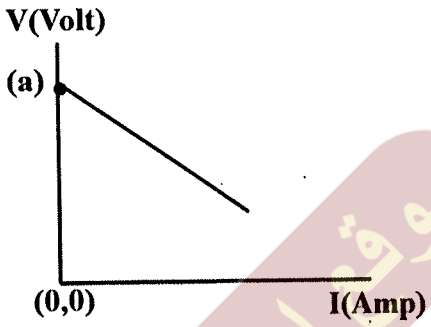
[9](Added) The opposite figure represents the graphical representation of the relation between the reading of the voltmeter and the reading of the ammeter





(i) Write the mathematical relation relating the variables on the graph

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(ii) What does the slope of the graph represent?

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(iii) What does the point (a) on the ordinate represent?

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[10] Mention one function of Thermal Imaging

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[11] Give reasons for: The galvanometer coil is connected to pair of spiral spring.

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[12] Choose the correct answer:

Laser beam does not follow inverse square law because

(a)its monochromaticity

(b) its coherent

(C) its color.

[13] Explain how we can: Increase the magnetic flux at the center of a circular coil.

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[14] Explain how we can Change the wavelength of X - rays which are produced from Coolidge tube.

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[15] Explain how we can: Produce a direct current from dynamo's coil.

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[16] Give reasons for: A Laser beam is used in the treatment of retinal detachment.

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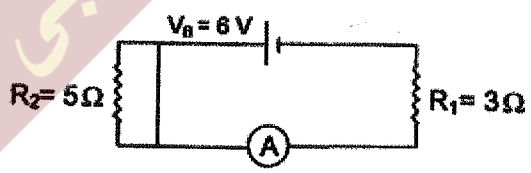
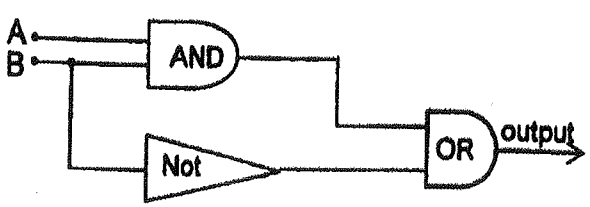
[17] Choose the correct answer: In the following figure the reading of ammeter is

(a) $\frac{1}{2}$ Amp.
(b) 2 Amp.
(c) $\frac{3}{4}$ Amp.



[18] Complete the truth table for this circuit

A	B	Output
0	0	
0	1	
1	0	
1	1	



[19] Write the mathematical relation relating the variables of each graph

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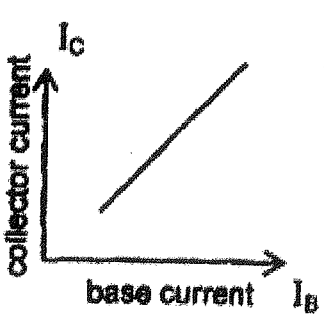

[20] A milliammeter of resistance 4 Ω has a coil capable of carrying a current of 16 mA it is desired to use it as ohmmeter using an electric cell of 1.5 volt having internal resistance 1.75Ω.

(i) Calculate the required standard resistance

(ii) Calculate the external resistance needed to make the pointer deflect to 10 mA?

(iii) Calculate the current that flows through it when connected to an external resistor 300 Ω.

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[21] A dynamo coil of length 40 cm and width 30 cm has 300 turns; it produces a current of frequency 50 /11 Hz if the effective value of e.m.f across its two terminals is $200\sqrt{2}$volt.

(i) Calculate The maximum value of the induced e.m.f

(ii) The magnetic flux density

(iii) The maximum value of e.m.f when the coil rotates around an axis parallel to its length with velocity 3m/ sec.

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[22] When monochromatic light of wavelength 4000 A° incident on a metal surface electrons of velocity 5.3×10^5 m/sec is released. Is electrons release from this surface when other monochromatic light of wavelength 5500 A° incident on it given.
($h = 6.6 \times 10^{-34}$ J.sec , $c = 3 \times 10^8$ m/s , $m_e = 9.11 \times 10^{-31}$ kg)

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[23] Compare between: Shunt and multiplier resistance from the point of view of the way of connection to the galvanometer and its use.

	Shunt resistor	**multiplier resistor**
The connection to the coil of the galvanometer.		
The use		

[24] [Added] Egypt 1986:
Find the impedance to an AC of frequency 70 Hz in a series circuit that consists of a condenser of capacity 50/11 μF and a resistance of 100 Ω.

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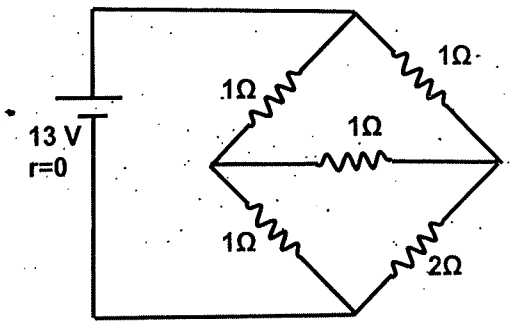
[25] [Added] SS' book: Find the equivalent resistance of the given resistance network using Kirchhoff's laws.



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[26] The table shows the relation between the length of a wire of cross-sectional area 0.1 m^2 and its resistance

Resistance R (ohm)	2.5	5	7.5	10	15
Length L(m)	5	10	15	20	30

Draw a graph relating the length [L] on the x-axis and its resistance [R] on the y-axis.

[27] From the graph find:

(a) The resistivity of the material of wire

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(b) The conductivity of the material of wire

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(C) The resistance of a wire of length 25m

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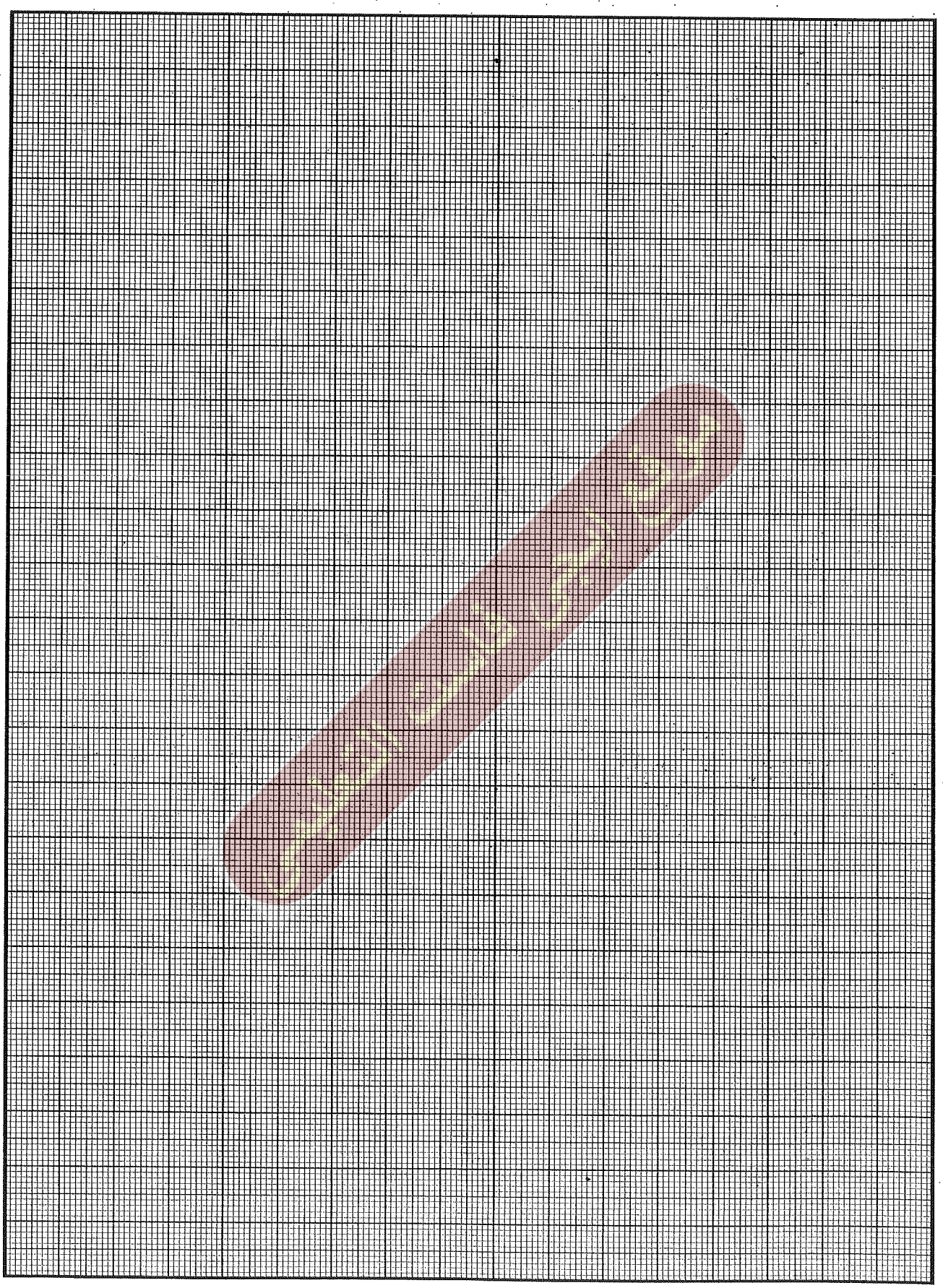

[28] (Added) If an Alternating current takes $\frac{1}{600}$ second to reach from zero to half its maximum value; calculate its frequency

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[29] (Added) Choose the correct answer: Ideal step up transformer the ratio between the number of turns of its coils 1:10
If its primary coil is connected to DC source of 12 V; the the e.m.f produces in its secondary coil is

(a) 1.2V (b)120V
(c) 0 (d)12V

[30] (Added) Explain what happens when: There is no two parallel mirrors found at the two ends of active medium in laser device

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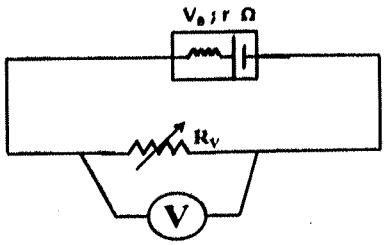
[31] (Added) Choose the correct answer: If the rheostat (R_v) is increased , the reading of the voltammeter will



(a)Increase (b) still as it is
(c) Decrease until it reaches zero
(d) Decrease and doesn't reach zero

[32] (Added) (1)A transistor n-p-n has current gain $\beta_e = 24$ and itsbase current intensity is 24 μA. calculate:
i- α_e
ii-The collectors current in Ampere

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[33] (Added) Choose the correct answer: Series of atomic spectral lines for hydrogen atom which lies in the visible range is:

(a) Pfund (b) Leyman
(c) Balmer (d) Paschen

[34] (Added) Explain what happens when:
Slip rigs is used in the DC motor.

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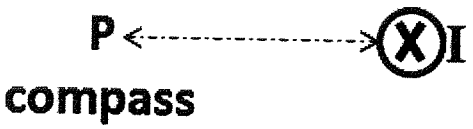
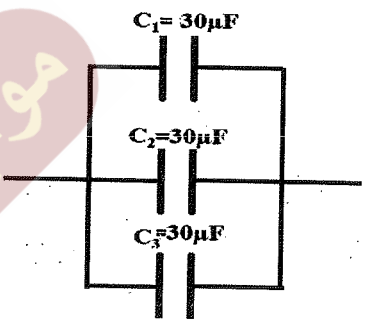
[35] (Added) Choose the correct answer:
If small compass is placed at point (p) near straight wire carry current (I) so the compass will deflect ……..



(a) to right (b) to left
(c) upwards (d) downwards

[36] (Added) Choose the correct answer: The equivalent capacitance for the three capacitors each of capacity 30μFshown in the opposite circuit is……



(a) 30μF (b) 10μF
(c) 90μF (d) $\frac{1}{30}$ μF

[37] (Added) State two factors only affect the mutual inductance between two coils

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[38] (Added) The two long parallel wires in the shown figure are separated by 5 mm if the mutual force per unit length between the two parallel wires is 3.2×10^{-4} N/m Knowing that (Permeability of air μo= $4\pi\times10^{-7}$ Wb/A.m.)

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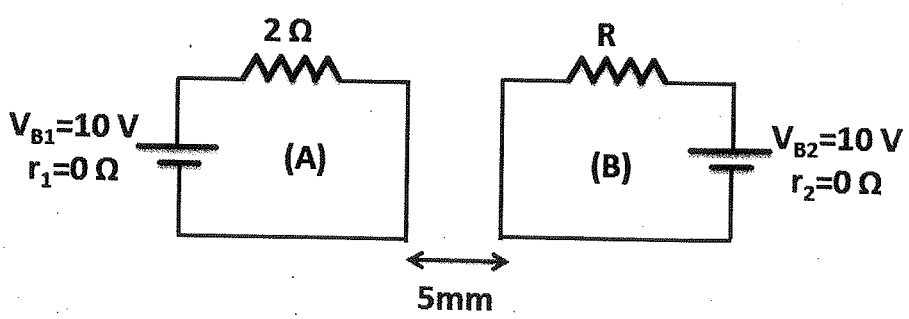

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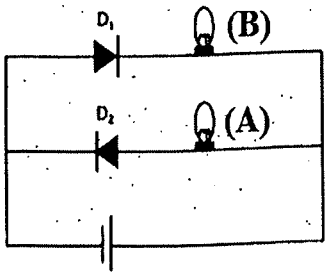
[39] (Added) Choose the correct answer:
In the opposite figure
(a)The lamp (A) is lighted only
(b) The lamp (B) is lighted only
(c) Both of lamps (A) and (B) are lighted equally
(d) No current passes in both of lamps (A) and (B)



[40] (Added) Mention three properties for X rays

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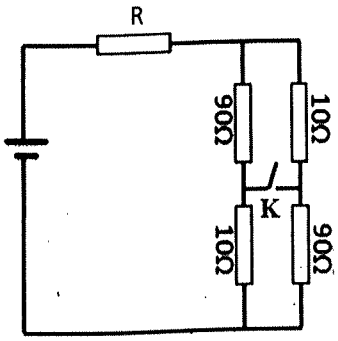
[41] (Added) In the circuit shown in the figure when the K is closed the equivalent resistance of the circuit decreases to half its value, calculate the value of the resistance R knowing that the internal resistance is neglected



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[42] (Added) State ONE of the factors affect:
The Photoelectron current intensity
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[43] (Added) Give reasons for: The wavelength associated with the electron decreases with the increase of its speed.
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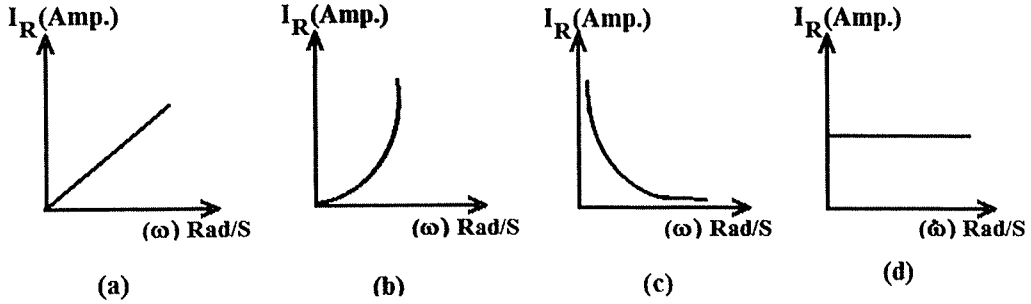
[44] (Added) Choose the correct answer: The relation between the current intensity in AC circuit consists ohmic resistor and the angular velocity of the source can be represented graphically as....



[45] (Added) Mention one use for: The resonant circuit
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2009 First Session

[1] Mention only one function for: The large resistance connected in series with the coil of the sensitive moving coil galvanometer.

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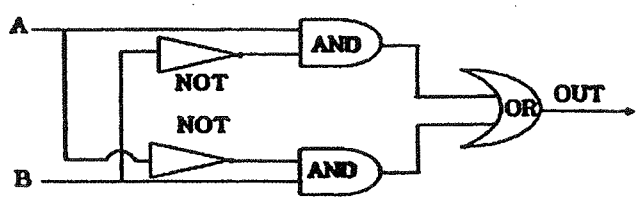
[2] Complete the truth table according to the given circuit.



A	B	out
0	0	
1	0	
0	1	
1	1	

[3] Mention only one function for: The transformer.

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[4] Mention the scientific reason for: The stimulated emission.

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[5] Three resistors (20, 40, 60) Ohm are connected to an electric current source. If the potential difference across each resistor is (50, 20, 30) volt respectively, illustrate by drawing how these resistors could be connected. Then calculate the total resistance of the electric circuit.

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[6] Mention the scientific reason for: The ohmmeter is used to make sure that the **p-n junction is** functioning well.

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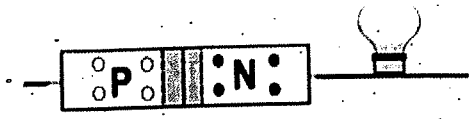
[7] Compare between: The magnetic flux density at the centre of a circular coil and that at a point inside a solenoid on its axis from the point of view of its relation with the radius of turns.

	At the center of a circular coil	At a point inside a solenoid on its axis
The relation between the magnetic flux density with the radius of turns.		

[8] The figure shows a p - n junction connected in series with a lamp works on a direct voltage .Complete the electrical circuit to light the lamp



[9] A rectangular coil of dimensions 20 cm x 10 cm and of 200 turns placed in a regular field of magnetic flux density of 0.4 Telsa. A current of 3 Amp is passing through the coil. Calculate the torque acting on the coil in the following two cases:
First: When the coil plane subtends an angle 60° to the direction of the field;
Second: When the coil plane is perpendicular to the direction of the field.

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[10] Give reason for each of the following : The existence of one reflecting and another semi - transparent mirrors at the two ends of He - Ne laser tube.

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[11] Write down only one equivalent unit for the following unit, then mention the physical quantity measured by it: Volt .sec/Amp

	The equivalent unit	**The physical quantity**
Volt .sec/Amp		

[12] Compare between: the wavelength of the photon produced from the transition of an electron at infinity in both Balmer and Lyman series.

	Balmer series	**Lyman series**
the wavelength of the photon produced		

[13] What is meant by Work function of a surface.

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[14] A current of intensity 4 Amp passes through an inductive coil of 800 turns to produce a magnetic flux of 2×10^{-4} Weber. If the current vanishes in 0.08 sec. **calculate**:

(i) emf induced in the coil.

(ii) The self-inductance of the coil.

(iii) What is the rule used in determining the direction of the induced current in the coil.

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[15] Mention the scientific reason for: Doubling the radius of a copper wire leads to decreasing its resistance to one quarter.

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[16] What is meant by Population inversion state in the active medium of laser production?

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[17] [Added] Egypt, 1987: A coil of inductance 7/275 H and a resistance of 6 Ω. Find the current intensity in the coil when it is connected to:

(i)An AC source of frequency 50 Hz and e.m.f. of 6 V.

(ii)A DC mains of voltage 6 V.

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[18] Choose the correct answer:

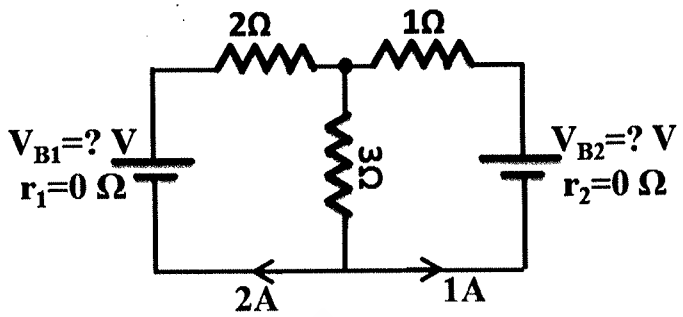
The ratio of photon's momentum to its mass equals .....

(a) The velocity of light

(b)Planck's constant

(c) The photon energy

[19] [Added] For the circuit shown find V_{B1} and V_{B2} .



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[20] Choose the correct answer:

The dark lines which appear in the continuous spectrum of the sun are considered .....

(a) emission spectra

(b) absorption spectra

(c) continuous spectra

[21] The following table represents the instantaneous values of the current generated by AC dynamo through a half revolution.

I Amp	0	3.6	6	8.3	10	12	10	6	3.6	0
t (mS)	0	0.5	1	1.5	2	3	4	5	5.5	6

Draw the graphical relation through a half cycle such that **time is** presented on the x-axis.

[22] From the graph find:

(i) The periodic time.

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(ii) The frequency.

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(iii) The effective value of the current intensity.

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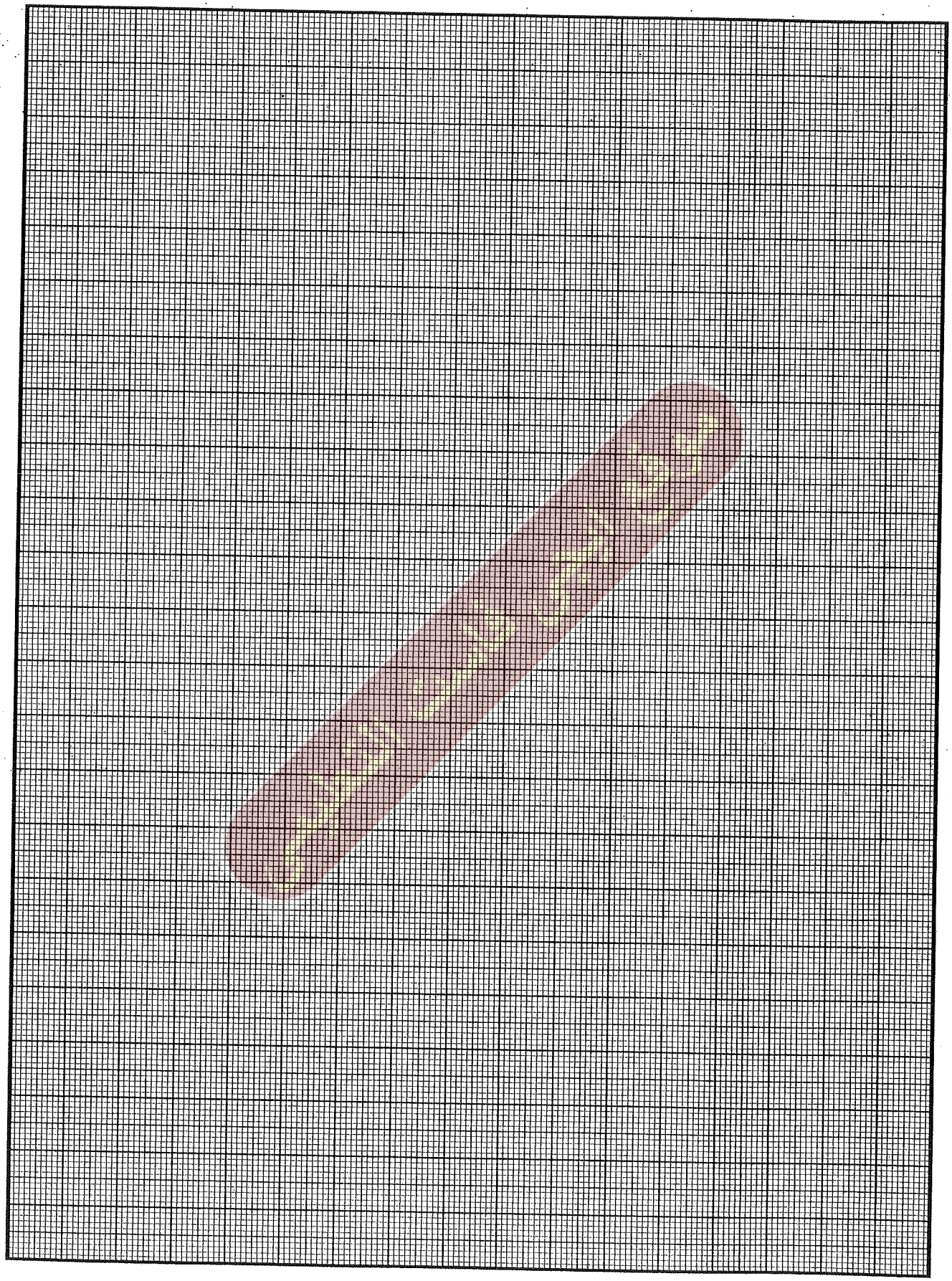

[23] What is the radiation used to study the crystalline structure of solids? Why?

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[24] Draw only the circuit in which the transistor is used as a switch (On condition).

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[25] Write down the scientific term that expresses the following statements:
The incidence of high energy photon onto a free electron, the photon frequency decreases, changes its momentum, and the electron velocity increases and changes direction.

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[26] Mention only one function for: Electric or magnetic fields in cathode ray tube.

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[27] (Added) Choose the correct answer: An electric transformer changes 220 volts into 17.6 volts, the ratio
between the number of turns of its coil is 10 : 1, its efficiency will be.....

(a) 95% (b) 80%
(c) 12.5% (d) 85%

[28] (Added) Compare between: P-type and N-type crystals of semiconductor. (with respect to the type of impurity)

	P-type crystal	N-type crystal
The type of impurity		

[29] (Added) Radio waves of frequency 92.4 MHZ and its power 100KW (Knowing that Planck's constant (6.625×10^{-34} J.s)
(a) Calculate the energy of each photon
(b) Calculate the number of photons in each second

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[30] (Added) Give reasons for:
The chosen of helium and neon as an active medium in (He-Ne) laser

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[31] (Added) What does the point (a) represent in the illustrated graph?

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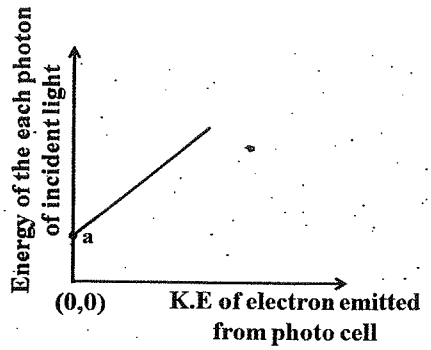

[32] (Added) Write down the scientific term:
It is the potential difference between two terminals of conductor its resistance is 1Ω and allow passing current intensity of 1 A. .....

[33] (Added) Illustrate with drawing ONLY: transistor as switch at OFF condition

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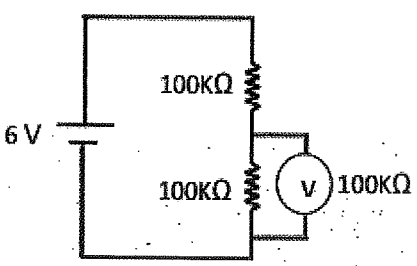
[34] (Added) Choose the correct answer:
If the voltmeter with resistance 100 kΩ (with neglect the internal resistance of battery) ,so its reading is:



(a) 4V (b) 3V
(c) 2V (d) Zero

[35] (Added) Compare between: shunt resistance and multiplier resistance (concerning the way connection with galvanometer).

	shunt resistance	multiplier resistance
The way connection with galvanometer		

[36] (Added) Choose the correct answer:
Spectral purity of laser photons means that it photons .....
(a) Have the same wavelength (b) have the same direction
(c) Coherence (d) obey the inverse square law

[37] (Added) Choose the correct answer: If the resistance of (100Ω) makes the ohmmeter deflects to 1/2 the scale, then the resistance that makes it deflect to 1/4 the scale is .....
(a) 100Ω (b) 200Ω
(c) 300Ω (d) 400Ω

[38] (Added) The opposite figure represents the characteristic X rays produced from Coolidge tube if target of molybdenum is used due to transition of electrons from n=2 and n=3 to the level n=1
Which wave length represents the transition....
(a) From (n=2 to n=1)?
.....
(b) From (n=3to n=1)?
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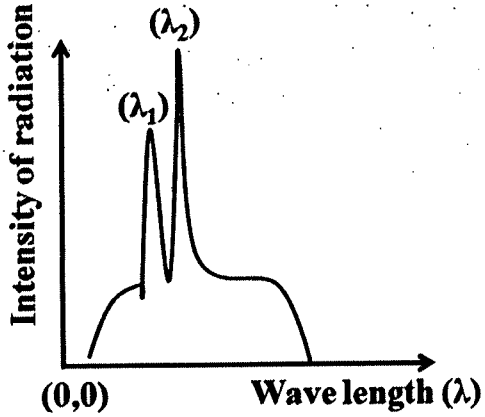

[39] (Added) If the power produced from power station is 100KWatt with potential difference 200Volt at the terminal of the station and there is a transformer at the station of turns ratio 1:5. Find the efficiency of the transmission if we use wires of resistance 4Ω to transfer this power.
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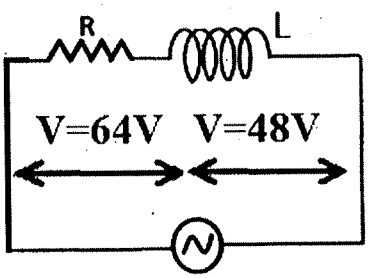
[46] Choose the correct answer:
In the illustrated circuit ; the e.m.f of the source is .....
(a) 16V
(b) 80V
(c) 112V
(d) 64V



[40] (Added) Write the mathematical relation of the law of mass action when silicon crystal is doped by phosphorus at thermal dynamic equilibrium
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[41] (Added) What is the result of?
Producing induced emf in the coil of the motor when it rotates between the poles of the magnet
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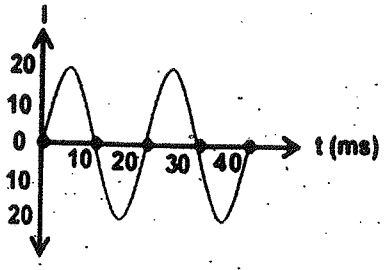
[42] (Added) The opposite figure shows the change of the produced current from the AC dynamo relative to time. **Find:**

(a)The angular velocity of the dynamo coil

(b)The effective current intensity



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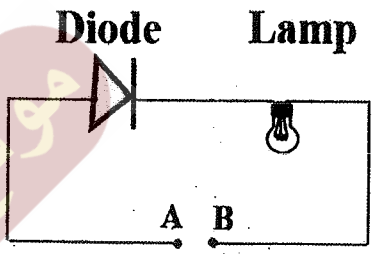
[43] (Added) The following figure represent a diode connected in series with an electric lamp:

(i)Show on the figure, the way of connection of the battery between the two points (A&B) to illuminate the lamp.



(ii)If the battery was replaced with an AC source. Determine the type of the electric current passing in the lamp. Explain your answer.

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[44] (Added) Compare between: Moving coil ammeter and hot wire ammeter (with respect to their scale division).

	Moving coil ammeter	hot wire ammeter
The scale division		

[45] (Added) A circular coil of diameter 10cm carries an electric current (I) generates a magnetic field at its center; If the coil is stretched uniformly in the direction of its axis such that it form a solenoid and the same current flows through it, **Calculate** the length of solenoid which makes the magnetic flux density at a point inside it along its axis = 1/4 of that at the center of circular coil.

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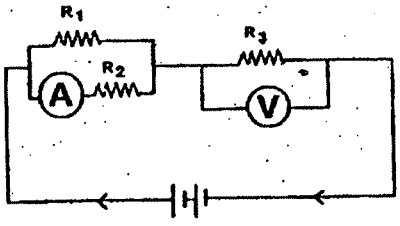
2009 Second Session



[1] The electric circuit shown in figure consists of $R_1 = 6\Omega$, $R_2 = 3\ \Omega$, $R_3 = 2\Omega$ and a battery whose internal resistance is one ohm. If the current passing through R_1 is 1 ampere,

(i) Calculate: The reading of the ammeter (A).

(ii) Calculate: The reading of the voltmeter (V).

(iii) Calculate: The emf **of** the battery.

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[2] Mention three applications of x-rays.

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[3] Mention the scientific base on which the following electromagnetic induction furnaces **operates.**

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[4] Explain how the characteristic line spectrum of x-rays is produced

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[5] The coil of a simple AC generator consists of (N) turns, the cross sectional area of each is (A)m^2. The coil rotates with constant frequency (f) HZ in a uniform magnetic field of constant flux density (B) Tesla. **Prove** that the instantaneous induced (emf) is given by the relation: emf = NBA $(2\pi f)$ sin $(2\pi f)$ t.

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[6] A beam of light, its wave length $=8 \times 10^{-7}$m, and its power is 200 W, falls on a certain surface. **Calculate:**

1- The momentum of the photon.

2- The force applied by the beam on this surface.

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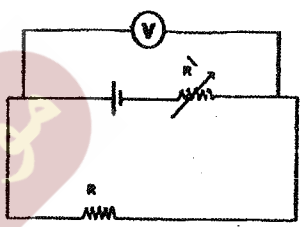
[7] Choose the correct answer:

In the circuit shown in figure, if the resistance R\ increases, the reading of the voltmeter will…

(a) Decrease

(b) Increase

(c) Remain constant



[8] Compare between:

Holography and ordinary photography (concerning the way by which the information in the image is recorded).

	Holography	Ordinary photography
the way by which the information in the image is recorded		

[9] Mention the function of: The two spiral springs in the moving coil galvanometer.

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[10] Compare between:

The optical microscope and the electronic microscope (concerning the way by which the final image is observed).

	Optical microscope	Electronic microscope
the way by which the final image is observed		

[11] Give reasons: The core in the transformer is made of thin insulated sheets of siliconic soft iron.

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[12] Explain briefly the function of (n-p-n) transistor as a switch; draw the electric circuit for a transistor as a switch in off condition.

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[13] Give reasons: A movable rectangular coil carrying a direct current does not move when placed in a magnetic field.

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[14] Give reasons: Laser beam does not follow the inverse square law of light.

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[15] Compare between:

Lenz's rule and Fleming's right hand rule (concerning their uses).

	Lenz's rule	Fleming's right hand rule
The use		

[16] Mention the function of: The high DC voltage in (Helium-Neon) laser.

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[17] What are the results of replacing the two metallic rings in the AC generator by two halves of a metallic cylinder insulated from each other?

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[18] Mention the function of: The filament in Coolidge tube.

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[19] Mention one unit used for measuring the Self-induction coefficient of a coil.

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[20] Choose the correct answer:

If the frequency of the emitted photons from a glowing body increases, their number will.....

(a)increase

(b)decrease

(c)remain constant

[21] Mention one unit used for measuring the magnetic dipole moment.

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[22] Mention the scientific basis on which Ordinary light bulbs **operates.**

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[23] [Added] Egypt 1989: An AC series circuit consists of a condenser of reactance 80 Ω, a coil of inductance 0.28 H, a resistance wire 12 meters long and cross sectional area $7x10^{-4}$ m^2. And the resistivity of its material is 35 x 10^{-5} Ω.m. and an AC main of frequency 50 cycles/s and of effective e.m.f of 20 V find;

(a) The maximum Current in the circuit.

(b) The potential difference across the terminals of each of the condenser and the coil.

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[24] What is meant by Dynamic equilibrium (thermal equilibrium) in a pure silicon crystal?

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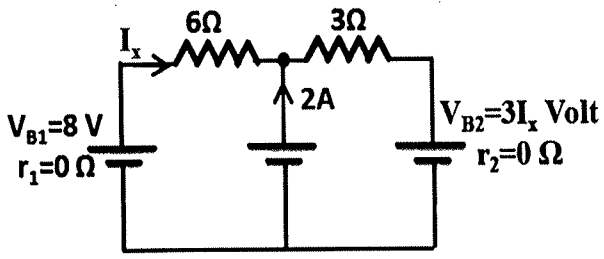
[25] [Added] For the circuit shown calculate I_x .



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[26] A straight wire of length 1 m carrying a current of 10 A placed in a uniform magnetic field of flux density B (Tesla). The following table illustrates the relation between the force F (Newton) acting on the wire and (sin θ), where θ is the angle between the wire and the direction of the magnetic field.

F (Newton)	0.3	0.6	0.9	1.2
Sin θ	0.1	0.2	0.3	0.4

Draw a graph to show the relation between (F) on the y - axis and (sin θ) on the x-axis.

[27] From the graph:

(i) Find the magnetic flux density (B)

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(ii) Find the magnetic force acting on the wire when θ = 30°

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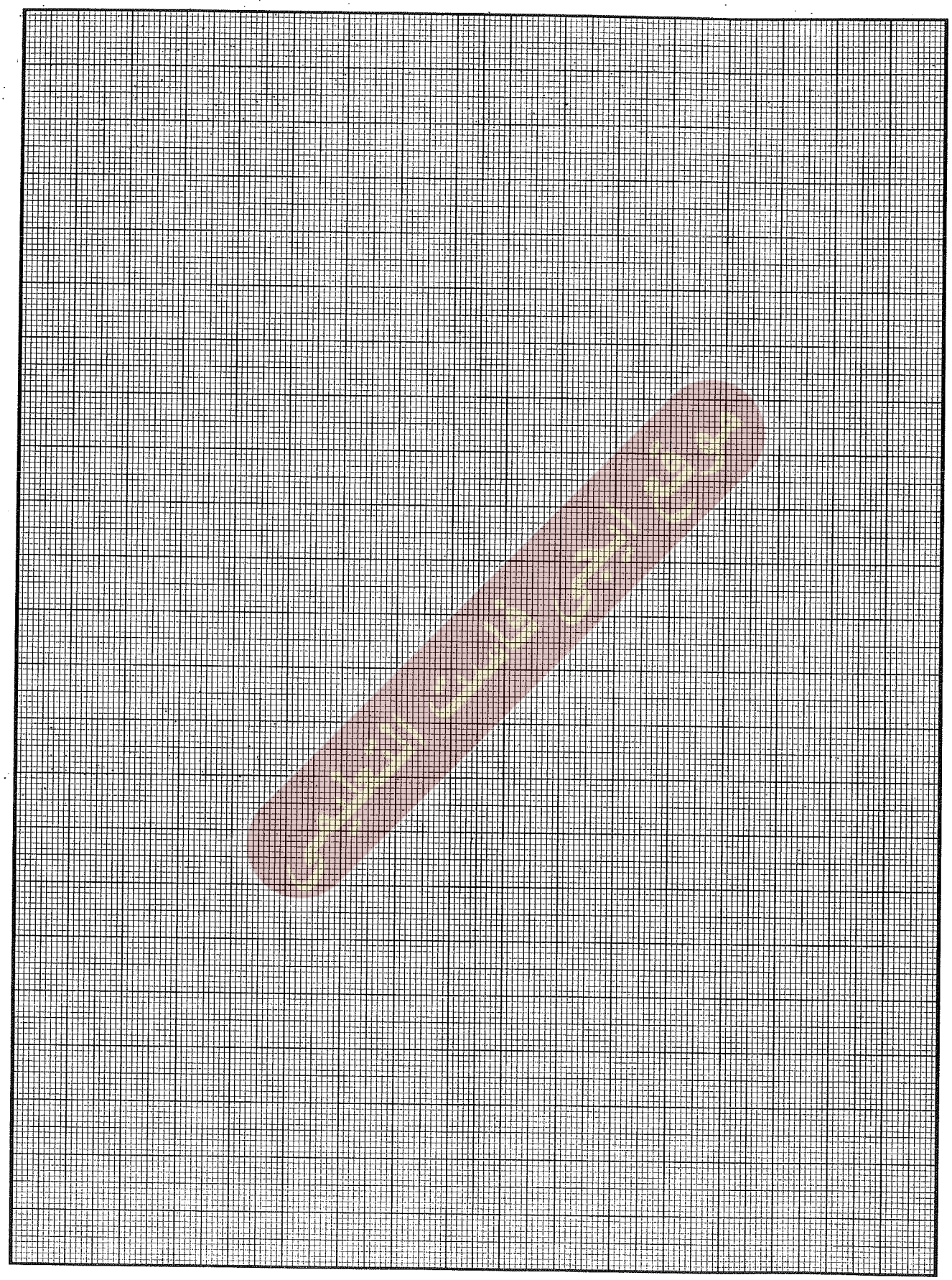

[28] (Added) Two similar wires are made of the same material; the length of each of them is 50 cm, the cross-sectional area of each of them $2mm^2$. They were connected in series in a circuit with an electric cell of internal resistance 0.5 ohm. The intensity of the electric current passing in the circuit is 2 Ampere. When the same wires were connected in parallel with same cell, the current intensity was 6 Ampere. Calculate:
a) The E.M.F of the electric cell used.
b) The electric conductivity of the wire material.

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[29] (Added) Give reason for: The permanent magnet used in the galvanometer has concave poles.

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[30] (Added) Prove that : the resonant frequency in L.R,C circuit [$f = \frac{1}{2\pi\sqrt{L.C}}$]

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[31] (Added) Compare between: the 2D imaging and 3D imaging concerning the recorded information

	2D imaging	**3D imaging**
the recorded information		

[32] (Added) An electric current is allowed to pass in a wire of 26.4 cm long in the form of an arc of a circle of radius 5.6 cm If the magnetic flux density at the center of this circle is 8.25×10^{-6} Tesla Find the current intensity.
(For air $\mu_0 = 4\pi x10^{-7}$ Wb/Amp.m)

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[33] (Added) Deduce the digital code for the decimal number $(148)_{10}$

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[34] (Added) What is meant by: Critical wavelength for metal (λ_c) = 5000A°?

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[35] (Added) Compare between: The Dynamo and DC motor with respect to the function of using the commutator (the two isolated halves of metallic cylinder)

	Dynamo	DC motor
Function of the commutator		

[36] (Added) Choose the correct answer:
The majority charge carriers in the N type semiconductor crystal is .....
(a) Free electrons (b) Positive ions
(c) Positive holes (d) negative ions

[37] (Added) Write down the scientific term:
The emission produced when an excited atom returns from higher energy level to lower energy level before the life time is over by the effect of an external photon has same energy like that causes excitation

.....

[38] (Added) A solenoid is 1.1 meter long, it consists of 700 turns, its cross sectional area is 10 cm^2, a current of intensity 2 Amperes passes in it, Find:
(a)The flux density at a point inside it and on its axis.
(b) The value of the induced e.m.f if the current vanishes through 0.01second.
(C)The coefficient of self-induction of the solenoid.

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[39] (Added) Choose the correct answer: The spectrum of Paschen's series lies in ..... region.

(a) Infrared (b) Ultraviolet
(c) Visible (d) x rays

[40] (Added) Choose the correct answer: Dynamo's coil rotates with velocity3000 revolution per minute so the time taken to cover angle 60^o from the starting position is.....

$(a)\frac{1}{600}$ sec $(b)\frac{1}{1200}$ sec $(c)\frac{1}{300}$ sec $(d)\frac{1}{60}$ sec

[41] (Added) If the needed energy to produce characteristic spectrum of X-ray is 1.9875×10^{-15}J. Calculate the wavelength of this spectrum.
(knowing C= 3×10^8m/s & h= 6.625×10^{-34}J.s)

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[42] (Added) Choose the correct answer: If the two lamps of resistance R_1 and R_2 [the value of $R_1 > R_2$], both are joined in series with a source so the .....

(a)The luminous intensity of R_1 is more than that R_2.
(b) The luminous intensity of R_2 is more than that R_1.
(c) The luminous intensity of R_2 is equal to that R_1.
(d) Can't be detected.

[43] (Added) Compare between: Inductive reactance and capacitive reactance (with respect to the effect of increasing the frequency)

	Inductive reactance	**capacitive reactance**
the effect of increasing the frequency		

[44] (Added) Mention ONE application for: Dual nature for electron.

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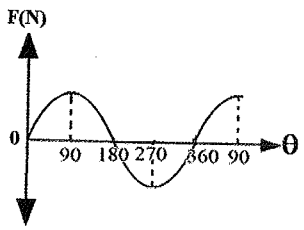
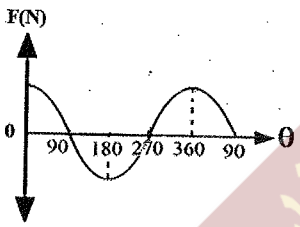
[45] (Added) Choose the correct answer: The graphical relation between the magnetic force acts on straight wire carrying an electric current and (θ) the angle between the wire and the direction of the magnetic field is represented like…



(a)



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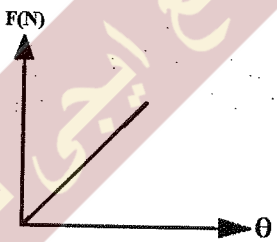

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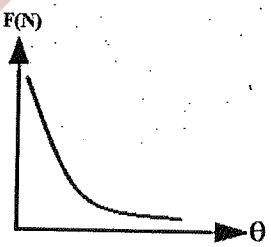
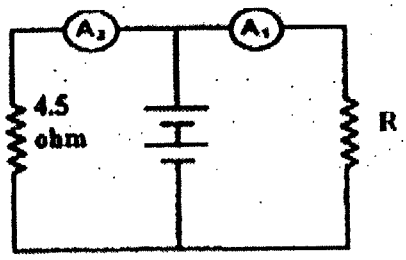


(d)

موقع أيجي فاست التعليمي

2010 First Session

[1] In the electric circuit shown in figure:



The reading of the ammeter (A) = 1 Ampere.
The reading of the ammeter (A) = 2 Ampere.
The internal resistance of the battery = 1 Ohm **Calculate:**
(a) The resistance (R).
(b) The emf (V_B) of the battery.

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[2] Compare between:
Line spectrum and continuous spectrum of x-rays (concerning its generation)

	Line spectrum of x-rays	**continuous spectrum of x-rays**
its generation		

[3] State ONE application only for the eddy Currents.
.....

[4] The figure represents three transitions A, B and C for the electron between the energy levels in hydrogen atom. Which of these transitions gives a spectral line:

(i) lies in Paschen's series.
.....

(ii) lies in the visible range.
.....

(iii) has the shortest wavelength.
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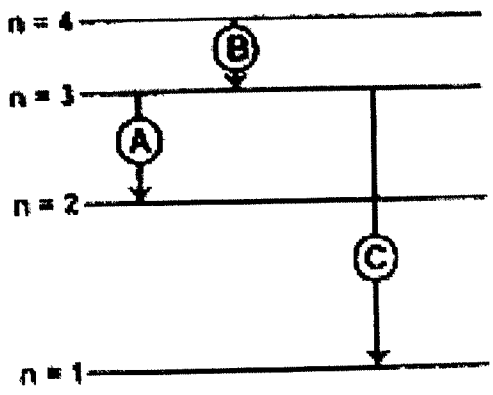

[5] A straight wire of length *(L)* is placed perpendicular to a uniform magnetic field of flux density (B). The wire is moved in a direction normal to the field at velocity (v). **Draw the figure then prove** that the magnitude of the induced emf in this wire is given by the relation: emf= B.L.V

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[6] Mention ONE use only for: High frequency electric field in the laser tube.

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[7] Choose the correct answer: A conductor of uniform cross-section, its length 20 m and its resistance 108 Ω. Another conductor of the same material its length 5 m, and of cross-sectional area equals three times the cross sectional area of the first. The resistance of the second conductor equals.....

(a) 9Ω

(b) 27Ω

(c) 84Ω

[8] Mention ONE use only for: P-n junction

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[9] Choose the correct answer: A transformer is used to step up voltage from 120 V to 3000 V, if the current passes through its primary coil is 2A and the current passes through its secondary coil is 0.06A. So the efficiency of the transformer is.....

(a)85% (b) 80% (c)75%

[10] Explain the scientific idea for: Laser action

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[11] Explain the scientific idea for the moving coil galvanometer.

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[12] Throughout your study for Compton effect, mention what will happen to each of the following after collision:

(i) Photon energy

.....

(ii) Photon velocity

.....

[13] A coil of .a dynamo consists of 70 turns, each of area 4×10^{-2} m^2. The coil rotates with velocity 3600 revolutions / minute in a magnetic field of flux density of 0.5 tesla . The coil starts the motion from the position at which its plane was normal to the field, **calculate**:

1. The maximum emf.
2. The emf after $\frac{1}{720}$ second from starting motion.

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[14] Write the name of the logic gate in each of the following cases, then draw the equivalent electrical circuit for each gate.

(i) Logic gate, has one input.

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(ii) Logic gate, has two inputs, its output is high when one of its input is high and the other is low.

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[15] Mention ONE use only for the hollow cylinder which is split in two insulated halves in the electric generator.

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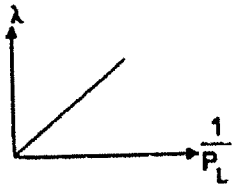
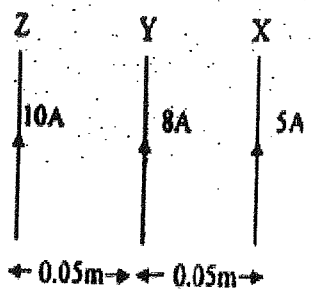
[16] Choose the correct answer:

The given graph represents the relation between the wavelength (λ) of a light beam and ($\frac{1}{P_L}$), where (P_L) is momentum of the photon in this beam. The slope of this line equals to .....



(a)mass of photon (b)plank's constant (c)speed of light

[17] The given figure represents three straight parallel wires X, Y and Z each of length 1 m. The wires carry a current of 5A, 8A and 10 A respectively in the directions shown. If the wire Y is 0.05 m away from each of the wires X and Z. Calculate the magnetic force acting on the wire Y.
(Knowing that $\mu_{air} = 4\pi \times 10^{-7}$ weber / A.m)



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[18] State ONE application only for: Emission of electrons from a metal surface when it is heated.

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[19] Mention the physical quantities which are measured by the following unit: V.s

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[20] State ONE application only for: Laser beam

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[21] Mention one condition ONLY for the occurrence: Stimulated emission.

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موقع إبحى فالت التعليمى

[22] [Added] Al-Azhar, 1989: An electric circuit consists of an AC main of 100 V and frequency 50 Hz, connected in series with a resistor of resistance 25 Ω an inductor and a condenser of capacity 100 μF. If the current and the voltage have the same phase, find:

(a) The inductive reactance of the inductor.

(b) The current intensity in the circuit.

(c) The phase angle

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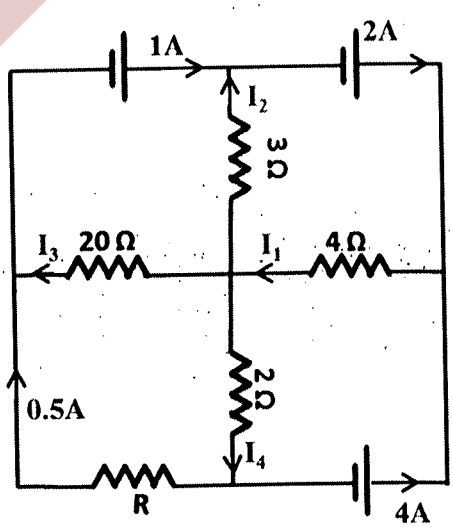
[23] [Added] In the shown figure calculate the currents I_1, I_2, I_3 and I_4 and also find the value of resistor (R).



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موقع إيجي فاست التعليمي

[24] (Added) write down the scientific term:

(a) Beam of rays have the same phase are used in holography and with the same wavelength of the reflected beam from the body, and meet the reflected beam at a photographic plate.

.....

(b)the dominant spectrum emission in ordinary light source

.....

[25] (Added) Compare between X ray and cathode ray with respect to (if it could be accelerated)

	X ray	cathode ray
Ability to be accelerated		

[26] (Added) Tuning circuit consists of a capacitor of capacitance (C) mF and inductive coil of self-inductance (L) mH, this circuit receive waves its frequency 600 KHz, if we replace the coil by another one of inductance (3L) mH, and the capacitor with another one has (3C) mF. Find the frequency of the wave can be received.

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[27] (Added) Mention the scientific idea (basic) for:

(a) Photoelectric cell.

.....

(b)Cathode ray tubes.

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[28] (Added) What is the scientific idea of :

Using platinum-iridium wire in the hot wire ammeter

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[29] (Added) Mention two forms of the light sources used in the optical pumping in laser devices

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[30] (Added) Choose the correct answer: Three equivalent lamps are connected in series and then in parallel with the same source, so the ratio between the consumed power in each circuit is:

(a) 1:9 (b) 1:6

(c) 1:3 (d) 1:2

[31] (Added) Compare between: Silicon crystal and metallic ohmic resistance (with respect to effect of increasing temperature on its conductivity)

	Silicon crystal	metallic ohmic resistance
The effect of increasing temperature on its conductivity		

[32] (Added) what is meant by... The capacitor capacitance is 16μF?

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[33] (Added) Give reasons for: Induced e.m.f may not be produced in the coil in case of switching on or switching of f the circuit.

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[34] (Added) Give reasons for:

The ohmmeter used to ensure the functionality of the diode

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[35] (Added) Mention one application OR use OR function for each of the following:

(a)Induction furnaces.....

(b)Lenz's hand rule

.....

[36] (Added) Choose the correct answer:

(i) The spectrum that contains all frequencies in a specific range is called .....

(a) Continuous spectrum (b) Line spectrum

(c) Atomic spectrum (d) characteristic spectrum

(ii)The spectrum that can be easily seen in hydrogen atom spectrum is produced when an electron goes down to energy level number ..... from the nucleus.

(a) Two (b) Three

(c) Four (d) Five

[37] (Added) What are the implications (results) of ...?

Replacement of the hallow metalic cylider splitted into two insulated halves in the DC motor with a metallic rings

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[38] (Added) Mention ONE use or function for: The electric field or the potential difference between the cathode and the target in Coolidge tube.

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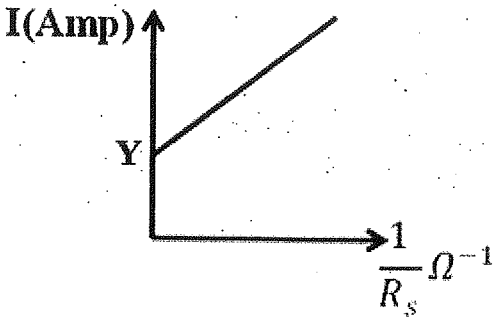
[39] (Added)

(a) Write down the expressing relation and what does the slope means in the opposite graph



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(b) What does point (Y) represent

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[40] (Added) What is meant by..

Critical frequency (υ_c) for metal surface = 4.8×10^{14}Hz?

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[41] (Added) Give reasons for: X-rays are used to detect defects in metallic structures in metal industry.

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[42] (Added) Mention one factor only affects: The type of mutual force between 2 wires carry current.

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[43] (Added) Write down the scientific term for the following statement:

It is the torque acting on a coil carrying electric current as its plane is parallel to a magnetic flux of density 0.1 T.

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[44] (Added) Calculate the intensity of the current passing in the 40Ω resistance in each circuit by neglecting the internal resistance of the source and the resistance of each diode.

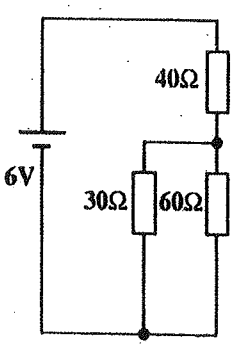

Figure (1)

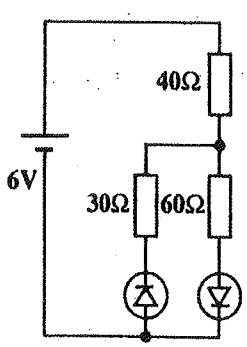

Figure (2)

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[45] (Added) Write down the scientific term:

(a) It is the quantity of electric charge passed a given cross sectional area in one second.....

(b) It's the resistance of a conductor of the material of length 1 m and cross sectional area 1 m^2 at 0^0C.....

2010(Second session)

[1] What do we mean by saying "The effective value of alternating current = 2 A"?

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[2] Write one property for: Digital circuits.

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[3] Mention one application only for f the mutual inductance between two coils.

.....

[4] Write one property for: Pfund's series in the spectrum of hydrogen atom.

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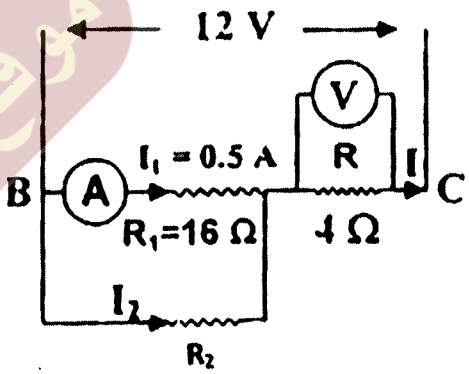
[5] The figure represents a part of an electronic:

(a) The reading of voltmeter (v).

(b)The value of the resistance (R_2)



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[6] Compare between: Line spectrum and continuous spectrum. (Concerning the concept)

	Line spectrum	**continuous spectrum**
The concept		

[7] Give reason for: In the moving coil galvanometer, the permanent poles of the magnet are curved.

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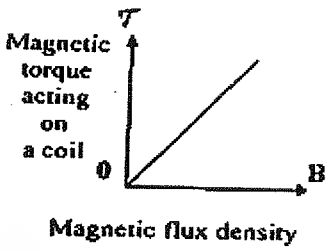
[8] Compare bètween: Stimulated emission and spontaneous emission.
(Concerning the movement of the photon after emission)

	Stimulated emission	Spontaneous emission
The movement of the photon after emission		

[9] Deduce what the slope of the line equals to in the following graph:



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[10] Choose the correct answer:
Laser light is monochromatic because .....
(a) it has approximately one wavelength
(b) its photons are of the same phase ,
(c) it is parallel rays

[11] mention the idea of working for: electron microscope
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[12] Define the Potential difference across two points.
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[13] Choose the correct answer:
A photon of light of wavelength (λ) and frequency (υ) and its velocity (c) , its momentum is given by .....
(a) $\frac{h\upsilon}{c}$ (b) $\frac{h\lambda}{c}$ (c) $\frac{h}{c}$

[14] Mention two factors only on which the coefficient of self-induction of a coil **depends on.**
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[15] Define: The thermal dynamic equilibrium of semiconductor crystal.
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[16] Mention two factors only on which the magnetic flux density at a point on the axis of a solenoid carrying an electric current **depends on.**
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[17] Define: Work function of a metallic surface.

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[18] A moving coil galvanometer, the resistance of its coil is 18 Ohm. Calculate:

(a) The value of the shunt resistor needed for passing $\frac{1}{3}$ of the total current through the galvanometer's coil.

(b) The value of the multiplier needed to make the galvanometer useful for measuring potential difference equals to ten times of that across the ends of its coil.

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[19] Give reason for: Helium and neon gases are used in gaseous laser.

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[20] Choose the correct answer:

When the number of turns in the dynamo's coil doubled and its angular velocity (ω) decreases to its quarter, the maximum electromotive force generated from it .....

(a)Increases to the double

(b) Decreases to its half value

(C) remains constant

[21] Give reason for: Digital electronics surpasses analog electronics.

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[22] Mention the idea of working for electric motor

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[23] Mention the results due to: Illuminating a hologram with a laser of the same wavelength as the reference beam.

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[24] A step down transformer, the number of turns of its primary coil is 5000 turns and the number of turns of its secondary coil is 250 turns. If the primary coil voltage is 240 volt.

(a)**Calculate** the induced electromotive force generated between the two ends of its secondary coil.

(b)If a back induced electromotive force of 4 volt is generated in the secondary coil when the current passing through the primary coil changes by a rate of 5 Amp. /sec, calculate the coefficient of mutual indication between the two coils.

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[25] Mention the results due to: Passing white light through a gas at certain temperature.

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[26] Mention one application only for: Infrared rays.

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[27] Mention one application only for: X-rays.

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[28] What do we mean by saying the current gain for a transistor = 99 ?

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[29] [Added] Eypt1990: An AC series circuit consists of a condenser of capacity 700/22 μF ,a resistor of resistance 50 Ω, an inductor and an AC source of frequency 50 Hz. If the potential difference across the terminals of the inductor is equal to that across the condenser = 20 V **find :**

(a) The inductance of the inductor.

(b) The current intensity in the circuit.

(c)The maximum e.m.f of the source.

(d)The phase angle between V and I.

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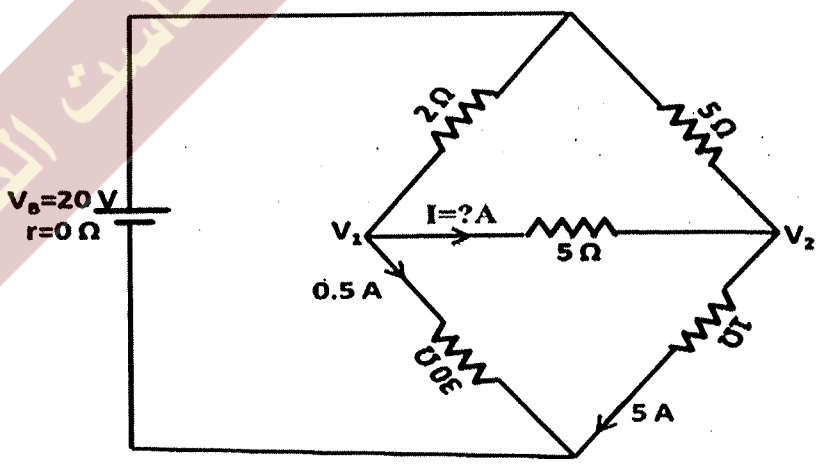
[30] [Added] In the shown circuit Calculate the current (I) and the electrical potential (V_1) and (V_2).



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موقع أبجى فاهمت التعليمى

[31] (Added) Give reasons for:
The thickness of the base of the transistor must be very small
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[32] (Added) Mention only three cases to generate an electric induced current in a secondary coil by the effect of a primary coil connected with a battery, key and rheostat. If this primary coil is connected with an A.C source, then how can you increase the induced current intensity in the secondary coil more than the current in the primary one?
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[33] (Added) Choose the correct answer:
The AC voltage lags the current by angle 90° when the AC current passes through .....
(a) Inductive coil with negligible ohmic resistance
(b) ohmic resistance
(c) capacitor
(d) oscillating circuit

[34] (Added) A wire of 30 cm length carrying a current of 0.4 Ampere is placed normal to the direction of a magnetic field. It is acted, upon by a force of 3×10^{-4} Newton. Calculate the magnetic flux density and then calculate the force exerted on the wire by the same field when the angle between them is 30°.
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[35] (Added) Give reasons for: Wavelengths of Pfund's series in hydrogen atom spectrum are the longest wavelengths.
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[36] (Added) Mention one use for the resonant circuit
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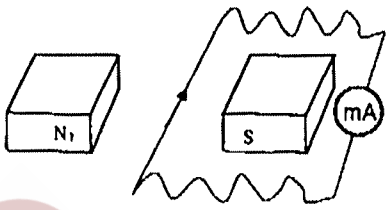
[37] (Added) Choose the correct answer:
If the Silicon crystal is doped with phosphorus [P].....
(a) The majority charges carriers will be electrons and the crystal becomes negatively charged
(b) The majority charges carriers will be holes and the crystal becomes positively charged
(c) The majority charges carriers will be electrons and the crystal still electrically neutral
(d) The majority charges carriers will be holes and the crystal still electrically neutral

[38] (Added) Choose the correct answer:
In which direction must the wire be moved in order to induce current in the direction shown in the figure?
(a) Upwards
(b) Downwards
(c) Towards the North Pole
(d) Towards the South Pole



[39] (Added) Give reason for
(a) using laser beam in the Holography
.....
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.....
(b) using laser beam in the treatment of the retinal detachment
.....
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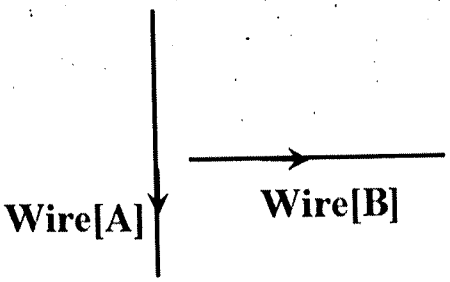
[40] (Added) Choose the correct answer:
In the figure shown wire [A] carrying an electric current downwards; another wire [B] carrying an electric current directed to right, So the force on the wire [B] acts ....
(a) Vertically upwards (b) vertically downward
(c) Rightwards (d) leftwards



[41] (Added) State one use or application for...
The thermal imaging of the black body radiation.
.....
.....

[42] (Added) Choose the correct answer:
The emission of electrons from the metallic surface (photo electric effect) depends primarily on ...
(a) The intensity of the incident light (b) The frequency of the incident light
(c) The exposure time (d) No correct answer

[43] (Added) State the mathematical formula of the law of mass action in pure semiconductors and what will be its form in the following cases:
(i)N-type crystal
(ii)P-type crystal
.....
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[44] (Added) Electric circuit consist of battery rheostat ammeter with neglected resistance connected in series and voltammeter with very high resistance connected with the terminals of battery. The shown table is the reading of ammeter and voltammeter with change the value of rheostat.

Reading of ammeter (A)	2	4	6	10	12	14
Reading of voltammeter (V)	8	7	6	4	3	2

Plot a graph between reading of voltammeter on Y-axis and reading of ammeter on x-axis and calculate the slope

[45] (Added) from the graph find:
i) Internal resistance of battery
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ii) Emf of battery.
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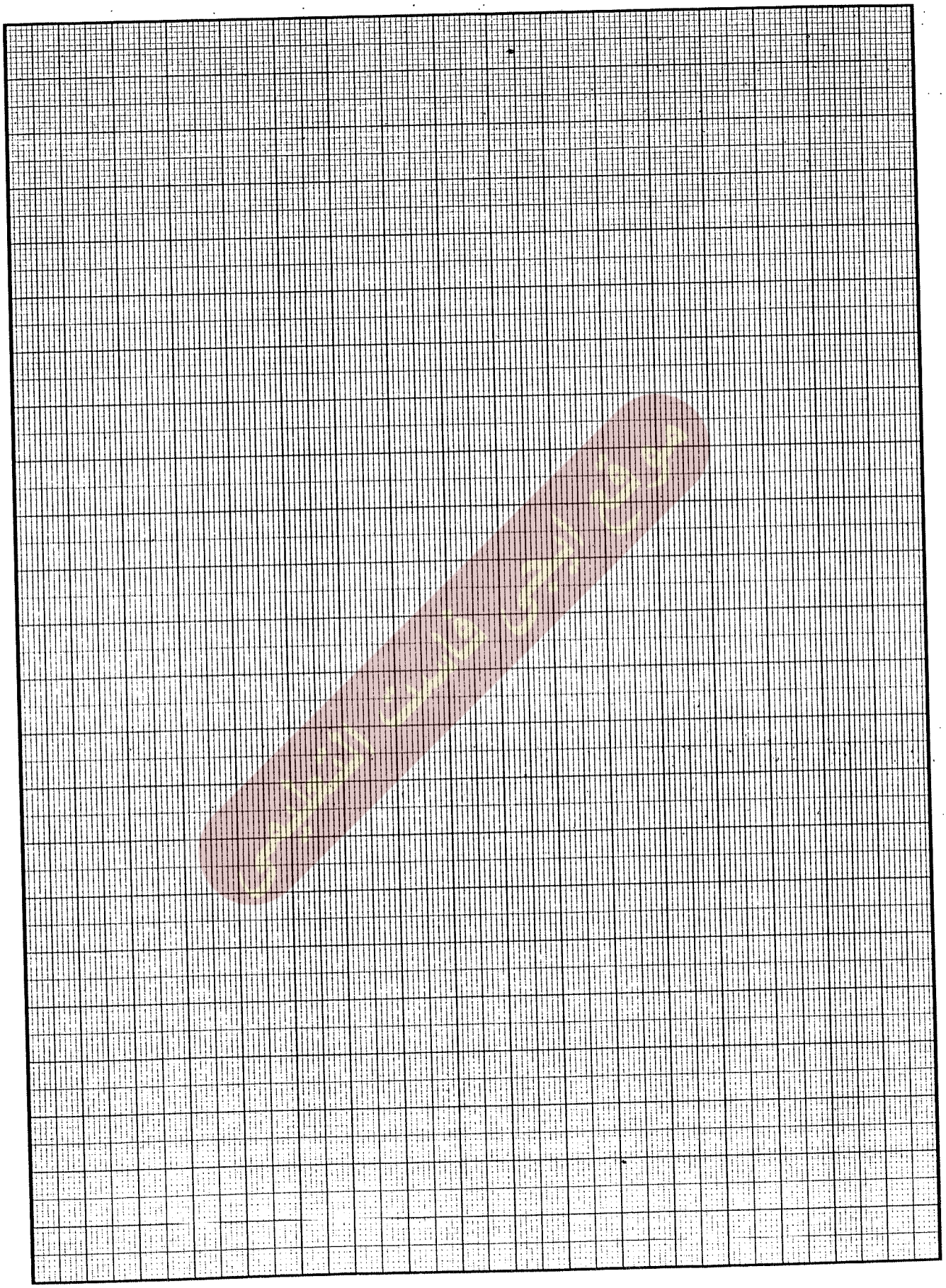
موقع إيجي فلت التعليمي



2011(First session)

[1] Mention one use for the electric motor.

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[2]Choose the correct answer:

The ratio between the photon energy after collision to its energy before collision is ..... in Compton Effect.

(a)greater than one (b) equal one (c) less than one

[3] Mention one use for the multiplier resistor in voltmeter.

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[4]Choose the correct answer:

Monochromatic means that laser has .....

(a)one wavelength (b) a band of wavelengths (c) doesn't obey inverse square law

[5] Explain the scientific idea on which the function of the induction furnaces **is based:**

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[6] Compare between:

Spontaneous emission and stimulated emissions (with respect to occurrence).

	Spontaneous emission	**stimulated emissions**
The occurrence		

[7] Write down the equivalent unit of (Henry) **and mention the physical quantity that is measured by it.**

	The equivalent unit	**The physical quantity**
Henry		

[8] Mention the necessary condition for the occurrence of the following:

The release of electron out of the metal surface when light falls on it.

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[9] Write down the equivalent unit of (Weber / m^2) **and mention the physical quantity that is measured by it.**

	The equivalent unit	The physical quantity
Weber / m^2		

[10] Write down the scientific concept for the following:
The wavelength at maximum radiation intensity is inversely proportional to temperature.

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[11] A step down transformer of 100 % efficiency, has 600 turns on its secondary coil used to operate a device of power 48 watt and potential difference 24 volt, using an electric source of e.m.f 200 volt.
(a) Calculate the number of turns in the primary coil.
(b) Calculate the current intensity in the secondary coil.
(c) Calculate the current intensity in the primary coil.

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[12]What's meant by Work function?

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[13] Write down the scientific term for the following:
Scale deflection per unit current intensity through the coil of the galvanometer.

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[14]What's meant by Hologram?

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[15] Mention the factors affecting the force acted on a straight wire carrying current in a normal magnetic field then **write the mathematical relation** between the force and these factors.

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[16]Explain the scientific idea on which the function of Laser **is based.**

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[17] Deduce a definition for magnetic flux density using relation of the force acted on a straight wire carrying current in a normal magnetic field

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[18] Mention the necessary condition for vanishing of the induced current in a straight wire moving in a uniform magnetic field.

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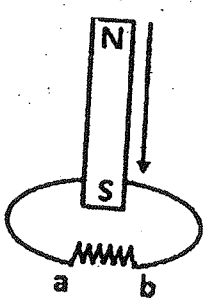
[19] Compare between: Fleming's left hand rule and Ampere's right hand rule (with respect to application).

	Fleming's left hand rule	**Ampere's right hand rule**
An application		

[20] Choose the correct answer:

In the opposite figure, if the bar magnet is being moved towards the loop ,the potential of point (a) should be ..... the potential of point (b).

(a) Greater than
(b) Less than
(c) Equal to



[21] What is the implication (النتيجة المترتبة على) **of** passing of electric current in the same direction in two parallel wires?

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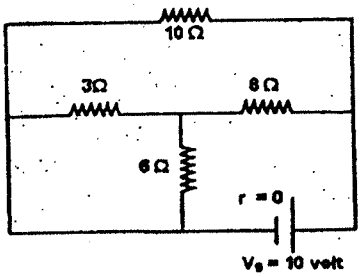
[22] From the shown circuit, Calculate:
(a) The equivalent resistance of the circuit.
(b)The Total current intensity passing through The circuit.
(c)The electric current intensity passing through 6Ω



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[23] What is the implication of the replacement of two metallic rings by a metallic cylinder split into two insulated halves in dynamo?

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[24] [Added] Al-Azhar, 1990: A tuning circuit of frequency 6 x 10^5 Hz consists of a condenser of capacity 50 μF and a coil. If the coil is replaced by another one of inductance 6 times that of the first one and the capacity of the condenser is increased by 25 μF, find the frequency of the circuit in this case.

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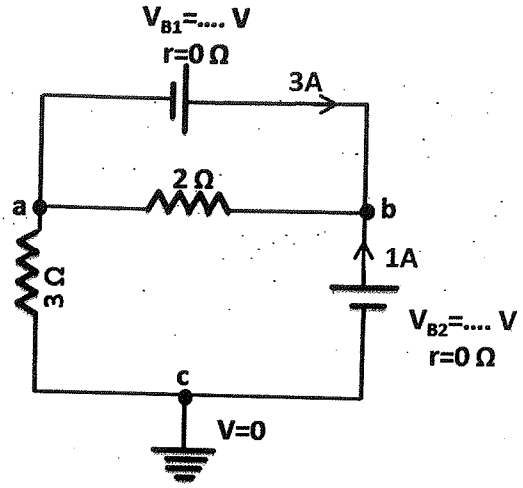
[25] [Added] In the illustrated circuit find:
(a) The e.m.f [V_{B1}]
(b) The e.m.f [V_{B2}]
(c) The potential difference across the3Ω
OR
In the illustrated circuit;
Knowing that point [C] is earthed (potential at[C] V_C= zero), **Find:**
(a) The e.m.f [V_{B1}]
(b) The electrical potential at points (a) & (b).



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[26] (Added) Choose the correct answer:
The dark lines which appear in the continuous spectrum of the sun are considered .....
(b) emission spectra
(b) absorption spectra
(C) continuous spectra.
(b) no correct answer

[27] (Added) Calculate the shortest wavelength for X-rays produced in Coolidge tube at potential difference of1 0000V.
Knowing that : (C = 3×10^8m/s ; e = 1.6×10^{-19}C; h = 6.625×10^{-34}J.s)
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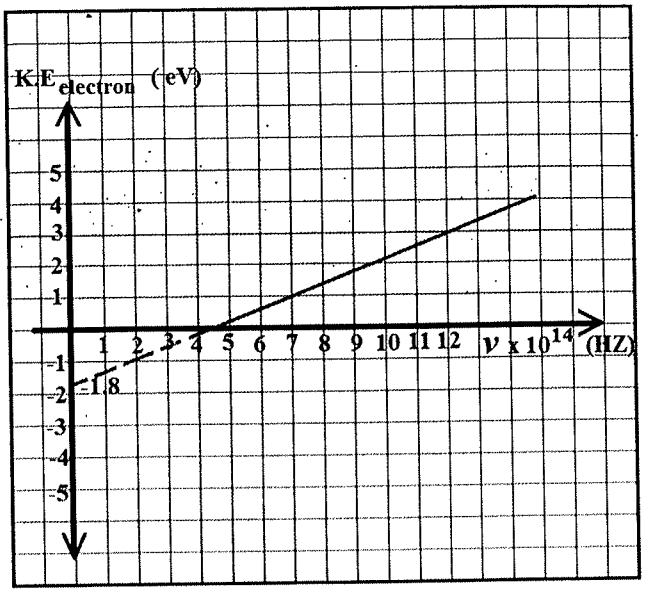
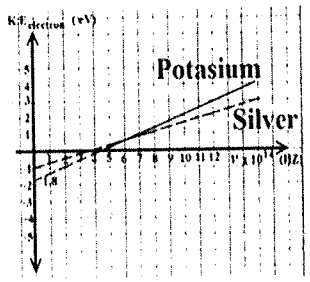
[28] (Added) Choose the correct answer:

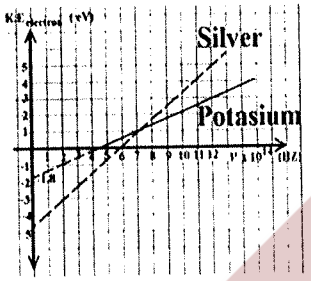
This graph shows the maximum kinetic energy for the emitted electrons from potassium metal at number of frequencies.



Which of the following graphs shows the correct comparison when replacing the potassium with silver of work function (4.73eV)



(a)



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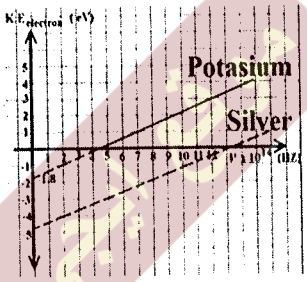
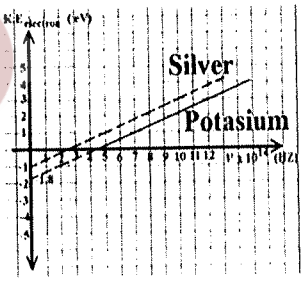


(c)



(d)

[29] (Added) [D] DRAW a transistor circuit used as amplifier

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[30] (Added) Choose the correct answer: Series of atomic spectral lines for hydrogen atom which lies in the visible range is :

(a) Pfund (b) Leyman

(c) Balmer (d) Paschen

[31] (Added) (1)A transistor n-p-n has current gain $\beta_e = 24$ and itsbase current intensity is 24 μA. calculate:

1- α_e

2-The collectors current in Ampere [(4min$_s$);(2Marks)]

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[32] (Added) Mention ONE factor affects the: Wavelength of the continuous spectrum of X-rays.

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[33] (Added) Explain how you can recognize the emitter and collector of triode by using ohmmeter.

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[34] (Added) Mention the use for the hot filament in Coolidge tube.

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[35] (Added) Prove that : $\beta_e = \frac{\alpha_e}{(1-\alpha_e)}$

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[36] (Added) Choose the correct answer: Laser beam does not follow inverse square law because of....

(b) its monochromaticity (b) its coherent

(C) its color. (b) its active medium

[37] (Added) Mention the scientific idea on which the following depends on
*** Thermal map of the earth to determine the earth's natural resources**

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[38] (Added) State one application depends on: The self induction of a coil

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[39] (Added) A photon is emitted of wavelength 468.1nm from a hydrogen atom.

a) Calculate the energy of this photon, knowing that : ($h = 6.625 \times 10^{-34}$ J.s, $C = 3 \times 10^{8}$m/s).

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b) Knowing that the **visible** spectrum range is from (700nm) to (400nm), determine the two levels that the electron moves through them to emit this spectrum.

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[40] (Added) write down the equitant unit for the following measuring units and Mention the physical quantity that can be measured by it

	An equitant unit	The physical quantity
Amp.Ω.sec		
C/V		

[41] (Added) When does the following value equals zero:
The current intensity following through the primary coil of a transformer although it is connected to AC source

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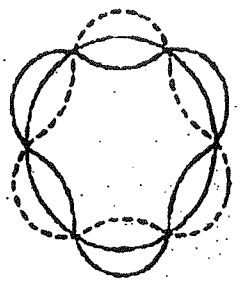
[42] (Added) Choose the correct answer: If the semiconductor crystal is doped with element of third group.....

(a)The majority charges carriers will be electrons and the crystal becomes negatively charged
(b) The majority charges carriers will be holes and the crystal becomes positively charged
(c)The majority charges carriers will be electrons and the crystal still electrically neutral
(d) The majority charges carriers will be holes and the crystal still electrically neutral

[43] (Added) The corresponding figure illustrates a pattern of standing waves for electron in a hydrogen atom in one of the hydrogen atom orbits according to Bohr, answer the following questions: **i. What is the order of the orbit (n) from the nucleus in which this electron lies?**



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ii. Knowing that the radius of the orbit in which the electron lies is equal to (4.76×10^{-10} m). What is the wavelength of the standing wave associated for this electron?

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[44] (Added) This table shows the relation between the wavelengths (λ) of the De-Broglie wave accompanied to moving particle with velocity (v).

$\lambda \times 10^{-20}$(m)	2	4	6	8	10
$v \times 10^{-3}$ (m/sec)	100	50	X	25	20

Draw the relation between the wavelength (λ) on y-axis and the reciprocal of the velocity on x-axis

[45] (Added) From the graph, find:

a. The value of X.

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b- The mass of the particle. ($h = 6.6\times 10^{-34}$ J.s)

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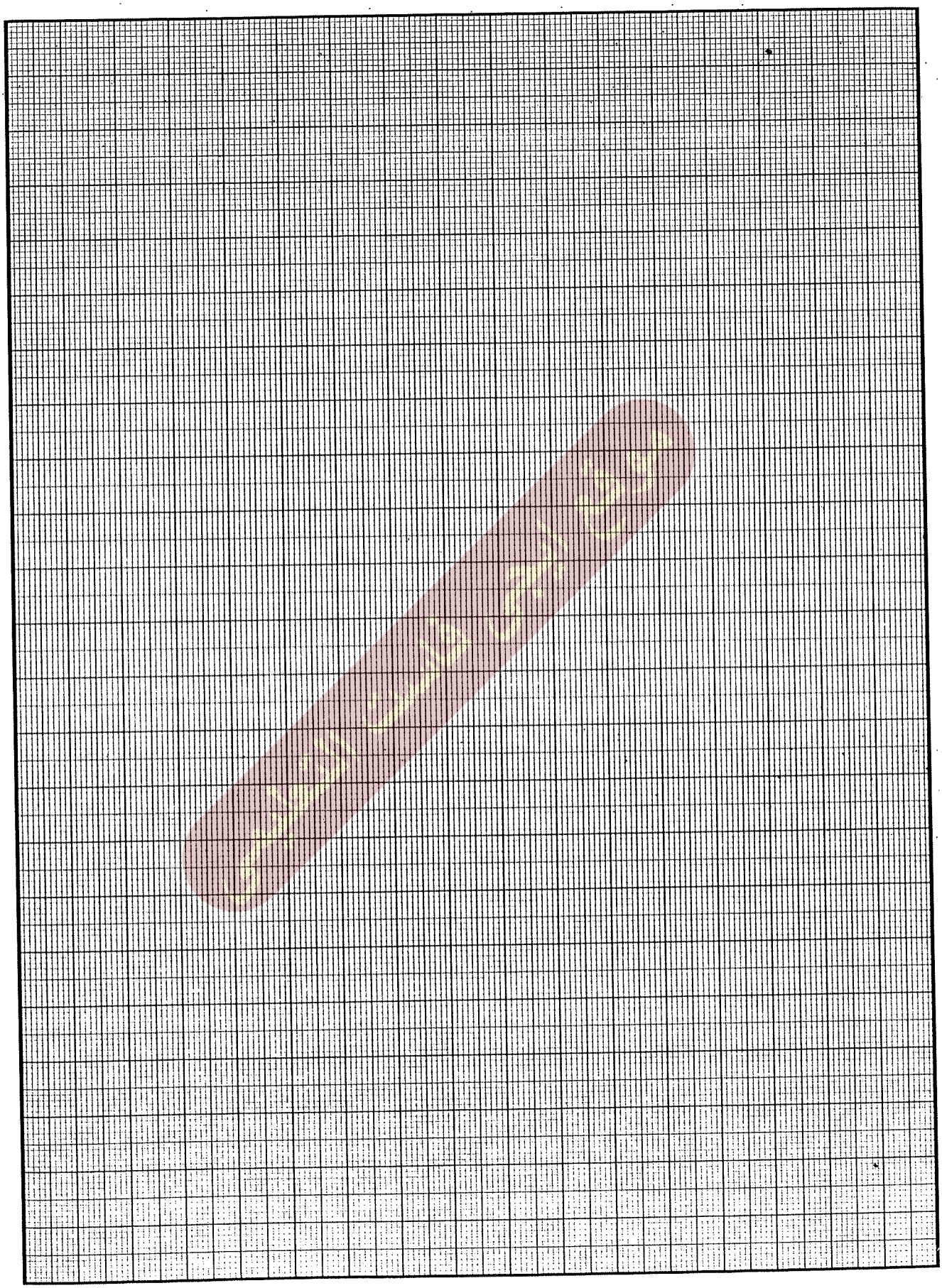

2011(Second session)

[1] Write down the scientific term of the following:
The resistance of a wire of length 1 m and cross – section 1 m^2 at constant temperature.

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[2]Explain the scientific base for the Photoelectric cell **then mention one use for it.**

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[3] Compare between:
Coefficient of self-induction and coefficient of mutual induction with respect to their formulas applied.

	Coefficient of self – induction	Coefficient of mutual induction
The mathematical formula applied.		

[4]Explain the scientific base for the electron microscope **then mention one use for it.**

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[5] Compare between:
Step up voltage transformer and step down voltage transformer with respect to the number of turns in primary coil in each.

	Step up voltage transformer	Step down voltage transformer
the number of turns		

[6]Mention without explanation two characteristics of laser beam.

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[7] Compare between: Ampere's right hand rule and right hand rule for Fleming with respect to the application.

	Ampere's right hand rule	Fleming right hand rule
The application.		

[8]Mention one application for Laser.

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[9] What's meant by the electrical conductivity of a conductor = 1.5×10^{8} $=\Omega^{-1}m^{-1}$?

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[10]Give reasons for:

The presence of two reflector mirrors one of them is semitransparent on the two ends of laser tube.

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[11] What's meant by the effective value of the current intensity = 0.5 Ampere?

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2 [1 A C dynamo has 100 turns on its coil, each of area 0.05 m^2 rotates in a magnetic field its density 0.1 Tesla to generate a maximum induced electromotive force =157 volt (given that $\pi = 3.14$) ,Calculate:

(a) The angular velocity.

(b) The frequency of the generated current.

(C)The average induced e.m.f . after $\frac{1}{4}$cycle from the maximum position.

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[13]Deduce the relation between the wavelength of photon and its linear momentum.

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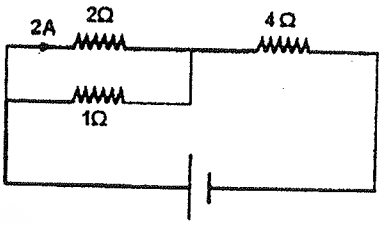
[14] Choose the correct answer:

3-From the illustrated circuit, the potential difference through 4 Ω .....



(a) 20volt

(b) 10 volt

(c) 24 volt

[15] Choose the correct answer:

One of the benefits of eddy currents, they are used in the design of ...

(a) Induction furnaces

(b) Galvanometer

(c) Dynamo

[16] The resistance of the coil of a sensitive galvanometer is 40Ω deviates to full scale deflection at 5 mA . Calculate the value of resistors and describe the way of connection with the galvanometer to measure:

(i)Maximum current intensity of value 20 Ampere.

(ii)Maximum potential difference of value 10 volt.

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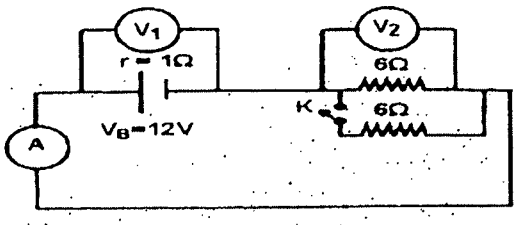
موقع ايجي ثانوي التعليمي

[17] In the circuit shown in the opposite figure, find the reading of (A), (v_1) and (v_2) . when the key (k) is closed .



	R_{eq}	Ammeter(A)	Voltmeter(V_1)	Voltmeter(V_2)
The relation				
(k) is opened				
(k) is closed				

[18]From the shown electric circuit :

(a)What type of magnetic pole is produced in terminal (B) of the coil ?

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(b)What is the effect of putting the soft iron cylinder inside the value of the instantaneous deflection of the galvanometer ?

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(c) What is the name of the rule which determine the direction of this current in the coil ?

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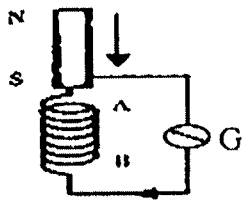

[19] [Added] Egypt 1991:

A current of 1A passes in a coil connected to a battery of e.m.f 12 volts. When this source is replaced by an AC one of frequency 50 Hz and has the same e.m.f as that of the direct source, the current intensity became 0.6 A only When a condenser is connected with the coil in series, the current intensity returns back to its original value (1A) .

(i) Find the inductance of the coil.

(ii) Find the capacity of the conductor.

(iii) Find the phase angle between the current and the alternating voltage.

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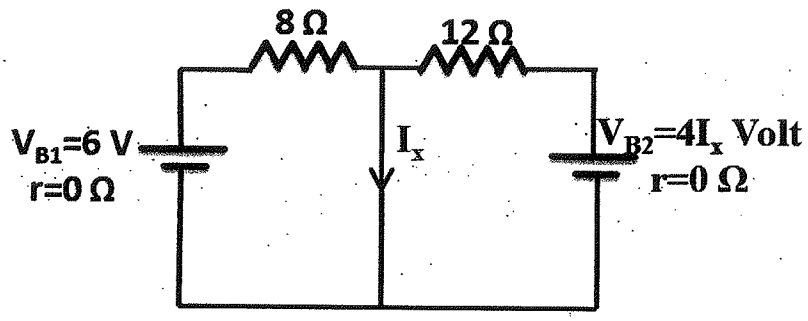
[20] [Added] Find V_{B2} in the illustrated circuit



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[21] (Added) Give reason for: The potential difference between the terminals of the cell changed by changing the total resistance of the circuit.

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[22] (Added) A battery of e.m.f 14V its internal resistance is negligible(r=0) connected in series to 50 turns circular coil of diameter 20cm, If the resistivity of the coil's wire $7\times10^{-7}\Omega$.m, radius of wire 1mm, calculate the torque acting on this coil when its placed parallel to magnetic field, its density 0.5T.

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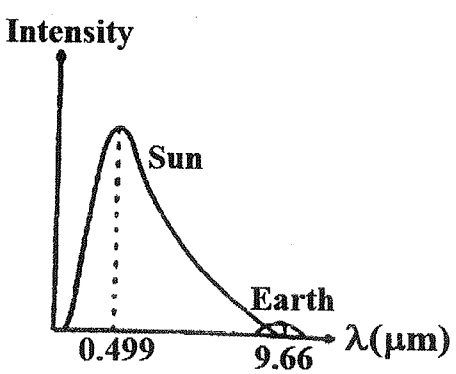
[23] (Added) The opposite figure shows the relation between the intensity of radiation emitted from hot bodies and wavelength. If the surface temperature of the sun in 6000°K, use the data on the figure to calculate the earth's surface average temperature.



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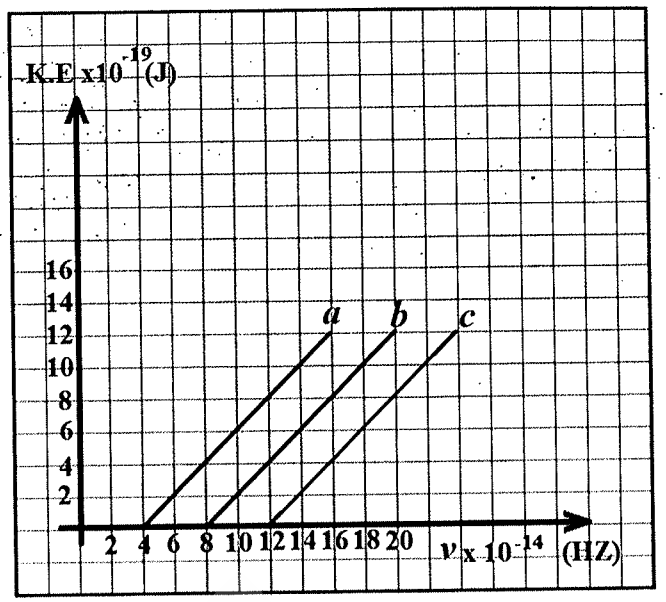
[24] (Added) The graph shows the relationship between the maximum kinetic energy of electrons emitted from three metals and the frequency of light falling on them. Depending on the graph:



[a] Calculate the work function for metal (b).

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[b] If a light with certain frequency falls to liberate electrons from the three metals, which of these free electrons have more K.E.?

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[25] (Added) Choose the correct answer:

In the dynamo which its coil connected with commutator, the current inside its coil is..

(a) AC (b) unidirectional

(c) variable intensity (d) DC

[26] (Added) voltmeter with resistance 500Ω is connected in parallel with resistance ,then connected with them in series an ammeter and when it connected to battery the reading of ammeter was 0.01A and the voltmeter is 3V ,find the resistance value.

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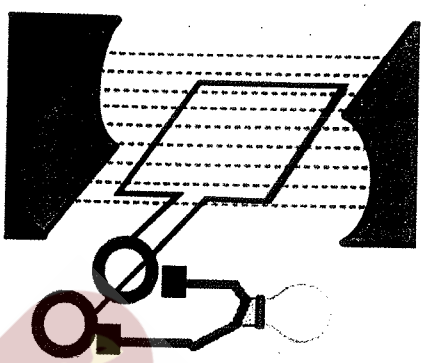
[27] (Added) Compere between each:

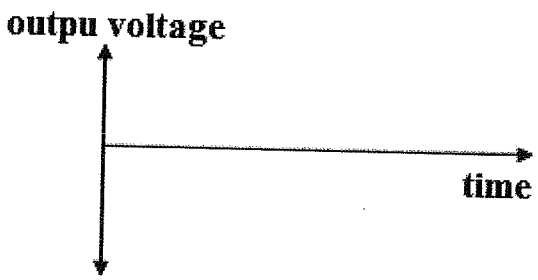
The reason for the existence of many coils in DC dynamo and electric motor.

	DC dynamo	DC motor
The reason for the existence of many coils		

[28] (Added) This figure shows a simple generator. The coil is rotating at constant speed.



On the axis below, sketch a graph of the voltage output against time as the coil makes one complete turn, starting from the position shown in the above figure.



[29] (Added) State two factors affect the Capacitive reactance of a capacitor

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[30] (Added) Give reason for:
X ray is used to study the crystalline structures.

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[31] (Added) Compare between: Kirchhoff's first law and second law (with respect to their definitions)

	Kirchhoff's first law	Kirchhoff's second law
The definition		

[32] (Added) state one use for the objective lens in the spectrometer

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[33] (Added) Write down the mathematical formula to calculate:
The efficiency of the electric transformer

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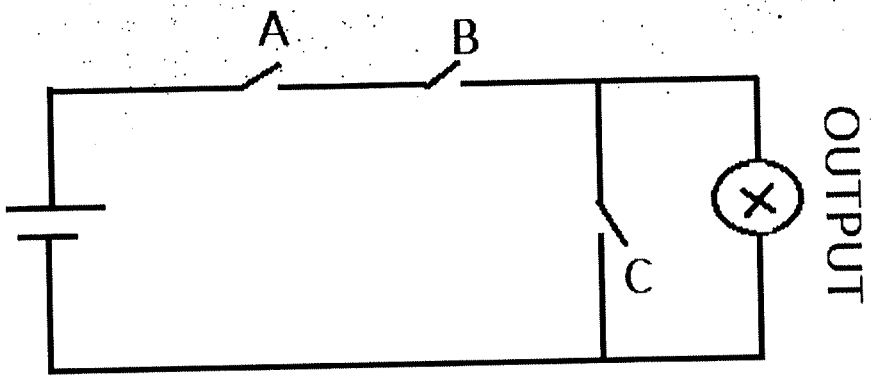
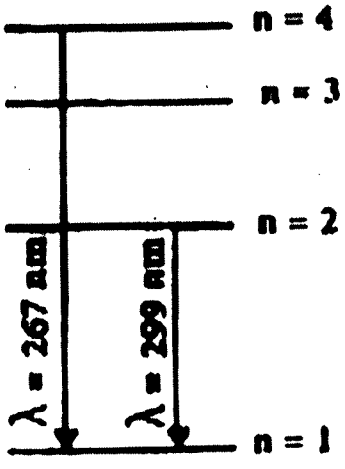
[34] (Added) Deduce the truth table for the following circuit;**Then suggest** electronic circuir using what you need from (NOT,AND,OR) gates to fulfill the obtained truth table.



INPUT			OUTPUT
A	B	C	

[35] (Added) The opposite figure represents the wavelengths of the emitted photons when an electron in a certain atom is relaxed from the higher energy levels to the first level.

Calculate the energy of photons emitted when an electron is relaxed from the fourth level to the second level.



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[36] (Added) Mention the function of: The electric field in Coolidge tube.

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[37] (Added) Write down the scientific term for the following statement:
It is the magnetic flux density that generates a force of 1 N of a wire of length 1m carrying current of intensity 1A when the wire is perpendicular to the flux lines.

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[38] (Added) what will happen when a photon $\Delta E=E_2-E_1$ falls on excited atom in the energy level E_2 before the life time is over

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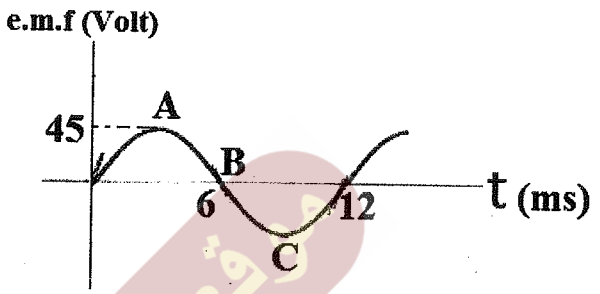
[39] (Added) The opposite figure represent the change in the induced e.m.f generated from A.C dynamo with time



i)Which point A, B OR C represent the emf induced in the coil when it becomes perpendicular to the magnetic field, explain why?

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ii)Find the time taken by the coil to change the emf induced from 0 V to 22.5 V for the first time

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[40] (Added) Give reason for: Laser is used in holography

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[41] (Added) Compare between: The sensitivity of galvanometer before and after adding shunt to be ammeter.

	The galvanometer	The ammeter
The sensitivity		

[42] (Added) Mention ONE factor affects the: Wavelength of the characteristic line spectrum of X-rays.

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[43] (Added) Mention the scientific idea on which the tuner circuit in the radio receivers **depends on.**

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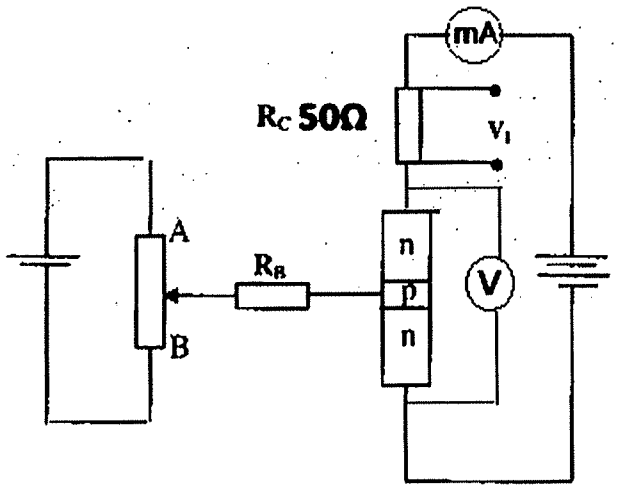
[44] (Added) The following table illustrates the reading of the voltmeter in Volt and the reading of the milliameter in mA for the shown circuit where a transistor is used as a switch



The reading of the voltmeter (Volt)	1	2	3	4	5	6
The reading of the milliameter (milli Ampere)	100	80	60	40	20	0

Plot a graph relating the The reading of the voltmeter (V_{EC}) on the ordinate and the potential difference across the constant resistance (I_CR_C) on the abscissa

[45] (Added) From the graph find:

a- V_{CC} (The e.m.f of the battery used in the collector circuit)

b- The reading of the milliameter when the reading of the voltmeter was 3.5V

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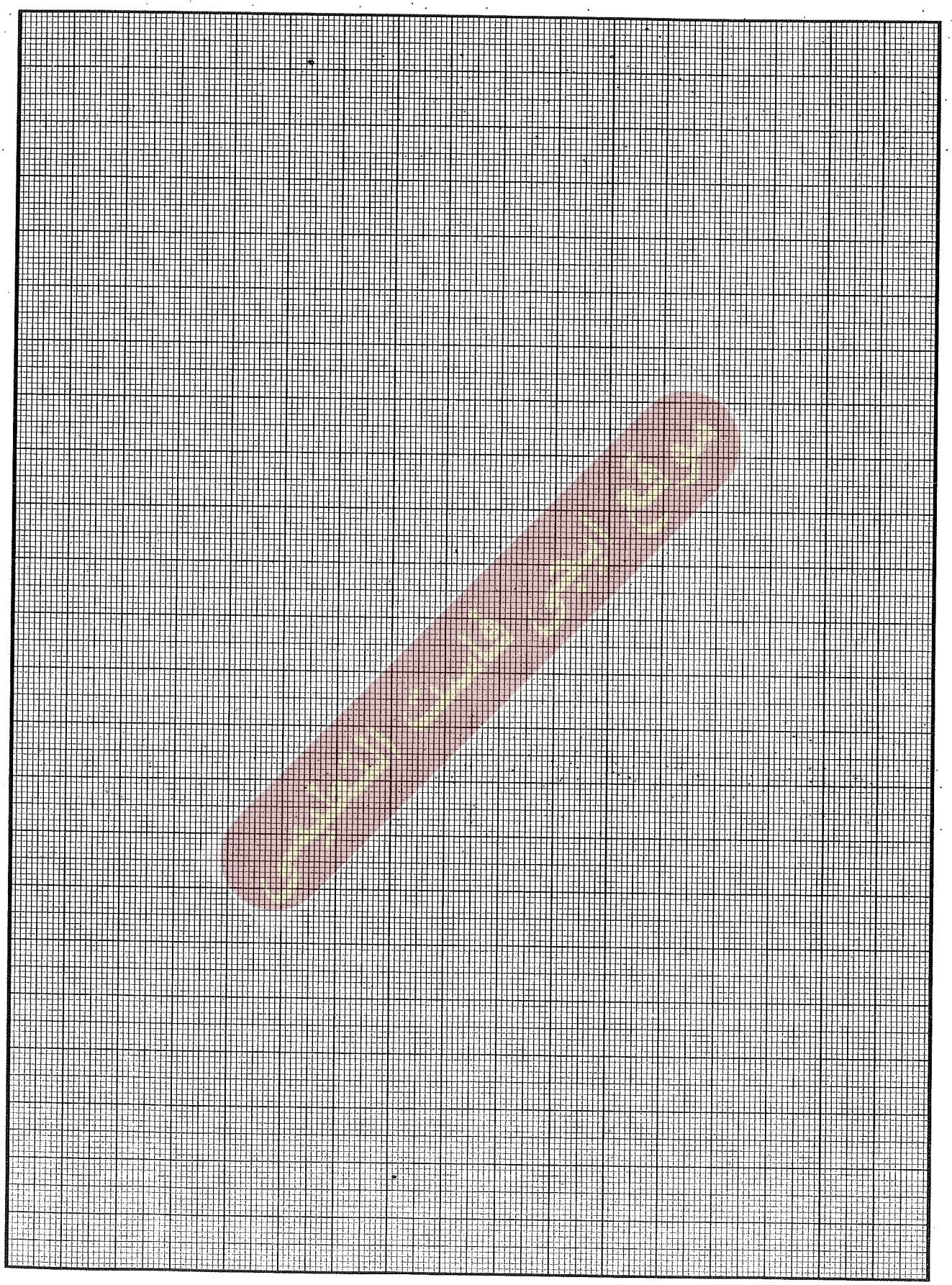

2012 (First session)

[1] Mention one application for the mutual induction between two coils

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[2]Write down only two characteristics for Laser beam

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[3] Compare between: Resistance and resistivity (with respect to their units)

	Resistance	**resistivity**
The units		

[4]Write down only two characteristics for X-rays

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[5] What is meant by "The effective value of the alternating current "**?**

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[6]Write down only two characteristics for Pfund's series for hydrogen atomic spectrum.

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[7] A moving coil galvanometer of resistance 5 Ω gives full scale deflection when a current of intensity 20mA flows through it, calculate:

a) The maximum current measured when it is connected to a shunt resistance of 0.1 Ω

b) The multiplier resistance connected with the galvanometer to convert it to voltmeter of maximum potential difference 5V

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[8] Write down the scientific term for the following:

1The Magnetic flux density, which will exert a force of one Newton on a current carrying wire of one meter length perpendicular to the field when the current intensity is one ampere

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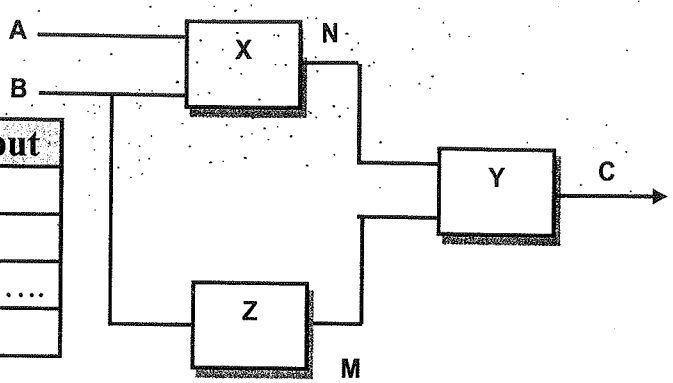
[9]From the shown truth table:

i-Deduce the kind of the gates X & Y & Z

ii-Complete the table

Input				Output
A	B	N	M	C
0	1	1	0	0
1	1	.....	0	.....
1	0	1	.....	1



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[10]Mention three sources of energy responsible for exciting the active medium to get laser beam

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[11] Write down the scientific term for the following:

The induced current must be in a direction such as to oppose the change producing it

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[12]Give reason for:

Photons might hit the surface of a metal without emitting photoelectrons

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[13] Give reason for:

The electric transformer cannot be used to step-up or step-down direct voltages

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[14]Write down the scientific term for the following statement:

The ratio between the energy of a photon and its frequency

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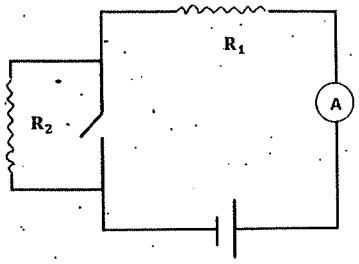
[15] Choose the correct answer:

1-In the shown electric circuit, on closing the Key, the reading of the ammeter .....

(a)Increases

(b) Decreases

(C) Doesn't change



[16] What is meant by The work function of a metal?

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[17] Mention only TWO factors affecting the torque acting as a rectangular oil carrying current placed such that its plane is parallel to a uniform magnetic field **then write down the mathematical of formula for it.**

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[18] What is meant by Fraunhofer lines?

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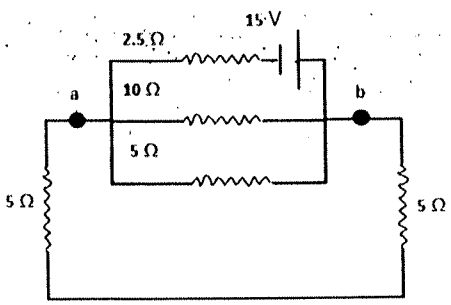
[19] In the shown electric circuit, calculate:

i-The total resistance of the circuit

ii-The total current intensity that passes in the circuit

iii-The potential difference across a & b



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[20]Compare between: Forward bias and reserve bias for n – p junction (with drawing only)

	Forward bias	**reserve bias**
drawing only		

[21] When does the value of the magnetic flux density at a point between two parallel wires each carrying electric current **become equal to zero?**

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[22] Write down only two characteristics for the lines of magnetic flux at the center of circular loop carrying current .

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[23] Write an equivalent unit for Cycle/sec **and mention the physical quantity used to be measure by it:**

	The equivalent unit	**The physical quantity**
Cycle/sec		

[24] Write an equivalent unit for Volt.sec **and mention the physical quantity used to be measure by it:**

	The equivalent unit	**The physical quantity**
Volt.sec		

[25] Write an equivalent unit for Ohm.sec **and mention the physical quantity used to be measure by it:**

	The equivalent unit	**The physical quantity**
Ohm.sec		

[26] [Added] Al-Azhar, 1992:

An AC series circuit consists of an AC mains [200 V-50 Hz], a condenser of capacity $\frac{100}{3\pi}$ μF and a filament lamp [25 W - 100 V]. Will the lamp operate normally or will its filament be melted?

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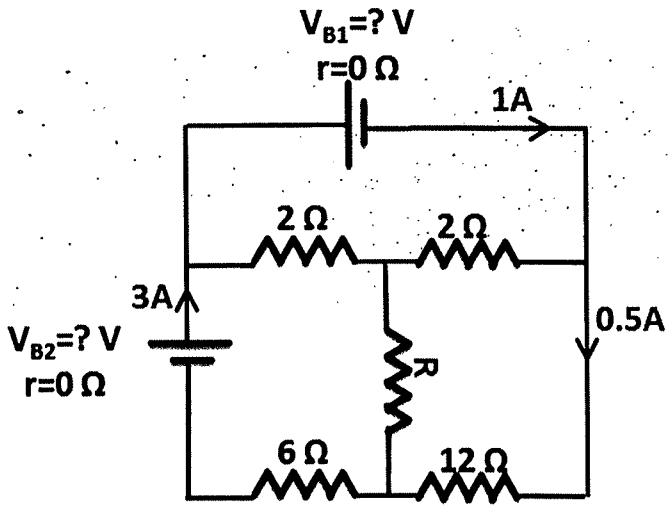
[27] [Added] Find the value of the resistor (R) and the potential difference (terminal voltage) across each battery.



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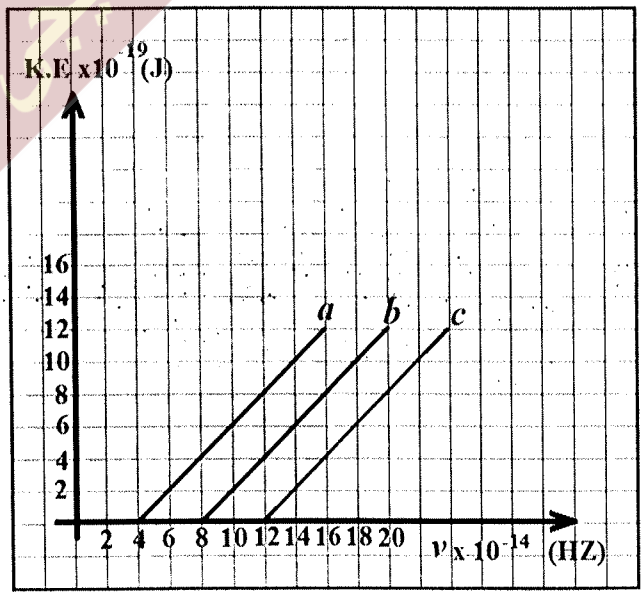
[28] (Added) The graph shows the relationship between the maximum kinetic energy of electrons emitted from three metals and the frequency of light falling on them. Depending on the graph:

[a] If a monochromatic light of frequency (7×10^{14}Hz) falls on each metal, what is the value of the maximum kinetic energy for the electrons in case of releasing from the metal?



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[b] What is minimum suitable frequency required to liberate electrons from any of these metals.

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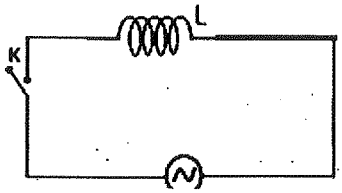
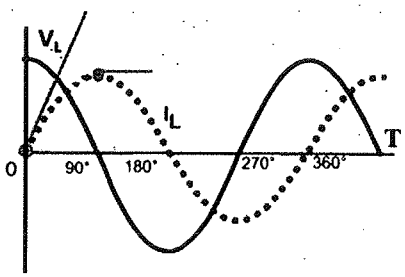
[29] (Added) In the shown circuit inductive coil of negligible ohmic resistance is connected to AC source



And the following graph represents the voltage across the inductor [V_L] and the intensity through the circuit [I_L] against the time.



By knowing that $V = L\frac{\Delta I}{\Delta t} \Rightarrow \therefore V \alpha \frac{\Delta I}{\Delta t}$ **deduce the phase angle between** [V_L] and [I_L]

Complete the following statements using only one of the following three choices

(*maximum value* **OR** *zero* **OR** *–Ve value*)

[i] At angle [θ]=0: the current intensity [I]=.....; while the slope of the tangent at this point $[\frac{\Delta I}{\Delta t}]$=..... so the voltage [V] =.....

[ii] At angle [θ]=90: the current intensity [I] =.....; while the slope of the tangent at this point $[\frac{\Delta I}{\Delta t}]$= ..... so the voltage [V] =.....

[iii] When the current intensity [I]decreases between angles [90 to180]: the slope of the tangent at this point $[\frac{\Delta I}{\Delta t}]$ =..... So the voltage will reverse its direction.

SO from the graph: **[V] leads [I] by angle .....**

[30] (Added) What will happen to the sensitivity of the ammeter by decreasing the value of the shunt connected in it

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[31] (Added) State one use for the spectrometer

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[32] (Added) Mention two methods to increase the mutual inductance between two coils

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[33] (Added) Calculate the length of antenna of car moves with velocity 80km/h in direction perpendicular to the horizontal component of the magnetic field of the earth which equals 18×10^{-6} Tesla if electromotive force of 4×10^{-4} Volts is induced through it

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[34] (Added) An electronic microscope is desired to investigate a body of length 4Angstrom using accelerated electrons of speed $2x10^6$m/s. is this possible? And why? (m_e=$9.1x10^{-31}$ Kg ; Planck's constant= $6.625x10^{-34}$ J.sec)

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[35] (Added) A transistor has $\alpha_e = 0.99$. Calculate β_e. Then calculate the collector current if the base current is 100 μA

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[36] (Added) Choose the correct answer: If the semiconductor crystal is doped with element of fifth group.....

(a)The majority charges carriers will be electrons and the crystal becomes negatively charged

(b) The majority charges carriers will be holes and the crystal becomes positively charged

(c)The majority charges carriers will be electrons and the crystal still electrically neutral

(d) The majority charges carriers will be holes and the crystal still electrically neutral

[37] (Added) Suggest how you can increase the penetrating power emitted from Coolidge tube

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[38] (Added) Mention the scientific interpretation (التفسير العلمي)for

The electric power (OR electric energy) consumed increases by decreasing the resistance if it is connected to the same voltage source.

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[39] (Added) Calculate the maximum frequency for rays in Coolidge tube when the potential difference between cathode and anode 13255 volt.

Given that(h= 6.625x 10^{-34} J.sec ; e=1.6×10^{-19} C; C=$3x10^8$ m/sec)

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[40] (Added) A coil of a dynamo consists 350 turn , The cross sectional area of each is $200cm^2$. The coil rotates with frequency 50 rotations/ sec in a uniform magnetic field of flux density 0.5 Tesla ;Calculate:

1-The maximum induced E.M.f generated

2- The instantaneous E.M.F after 1/600 sec from the position at which the coil's plane is normal to the magnetic flux lines

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[41] (Added) Choose the correct answer: The intensity of the ordinary light at a point is…

(a) Directly with the distance from the source

(b) Inversely with the distance from the source

(c) Directly with the distance from the source

(d) Inversely with square the distance from the source

[42] (Added) State the condition required to obtain pure spectrum by the spectrometer

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[43] (Added) What will happen to the magnetic flux density

a) At the axis of a solenoid connected to a cell of negligible resistance if half its length is cut

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b) At the center of a circular coil connected to a cell of negligible resistance if half its length is cut while its radius remains constant

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[44] (Added) The following table represents the relation between the collector current (I_c) and the base current (I_B) for npn transistor

(I_c) mA	5	10	15	20	b	30	35
(I_B)μA	100	200	a	400	500	600	700

Draw a graph for the relation ($I_c - I_B$) where I_B is represented on the horizontaaxis (x) and I_c is represented on the vertical axis (y).

[45] (Added) From the graph find:

A- The values (a) and (b)

B- The current gains β_e

c- The ratio between the current passes through the collector to that emitted from the emitter α_c

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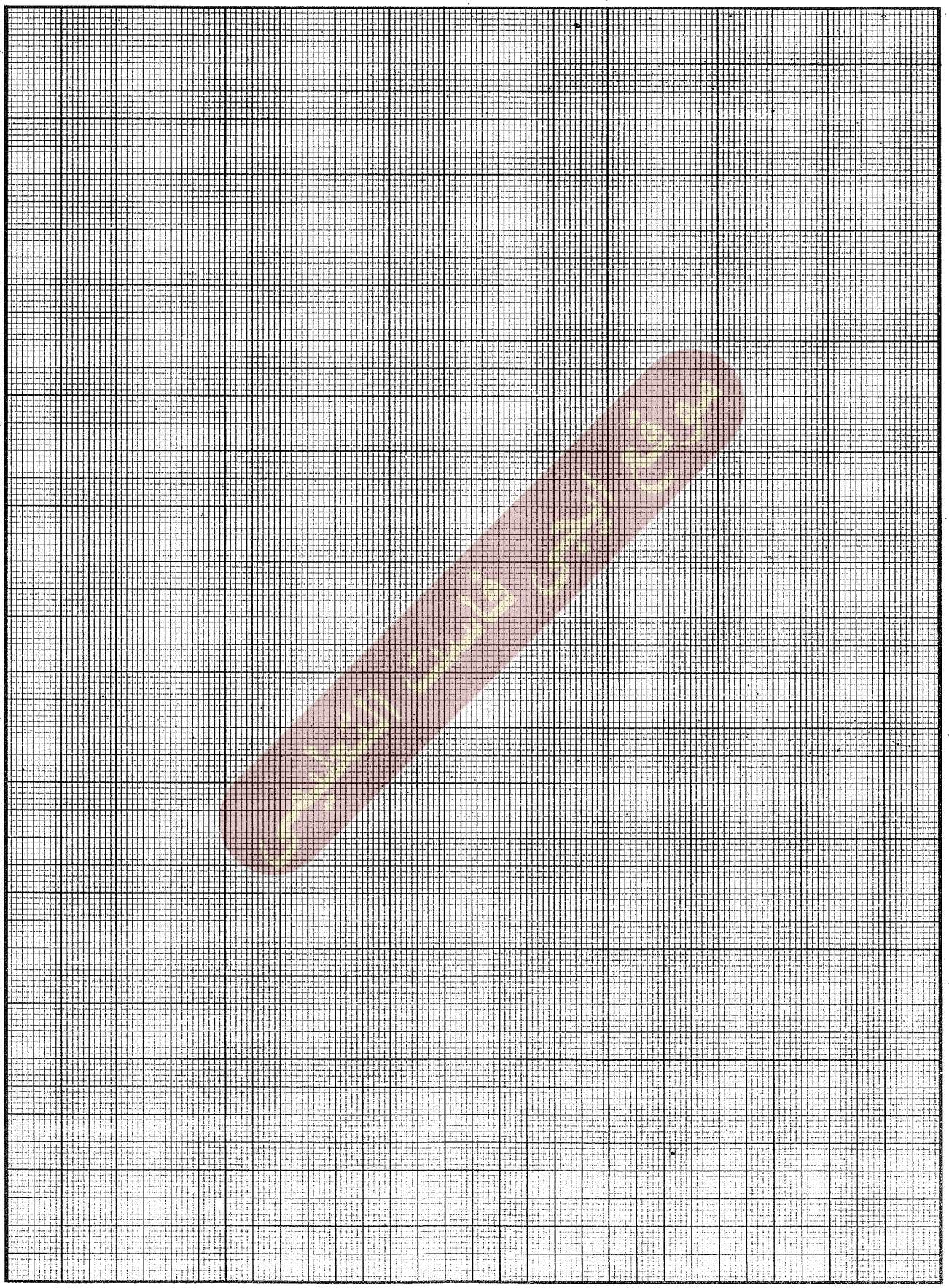
موقع أيجى فاست التعليمى



2012 (Second Session)

[1] Mention one condition to get torque acting on a rectangular coil carrying current placed in a magnetic field is equal to zero.

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[2]What happens to the wavelength of an electron on increasing its velocity?

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[3] Compare between:

Shunt resistor and multiplier resistor (with respect to connection method with the galvanometer).

	Shunt resistor	**multiplier resistor**
The connection method with the galvanometer		

[4]What happens to the frequency of an X-ray photon on colliding with a free electron?

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[5] What's meant by: Electric conductivity of a material?

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[6]Mention one use for: The spectrometer.

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[7] What's meant by: Coefficient of self-induction of a coil?

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[8]Mention one use for: The resonant cavity.

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[9]Give reason for: Helium gas and neon gas are suitable for producing gas laser.

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[10] The alternating induced electromotive force that produced due to the rotation of a coil in a magnetic field is given by the relation. emf = 180 sin 18000 t **Calculate:**
i-The effective induced electromotive force.
ii-The frequency.
iii-The induced electromotive force after 5 millisecond from the position at which the plane of the coil is perpendicular to the magnetic field.

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[11] Choose the correct answer from those between brackets:
When the length of a copper wire is doubled, and its cross section decreases to its half, its resistance .....
(a)is doubled (b)decreases to its half (C) increases 4 times

[12]Explain the scientific idea for: The electron microscope.

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[13] Explain the scientific idea for the induction furnaces.

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[14]Choose the correct answer:
To get P-type crystal, the semiconductor crystal must be doped with .....
(a)Antimony
(b) Boron
(c) Phosphorus

[15] Explain the scientific idea for the electric motor.

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[16]Mention without explanation three characteristics of: Leman's series.

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[17] Give reason for: Using step-up voltage transformers at electric power stations.

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[18]Mention without explanation three characteristics of: X-rays.

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[19] Give reason for: The continuity of rotation of the electric motor in the same direction.

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[20]Compare between:

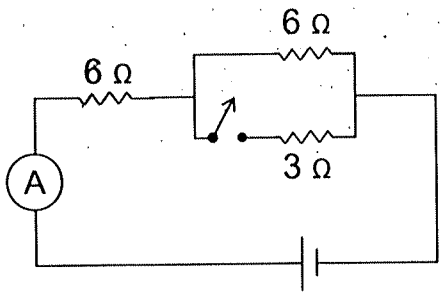
(AND) gate and (OR) gate (with respect to the equivalent drawing).

	AND	OR
the equivalent drawing		

[21] In the illustrated circuit the reading of the ammeter = 2 Amperes, when the key is closed the reading becomes 2.8 Amperes.

i- Calculate the internal resistance of the battery.

ii- Calculate the E.M.F. of the battery.



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[22]Compare between:
N-type and P-type (with respect to the type of charge carriers).

	N-type	P-type
type of charge carriers		

[23] Mention one use for the Ohmmeter.

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[24]Compare between:
Spontaneous emissions and stimulated emissions (with respect to conformity to the inverse square law).

	Spontaneous emissions	**stimulated emissions**
conformity to the inverse square law		

[25] [Added] Egypt 1993: Using the illustrated circuit and the given information, find the reading of each of the four voltmeters.

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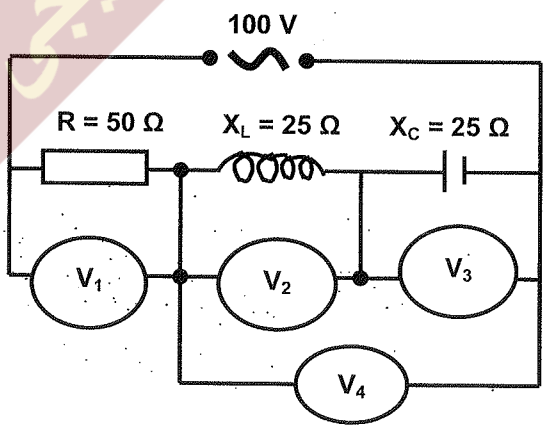

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[26]Mention one condition to get:
The emission of electrons from surface of a metal.

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[27]Mention one condition to get:
The laser action.

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[28] [Added] For the circuit shown find I_1 and I_2 .

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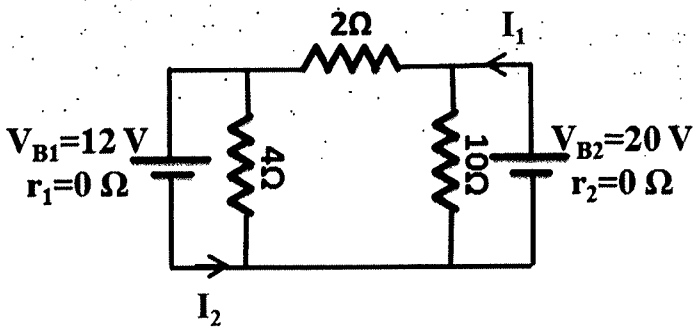

[29] A metal wire of one meter length carrying current 10 Amperes in a magnetic field of density (B), the table illustrates the relation between the force acted on the wire in Newton (F) and sine the angle between the field and the wire (θ).

F(N)	0.2	0.4	0.6	0.8	1	1.2
Sin θ	0.1	0.2	0.3	0.4	0.5	0.6

Draw the graphical relation between the force (F) in Newton on the vertical axis and (sin θ) on the horizontal axis.

[30] From the graph: find:

a) Find the force affecting the wire when it becomes perpendicular to the magnetic field.

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b) Find the magnetic flux density.

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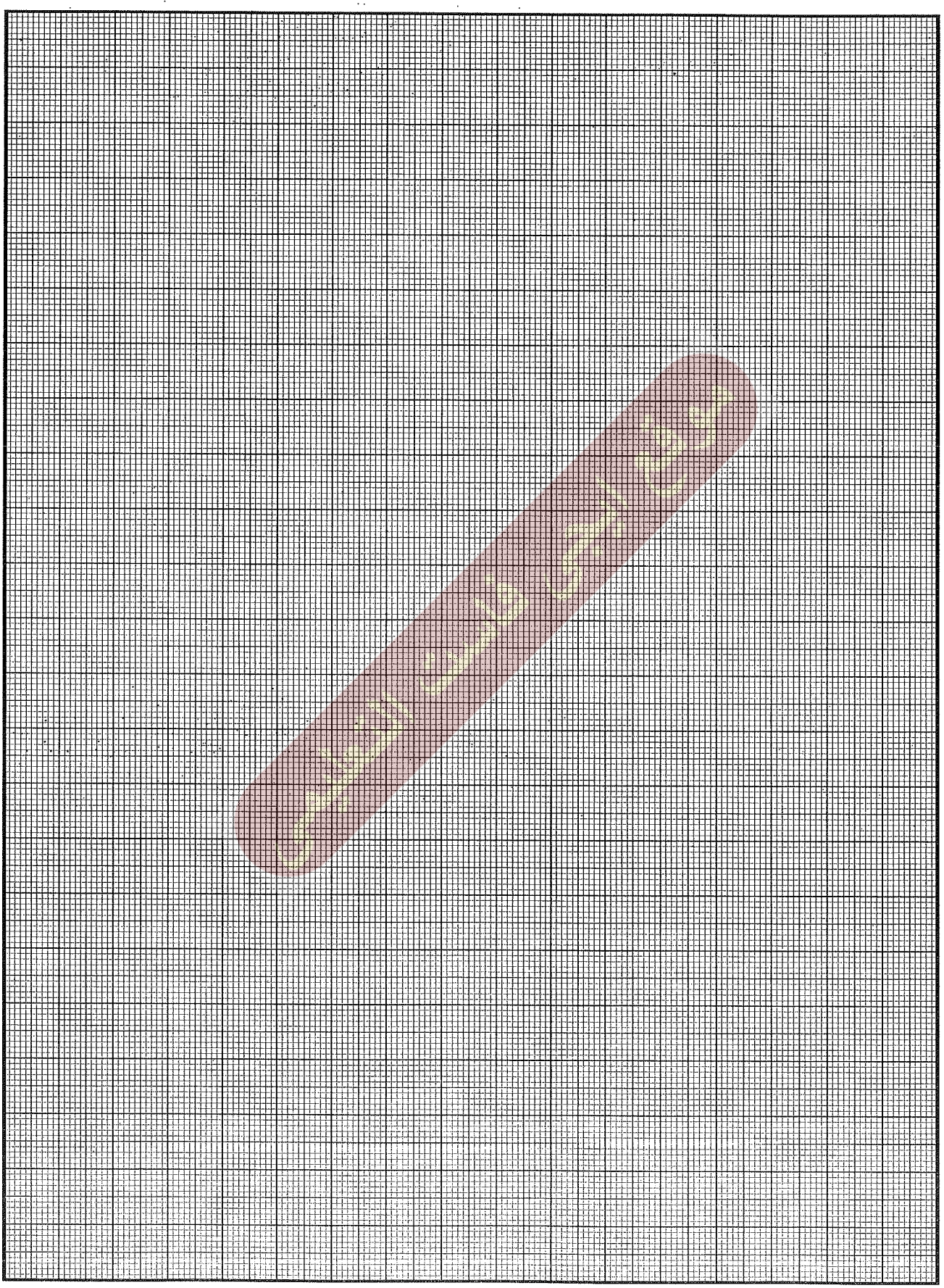

[31] (Added) State the conditions required to Investigate the details of the object

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[32] (Added) State one use for The commutator " two halves of a hollow metallic cylinder insulated from each other" in the Motor

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[33] (Added) Mention two factors affect the magnetite of the magnetic dipole moment of a coil

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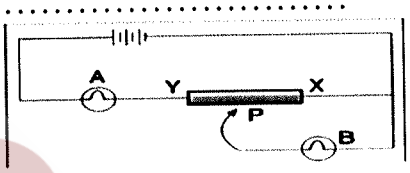
[34] (Added) Choose the correct answer:

In opposite circuit; what will happen to the two lamps lighting A,B in the circuit when the slider [p] is moved from point X to Y (neglect the internal resistance the battery)



	Lamp A	Lamp B
A	Doesn't change	Increase
B	increase	Increase
C	decrease	Doesn't change
D	increase	Decrease

[35] (Added) Write down the scientific term:

a)It is the state where the number of atoms in the excited level exceeds the number of atoms in the lower level

.....

b)Excitation by light energy in the laser

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[36] (Added) Choose the correct answer:

i)Fraunhofer lines in the solar spectrum are:

(a) Emission continuous spectrum

(b) Emission line spectrum

(c) Absorption line spectrum

(d) Absorption continuous spectrum

ii) x – rays are used in imaging bones because:

(a) They can't deflect by electric field

(b) They can reflect from metallic surface

(c) They can penetrate matter with different degrees

(d) They can ionize gases

[37] (Added) Mention ONE application for: Thermionic effect

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[38] (Added) Light beam of wavelength 8 $\times 10^{-7}$m and power 200W falls on certain surface. ($h=6.625\times10^{-34}$J.S ; C= 3×10^{8}m/s) Calculate:
i. The momentum of the photon from this radiation.
ii. The force by which the light beam act on the reflecting surface .

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[39] (Added) Mention the scientific term The sum of currents (concerning their directions) at any node in the closed circuit equals ZERO .....

[40] (Added) State the scientific idea for the hot wire ammeter

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[41] (Added) write the mathematical formula of Ampere circular law .....

[42] (Added) Find the binary number which equivalent to the decimal number $(101)_{10}$

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[43] (Added) When does each of the following values equals zero:
a- The induced E.m.f in a straight wire moving in a uniform magnetic field.

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b-The E.m.f induced from the rotation of the coil's dynamo

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[44] (Added) Explain *how you can recognize diode and linear resistance (Ohmic resistance which its coil is double wounded) by using ohmmeter.*

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[45] (Added) A galvanometer of resistance 20 Ω if it is shunted by a 5 Ω resistor
a) Find how many times its range of current intensity increase?
b) How many times its sensitivity decreases?

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2013 (First session)

[1] What is the scientific idea on which operation of the electric transformer **depends?**

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[2]Find the decimal number of the following code in Binary system $(10100)_2$

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[3] State two factors only on which the magnetic dipole moment **depends:**

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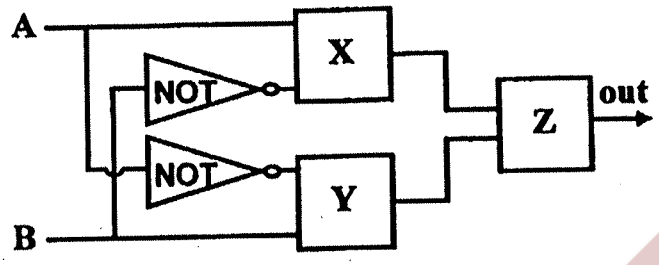
[4]From the given truth table
Deduce the types of the gates (X ,Y, Z).



A	B	out
0	0	0
1	0	1
0	1	1
1	1	0

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[5] What is meant by: Self-induction coefficient of a coil = 0.5 Henry?

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[6]Choose the correct answer:

The spectrum resulting from the transfer of excited atoms from a high energy level to lower level is called ..... spectrum.

(a) absorption
(b) emission
(c) continuous

[7] Compare between:

Ampere's right hand rule and Fleming right hand rule with respect to the use of each.

	Ampere's right hand rule	Fleming right hand rule
The use		

[8]Mention one use for: Cathode ray tube.

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[9] A copper wire of length 50.24 m and cross sectional area 1.79×10^{-7} m^2 is wound as a circular coil; its number of turns is 200 turn each of radius 4cm. Its two terminals are connected to a direct current source of electromotive force 12 volt and internal resistance 1 Ω .

Knowing that copper resistivity is $1.79\ x10^{-8}$ Ω.m, $\pi = 3.14$, $\mu_o = 4\pi\ x10^{-7}$ web/A.m.

(a) **Calculate** the current intensity flowing through the wire.

(b) **Calculate** the magnetic flux density at the center of the coil.

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[10]Mention one use for: The reference beam for producing 3D image of an object.

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[11]Mention one use for: Coolidge tube.

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[12] An alternating current dynamo has a coil of 200 turns of mean dimensions [30cm, 40 cm]. If it rotates in a uniform magnetic flux with frequency $\frac{50}{\pi}$ cycle/sec, an effective emf = 141.4 volt is produced.

Calculate:

(i)Maximum value of the produced electromotive force.

(ii)Magnetic flux density affecting the coil.

(iii) The average emf produced through $\frac{1}{4}$ cycle from the position in which the coil plane is perpendicular to the field, $\pi = 3.14$

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[13] What are the results of Switching off an electric circuit of a strong electromagnet coil connected in series to a battery and a switch ?

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[14]Write down the physical quantities that measured by J/Hz and mention an equivalent unit for it:

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[15] Explain why the equivalent resistance of a group of resistors connected in parallel decreases?

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[16]Explain the following:
Radiations emitted from the earth can't be seen.

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[17] Write down the equivalent unit of (N/A.m) **and mention the physical quantity that is measured by it.**

	The equivalent unit	The physical quantity
N/A.m		

[18]What are the results of...?
Changing the target element in Coolidge tube by another one of higher atomic number.

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[19] Write down the equivalent unit of (Tesla.m^2/s) **and mention the physical quantity that is measured by it.**

	The equivalent unit	The physical quantity
Tesla.m^2/s		

[20]Compare between: Spontaneous emission and stimulated emission (by drawing only).

	Spontaneous emission	stimulated emission
by drawing only		

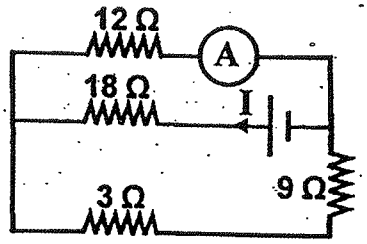
[21] Choose the correct answer:

In the shown circuit, the ammeter reading equals.....

(a) I

(b) I/2

(C) I/3



[22]Compare between:

Balmer and Lyman series in hydrogen atomic spectrum with respect to the wavelength of radiation emitted from each.

	Balmer series	Lyman series
wavelength of radiation emitted		

[23] A sensitive galvanometer of coil resistance 50 Ω , gives full scale deflection at current intensity 40 mA. It is desired to be used as an ohmmeter using a standard resistor and an electric cell of electromotive force 3 volt. (of negligible internal resistance). Calculate:

i) The value of the standard resistance .

ii) The external resistance needed to make the pointer deflect to 1/4 its full scale.

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[24]What is meant by: Current gain of a transistor = 300?

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[25] What is the scientific idea on which operation of <u>Laser action</u> depends?

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[26] [Added] Egypt, 1995: A battery of e.m.f. 12 volts is connected in series to an inductive coil. The current flowing is 2 Amp. If the battery is replaced by an AC source of an effective value of 12 volts, the current flow will be 1.2 Amp. When a capacitor is connected in series to the coil in the second circuit, the current intensity increases to its value in the first circuit (2 Amp). Neglecting the internal resistance of the power sources. Calculate:

a) The ohmic resistance of the coil.
b) The inductive reactance of the coil.
c) Is the last circuit, consisting of the AC supply, coil and capacitor, in resonance or not? Why?

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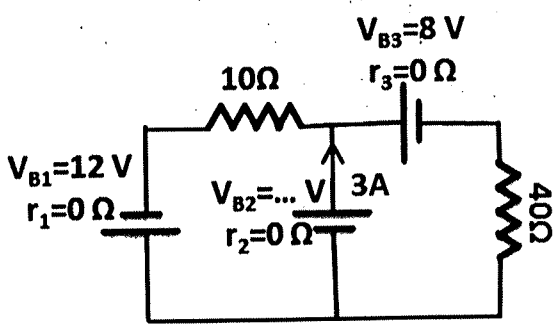
[27] [Added] Calculate the voltages (V_{B2}) and the potential difference across 40Ω resistor in the illustrated circuit



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[28] (Added) Calculate the radius of the second energy orbit of hydrogen atom electron, knowing that the wavelength associated with the moving electron is 9.9A° $(\pi = \frac{22}{7})$

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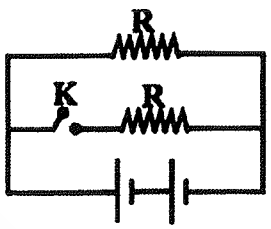
[29] (Added) Choose the correct answer:

In the shown circuit when the key is closed (switched on) , the power consumed from the source will …



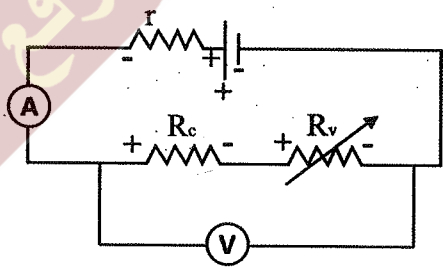
(a) increase

(b) decrease

(C) not change

(d) becomes zero

[30] (Added) Choose the correct answer: In the circuit shown in the figure, If the variable resistance R_V is increased, the reading of the voltmeter will



(a) decrease (b) increase

(c) remain constant (e) vanish

[31] (Added) when does the following value equal zero?

The total magnetic flux densities at point in the mid distance exactly between two wires carrying electric currents in same direction

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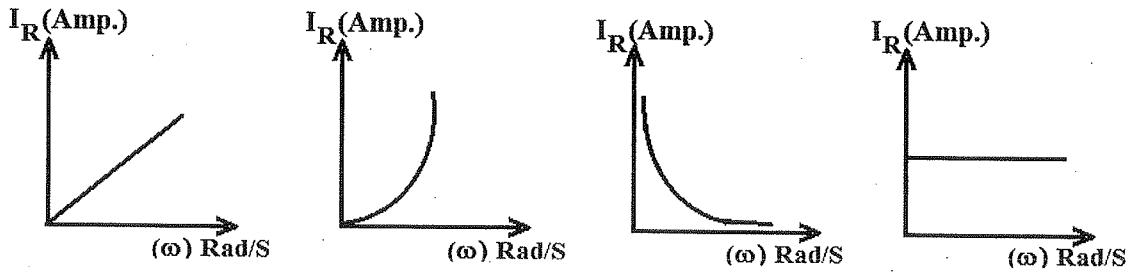
[32] (Added) Choose the correct answer: The relation between the current intensity in AC circuit consists ohmic resistor and the angular velocity of the source can be represented graphically as….



(a) (b) (c) (d)

[33] (Added) State one use for: Compton effect

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[34] (Added) Compare between photons and electrons with respect to: mass at rest

	photon	**electron**
Mass at rest		

[35] (Added) Choose the correct answer: When a coil rotate between 2 poles of magnet ; the magnetic flux (ϕ_m) through the coil becomes 1/2 its maximum value when .....

(a) The coil's plane is perpendicular to the magnetic flux lines
(b) The coil's plane is parallel to the magnetic flux lines
(c) The normal to the coil's plane makes angle 30° the magnetic flux lines
(d) The normal to the coil's plane makes angle 60° the magnetic flux lines

[36] (Added) Give reason for:

a) Tungsten is commonly used in Coolidge tube

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b) Cesium is preferable in the photoelectric cells

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[37] (Added) What is the hologram, and on what physics principle is it based?

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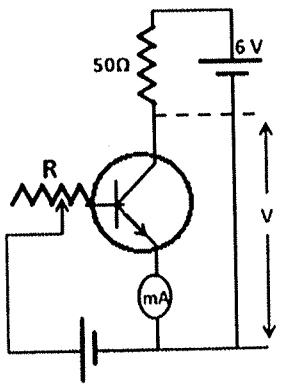
[38] (Added) The figure illustrates a transistor as a switch



1-is the transistor at [ON] or [OFF] position
2-If the milli-ammeter reads 100mA and the current gain of the transistor =49, find the voltage (V).
3-What happens to the voltage (V) when the resistor (R) is decreased?

Note (6V battery has negligible internal resistance)

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[39] (Added) Choose the correct answer: If the unknown resistance that measured by the ohmmeter is three times the total resistance of the instrument, than the pointer of the instrument will deflect to:

(a) half the scale (b) one third the scale

(c) quarter the scale (d) one fifth the scale

[40] (Added) Give reasons for: If the electric potential of the base of NPN transistor is high (+Ve) ,it is considered at ON position

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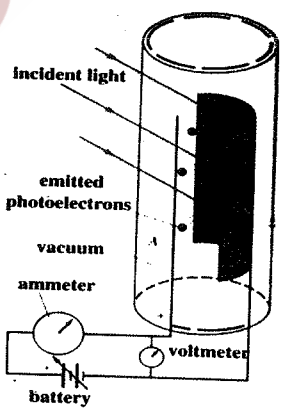
[41] (Added) Choose the correct answer: If the phase difference between the reflectred rays and the reference beam is 4π

Then the path differnce is... (a) 2λ (b) 0.5λ (c) λ (d) 4λ

[42] (Added) : If the work function of cesium is 1.9 ev

a) What is the threshold frequency of cesium

b) Find the kinetic energy of the emitted photoelectrons when blue light of wavelength 400nm falls on it



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[43] (Added) If the alternating e.m.f. can be calculated from the relation:

$E = 200 \sin 100\pi t$; Calculate :

a) The effective e.m.f.

b) The current frequency.

c) The consumed energy in a resistor of 20 Ω during one cycle only of the alternating current.

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موقع ايجي فاست التعليمي

[44] (Added) the following table represent the relation between the wavelengths of photons of electromagnetic wave (λ) and the reciprocal of momentum for each photon ($1/P_L$)

λ ($\times 10^{-10}$m)	1	3	5	7	9
$1/P_L$ ($\times 10^{22}$ kg $^{-1}$ m^{-1}s)	15	45	75	105	135

Draw the relation between (λ) on Y-axis and ($1/P_L$) on X-axis

[45] (Added) from graph find:

1. Planck's constant.

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2. The linear momentum of a wave's photon of wavelength = 6A°.

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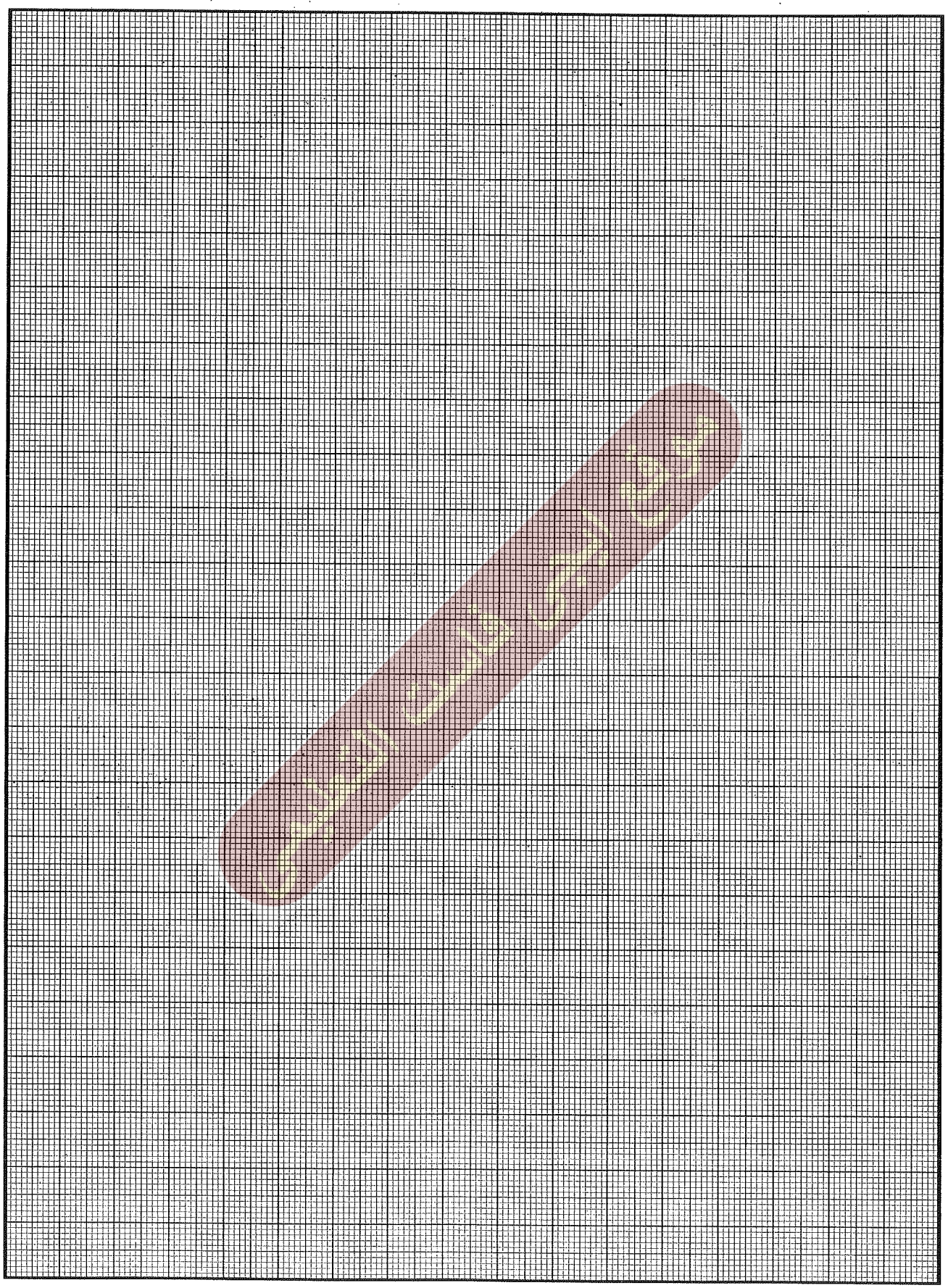
موقع إيجي فاست التعليمي



2013 Second Session

[1] What is meant by: The intensity of electric current is 0.3 Ampere?

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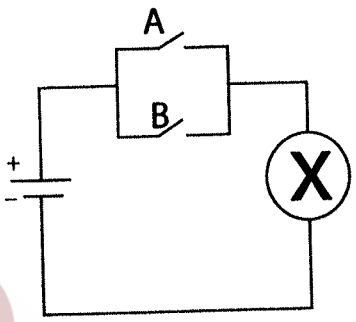
[2] The shown figure represents the equivalent electric circuit for a logic gate:

(i)Mention the **type of the gate** represented in the drawing, and then draws the symbol of the gate



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(ii)Write the truth table in case of lightening the lamp

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[3] What is meant by: Resistivity of material = 5×10^{-7} Ohm.m?

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[4] Mention **one use only for** Microwaves

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[5] What is meant by: The effective value of the A.C current = 5 Ampere ?

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[6] Compare between electron and photon from point of view of Charge, mass and energy

	electron	photon
charge		
Mass		
Energy		

موقع أين فاسك التعليمي

[7] What is the scientific idea on which operation of the alternating current dynamo **depends?**

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[8]Choose the correct answer:

Mass of the photon during its motion is.....

(a) $h\nu/c^2$

(b) Zero

(c) $h\nu/c$

[9] What is the scientific idea on which operation of the electric motor **depends?**

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[10] Write down the scientific term for the following statement:

When a high-frequency photon collides with a free electron, the photon frequency decreases and its direction changes

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[11] Explain with drawing an experiment to demonstrate the mutual induction between two coils and how can you generate induced current in the secondary coil

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[12] Write down the scientific term for the following statement:

The wavelength of maximum intensity (λ_m) is inversely proportional to the temperature

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[13] A solenoid consisting of 400 turns, each of crosses sectional area 4 cm^2 is placed perpendicular to a uniform magnetic field of flux density 0.3 Tesla. Calculate the average induced electromotive force generated in the solenoid when:

a) The magnetic flux density increases to 0.5 Tesla through 2 millisecond

b)The magnetic flux density decreases t0 0.2 Tesla through 2 millisecond

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[14] Mention four properties for x-ray.

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[15] Explain the role of the electric field between the target and the filament in Coolidge tube

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[16] Compare between:

Fleming right hand rule and Fleming left hand rule with respect to the use of each

	Fleming right hand rule	**Fleming left hand rule**
the use		

[17] What is the role of Helium atoms in (helium – Neon) laser device, Mention two properties only of laser rays

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[18] Write down the scientific term for the following statements:

A very high resistance joined in series with the moving coil galvanometer, to convert it to voltmeter

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[19]Compare between each of the following:

P-type crystal and N-type crystal with respect to the charge carries

	P-type crystal	N-type crystal
the charge carries		

[20] Mention only one factor affecting the resistance of a wire **and mention the mathematical relation.**

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[21]What is meant by?

The critical frequency of a metal surface = 3.35×10^{14} Hertz

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[22] Mention only one factor affecting the magnetic flux density at the center of a circular coil **and mention the mathematical relation.**

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[23] Choose the correct answer:

If the electromotive force of a source is 12V, the potential difference across its two terminals when current flowing in a closed circuit is.....12V

(a)Less than

(b) More than

(C) Equal to

[24] Choose the correct answer:

The torque acting on a coil carrying a current in a uniform magnetic field becomes maximum when the plane of the coil is..... the direction of the magnetic field

(a)Perpendicular to

(b) Parallel to

(C) inclined by an angle 30° to

[25] Choose the correct answer:

The existence of a cylinder made of soft iron in the moving coil galvanometer make the magnetic flux lines in the shape of

(a)Straight lines

(b) Circles

(C) radial

[26] An electric current of intensity 5A flows through a straight wire. Calculate the magnetic flux density produced, at a point in air of perpendicular distance 10 cm from the wire. If another wire of length 50 cm carries an electric current of intensity 2A, is placed at the point. Calculate the force acting on this wire as it is affected by the field ($\mu - 2 \times 10^{-7}$ weber/A.m)

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[27] Mention one use only for the shunt resistance

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[28] A copper wire of length 50.24 m and cross sectional area 1.79×10^{-7} m^2 is wound as a circular coil; its number of turns is 200 turn each of radius 4 cm. Its two terminals are connected to a direct current source of electromotive force 12 volt and internal resistance 1Ω. If you know that copper resistivity is 1.79×10^{-8}Ω.m,

(π=3.14Ω.m, μ=4πx10^{-7}web/A.m)

Calculate:a) Current intensity flowing through the wire

b) Magnetic flux density at the center of the coil

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[29] Give reasons for:

The ohmmeter is joined with a fixed resistance and a variable resistance

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[30] Give reasons for:

Transformer cannot operate using direct e.m.f

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[31] Give reasons for:

There is no ideal transformer (100%efficiency)

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[32] [Added] Al-Azhar, 1995: A coil of negligible ohmic resistance and of inductance 1 Henry is connected in series with an ohmic resistance of 300 Ω and AC mains of e.m.f. 200 V and frequency 700/11 HZ. Find the potential difference across the terminals of each of the coil and the resistance.

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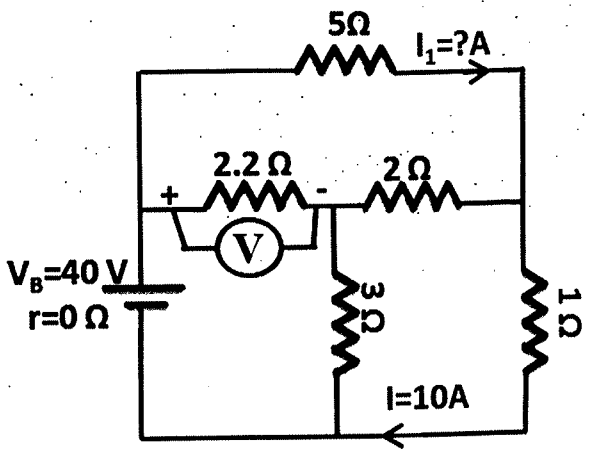
[33] [Added] In the illustrated circuit, Calculate the current (I_1) and the reading of the voltmeter.



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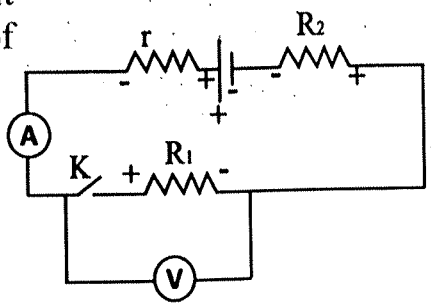
[34] (Added) Choose the correct answer: In the circuit shown in the figure, If the Key (K) is open; the reading of the voltmeter will be equal to .....

(a) zero (b) nearly equal V_B
(c) more than V_B (e) can't be detected



[35] (Added) When does the following value equal zero?

The total magnetic flux densities at point in the mid distance between two wires carrying electric currents have same intensity

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[36] (Added) Choose the correct answer: If the unknown resistance that measured by the ohmmeter is twice the total resistance of the instrument, than the pointer of the instrument will deflect to:

(a) half the scale (b) one third the scale
(c) quarter the scale (d) one fifth the scale

[37] (Added) Give reason for:

a) X-ray penetrate the media easily

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b) Dark lines appears in the solar spectrum

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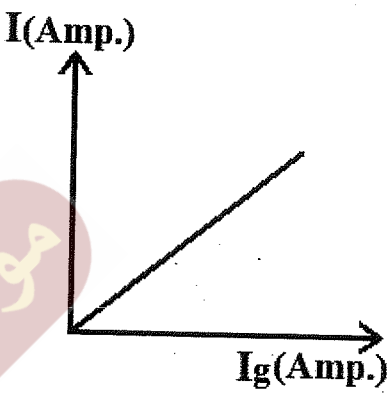
[38] (Added) the opposite graph represents the relation between the total current passes through the ammeter(I) and the current passes through its coil (I_g); write down its expressing relation and what does the slope means



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[39] (Added) Choose the correct answer:

A coil is rotated between 2 poles of magnet ; as it makes angle 60° starting from the normal position.....

(a)the magnetic flux (ϕ_m) through the coil becomes 1/2 its maximum value

(b)the magnetic flux (ϕ_m) through the coil becomes zero

(c)the magnetic flux (ϕ_m) through the coil becomes $\frac{\sqrt{3}}{2}$ its maximum value

(d)the magnetic flux (ϕ_m) through the coil becomes 1/3 its maximum value

[40] (Added) Give reasons for: If the electric potential of the base of NPN transistor is low (-Ve),it is considered at OFF position

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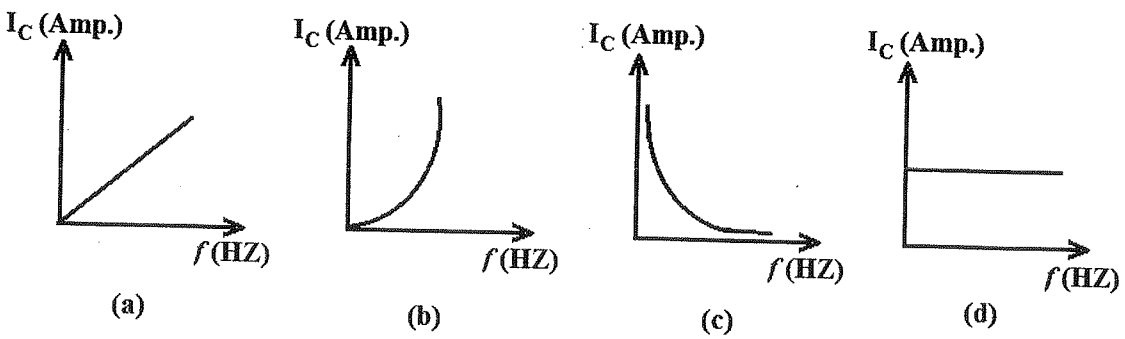
[41] (Added) Choose the correct answer: The relation between the current intensity in AC circuit consists capacitor and the frequency of the current can be represented graphically as....



[42] (Added) Give reasons for: The existence of a reflected mirror and semi reflected in the (He – Ne) laser apparatus.

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[43] (Added) write down the scientific term: It is a vector emanating from the north pole of the coil perpendicular to the coil's plane; Its direction can be detected in direction of advancing(motion) of a right hand screw if it was twisted in the direction of the current

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[44] (Added) A simple A.C. generator consists of a coil of cross section area ($0.125m^2$) the number of turns is 200 turn rotates in a magnetic field of flux density (B) Tesla with constant frequency (f)Hz. The following table illustrates the relation between the induced e.m.f. in the coil (ε.m.f) and the time taken through one complete revaluation.

ε.m.f (volts)	0	22	31.4	22	0	-22	-31.4	-22	0
Time (millisecond)	0	2.5	5	7.5	10	12.5	15	17.5	20

Draw a graphical relation between (time) on the x-axis and (ε.m.f) on the (y)-axis

[45] (Added) From the graph find:

a- The maximum value of the ε.m.f induced

b- The frequency (f) with which the coil rotates in the magnetic field.

c-The magnetic flux density.

d- The instantaneous e.m.f. when the coil's plane makes an angle $60^{\circ}$with the magnetic flux.(π =3.14)

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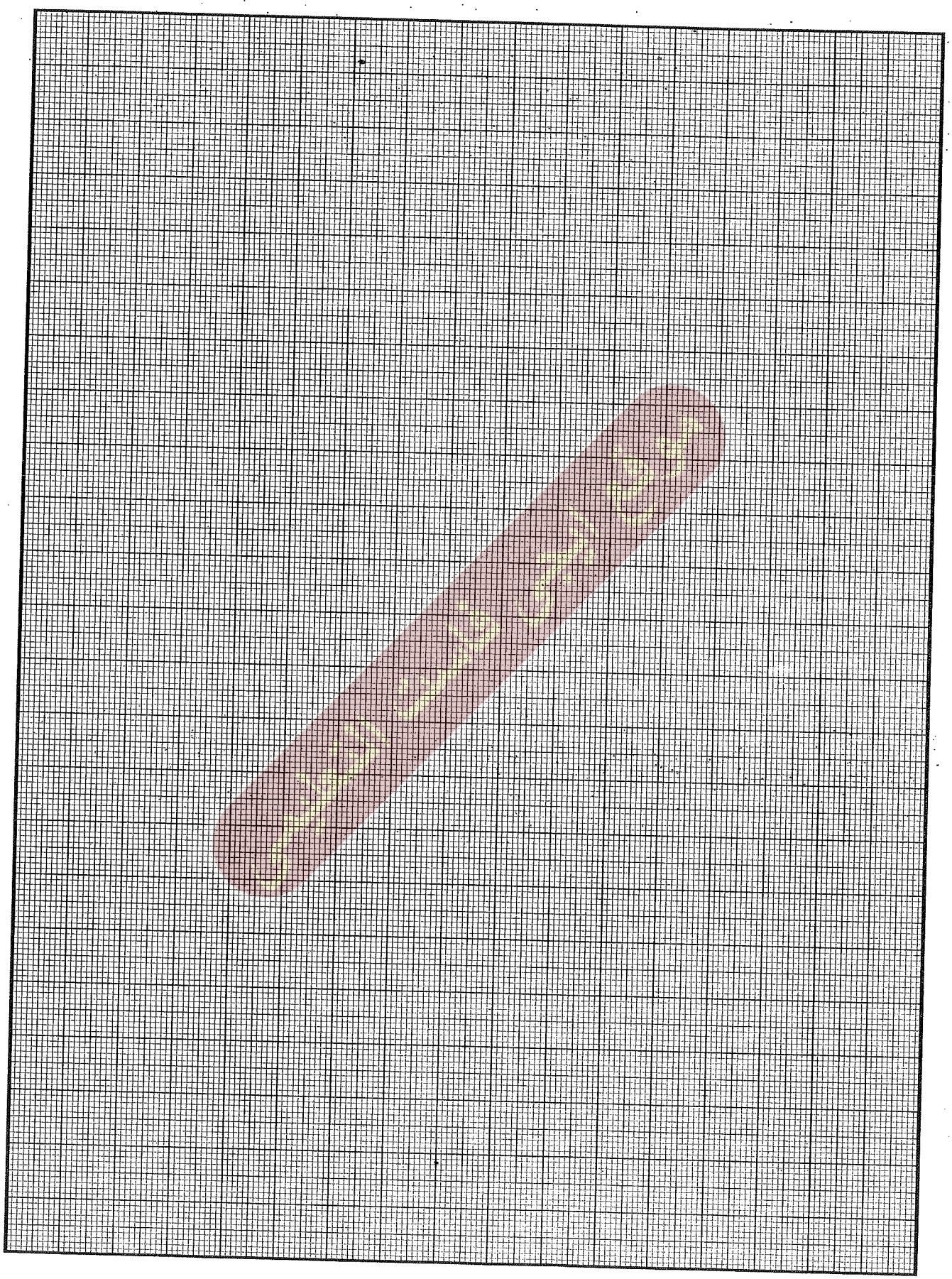

2014 First Session

[1] Mention the scientific idea of the electric transformer

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[2]What are the results of the absence of two parallel mirrors at the two ends of the laser tube?

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[3] Mention the scientific idea of the induction furnaces

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[4]What are the results of relaxation of an excited atom from an excited state to lower state after the life time interval is over?

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[5] Mention the scientific idea of the direct current ammeter

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[6]Choose the correct answer: A monochromatic light falls on a metal surface, electrons are freed if another monochromatic light of higher frequency and the same intensity fall on the same metal, the number of emitted electrons.....

(a)Increases
(b) decreases
(c) is not changed

[7] What is meant by electric conductivity of material?

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[8]Choose the correct answer: Laser rays are characterized by keeping their intensity for long distances, this means that they.....

(a)Have one wavelength
(b)are coherence
(c) don't obey the inverse square law

[9] Give reasons for:

The two poles of the permanent magnet in the sensitive galvanometer are concave

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[10]By using the following physical units, from three groups of equivalent units then state the physical quantity measured by each group:

1-$Kg.m^2/s$ 2-V.s/A 3-Tesla.m/A

4-V.s/A.m 5-Ω.s 6-J.s

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[11] Give reasons for:

Equality of the electric potential difference across the two poles of an electric cell and its electromotive force when no current flows through its circuit

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[12]Deduce a relation to calculate the force resulted from collision of photons with surfaces at a rate φ_L

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[13] A sensitive galvanometer of coil's resistance 50Ω, gives full scale deflection when a current 0.002A flows through it, it is connected to a multiplier resistance of 450Ω to convert it into a voltammeter, what is the maximum range of such voltmeter? If it is desired to use the voltmeter to measure the electric current intensity by connecting it with a shunt resistance 0.1Ω, what is the maximum current intensity that can be measured by it?

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[14]Mention one use only for The reference beam in holography.

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[15] Write the scientific term of the following statement:

A flow of electric charges in a conductor

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[16]Mention one use only for Coolidge tube.

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[17] Write the scientific term of the following statement:

The scale deflection per unit current intensity flowing through the coil of a galvanometer

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[18]Mention one use only for the transistor.

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[19] Mention one factor only from the factors that affect the magnetic force acting in a straight wire carrying an electric current placed perpendicular to a uniform magnetic field.

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[20]Compare between:

Spontaneous emission and stimulated emission of radiation (concerning the wavelengths of the emitted radiation)

	Spontaneous emission	stimulated emission
the wavelengths of the emitted radiation		

[21] Mention one factor only from the factors that affect the coefficient of self induction a coil

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[22]Compare between:

Pfound's series and Balmer's series (concerning the wave length of the emitted radiation)

	Pfound's series	Balmer's series
the wave length of the emitted radiation		

[23] Compare between:

Ampere's right hand rule and Fleming's left hand rule (concerning the use of each)

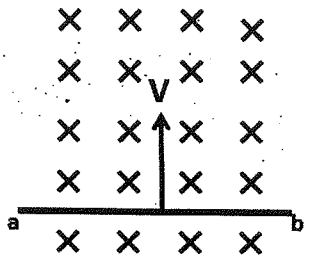
	Ampere's right hand rule	**Fleming's left hand rule**
The use		

[24] The opposite figure shows a metal rode (ab) of length 0.25m moving with a linear velocity 2 m/sec perpendicular to a magnetic field of flux density 0.4 Tesla and its direction is perpendicular to the paper inwardly:

1-Determine the direction of the current in the wire

2-Mention the name of the rule used to determine the direction of the current

3-Find the magnitude of the induced electromotive force in the wire



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[25]Mention one factor only from the factors that affect the wavelength of the line (characteristic) spectrum of X-rays.

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[26] Mention one use only for the ohmmeter

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[27]Write the scientific term of the following statement:

The minimum energy required to free the electrons from the surface of a metal

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[28] Mention one use only for Lenz's rule

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[29] What is meant by Fraunhofer lines?

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[30] By using the following physical units, from three groups of equivalent units then state the physical quantity measured by each group:

1-$Kg.m^2/s$ 2-V.s/A 3-Tesla.m/A

4-V.s/A.m 5-Ω.s 6-J.s

	Two equivalent units	The physical quantity
Group (1)		
Group (2)		
Group (3)		

[31] What is meant by Laser action?

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[32] An electric circuit contains four electric resistors (R_1, R_2, R_3, R_4) Ohm, if the electric current intensity that flows through each of them is (0.3, 0.3, 0.4, o.2) Ampere respectively and the value of $R_1 = 6\Omega$, $R_3 = 15\Omega$ and the internal resistance of the battery 1Ω

1-Show by drawing the method of connection of these resistors

2-Calculate the total resistance of the circuit

3-Calculate the electromotive force of the electric source

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[33] Mention the scientific idea of Cathode rays tube

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[34] When does the value of the torque acting on a coil through which an electric current flows and placed in a uniform magnetic field **equal zero?**

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[35] When does the value of the total magnetic flux density at a point outside two straight parallel wire carry electric current **equal zero?**

.....

[36] When does the value of the average electromotive force induced in a coil rotating in a uniform magnetic field **equal zero?**

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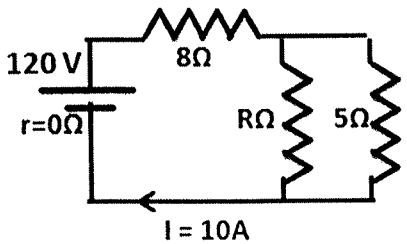
[37] Choose the correct answer:

In the opposite circuit the value of R =.....

(a)20 Ω

(b) 40 Ω

(C) 60 Ω



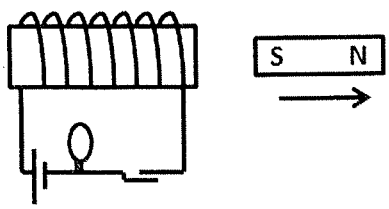
[38] Choose the correct answer:

In the opposite figure; When the magnet moves in the direction shown the intensity of illumination of the lamp.....

(a)Increases

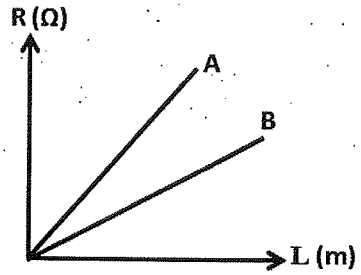
(b) Decreases

(C) Vanishes



[39] The opposite graph represents s the relation between the electric resistances (R) and the length (L) for two wires (A and B) of different materials having the same cross sectional area

(a)Which one of the two wires has greater specific resistance? and why?



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(b)If the two wires are connected together in parallel in an electric circuit, which one of them carries greater electric current? and why?

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[40] An A.C. dynamo its coil consists of 420 turn, the cross-area of each $3 \times 10^{-3} m^2$ rotates in a magnetic field of flux density 0.5 Tesla, if the coil starts rotating from the position perpendicular to the flux lines and reaches to maximum induced electromotive force after 1/200 sec (given that b=22/7) calculate:

1-The maximum induced electromotive force

2-The time needed for the current to reach half its maximum value

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[41] Chooseto answer (A) OR (B)

(A)What are the results of each of Flowing of electric currents in two opposite directions through two straight parallel wires close to each other?

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[42] What are the results of each of Flowing of direct electric current through a solenoid?

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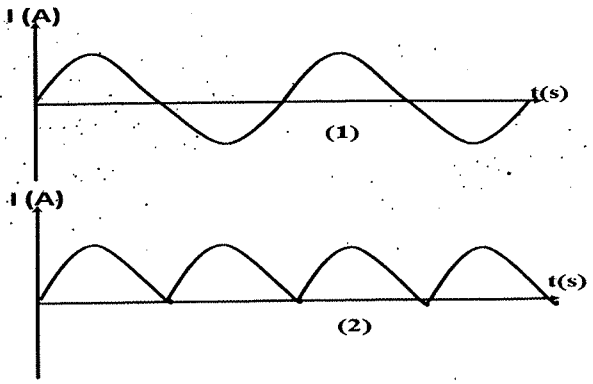
[42] Figure (1) shows the resultant current through the external circuit of an electric generator

Figure (2) shows the resultant current through the external circuit of the same electric generator after making a certain modification

(I) Whate is the difference between the two currents?



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(ii) What is the modification made on the electric generator?

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(iii)Why can't the ammeter be used to measure the resultant current in both figures?

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[43] [Added] An AC circuit consisting of a resistance 100 Ω, a coil of inductive reactance 125 Ω and a capacitor of capacity (C) microfarad , connected in series to a (220V, $\frac{280}{11}$ Hz) AC supply ; **Calculate:**

1. The value of (C) which maximizes the current intensity in the circuit.
2. The potential difference across each of the coil and the capacitor

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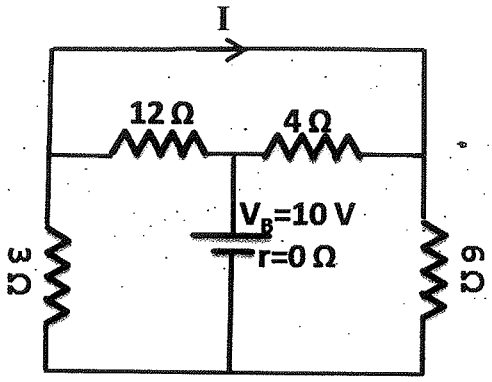
[44] [Added] In the shown figure calculate the current (I) and also the total resistance of the circuit.



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[45] An electric transformer of a changeable number of secondary coil turns (N_s) is used to obtain different values of output potential difference (Vs), the following table shows the relation between V_s on the y-axis and (N_s) on the x-axis

V_s (volt)	48	96	120	144
N_s (turn)	50	100	125	150

From the graph find:
1-The slope of straight line
2-The resultant power from the secondary coil when its number of turns becomes (N_s = 200 turn) and the resistance of its circuit is 75Ω

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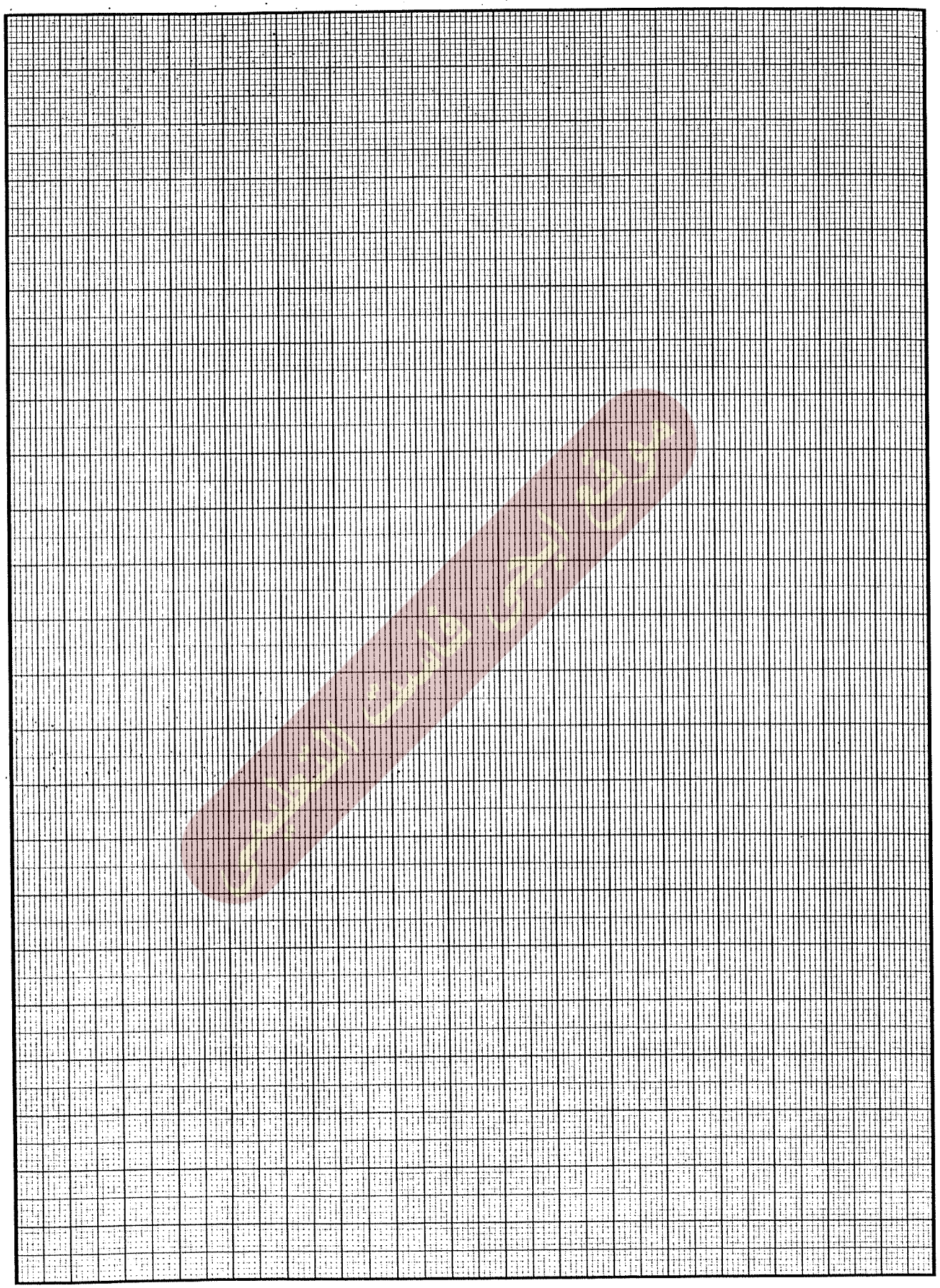

2014 Second Session

[1] Mention the name of one device whose scientific idea is based on coefficient of self-induction

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[2]Mention the mathematical relation used to calculate the wavelength of the characteristic x-rays

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[3] Mention the name of one device whose scientific idea is based on eddy current

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[4]Mention the mathematical relation used to calculate the force resulted from collision of photons with surfaces at a rate φ_L

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[5] Mention the name of one device whose scientific idea is based on Magnetic effect of the electric current

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[6]Give reasons for:

X-rays have a great penetrating power

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[7] Mention the scientific term that represents the following statements:

The magnetic flux density that exerts a force of 1N on a wire of length 1m carrying an electric current of intensity 1 Amp. When placed perpendicular to the field

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[8]Give reasons for:

In the electron microscope, as high voltage difference between the cathode and the anode increases the accompanied wavelength to the motion of electron decreases

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[9] Mention the scientific term that represents the following statements:
The ratio between the resultant (output) powers to the input power in a electric transformer

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[10] Choose the correct answer:
A monochromatic light fell on the surface of a metal and electrons are liberated from its surface. If the intensity of light increases the number of liberated electrons
(a)Increases (b) decrease (c) remain unchanged

[11] A sensitive galvanometer its coil consists of 100 turn, the cross sectional area of each is 5 cm^2 and its pointer deflects to the end of its scale when an electric current 0.4 mA flows through it, given that the magnetic flux density that affects it is 0.4T and the plane of the coil makes an angle 60° with the flux line. Calculate each of the following:
1-The magnetic torque that affects the coil
2-the resistance of the galvanometer's coil, if it is connected to a multiplier resistor 4000Ω to act as a voltmeter measures a potential difference of maximum value 5V

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[12] Choose the correct answer:
The photons emitted from the spontaneous emission have the same
(a)Frequency (b) phase (c) direction

[13] Compare between:
The shunt resistor and multiplier resistor (concerning their function with the galvanometer)

	The shunt resistor	**The multiplier resistor**
The function with the galvanometer		

[14] What are the results of Interference of the reference rays with the object rays in holography?

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[15] What is meant by the Magnetic dipole moment?

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[16] Mention one factor only affects the wave length of continuous spectrum of X-rays

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[17] What is meant by the electromotive force of an electric?

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[18]What is meant by the hologram ?

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[19] Mention one factor only from the factors upon which the resistivity of conductor **depends.**

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[20]What is meant by Wien's law **?**

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[21] Mention one factor only from the factors upon which the electromotive force induced in a coil **depends.**

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[22]If the energies of the first, the fourth, and the fifth energy levels of hydrogen atom are (-21.76×10^{-19}, -1.36×10^{-19}, -0.87×10^{-19}) joule respectively, given that the velocity of light 3×10^{8}m/s. calculate:

i-The wavelength of the radiation emitted when the electron, fall from the fifth to the first energy level

ii-The minimum frequency of Bracket's series ($h = 6.625 \times 10^{-34}$J/S)

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[23] Prove that the induced electromotive force generated between the terminals of wire moves perpendicular to a uniform magnetic field is determined from the relation e.m.f = -BLV

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[24]Compare between:

Two materials are used as a target in Coolidge tube. One of them has a larger atomic number and the other has a smaller atomic number (Concerning frequency of the line spectrum of each)

	larger atomic number	smaller atomic number
frequency of the line spectrum		

[25] A solenoid of 100 turns and cross sectional area 5 cm^2 is placed perpendicular to a uniform magnetic field of flux density 0.2T. Calculate the average induced electromotive force in the solenoid in the following cases:

i-If the solenoid is revolved a quarter revolutions within 0.1 sec

ii-If the solenoid is turned upside down within 0.2 sec

iii-If the magnetic flux density is decreased to 0.1T within 0.1 sec

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[26]Compare between:

X-rays and laser rays (Concerning the wavelength of each)

	X-rays	laser rays
the wavelength		

[27] What are the results of closing the circuit of the primary coil of a transformer while the circuit of the secondary coil is opened?

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[28]Mention the scientific term that represents the following statement:
A spectral series is produced due to returning the electrons in hydrogen atoms to the third energy level

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[29] What are the results of increasing the length of a conductor to double its value with decreasing its diameter to half its value?

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[30] Mention without explanation the main components of a laser device

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[31] What are the results of the absence of a variable resistor in the ohmmeter?

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[32]Mention the name of one device whose scientific idea is based on:
Dual nature of electron

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[33] Choose the correct answer:
The magnetic torque acting on a coil carrying an electric current and placed in a magnetic field is maximum value when the plane of the coil is
(a)Perpendicular to the field
(b) Parallel to the field
(C) Making angle 30° with the field)

[34]Mention the name of one device whose scientific idea is based on:
Population inversion

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[35] Choose the correct answer:

The average value of the electromotive force induced in the coil of the dynamo during one complete revolution starting from the perpendicular position equals

(a)Its maximum value

(b) Its effective value

(C) Zero

[36] Mention the physical quantity that is measured by the unit J/Ω. C . Then state an equivalent unit of it.

	The equivalent unit	The physical quantity
J/Ω. C		

[37] Mention the physical quantity that is measured by the unit J.sec/Amp. C. Then state an equivalent unit of it.

	The equivalent unit	The physical quantity
J.sec/Amp. C		

[38] Mention the physical quantity that is measured by the unit Volt.sec/meter^2. Then state an equivalent unit of it.

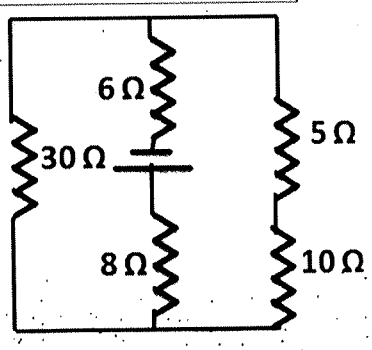
	The equivalent unit	The physical quantity
Volt.sec/meter^2		

[39] From the circuit shown in the figure calculate each of the following:

i-The equivalent resistance of the circuit

ii-the electromotive force of the source given that the electric current intensity flowing through resistor 30Ω = 1 Ampere.

And the internal resistance of the source r=2Ω



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[40]Answer (A) OR (B)

(A)Give reasons for:

The galvanometer can't be used to measure the intensity of alternating current

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(B) Give reasons for: The coils of electric transformer are made of copper

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[41] Explain with drawing Faraday's experiment to show electromagnetic induction

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[42] Mention the mathematical relation used to calculate the maximum electromotive force induced in the dynamo.

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[43] [Added] When an inductive coil is connected to a DC Supply of 6 volt and of internal resistance 1 Ω a current of 1.5 Ampere flows. When the source is replaced by an AC supply of 5 volt and of frequency 49 Hz the current flowing in the same coil is 1 Ampere. Calculate the self-inductance of the coil.

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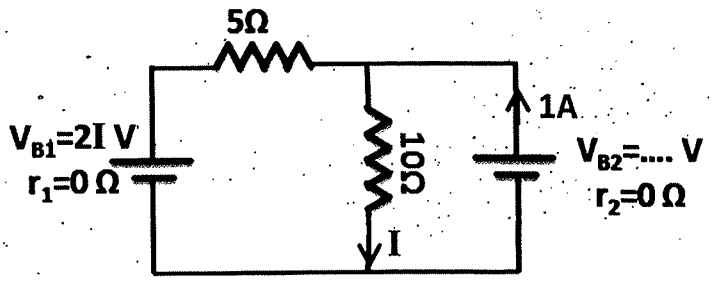
[44] [Added] Find V_{B2} in the illustrated circuit



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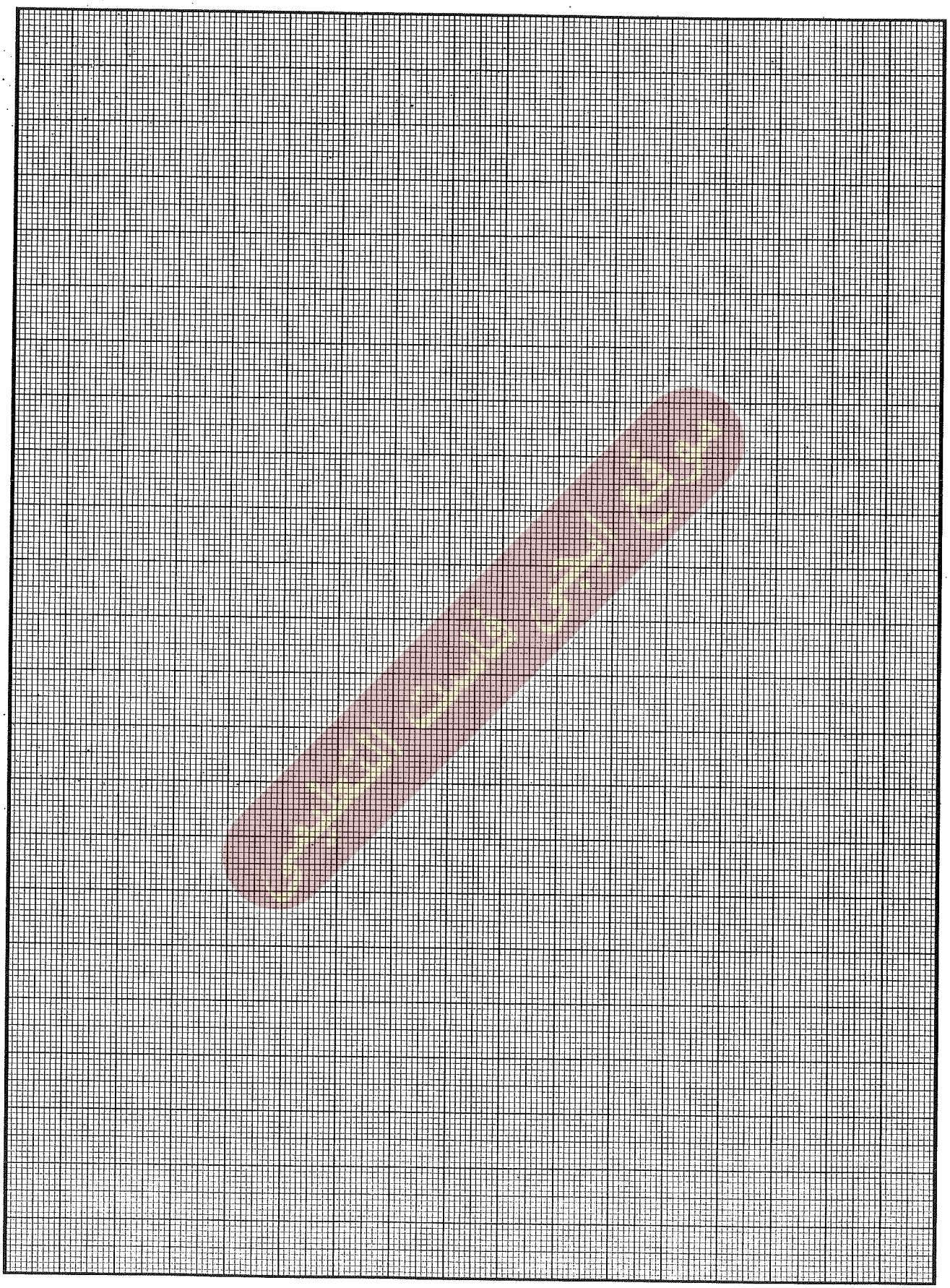

2015 First Session

[1] Mention one use for the voltammeter.

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[2] Mention three application of x-ray

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[3] Mention one use for the eddy currents.

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[4] Mention **three** properties of laser

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[5] Mention one use for the mutual induction between two coils.

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[6] Choose the correct answer:

Fraunhofer lines are examples of the.....spectrum

(a)Continuous emission

(b) Linear emission

(c)linear absorption

[7] Mention one use for the magnetic torque.

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[8] When is a crystal of a semiconducting material in a state of dynamic equilibrium?

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[9] What is meant by the electromotive force of a source?

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موقع إيجي ستيت التعليمي

[10] When is the atom of the active medium in the state of population inversion?

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[11] How do you explain the ohmmeter scale is opposite to that of the ammeter?

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[12] Mention one use for Microwaves

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[13] The potential difference across the primary coil of an ideal transformer is 240V.If the number of turns of its secondary coil is duple that of the primary coil and the intensity of current flowing through the primary coil is 3A

1-Mention the type of such transformer

2-Calculate each of the following:

a-The potential difference across the secondary coil

b-The intensity of current flowing through the secondary coil

c-The produced electric power

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[14] Mention one use for The Spectrometer

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[15] Write the scientific term for the following statement:

The induced current must be in a direction such that to oppose the change producing it

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[16] Mention one use for Thermal imaging

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[17] Write the scientific term for the following statement:

The magnetic flux density which exerts a force of one Newton on a current carrying wire of one meter length perpendicular to the magnetic field when the current is 1 Ampere

[18] Mention one use for P-N junction.

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[19] What is the mathematical relation for Ohm's law for closed circuit?

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[20] What is the mathematical relation for Law of mass action in semiconductors?

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[21] What is the mathematical relation for Ampere's circular law?

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[22] What is the mathematical relation for Calculation of wave length of the characteristic x-ray?

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[23] Compare between:

Shunt and multiplier resistors, concerning the way of connecting to the galvanometer

	The shunt resistor	**The multiplier resistor**
The way of connecting to the galvanometer		

[24] Write the scientific term of the following statement:

The spectrum that consists of all wave lengths or frequencies in a definite range

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[25] Compare between:

Right screw rule and Fleming right hand rule, concerning the use

	Right screw rule	**Fleming right hand rule**
The Use		

[26] Write the scientific term of the following statement:
The wavelength of the maximum intensity of radiation (λ_m) is inversely proportional to the temperature of the radiating source

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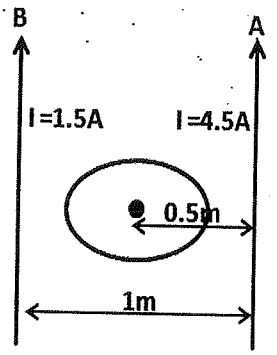
[27] Two straights wires (A) and (B) are placed (1m) apart from each of the flowing through wire (A) is (4.5 A) and that flowing through wire (b) is (1.5 A) in the same direction. A circular coil of one turn and radius = (10π cm) is placed between the 2 wires in the same plane and its center is at a distance (0.5m) from wire (A) as shown in the figure. What are the intensity and direction of the current passing through the circular coil such that the magnetic flux density at its center = zero?



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[28]How do you explain the wavelength of the wave accompanying the electron motion decreases by increasing its velocity

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[29] Mention one use for the induction coil.

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[30]How do you explain Selection of Helium and Neon elements as active medium in (He – Ne) laser?

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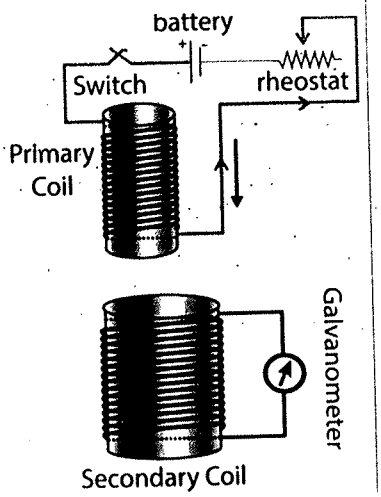

[31] The opposite figure shows two adjacent solenoids, one of them is movable
Determine six ways that generate an induced current through the secondary coil across the resistance R

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[32] What is meant by critical frequency for a metal?

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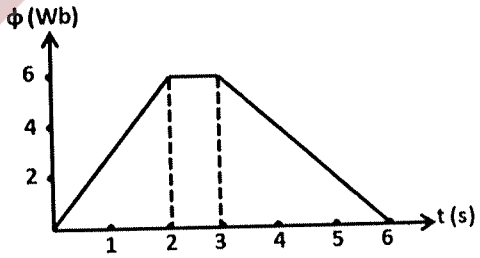
[33] The magnetic flux that masses through a coil of 200 turns changes during 6 Seconds. Using the shown graph, calculate the induced electromotive force during:
1-The first two seconds 2-The third second
3-The last seconds



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[34] What is meant by resonant cavity?

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[35] Mention one use for: Wave nature of the electron

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[36] Choose to Answer (A)OR (B)

(A)Choose the correct answer:

A group of equal resistors when connected in series, its equivalent resistance = 100Ω and on connecting them in parallel, its equivalent resistance = 4Ω. The value of each resistor = ...

(a) 20 Ω (b) 50 Ω (C) 100 Ω

(B) Choose the correct answer:

Sensitivity of galvanometer is determined by the relation

(a) θ^2/I (b) θ/I (C) θ/I^2

[37] Mention two factors only on which the magnetic flux density at a point on the axis of a solenoid carrying a current **depends.**

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[38] Mention two factors only on which the induced electromotive force in a straight wire moving in a magnetic field **depends.**

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[39] Mention two factors only on which the mutual induction between two coils **depends.**

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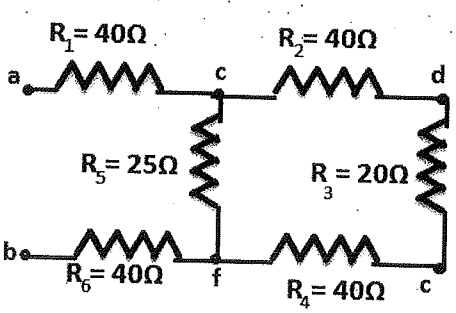
[40] In the shown electric circuit, if the potential difference V_{ab} = 200 volt, calculate:

i-The equivalent resistance of the circuit

ii-The current intensity through resistor (R_1)

iii-The current intensity through resistor (R_s)



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[41] The opposite table shown the characteristics of three Metallic conductors made of different materials x,y,z and they have the same cross sectional area

conductor	Its length	Its resistance
X	2m	1Ω
Y	3m	4 Ω
Z	3m	6 Ω

(i) Deduce the ration σ_x ,σ_y ,σ_z knowing that σ is the electrical conductivity.

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(ii) Deduce which of these materials has highest electrical conductivity

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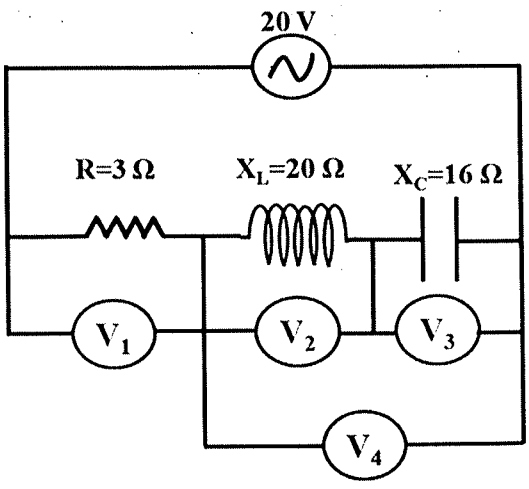
[42] Mention the role of the two insulated halves of the hollow metallic cylinder connected to the two ends of the coil in each of dynamo, and motor

	Dynamo	DC motor
the role of the two insulated halves of the hollow metallic cylinder connected to the two ends of the coil		

[43] [Added] Egypt May 1999:
Using the illustrated circuit shown in figure,
calculate:
i.The total impedance of the circuit.
ii. The current flowing through the circuit.
iii. The reading of each of the four voltmeters.



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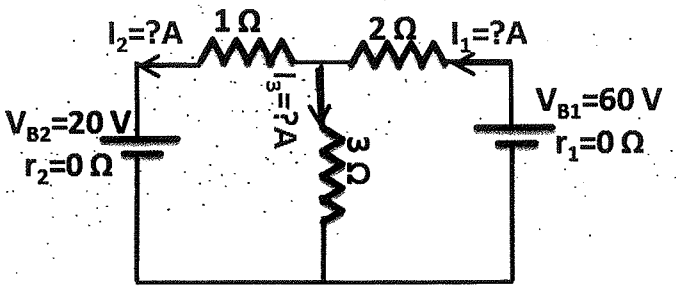
[44] [Added] Calculate I_1, I_2, and I_3 in the illustrated circuit.



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[45] The following table illustrates the relation between the collector current I_C and the base current I_B of a transistor NPN

I_C (mA)	15	30	45	60	75
I_B (mA)	0.15	0.3	0.45	0.6	0.75

Draw a graphical relation between I_C on the (y-axis) and I_B on the (x-axis)

i-From the graph, find the current gain (β_e) of such transistor

ii-Find the value of each the following:

a-α_e

b-I_e when I_c = 45 mA

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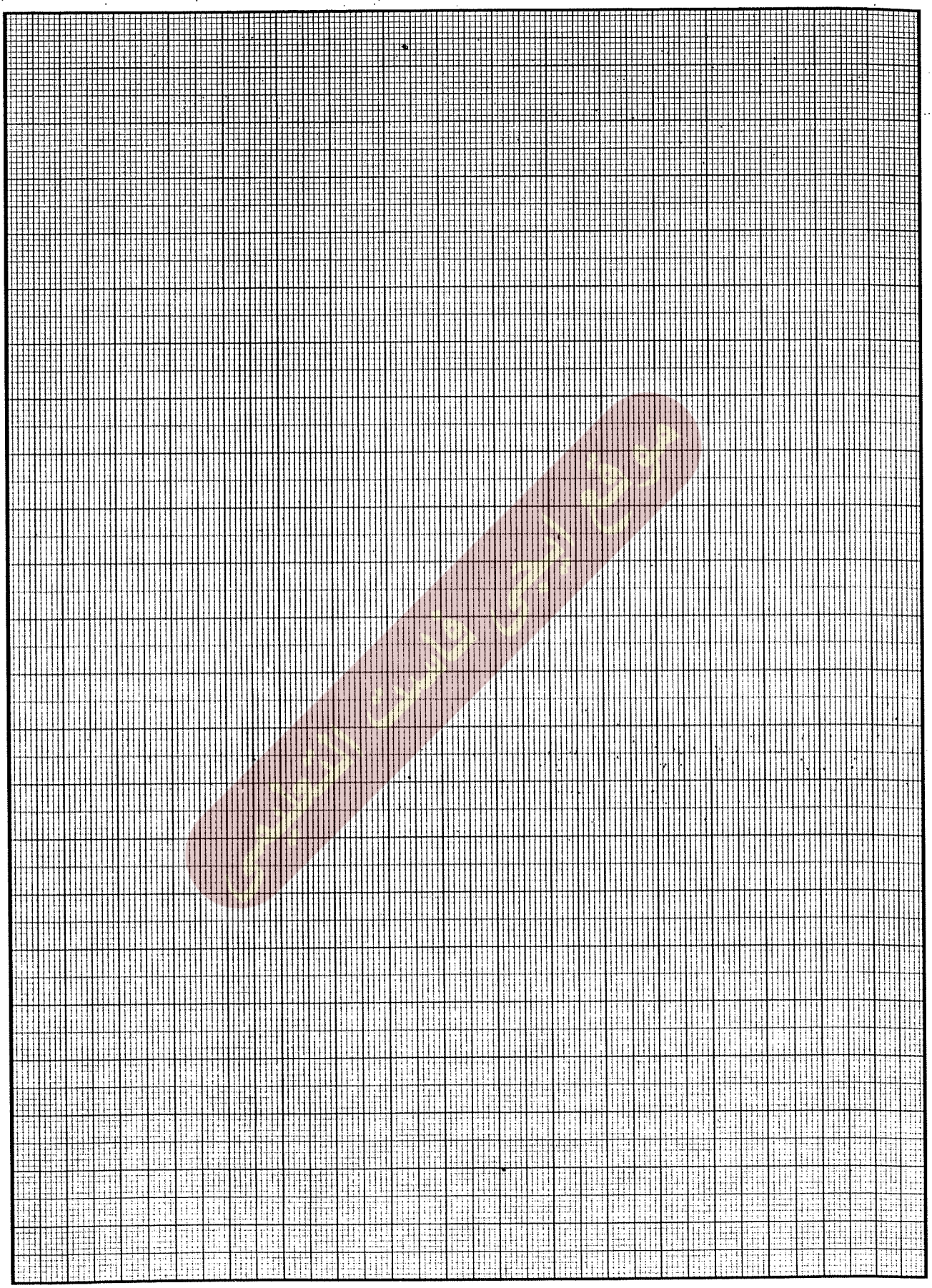

2015 Second Session

[1] Choose to Answer (A) OR (B)

(A)Mention one use for the step up transformers.

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(B) Mention one use for the Direct current ammeter.

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[2] Choose to Answer (A) OR (B)

(A) Mention three only from the properties of laser beam

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(B) What is the result of Doping in pure semiconductor?

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[3] Give reason for: the efficiency of a transformer is less than 100%?

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[4] Choose to Answer (A) OR (B)

(A) What is the role of the objective lens in the spectrometer?

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(B) What is the role of Neon atoms in (He – Ne) laser .....?

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[5] What happens when transferring of the excited atom from the excited level to another level of lower energy .....?

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[6] Compare between:

The magnetic flux density surrounding a straight wire carrying a direct current and that at the center of a circular coil carrying current concerning the mathematical relation

	Straight wire	Circular coil
The mathematical relation to calculate the magnetic flux density		

[7] Choose to Answer (A) OR (B)

(A) Choose the correct answer:

The wavelength of characteristic radiation of x-rays depends on the.....

(a)Electric potential difference between the target and filament

(b) Type of target material

(c) Temperature of the filament

(B) Choose the correct answer:

The spectrum of Bracket's series for hydrogen lies in the.....range

(a)Ultraviolet

(b) Infrared

(c) Visible

[8] The coil of an alternating current dynamo consisting of 800 turns each of area $(\frac{7}{11}x10^{-2})$ m^2 and moves in a uniform magnetic field of flux density 0.03 T. If the maximum induced electromotive force generated is 48V, calculate

i-The frequency of the produced current (π=22/7)

ii-The value of maximum induced electromotive if the periodic time of the coil becomes 0.01 Sec

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[9] Choose the correct answer:

In P-type crystal, the ratio of concentration of holes to that of free electrons at certain temperature is.....one

(a)More than

(b) Equal to

(c) Less than

[10] Write the scientific term:

The self-induction of a coil in which an emf of 1Volt is induced when the current passing through it changes at a rate of one Ampere per second

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[11] What is the mathematical relation used in the calculation the multiplier resistor required to be connected in series to the galvanometer coil to convert it into voltammeter.

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[12] Choose to Answer (A) OR (B)

(A) Explain the following:

The frequency of photon of gamma rays decreases as a result of collision with a free electron

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(B) Explain the following:

Appearance of Fraunhofer lines in solar spectrum

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[13] What is the mathematical relation used in the calculation the equivalent resistance for N of equal resistors connected in parallel.

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[14] Choose to Answer (A) OR (B)

(A) What is meant by Photoelectrons?

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(B) What is meant by Braking radiation?

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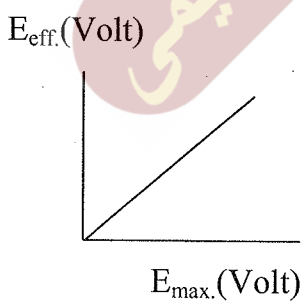
[15] Write what is represented by the slope in the following graphical relation:



Expressing relation: .....

The slope: .....

[16] What is meant by Optical pumping in laser?

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موقع أيجي فاست التعليمي

[17] The full scale deflection of moving coil galvanometer from zero position is 80°.When a current of 30 mA pass, the scale deflection from zero position was 60°.calculate:

1-The galvanometer sensitivity

2-The maximum current can be carried by the galvanometer coil

3-The maximum current could be measured by the device if its coil is connected to a shunt of 0.01 its coil resistance

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[18] Choose to Answer (A) OR (B)

(A) Mention one application only for: Einstein's relation for converting mass into energy

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(B) Mention one application only for: Reverse connection of pn junction

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[19] Choose to Answer (A) OR (B)

(A) Mention one application only for the ohmmeter.

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(B) Mention one application only for the mutual induction between two coils .

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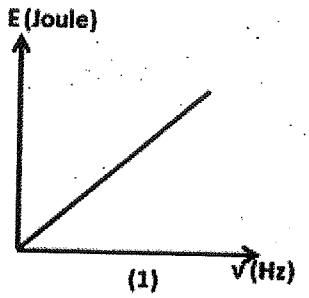
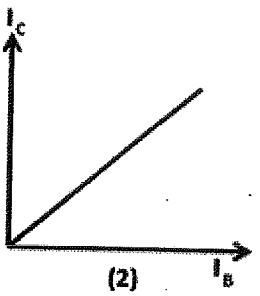
[20] Write what is represented by the slope in the following graphical relations:

(a)		
(b)		

[21] Mention one application only for the Self-induction.

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[22] What is the mathematical relation used in the calculation of:

The force by which a beam of photons affects a surface

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[23] Explain the following:

The scale of the ohmmeter is not uniform

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[24] Write the scientific term of the following statements:

(i)The spectrum that occurs at specified frequencies or wavelengths and not continuously distributed

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(ii)The container and the activating catalyst for amplification in laser

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موقع إيجي ناتس التعليمي

[25] The secondary coil of an ideal electric transformer is connected to an electric lamp of resistance 10 ohm which consumes 3000 joule during 5 minutes. If the induced electromotive force of the source connected to the primary coil is 200 volt, calculate:
a-The electric current intensity flowing through the primary coil
b-The electric current intensity flowing through the secondary coil
c-The potential difference across the two terminals of the secondary coil and from that determine the type of such transformer

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[26] Write the scientific term of the following statement:
Equality of the number of bonds broken per second to the number of bonds mended per second in a semiconductor

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[27] Choose the correct answer:
If the radius of a metallic wire is doubled and its length is halved, the electrical conductivity of the wire's material is
(a)Doubled
(b) Halved
(C) Kept constant

[28] Compare between each pair of the following:
(a) Logic gate AND and logic gate OR, concerning the equivalent drawing for each them

	AND	OR
the equivalent drawing		

(b)N-type crystal and P-type crystal, concerning the valence of impurity atom

	N-type crystal	P-type crystal
valence of impurity atom		

[29] Mention two factors only on which the magnetic dipole moment **depends.**

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[30] Mention two factors only on which the instantaneous induced electromotive force of an alternating current dynamo **depends.**

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[31] When is linear emission spectrum of hydrogen in visible range?

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[32] Mention two factors only on which the direction of force acting on a wire carrying current placed in a uniform magnetic field **depends.**

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[32] Mention one use for the electron microscope.

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[34] What happens when subjecting a metallic piece to a magnetic field due to alternating current of high frequency?

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[35] What happens when replacing the two metal rings in the dynamo by two halves of a hollow metallic cylinder insulated from each other?

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[36] Mention one use for the Laser in medicine

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[37] Mention one use for the transistor.

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[38] You have three electric lamps of equal electric resistance. Illustrate by drawing, How they could be connected together in an electric circuit with an electric cell of negligible internal resistance such that:

a-The luminous intensity of the three lamps is maximum

b-The luminous intensity of the three lamps in minimum

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[39] [Added] Egypt August 1999:

Electro generator has a coil of 500 turns the cross sectional area of each turn = $\frac{7}{11}m^2$. It is placed in a uniform magnetic field of magnetic flux density 5 x 10^{-4}Tesla. If coil rotates with frequency 50 cycle/sec, and its terminals are connected in series with a capacitor of capacitive reactance 110Ω and an inductive coil of inductive reactance 80 Ω and its Ohmic resistance 40Ω. Calculate neglecting the internal resistance of the electric generator:

i. The maximum induced e.m.f generated.

ii. The effective value of the current flowing through the circuit.

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[40] What is the role of the two spiral springs in the sensitive galvanometer?

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[41] What is the role of the core made of soft iron in the electric transformer?

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[42] Explain (without drawing) how the sensitive galvanometer is converted to be used as an ammeter. Deduce the required mathematical relation

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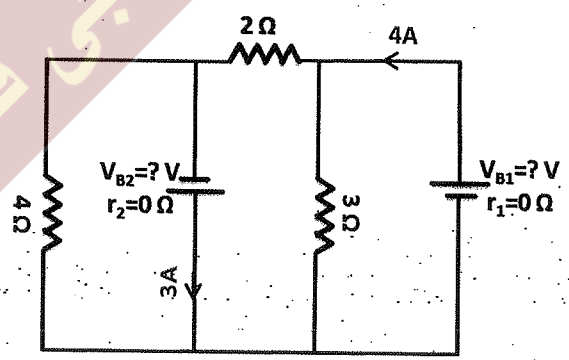
[43] [Added] Using the given data on the illustrated circuit calculate the voltages (v_{B1}) and (v_{B2}).



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موقع إيجي فاست التعليمي

[44] In an experiment for verification of ohm's law for a closed circuit, the obtained results for the intensity of current passing through the circuit and the potential difference across the terminals of the electric cell are shown in the following table:

V (volt)	9	8	7	6	5
I (Ampere)	1	2	3	4	5

Draw a graphical relation between the potential difference on (y-axis) and current intensity on (x-axis)

[45] From the graph, find:

i)The internal resistance of the electric cell

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ii)The electromotive force of the electric cell

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iii)Calculate the equivalent electric resistance of the external circuit connected to the cell, if the intensity of the flowing current through it is 4A

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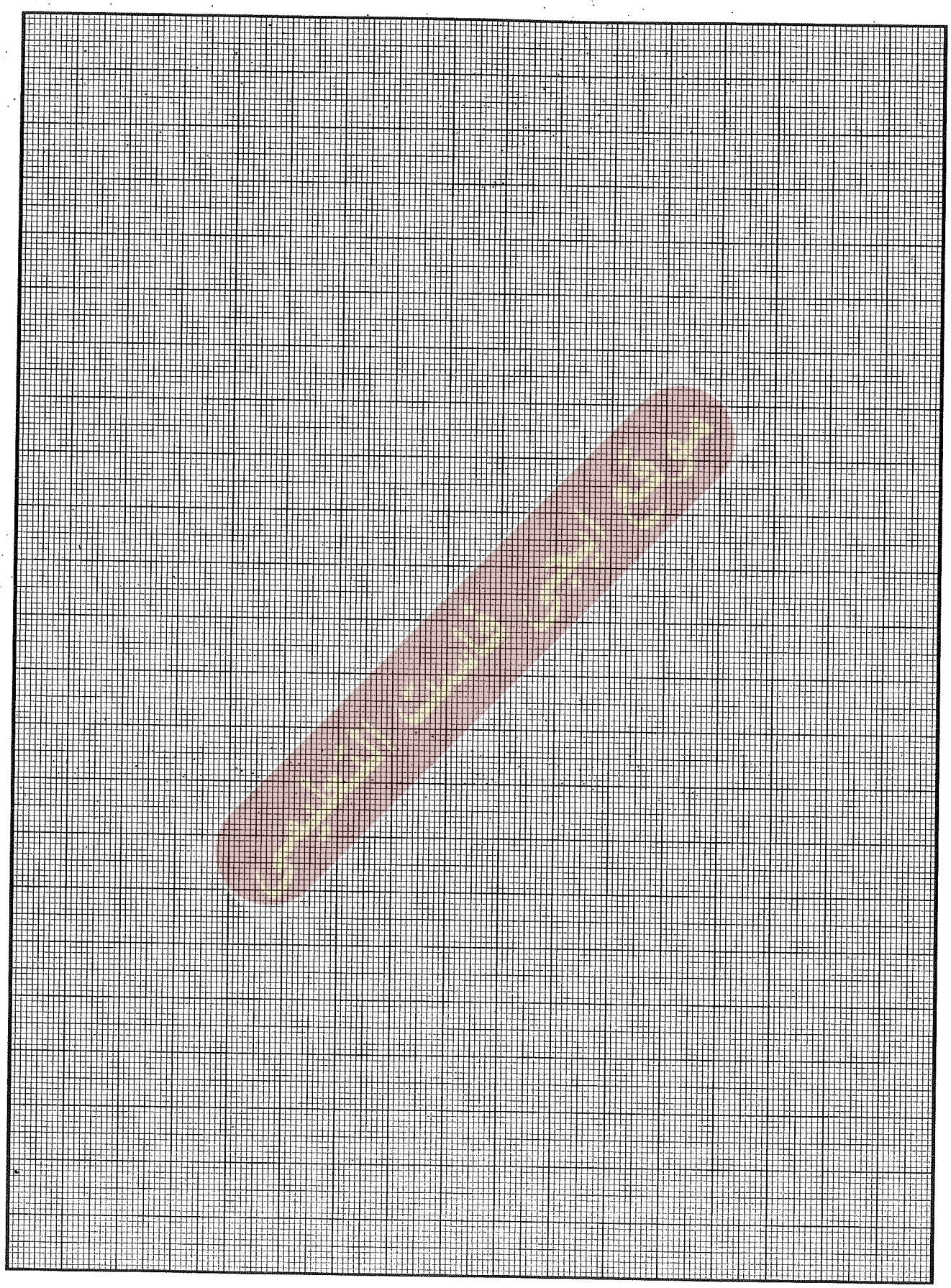
موقع إيجي فاست التعليمي



First Session 2016

[1]Choose to answer (A) OR (B)

(A)Write down the scientific expression for the following statement:

The total work done to transfer one coulomb throughout a closed electric circuit.

(B)Write down the scientific expression for the following statement:

The self-inductance of a coil in which an emf of one volt is induced when the current passing through it changes at a rate of one ampere per second.

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[2] Write down the scientific expression for each of the following statements:

(a) The direction of the induced current generated in a coil is such that to oppose the change in magnetic flux producing it.

.....

(b)Write down the scientific expression for the following statement:

The deflection angle of galvanometer pointer from zero position when the current intensity passing through its coil is unity.

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[3] Write down the scientific expression for the following statement:

Light amplification by stimulated emission of radiation.

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[4]Mention one factor only affects:

The wavelength of the characteristic radiation of X-rays.

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[5]Mention one factor only affects: The magnetic dipole moment.

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[6]Mention one factor only affects:

The direction of the induced e.m.f in a coil that intercepts a magnetic flux.

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[7] Mention one condition for occurring the following:

Driving the atoms of the active medium in laser into a state of population inversion.

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[8] Mention one condition for occurring each of the following:

(a) Liberating photoelectrons from a metal surface due to light falling on it.

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(b) Obtaining a pure spectrum by spectrometer.

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[9]A transistor npn has current gain β_e=24 and its base current intensity is 24 μA calculate: (1)α_e (2) the collector current I_c in Ampere.

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[10]What is the scientific idea on which the following is set:
Converting the sensitive galvanometer into ammeter.

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[11]What is the scientific idea on which the following is set:
Hot wire ammeter.

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[12]What is the scientific idea on which the following is set:
Studying the crystalline structure of materials using X-rays.

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[13]What is the scientific idea on which the following is set:
Alternating current dynamo.

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[14]What is the scientific idea on which the following is set:
Cathode ray tube.

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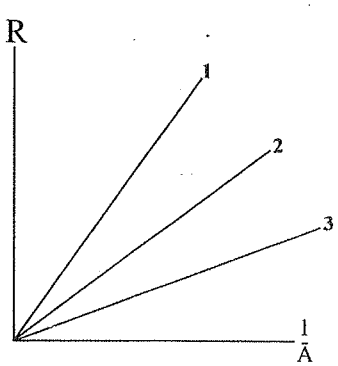
[15] The opposite graph illustrates the relation between electric resistance and the reciprocal of cross-sectional area for three wires 1.2.3 of different materials and equal lengths.



(a)Which one of the wires has highest conductivity? why?

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(b)If three wires made of these metals and have the same cross-sectional area are connected in series in an electric circuit, which one of these wires has highest potential difference across its terminals? why?

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[16]Write the mathematical relation used to calculate each of the following:
(a)Average induced e.m.f generated in the dynamo coil.
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(b) Magnetic flux density at the center of a circular loop carrying an electric current.
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[17]Write the mathematical relation used to calculate the following:
Phase difference of light rays leaving off the object on photography.
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[18]An alternating current source of frequency $\frac{100}{\pi}$ Hz and effective potential difference across its poles 20 V is connected in series to an ohmic resistor of 3Ω and a capacitor of capacitance 1250μF calculate:
(a) The capacitive reactance of the capacitor.
(b) The current intensity passing through the circuit.
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[19]Give reasons for:
The metallic cylinder in the sensitive galvanometer is not divided into insulated sheets.
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[20]Give reasons for:
The decrease of the total current intensity in a closed electric in which several resistors are connected in series.
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[21]Give reasons for:
There is no loss in electric power as thermal energy during the passage of alternating current through a circuit containing a capacitor.
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موقع البحر في الفيزياء

[22]Give reasons for:
The continuity of rotation of electric motor coil in the same direction.
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[23]Give reasons for:
The radiation emitted from the earth are not seen.
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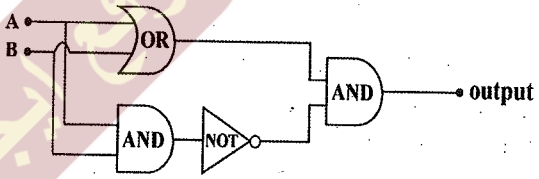
[24](a) 1-from the electronic circuit, complete the truth table.

A	B	output
0	0	
0	1	
1	0	
1	1	



(b) convert the binary code $(111011)_2$ into decimal showing the steps of conversion.
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[25]When does each value of the following equal zero.....?
(a) The consumed energy in the primary coil of an ideal electric transformer spite of its connection to an alternating source.
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(b) The magnetic force acting on wire carry electric current placed in magnetic field.
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[26]When does the following value equal zero.....?
Phase angle between the total voltage and current intensity of alternating current circuit containing a resistor; a coil and a capacitor.
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[27]A step-down transformer of efficiency 75% works on voltage of 200V. It has two secondary coils, the first is connected to a device of power 4.8watt and operate on voltage 12V and the second is connected with anther device labeled by (24V-0.05A). if the number of turns in primary coil is 1100 turn. **Calculate**.

(a)The number of turns in first secondary coil.

(b)The current intensity through the primary coil when the two devises operate together.

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[28]Compare between:

Digital and analog electronics (concerning dealing with the natural quantities).

	Digital electronics	analog electronics
dealing with the natural quantities		

[29]Compare between:

Ampere right hand rule and Fleming left hand rule (concerning the use)

	Ampere right hand rule	Fleming left hand rule
the use		

[30]Compare between:

A radiation of body of temperature 6000 ^{o}K and a radiation of anther body of temperature 3000 ^{o}K (concerning the frequency of each)

	A radiation of body of temperature 6000 ^{o}K	radiation of anther body of temperatu 3000 ^{o}K
the frequency		

[31]Compare between:

Alternating current dynamo and direct current dynamo (concerning the shape of metal part touching the two brushes)

	Alternating current dynamo	direct current dynamo
the shape of metal part touching the two brushes		

[32]Compare between:

Spontaneous emission and stimulated emission (concerning the direction of propagation of photons after emission)

	Spontaneous emission	Spontaneous emission
the direction of propagation of photons after emission		

[33] Choose the correct answer:

Energy of the fourth level in hydrogen atom equal.....joule.
(knowing that: $e=1.6*10^{-19}C$)

a.$-1.36x10^{-19}$ b.$-5.44x10^{-19}$ c.$-8.7x10^{-19}$

[34] Choose the correct answer for each of the following:

(A) If the number of turns of a solenoid carries a current is decreased to its half with keeping its length and diameter of its turns constant, the magnetic flux density at a point of its axis

a. decreases to its half b. decreases to its quarter c. doesn't change

(B) If the number of turns of inductive coil connected to alternating current source increases its inductive reactance.....

a.increase b. decrease c. is kept constant

[35]Prove (without drawing) that: the induced e.m.f generated in a straight wire moving perpendicular to a uniform magnetic field is determine by relation: e.m.f= Blv_{el}

(where: B is the flux density. L is wire length, v_{el} is the velocity of motion)

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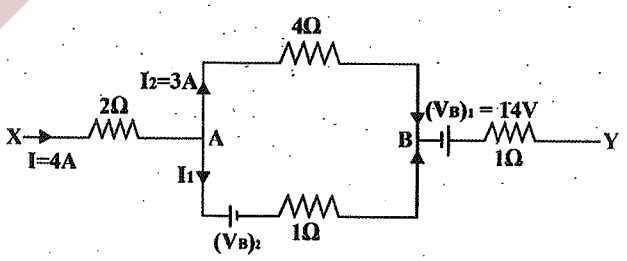
[36] The opposite figure represents a part of an electric circuit. By using Kirchhoff's laws and taking into account the current directions paths and the shown labels. **Calculate:**

(a)potential difference across X, Y

(b)e.m.f of the battery $(V_B)_2$

(neglecting the internal resistance of two sources)



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[37]What is meant by.....?
Copper resistivity $=1.79*10^{-8}$ Ω.m
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[38]What is meant by.....?
The magnetic flux per unit area of a surface=0.05Wb/m^2
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[39]What is meant by.....?
The critical wavelength of a metal surface=5000Å
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[40]What is meant by.....?
The effective value of alternating current intensity =0.707A
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[41]What is meant by.....?
The total impedance of an alternating current circuit=500Ω
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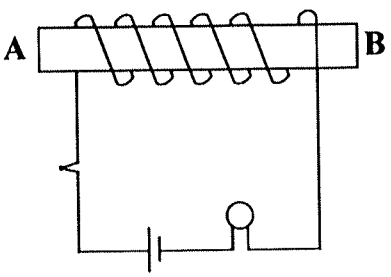
[42] In the show circuit, what happen to the lighting of lamp momentarily if the south pole of magnet is approached to terminal A and then to terminal B? Explain your answer in each case



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[43] What is the result for the following;
Absence of standard fixed resistance in the ohmmeter circuit.
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[44] What is the result for each of the following;
(a) Meeting the beam reflected from the object and reference beam at a photographic plate in holography.
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(b)Passing of sunlight through gases and vapors surrounding the sun atmosphere.
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[45] A sensitive galvanometer has a coil of resistance 50Ω and capable of carrying a current of maximum value 0.12A. it is connected to a multiplier resistance R_m to be convert into voltammeter. The following table illustrates the relation between voltmeter reading (V) when connecting it between the terminals of a conductor in an electric circuit and the intensity of current passing through the voltmeter (I_g)

V (volt)	50	60	70	80	90	100
I_g (Ampere)	0.05	0.06	0.07	0.08	0.09	0.1

1-draw a graph relating the potential difference (V) on Y-axis and I_g on X-axis.
2-the maximum potential difference which can be measured by the voltmeter
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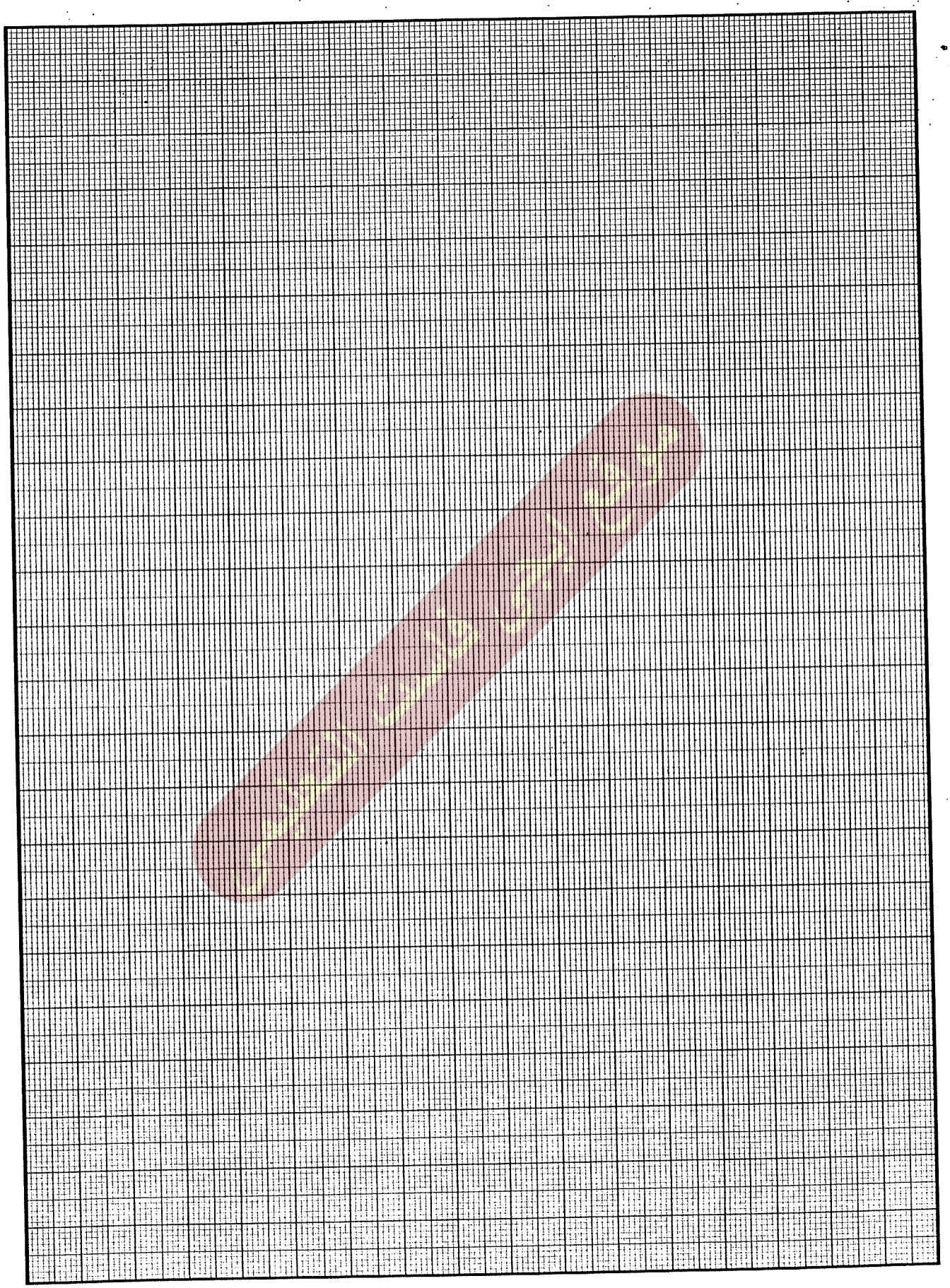

Second Session 2016

[1] Choose to answer (A) OR (B)
(A)Mention the scientific idea on which the sensitive galvanometer depends.
(B)Mention the scientific idea on which the dynamo depends.
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[2] Mention the scientific idea on which generating laser depends on.
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[3] Mention the scientific idea on which the induction furnace depends on.
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[4] Mention the scientific idea on which the resonant circuit depends on.
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[5] What is meant by?
(a) Current gain in transistor.
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(b) Diffusion current in pn junction.
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[6] What is meant by the Critical frequency for a metal surface?
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[7] How do you explain Using X-rays in diagnosis of bone fracture?
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[8] How do you explain?

(a)The scale of hot wire ammeter is not uniformly divided.

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(b)The ohmic resistors are made of double wound wires.

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[9]A sensitive galvanometer has a coil of resistance 125Ω and the maximum current it carries 200μA. It is desired to use it as an ohmmeter using a standard resistor of 1500Ω, a rheostat and an electric cell of electromotive force 1.5V and neglected internal resistance.

Calculate:

(a)The value of resistance taken from the rheostat when the device terminals are connected.

(b)The value of the external resistance that when connected to the device, it gives half full scale deflection.

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[10]Write the scientific term for each of the following statements:

(a) The total opposition to the flow of alternating current in a circuit contains an inductor, a capacitor and an ohmic resistance.

.....

(b)The value of induced emf generated in a coil when the intensity of current passing through it changes at a rate 1 Ampere/sec.

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[11]Write the scientific term for the following statement:

Emission of spectrum produced due to the transfer of excited atoms from a higher energy level to a lower energy level after the lifetime interval is over.

.....

[12]Write the scientific term for the following statement:

Resistance of a conductor of 1m length and cross-sectional area of $1m^2$ at constant temperature.

.....

[13]Write the scientific term for the following statement:

The minimum amount of energy needed to free the electron from the metal surface without gaining kinetic energy.

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[14] Deduce (without drawing) the relation used to calculate the value of shunt resistor R_s required to convert the sensitive galvanometer into ammeter.

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[15]Compare between:

Moving coil ammeter and hot wire ammeter (concerning the use).

	Moving coil ammeter	hot wire ammeter
the use		

[16]Compare between:

Forward connection and reverse connection in the pn junction (concerning the thickness of the depletion region).

	Forward connection	reverse connection
the thickness of the depletion region		

[17]Compare between:

Lenz's rule and Fleming right hand rule (concerning the use).

	Lenz's rule	Fleming right hand
the use		

[18] A copper wire of length 50cm moves at velocity 0.2m/s perpendicular to a magnetic field of flux density 0.4T. **Calculate:**

(a)The induced electromotive force generated in the wire.

(b)The intensity of current passing through the wire, if its terminals are connected to a closed circuit of total resistance 20Ω.

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[19]Choose the correct answer:
The ratio of the longest wavelength in Balmer's series to the longest wavelength in Lyman's series is.....one.

a. More than.
b. Less than.
c. Equal to.

[20]Choose the correct answer:
If the torque acting on a coil carrying current and its plane is parallel to a magnetic flux of density 0.3T is 12N.m, the magnetic dipole moment for this coil equals.....$A.m^2$

a. 30
b. 40
c. 50

[21]Choose the correct answer:
On placing a soft iron core inside an inductive coil connected to an alternating current supply, the phase angle between to total voltage and the current.....

a. Increases.
b. Decreases.
c. Is kept constant.

[22]Choose the correct answer:
The type of the mutual magnetic force between two parallel wires carrying currents depends on the.....

a. Direction of current in each of them.
b. Current intensity in each of them.
c. Distance separating them.

[23]Choose the correct answer:
If the rate of change of current intensity in an inductive coil is double, the self-inductance of the coil.....

a. Is double.
b. Decreases to the half.
c. Doesn't change.

[24] Mention one use for Logic gates.

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[25]Mention one use for each of the following:
(a) Spectrometer.

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(b) Cathode ray tube.

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[26] What are the types of electronic device? Mention one example for each type.

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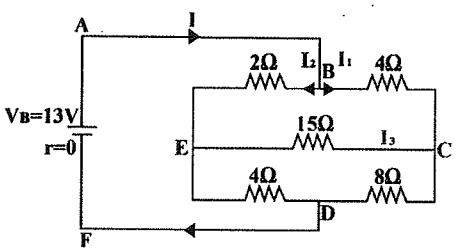
[27]From the opposite figure and using Kirchhoff's laws:

(a)Write the equations of change in potential difference through the following paths (ABCDFA), (ABEDFA), (BCEB).

(b)Using the equations, calculate the intensity of current (I_3) passing through the resistor 15Ω.



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[28] Mention one factor from the factors on which the following depend:

Mutual inductance between two coils.

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[29] Mention one factor from the factors on which the following depend:

The rate of electron liberation from a metal surface in photoelectric emission.

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[30] Mention one factor from the factors on which the following depend:

The force acting on a wire carrying electric current placed perpendicular to a magnetic field.

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[31] Mention one factor from the factors on which the following depend:

Potential difference across the terminals of the secondary coil of an ideal transformer.

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[32] Mention one factor from the factors on which the following depend:
Potential difference across the terminals of an electric cell in a closed electric circuit.
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[33]How can we decrease the potential difference between the emitter and the collector V_{CE} in transistor when using it as a switch?
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[34]How can we decrease each of the following?
(a) The loss in electric power during transmission of electric energy from the generating power stations to zones of distribution.
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(b)The magnetic flux density at the center of a circular coil carrying an electric current.
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[35]What are the main components of laser?
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[36]An alternating current circuit contains an inductor of inductive reactance 36Ω, a capacitor of capacitive reactance 30Ω and a resistor of 8Ω connected in series to an alternating current supply of effective potential difference 20V. **Calculate:**
(a) The potential difference across the inductor terminals.
(b) The phase angle between the total voltage and current.
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[37]What happens to?
The wavelength associating the free electron's motion when increasing the potential difference between anode and cathode in the electron microscope
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[38]What happens to?
The pair spiral in the sensitive galvanometer when electric current flows through its coil.
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[39]What happens to?
The spectrum produced from the core of the Sun when passing through gases and vapors forming Sun atmosphere.
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[40]What happens to?
The value of potential difference across two points in an electric circuit when increasing the multiplier resistance in the use voltmeter.
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[41]What happens to?
The electric resistance of a wire has a regular cross-section and length (L) when reshaping its mass to be a wire of regular cross-section of length (2L).
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[42]When?
The atoms of the active medium for generating laser be in a state of population inversion.
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[43]When?
(a)The current out of dynamo becomes unidirectional and of almost constant intensity.
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(b)Does the voltage lag the current by a phase angle 90° in an alternating current circuit that contains a non-ohmic inductor and a capacitor connected in series?
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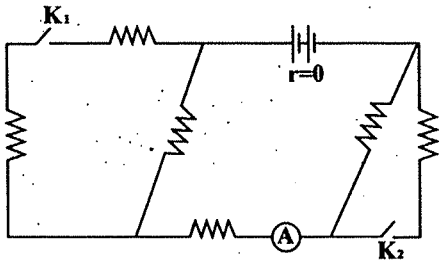
موقع أبي فاست التعليمي

[44] In the show circuit, if the resistors are equal each of them is R and the ammeter reading I. On closing K_1 only, them ammeter reading I_1 and on closing K_2 only, the ammeter reading is I_2.



Answer the following:

(a)Which of the two currents I_1 or I_2 has higher intensity?

(b)What happens to the ammeter reading when closing the two keys K_1 and K_2 together? Why?

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[45] An alternating current dynamo consists of 20 turns each of area $0.08m^2$. It rotates in a uniform magnetic field of flux density B. the following table illustrates the relation between emf_{max} produced by the dynamo and the angular velocity of the coil rotation.

Emf_{max} (volt)	32	40	48	56	64
ω (rad/s)	400	500	600	700	800

1. Draw the graph between (emf_{max}) on Y-axis and angular velocity (ω) on the X-axis.
2. **From the graph, find:**
   a. The value of emf_{max} when the angular velocity is 750 rad/s.
   b. The magnetic flux density acting on the coil.

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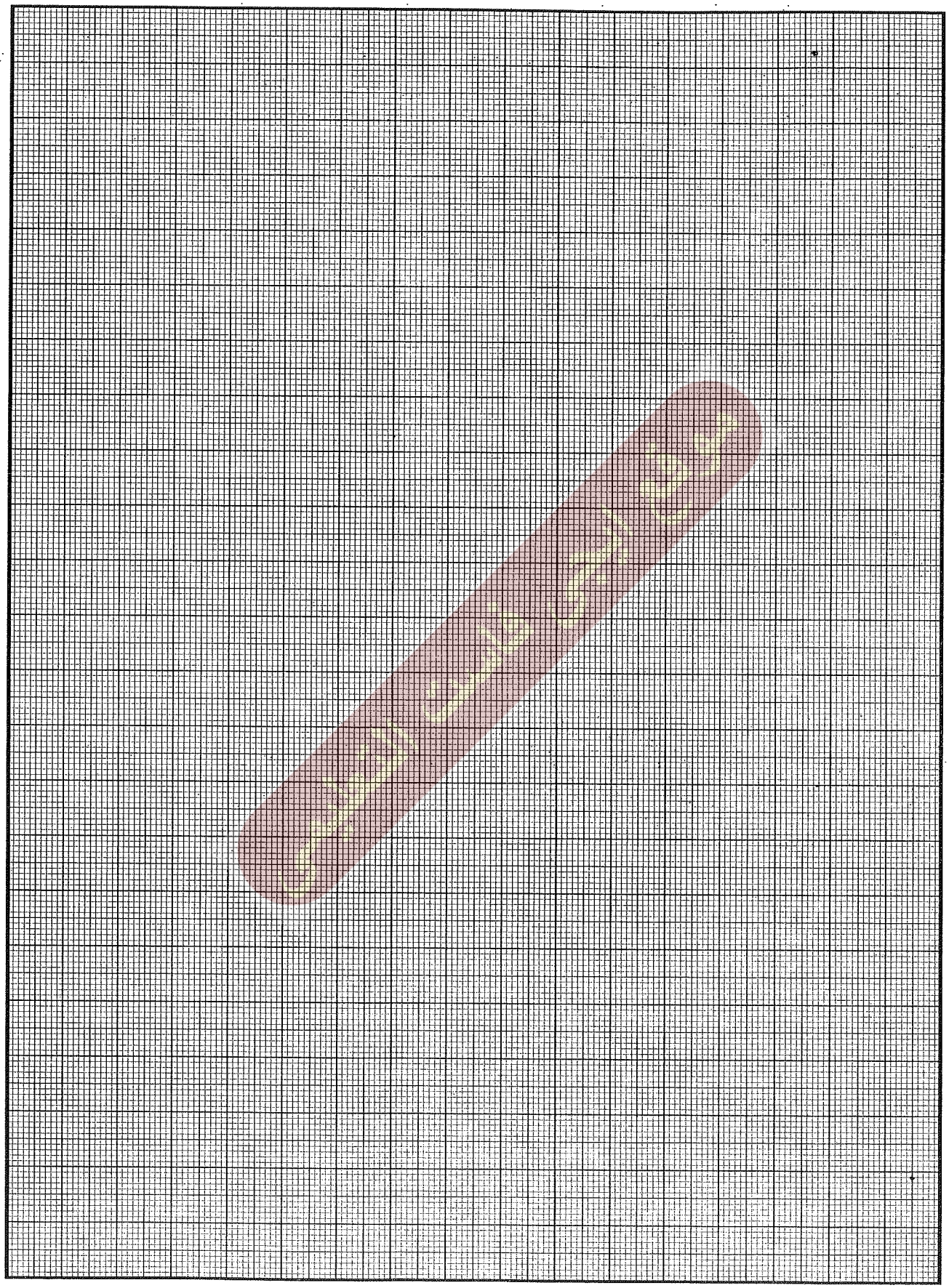

Booklet exam 2017 first session

1. Choose to answer (A) or (B):

What is meant by?

(a) The electromotive force induced in a coil when the current intensity through it changes at rate of 1 A/s=0.1 V

(b) The ratio between the power produced in the secondary coil to the power supplied to the primary coil in the electric transformer $=\frac{80}{100}$

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2. Choose to answer (A) or (B):

Define:

A.Surface potential barrier

B. Planck`s distribution

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3. Choose to answer (A) or (B):

Mention one factor that can increase:

A.The electric resistance of a copper wire at a certain temperature.

B.The potential difference between the poles of an electric cell in a closed circuit.

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4. Give reason for:

The zero position of moving coil galvanometer is at the middle of its scale.

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5. Give reason for:

Eddy currents are induced in a metallic block placed inside a solenoid connected to an AC supply.

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موقع البحر العلمي والتعليم

6. Compare:

Point of comparison	Line spectrum	Continuous spectrum
Definition:	....	....

7. A silicon crystal is doped with aluminum atoms at concentration 10^{13} cm^{-3} .calculate the concentration of free electrons in the pure silicon crystal. Knowing that the concentration of free electrons in the doped crystal is 10^{11} cm^{-3}.

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8. The turns of solenoid are compressed regularly till the coil length is reduced to its half keeping its cross-sectional area unchanged. What is the effect of this on this on the self- inductance of the coil? Explain your answers.

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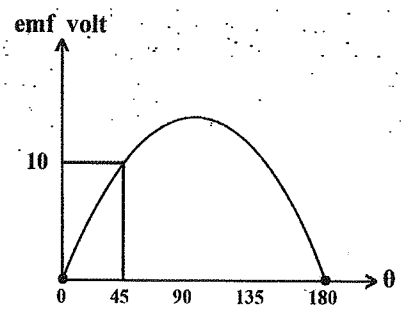
9.the given graph represents the relationship between the induced electromotive force (emf) in the dynamo coil and the angle between the normal to the coil plane and the magnetic flux direction (θ) .Find the maximum value of the induced electromotive force.



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10. Choose to answer (A) or (B):

Mention one use of:

A.The ohmmeter

B.The shunt resistance in the ammeter

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11. Choose the correct answer:

Momentum of photon whose energy (E) is given by the relation.....
(Where: c is the speed of light in space)

a. $\frac{E}{C^2}$ **b.** Ec^2

c. $\frac{E}{C}$ **d.** Ec

12. state Faraday`s law in electromagnetic induction.

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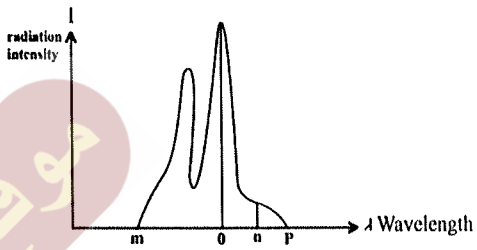
13. The diagram represents X-rays spectrum produced from Coolidge tube .which wavelength (m, o, n. or p) is emitted from the target material due to the transition of an electron from a higher energy level in the target atom to a level near the nucleus?



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14. what is the role of the metastable level in neon atoms in (helium – neon) laser?

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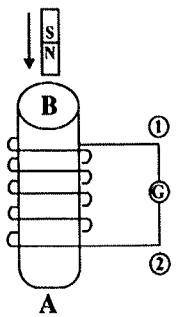
15. Choose the correct answer:

A magnet falls towards a coil as shown in figure. Which choice of the following is correct?
(knowing that: each raw is a choice)

	Current direction through the galvanometer	The pole formed at (A)
A	From 1 to 2	North
B	From 1 to 2	South
C	From 2 to 1	North
d	From 2 to 1	South



16. Choose to answer (A) or (B):

(a) A step down transformer, of efficiency 75 % and the ratio of turns in its coil is 1:4m is connected to an AC supply of emf 120 V ,calculate the electromotive force generated between the terminals of the secondary coil.

(b) A rectangular coil of 100 turns and cross sectional area 0.06 cm^2 rotates at frequency 50 Hz in a uniform magnetic field of flux density 0.1 T .

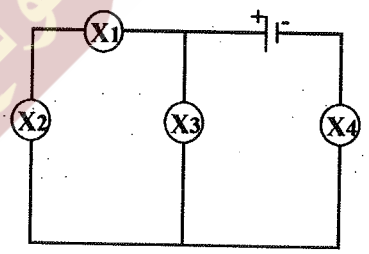
Calculate the average emf induced through $\frac{1}{4}$ revolution

17. Compare:

Point of comparison	Laser rays	X-rays
Coherency of photons emitted from their devices	....	....

18. Choose the correct answer:

In the electric circuit shown in figure all bulbs are glowing. If the bulb (X_1) has gone off, the bulbs that still glowing are.....



(a) (X_2) and (X_3)

(B) (X_2) and (X_4)

(C) (X_3) and (X_4)

(D) (X_2) ,(X_3) and (X_4)

19. Choose to answer (A) or (B):

Mention one use of:

(a) Resonant circuit

(b) Hot wire ammeter

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20. Choose to answer (A) or (B):

What is the rule used to determine:

(a) The direction of the induced current in a straight wire moving in a magnetic field

(b) The direction of the magnetic force on a straight wire carrying an electric current , placed in a magnetic field

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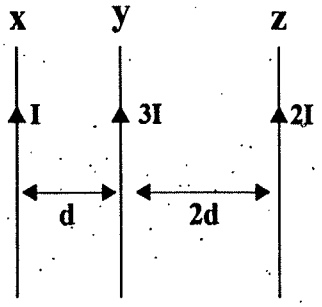
موقع أبجى فاست التعليمى

21.Choose to answer (A) or (B):

(A)in figure, you have three long wires (X,Y and Z).
Which of these wires is not affected by a magnetic force?



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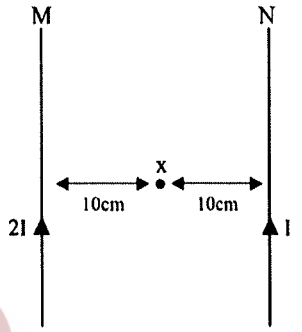
(b)in the figure, the wire (M and N) are very long, as the wire (N) i displaced 3 cm towards the point (X) the total magnetic flux densit at (X).....



(a) increase
(b) decrease
(c) does not changed
(d) become zero

22. If the wavelengths having maximum intensity in each of the solar radiation and the radiation from a star (Z) are 0.5 μm and 0.4 μm respectively .calculate the surface temperature of the star (Z) given that the surface temperature of the sun is 6000°K.

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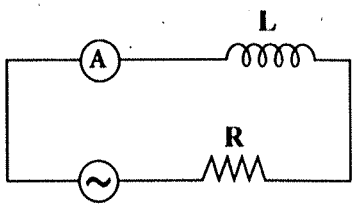
23. Choose the correct answer:

When a capacitor is connected in series to the given circuit, it is noticed that the reading of the hot wire ammeter is unchanged. In this case, the capacitive reactance of the capacitor is.....the inductive reactance of the coil.



(a)half (b) equal to
(c)twice (d) three times

24. Calculate the frequency of the photon emitted from the hydrogen atom as the electron shifts from level (M) whose energy is (-2.42×10^{-19} J) to the level (L) whose energy is
(-5.44×10^{-19}J) (knowing that : `plank`s` constant(h) = 6×10^{-34} J.s)

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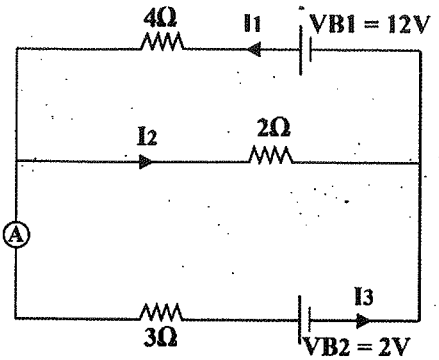
25. Find the ammeter reading in the given circuit, neglecting the internal resistance of the two batteries.



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26. Explain how the depletion region is formed inside the pn junction.

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27. A sensitive galvanometer is connected to a shunt resistance (X) of 0.2 Ω and then this shunt is replaced by another shunt resistance (Y) of 0.02Ω with the same galvanometer.
In which case, the ammeter is able to measure higher range of current intensity? Why?

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28. Choose to answer (A) or (B):
Write down the scientific concept that is expressed as:
(a) The container and the activating catalyst for amplification in laser
(b) A parallel laser beam that interferes with the information carrying rays reflected from the object in holography.

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29. Choose to answer (A) or (B):
Mention one result of:
(a) Increasing the voltage between the anode and the cathode in the electron microscope
(b) Stopping the action of the electric and magnetic fields in the cathode ray tube as the electron beam passes.

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30. Illustrate by vectors the phase difference between the voltage and the current in a circuit consisting of an AC supply and an inductive coil of negligible ohmic resistance.

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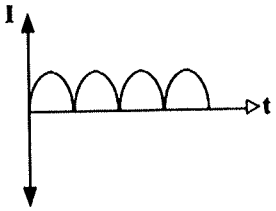
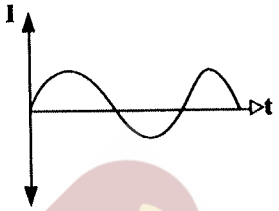
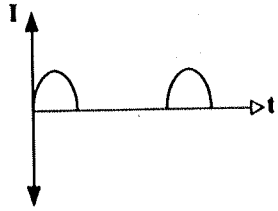
31. Choose the correct answer:

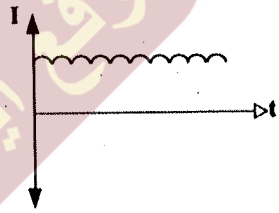
The graph that represents the current generated by a dynamo consisting of a number of coils with equal small angles between their planes

is.....

a) 

b) 

c) 

d) 

Choose to answer (A) or (B):

32. Give reason for:

(A) Using X-rays in studying the crystalline structure of solids.

(B) Emission of continuous radiation of X-rays in Coolidge tube.

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33. Explain the role of inertia in the operation of the electric motor.

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34. What is the role of the inductive coil in the fluorescent lamp circuit?

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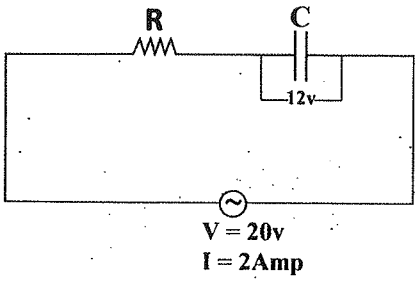
موقع ايجى فاست التعليمى

35. Choose the correct answer:

In the given circuit, the value of the ohmic resistance (R) equals.....



(a) 4 Ω
(b) 6 Ω
(c) 8 Ω
(d) 12 Ω

36. An ohmmeter whose circuit has a resistance of 3750 Ω and the maximum current that can be passed through it is 400μA .Calculate the value of the external resistance that makes its pointer deflect to half of the scale.

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37. Choose to answer (A) or (B):

Mention one factor that affects:

(a) The capacitive reactance of the capacitor
(b) The resonant frequency in (LCR) circuit.

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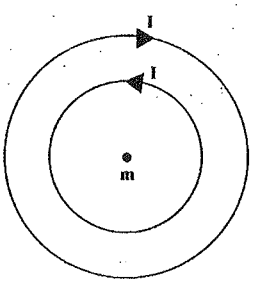
38. Choose the correct answer:

Two concentric metal rings in one plane. each carries a current of intensity (I) as shown in figure.the direction of the magnetic flux at the common center (m) is .....



(a) Rightwards
(b) Leftwards
(c) Into the page
(d) Out of the page.

39. In the mutual induction experiment, what happens in the secondary coil while the current intensity in the primary coil is increasing?

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40. Monochromatic light falls on a metal surface and photoelectrons are liberated. What is the effect of increasing light intensity on the kinetic energy of the librated electrons from this surface?

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41. What is the measuring unit of the magnetic dipole moment of a coil?

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42. Choose the correct answer:

The equivalent resistance of a number of identical resistances (n) each of resistance (R) .when connected in series equals.....

(a) nR

(b) $\frac{R}{n}$

(c) $\frac{n}{R}$

(d) n^2R

Choose to answer (A) or (B):

43. (A) when will the output (0) in each of the following logic gates?

(B) Draw only a labeled diagram for the circuit of a transistor (npn) as a switch in (OFF) condition

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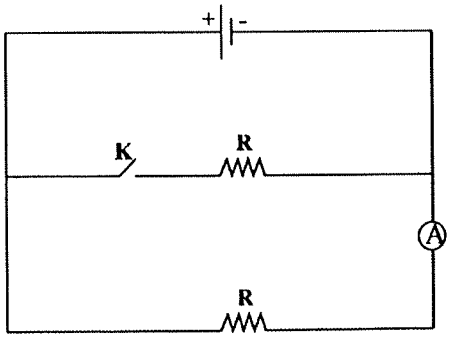
44. In the given circuit, the ammeter reading is 2A When the switch (K) is off.
Find its reading when the switch (K) is closed.
(Neglecting the internal resistance of the battery)



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45. a sensitive galvanometer can measure current intensity up to (I_g) .A number of multiplier resistances are connected to its coil(one at a time) to convert it into a voltmeter .the table below records the maximum potential difference measured by the voltmeter (V) in Volts and the total resistance of the voltmeter (R) in Ohm

V (Volt)	100	150	200	250	300
R(Ohm)	500	750	1000	1250	1500

(a) Plot a graphical relationship between (V) on Y-axis and R on (X-axis).
(b) From the graph. Find the measuring range of the galvanometer (I_g).

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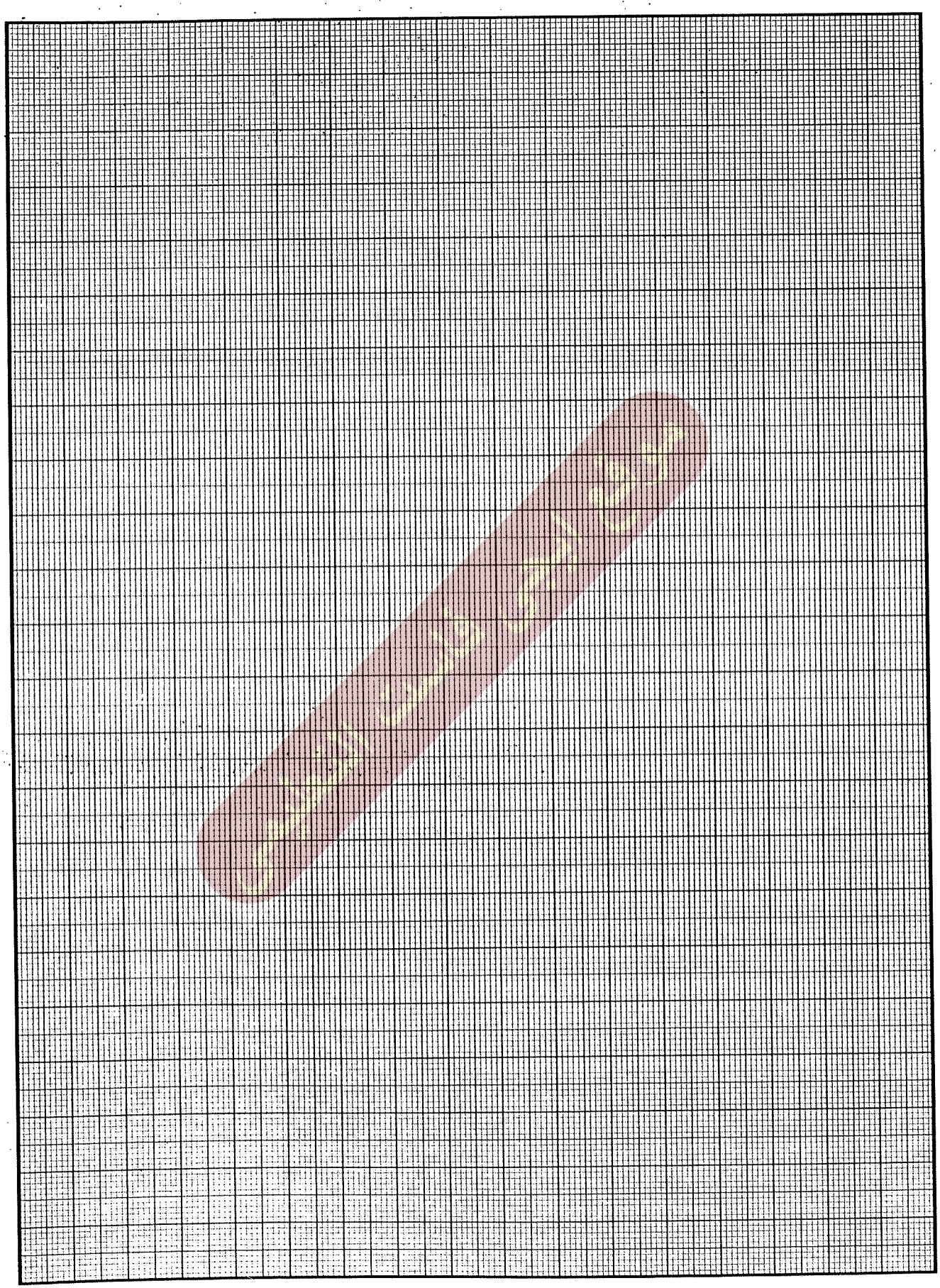

Booklet exam of second session 2017

1. Choose to answer (a) or (b)
Mention one use of:
a) The electric transformer
b) Lenz's rule

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2. Choose to answer (a) or (b)
Mention the scientific principle on which the following is based:
a) Night vision system
b) The electron microscope

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3. Choose to answer (a) or (b)
Mention the scientific concept:
a)a physical quantity equal to the resistance of a wire of a certain material having length 1 m and cross-sectional area 1 m^2,at a certain temperature
b) The current intensity when a quantity of charge of 1 Coulomb passes through a given cross-sectional area of a conductor in 1 sec

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4. When is the magnetic force acting on a wire carrying an electric current and placed in magnetic flux maximum?

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5. give reason for:
In some electric generators, there is commutator split into a number of sections twice the number of coils inside it

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6. Choose the correct answer:
The wave length of characteristic spectrum of X-ray depends on.....
a) The current intensity through the filament.
b) The potential difference between the target and the filament.
c) The type of target material.
d) The air pressure inside the tube.

7. In a pure silicon crystal, the concentration of positive holes is 10^{12} cm^{-3}.what is the concentration of phosphorus atoms per m^3 should be added to the crystal to make the hole concentration in the crystal 10^{10} cm^{-3} ?

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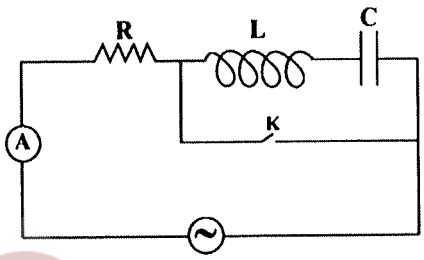
8. the given electric circuit is at resonance.
What happens to the reading of the hotwire ammeter when the switch (k) is turned on?
Explain your answer.



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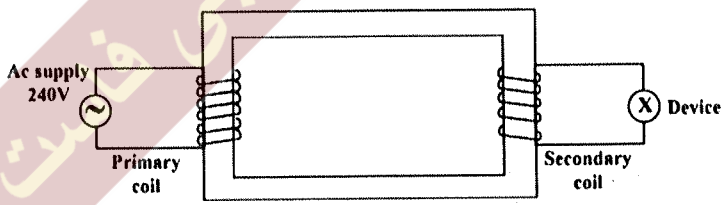
9. The diagram illustrates an ideal transformer. Its secondary coil is connected to device (X). A current of value 2A passes through the device.
First: what is the type of this transformer?
Second: find the resistance of the device (X) that is connected to the secondary coil.



Given that: $N_s = \frac{1}{2} N_p$

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10. Choose to answer (a) or (b)
Mention the factors that affect:
a) The magnetic flux density at the center of a circular coil carrying an electric current.
b) The magnetic dipole moment.

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11. The table records the radiation intensity of some frequencies (A,B and C) in a certain spectrum.

Radiation	Frequency	Intensity
A	$3.5X10^{14}$ Hz	high
B	$5.5X10^{14}$ Hz	Medium
C	$7.5X10^{14}$ Hz	low

Each ration is used to illuminate a metallic surface of work function $3.56x10^{-19}$ J. Which radiation of (A,B and C)is able to free the greatest number of photoelectrons per second(knowing that : $h=6.625x10^{-34}$ J.s)

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12. when is the induced electromotive force generated by the dynamo maximum?

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13.choose the correct answer:

Production of X-ray in Coolidge tube represents a model of energy transformation according to the following sequence.....

a) Mechanical energy→electric energy→electromagnetic energy.

b) Electromagnetic energy→mechanical energy→electric energy.

c) Electric energy→mechanical energy→electromagnitic energy.

d) Electric energy→electromagentic energy→mechanical energy.

14. What is the role played by the reference beam in holography?

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15. Choose the correct answer:

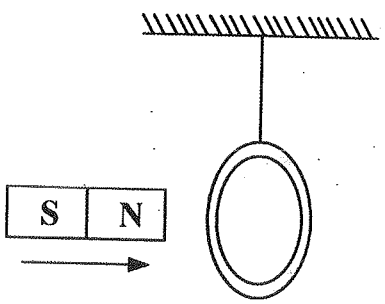
Copper ring is suspended freely by a thread. As a magnet is moved closer to the ring as shown in figure.....

a) The ring is attracted to the magnet.

b) The ring face (A) become North Pole.

c) The ring face (A) becomes South Pole.

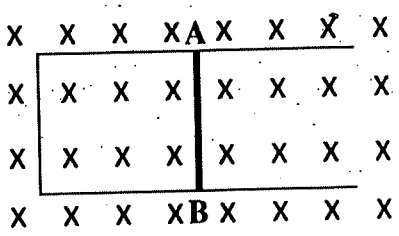
d) The ring is not affected since it is made of copper.



16.Choose to answer (a) or (b)

a) Calculate the coefficient of self-induction of a solenoid having cross-sectional area 0.015 m^2 , length 0.2 m and 1200 turns.
(Given that: л=3.14, μ= 4 лx10^{-7} Wb/A.m)

b) the diagram shows a metallic wire (AB) 0.15 m long placed perpendicular to magnetic flux of density 0.4T. find the magnitude and direction of velocity of the wire motion that induces an emf of 0.03 V between its terminals and causes a current of flow from (A) to (B)



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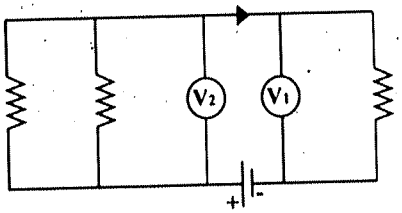
17. Compare:

Point of comparison	He-Ne laser	X-ray
Range of wavelength produced by each device:	.....	.....

18. in the given diagram:
Find the ratio between the readingof the voltmeter (V_1) and that of (V_2).



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19.Choose to answer (a) or (b)

What is condition required for:

a) The coil and the capacitor in (LRC) circuit connected to an AC supply to be at resonance.
b) The inductive reactance of an inductive coil to vanish in a closed circuit.

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20. Choose to answer (a) or (b)
Mention the scientific idea of:
a) induction furnaces.
b) the electric motor.
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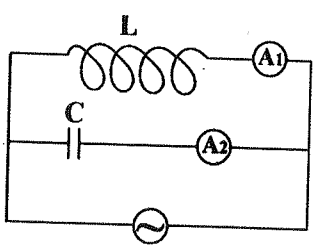
21. Choose to answer (a) or (b)
Choose the correct answer:
A) The resistance of ohmmeter is (R) .if an external resistance of (4R) is connected to it. Its pointer would deflect to.....
a)full of current scale .
b)$\frac{1}{4}$ of current scale.
c)$\frac{1}{5}$ of current scale.
d)$\frac{1}{6}$ of current scale.
B) If the ratio between magnetic flux densities at two points (x,y) located around a straight wire that carries an electric current is $(\frac{B_x}{B_y} = \frac{2}{3})$, the ratio of the normal distances from each of two points to the wire $\frac{d_x}{d_y}$ *is* .....
a)$\frac{2}{3}$
b)$\frac{1}{3}$
c)$\frac{1}{6}$
d)$\frac{3}{2}$

22. Choose the correct answer:
In Compton Effect, the particle property of photon has been proved by applying.....
a) Law of conservation of mass energy
b) Law of conservation of momentum.
c) De-Broglie equation.
d) Law of conservation of mass.

23. in the electric circuit shown:
The source is replaced by another of the same voltage but of higher frequency. Which choice (a,b,c or d) in the table below gives the change that would happen to the readings of (A_1 and A_2)?



	Reading of hot wire ammeter A_1	Reading of hot wire ammeter A_2
(a)	Increases	Decreases
(b)	Decreases	Increases
(c)	Decreases	Decreases
(d)	increases	Increases

24. Calculate the energy of the emitted photon as an electron in the hydrogen atom shifts from (n=2) to (n=1)

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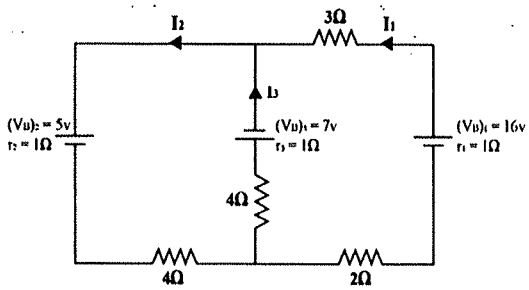
25.in the given circuit, the Kirchhoff's laws to find the value of (I_1).



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26.what is meant by the electric noise? Why does not it affect negatively on information bearing signals in digital electronics.

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27.Give reason for:

The sensitive galvanometer is not used in measuring the value of alternating current.

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28. Give reason for:

The electromagnetic radiations emitted from the Earth are invisible.

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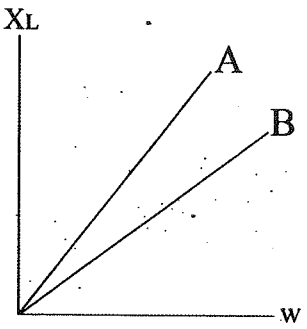
29. Choose to answer (a) or (b) Compare:

a) **Point of comparison**	**Primary coil**	**Secondary coil**
The frequency of current:		

b)**Point of comparison**	**The coil of electric motor**	**The coil of sensitive galvanometer**
Direction of current during operation		

30. Two solenoids (A and B) are connected in series to the coil of an AC dynamo whose angular velocity (ω) can be changed .Use the opposite graph to determine the coil that has greater self-inductance.



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31. Choose the correct answer:

If the average induced emf in an AC dynamo during $\frac{1}{4}$ revolution = 147 V, the maximum value of the generated electromagnetic force .....(where : $\pi = \frac{22}{7}$)

a) 231 V
b) 220 V
c) 147 V
c) 93.5 V

32. Choose to answer (a) or (b)

Mention one use for:

a) X-ray

b) The spectrometer

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33. Choose to answer (a) or (b)

Write down the scientific concept that expressed as:

a) The excited level in the atom of the active medium in laser production that is characterized by relatively long life time.

b) Emission due to relaxation of the excited atom from a higher energy level to a lower energy level before the life time interval is over due to the effect of the external photon.

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34. three resistances (R_1 ,R_2 and R_3) are connected in parallel. Prove (without drawing) that their equivalent resistance can be determined by the relation: $\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

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35. An electric circuit consist of an Ac supply.an ohmic resistance R and a capacitor of a capacitive reactance (X_C= 3R) connected in series. Calculate the phase angle between the total voltage and current.

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36. The resistance of a voltmeter is 300 Ω and the maximum voltage it can measure is (V_g).calculate the multiplier resistance that allows it to measure voltage up to 10 times the value of (V_g).

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Choose to answer (a) or (b)

37. Give reason for:

a) The whole graduation of the hot wire ammeter is not uniform

b) The capacitor allows the current to pass in AC circuit.

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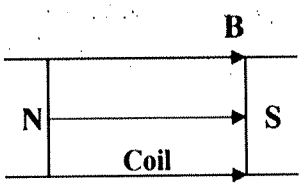
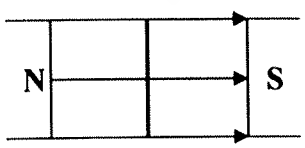
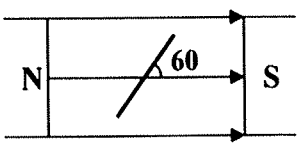
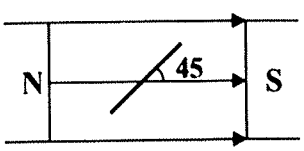
38. Choose the correct answer

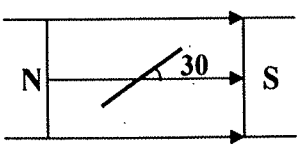
The figure illustrates a side view for a rectangular coil that carries an electric current .placed in a magnetic field and affected by a torque (τ) . which of the following coil positions makes its subject to torque =($\frac{\tau}{2}$)? .....



a 

b 

c 

d 

39. Give reason for:

The soft iron core in the electric motor is made of thin insulated sheets.

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40. Choose the correct answer:

Sequence of results that occur in the electron microscope due to an increase in the potential difference between the anode and the cathode.

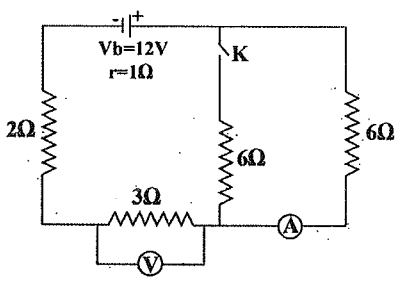
(note: each raw represents a choice)

	Kinetic energy of electrons	Wavelength associating the electron	Resolving power
(a)	Increase	Increase	Increase
(b)	Increase	Decrease	Decrease
(c)	Increase	Decrease	Increase
(d)	decrease	Decrease	Decrease

42. Choose the correct answer

In the given electric circuit: when turning the switch (K) on.

(Note: each row represents a choice)



	Ammeter reading (A)	Voltmeter reading (V)
(a)	Decreases	decreases
(b)	Decreases	Increases
(c)	Increases	Increases
(d)	Decreases	Decreases

43. Choose to answer (a) or (b)

What happens if?

a) The alternating current is transferred for long distances without stepping the voltage up at the power station.

b) As a primary coil carrying a direct current is taken out from a secondary coil.

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44. How can the ohmmeter be used to distinguish between a pn junction and an ohmic resistance?

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45. The table below shows the relation between the magnetic flux density (B) at a point on the axis of a solenoid and the intensity of current (I) passing through the coil

I(Ampere)	1	2	3	4
B(Tesla)	$4x10^{-4}$	$8x10^{-4}$	$12x10^{-4}$	$16x10^{-4}$

a) Plot a graphical between the current intensity (**I**) on X-axis and the flux density (B) on Y-axis.

b) From the graph, find the number of turns per one meter of the coil.

(Knowing that: , $\mu = 4\pi x10^{-7}$ Wb/A.m)

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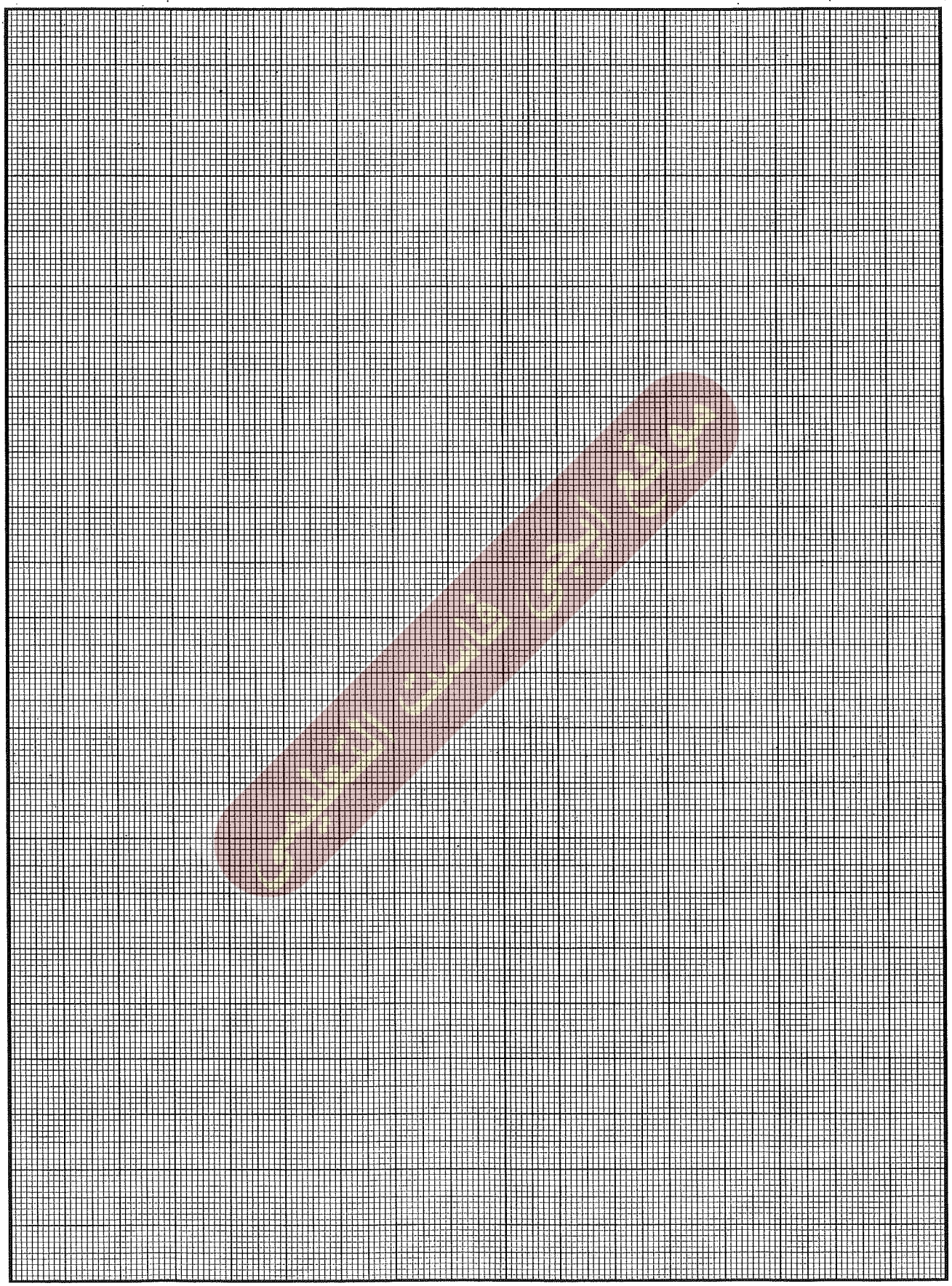
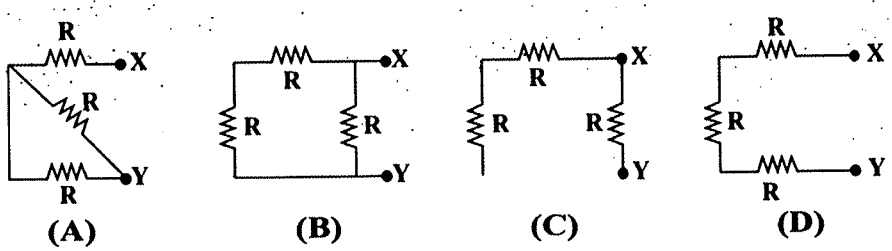


2018 first session

1. Choose to answer (A) or (B)

A) Choose the correct answer: Three resistors each of value R ,which of the following figures give the smallest value of resistance between X and Y

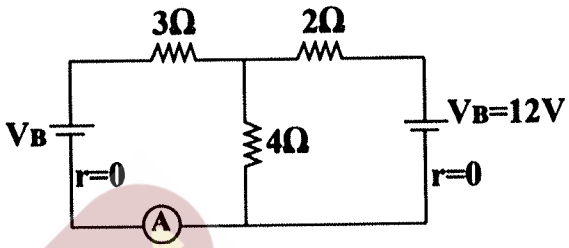
a. (A)
b. (B)
c. (C)
d.(D)



B) Choose the correct answer:

In the circuit shown, the value of (V_B) which makes the ammeter reading equal to zero is

a.12 V b.10 V
c.8 V d.6 V



2.Ohmmeter has resistance (R) passing through it current of intensity (I), when the ohmmeter is connected with an external resistance of 6000Ω the intensity of the current decrease to ($\frac{1}{3}$ I) .calculate the resistance of the ohmmeter.

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3. Choose to answer (A) or (B)

A. Choose the correct answer:

Two solenoids have the same radius and the same permeability. If the number of turns of the first solenoid is double, the number of turns of second solenoid, the ratio between the self induction coefficient of the first to the self-induction coefficient of the second is:

a.0.25 b.0.5 c.1.0 d.4

B) Mention one factor only leads to decrease the inductive electro motive force produced in a wire moves in a direction perpendicular to uniform magnetic field.

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4. Give reason for:

A number of coils are used with equal small angles between their planes in the electric motor.

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5. Choose to answer (A) or (B)

A. mention one factor only leads to increase the frequency of the characteristic X-ray spectrum which generated in Coolidge tube.

B. Calculate the wavelength of photon with energy $=4.968\times10^{-19}$ Joule, given that ($h=6.625\times10^{-34}$ J.s) and the speed of light $=3\times10^{8}$ m/s)

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6. Convert $(11000)_2$ to decimal system

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7. Mention two functions for the shunt (R_S) in the ammeter

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8. Choose the correct answer:

Energy transformation in the inductive furness are:

a.thermal→electrical →magnetic

b.electrical →thermal →magnetic

c.magnetic →thermal →electrical

d.electrical →magnetic →thermal

9. A series circuit consists of a resistor 6 Ω ,capacitor of capacitive reactance 80 Ω and inductive coil without ohmic resistance ,its self-inductance 0.28 H and AC source of potential ,20 V,50 Hz

Calculate the maximum value of the current intensity in the circuit (π =3.14)

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10. Choose to answer (A) or (B)

A. what is meant by P-type semiconductor?

B. what is the type of the transistor represented by the shown figure?

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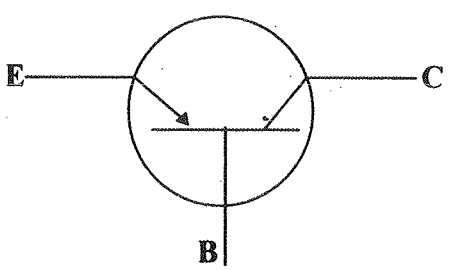

11. Choose to answer (A) or (B)

Give reason for:

A) The production of laser beam needs atoms of active medium must be in the case of population inversion

B) The magnification of laser based on multireflection of the photon in the resonance cavity

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12. Choose to answer (A) or (B)

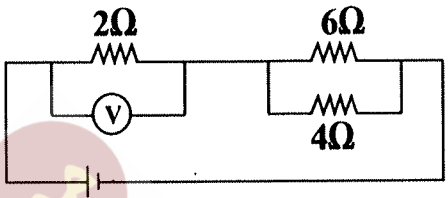
A) Choose the correct answer: in the circuit shown in the figure, the reading of voltmeter is 4V,so the electric current intensity passing through the resistance 6 Ω is:

a. 0.8 A

b. 1.0 A

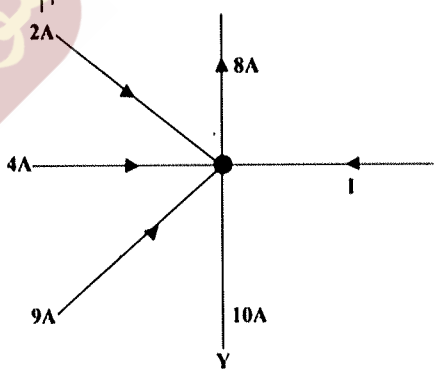
c. 1.2 A

d. 2.0 A



B) The figure shown represents a branching in the electric circuit.

Find the current in the branch X and the direction of the current in the branch Y



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13. Choose the correct answer:

Inductive coil, capacitor, ohmic resistance and hot wire ammeter are connected in series with AC source , and the circuit in resonance, if a soft iron bar is placed inside the coil, the reading of the hot wire ammeter will be:

a. increasesd **b.** decreased

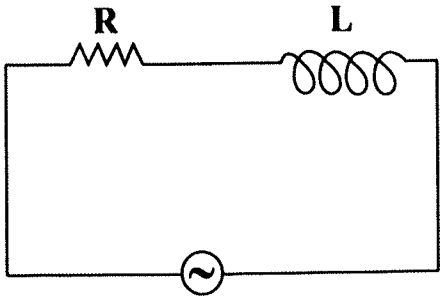
c. remained constant **d.** equal zero

14. Choose the correct answer:

In the circuit shown in the figure, if the AC source is replaced by DC source with the same potential difference, so the ratio between the effective value of the current intensity in the first case and the electric current intensity in the second case is:

a. equal zero **b.** less than one

c. equal one **d.** greater than one



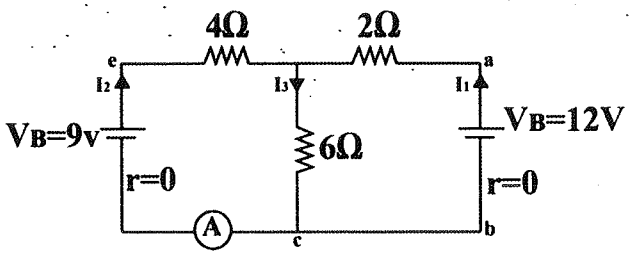
15. Choose the correct answer:

The ratio between associated wavelengths of a particle its mass (m) and other particle its mass (2m) both are moving with the same velocity is:

a. 0.25 **b.** 0.5

c. 1.0 **d.** 2.0

16. In the circuit shown in the figure calculate the current I_3 passing through the resistor 6Ω



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17. a rectangular coil with number of turns (N) and surface area $12{,}15 \times 10^{-3}$ m^2. The intensity of the electric current passing through it (3A) and is placed in a uniform magnetic field of magnetic flux density (0.4T) the table shows the relation between the magnetic torque (τ)acting on the coil and the sin of the angle (θ) between the normal to the coil and the direction of magnetic flux lines.

$\tau \times 10^{-1}$ N.m	1.4	2.8	4.2	5.6	7
Sinθ	0.2	0.4	0.6	0.8	1

Draw a graph between (τ) on the vertical axis and (sinθ) on the horizontal axis.from the graph find the number of turns of the coil

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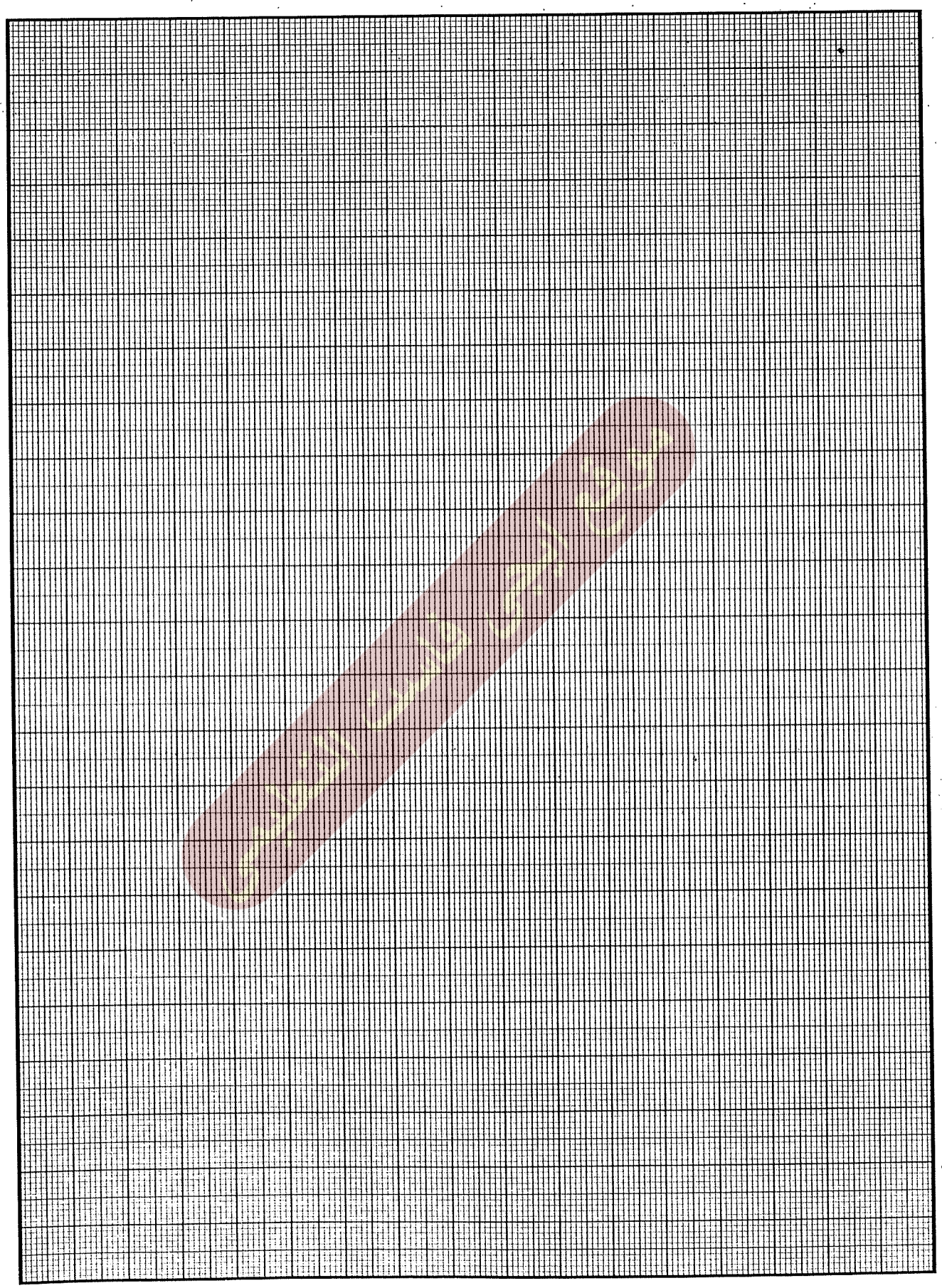

18. Compare between:

The modification on the AC dynamo to convert it to a unidirectional current dynamo and nearly DC dynamo

Nearly DC dynamo	Unidirectional current dynamo
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19. A moving coil galvanometer has resistance 45Ω.when the galvanometer is connected to shunt resistor, the intensity of the current passing through the coil of the galvanometer become 0.1 of the total current .find the value of the shunt (R_s)

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20. Choose the correct answer (A) or (B)

A) Compare between:

Point of comparison	P- type semiconductor	N-type semiconductor
Valancy of impurities	.....	.....
	.....	.....

B) The figure represents p-n junction connected with electric lamp .in which circuit the lamp is glowing? And why?

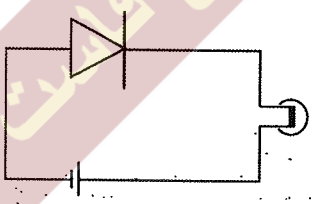

Figure (1)

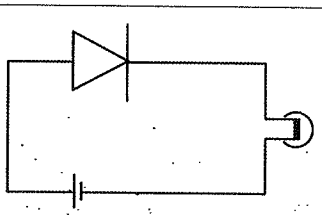

Figure (2)

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21. Compare between:

Point of comparison	Photons in spontaneous emission	Photons in stimulated emission
Intensity remains constant along far distance	.....	.....
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	.....	.....

22. Mention the mathematical relation that is used to calculate the radius of the electron orbit in hydrogen atom by using the wavelength associated to the electron and the level number (n).

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23. Write down the scientific concept of the impedance in AC circuit

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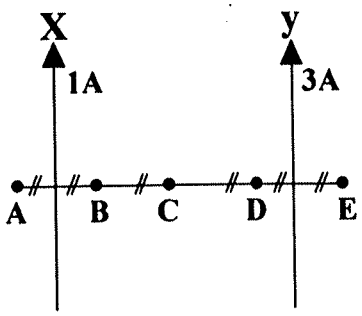
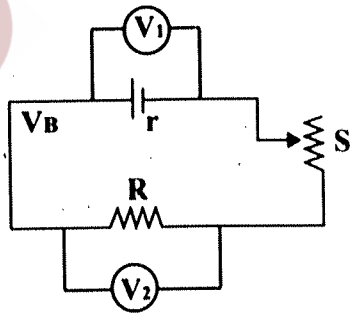
24. Two parallel long wires carry a current of 1 A and 3A in the direction as shown in figure .
At which point A,B,C,D or E is neutral point.



25. Choose to answer (A) or (B)

A. Give reason for:

In the circuit shown, when the variable resistance increases, the voltmeter reading (V_1) increases and voltmeter reading (V_2) decreases

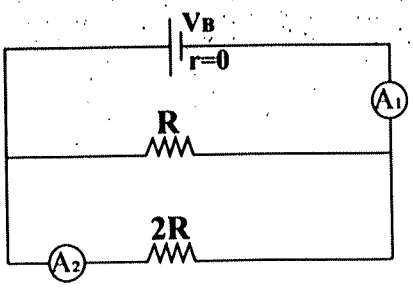


B) Choose the correct answer:

in the circuit shown in the figure, the ratio between the reading of the ammeter (A_1) to the reading of the ammeter (A_2) is

a. $\frac{1}{2}$ b. $\frac{2}{1}$

c. $\frac{1}{3}$ d. $\frac{3}{1}$



26. A rectangular coil ,its dimension (0.2m) and (0.3m) rotates at linear velocity of (10π)m/s.inside a constant magnetic field calculate:

1. The angular velocity
2. The number of rotation of the coil in second

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27. Calculate the force applied by a beam of light whose power is 2.5 W on a surface. Knowing the speed of light in air or vacuum ($c=3x10^8$ m/s)

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28. Choose to answer (A) or (B)

A) Mention Kirchhoff's second law (conservation of energy)

B) Mention Ohm's law

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29. Choose to answer (A) or (B)

A) Compare between the self-induction coefficient of solenoid when:

Iron core inside the solenoid	Solenoid without iron core
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B) Choose the correct answer:

Primary coil is connected with DC source and is placed inside secondary coil. When the circuit of the primary coil is opened in the second coil, the current will be:

a. forward induced current
b. backward induced current
c. alternating current
d. direct current

30. Choose to answer (A) or (B)

A) What is meant by photo electric effect?

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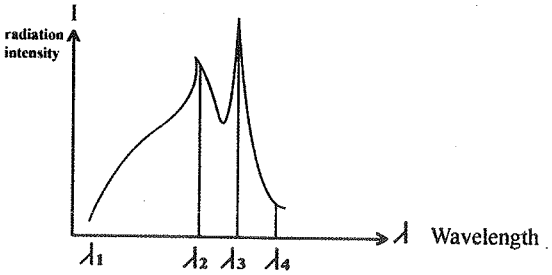
B) Choose the correct answer:

The figure shown represents the relation between wavelength and intensity of X-ray spectrum which is produced from Coolidge tube.

Which wavelengths depends on the potential difference between the filament and the target

a. λ_1, λ_2
b. λ_2, λ_3
c. λ_1, λ_4
d. λ_1, λ_3



31. Choose the correct answer:
The speed of gamma photon after collides with a free-electron in Compton effect is:
a. increased b. decreased
c. equal zero d. does not change

32. Choose the correct answer:
Excited Helium atoms lose its excited energy and returns back to the ground state, as a result of:
(a) collisions with the unexcited He-atoms
(b) collisions with the unexcited Ne-atoms
(c) emission of photons by spontaneous emission
(d) emission of photons by stimulated emission

33. How can we avoid the effect of the electrical noise at the transmition of wireless information?
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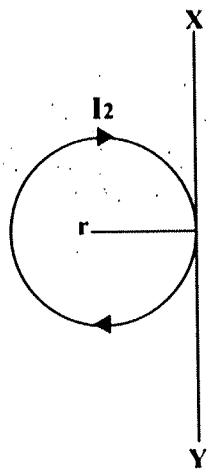
34. Choose the correct answer:
In the figure shown, a long straight wire carrying current (I_1)is placed tangent to circular ring of radius (r) and a current (I_2)passing through it in the direction shown.
When the neutral point formed at the center of the ring which of the following choices represents the ratio ($\frac{I_1}{I_2}$)and the direction of the current I_1.



choices	The ratio $\frac{I_1}{I_2}$ and the direction of I_1
a	π upward
b	π downward
c	1/π upward
d	1/π downward

35. What are the factors needed to increase the efficiency of electric transformer? (State two factors only)
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36. Inductive coil of inductive reactance 80Ω, capacitor of capacitive reactance of 60 Ω and ohmic resistance of 20 Ω connected together in a series to an AC power supply in a closed circuit. Calculate the angle of phase between the total potential difference and the intensity of the current passing in the circuit
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37. Choose the correct answer (A) or (B)

A) Write the scientific term:

Attraction force which prevent free electrons from leave the surface of metal

B) Mention one application based on dual nature of electrons

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38. Choose to answer (A) or (B)

A) Choose the correct answer:

Electric transformer, the rate of change the current in its primary coil 5 A/S, and backward induced emf in the secondary coil 4V, so the mutual induction coefficient between the two coils is:

a. 0.6 H b. 0.8 H

c. 1.0 H d. 2.5 H

B) Give reason for:

The soft iron core in the transformer is made of insolated sheets (laminas)

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39. Choose the correct answer (A) or (B)

A) Choose the correct answer:

The ratio between impedance of wireless radio receiver when receiving signal with frequency (f) and its impedance when it receive signal with frequency (2f) is:

a. 0.25

b. 0.50

c. 1.0

d. 2.0

B) Give reason for:

The circuit contains inductive coil without resistance and AC source is considered as open circuit at very high frequencies.

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40. What happens to the wavelength at maximum intensity which emitted from a hot body when its temperature is increased?

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41. Give reason for:

Helium –Neon (He-Ne) laser is selected as two elements in the active medium

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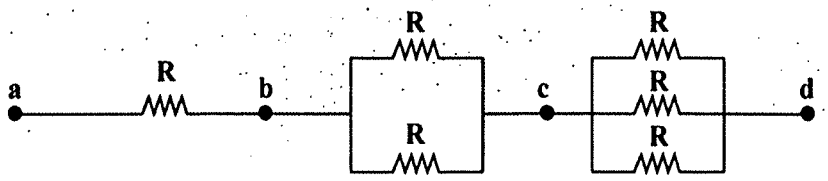
42. The figure shown represents ,a part of electrical circuit, the potential difference between c and b equal 3V.
What is the potential difference between a and d?

a. 12 V
b. 11 V
c. 10 V
d. 9 V



43. A rectangular coil its dimensions 0.12 m and 0.1 m, carries a current 3A its number of turns 50 turns. The coil placed perpendicular to magnetic field. Whose magnetic flux density uniform. Calculate the magnetic dipole of the coil.

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44. Draw the simple equivalent electric circuit which represents:
1. NOT gate
2. OR gate

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45. Compare between:

Point of comparison	Right hand screw rule	Fleming`s left hand rule
uses	.....	.....
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موقع ايجى فاست التعليمى

2018 second session

1-Choose to answer (A) or (B) only
what is meant by the following statement.
(A)The method of connection of group of electrical resistors with different values to form equivalent resistance its value less than the smallest one.
what is meant by
(B)The total work done to transfer one coulomb inside and outside the battery in the closed circuit =15 joules.

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2-Choose to answer (A) or (B) only
Choose the correct answer:
(A) straight wire with length 2 meter is moving with velocity 10 m/s perpendicular to uniform magnetic field with magnetic flux density 0/1T, the induced electromagnetic force generated is equal to.
(a) 2 V
(b) 1.5 V
(c) 1 V
(d) 0.5 V
(B) Inductive coil with self-inductance coefficient 0.25 H is needed to generate an induced electro motive force = 10 volt the rate of change of electric current passing through the coil is equal to
(a) 0.025 A/s
(b) 2.5 A/s
(c) 10.25 A/s
(d) 40 A/s

3-Choose to answer (A) or (B) only.
mention:
(A) Wine's law
(B) One application for a thermal imaging in the medicine

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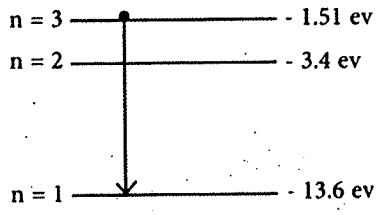
4-The figure represents one of electron transitions in hydrogen atom. Calculate the wave length of the emitted photon
(Knowing $h=6.625\times10^{-34}$ J.s , $c=3\times10^{8}$ m/s and $e=1.6\times10^{-19}$ C)



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5-in helium neon LASER compare between: each of them:

Point of comparison	Helium gas	Neon gas
The source of excitation to the higher level		

6-what is meant by
Drift current in the P-N junction.

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7-What is the relation between type of force between two wires passing through each of them electric current and the direction of current in the two wires?

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8-Two adjacent coils with mutual induction 0.2 H between them, the current is changed in the primary coil from 5 A to 3 A in 0.01 sec. calculate induced electro motive force generated in the secondary coil

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9-Give reason for :

The electric current does not flow in the circuit contains capacitor if direct current source connected in series.

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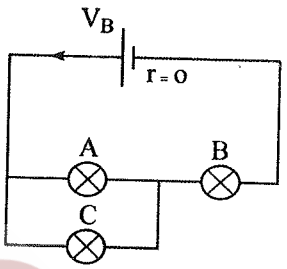
10-Choose to answer (A) or (B) only

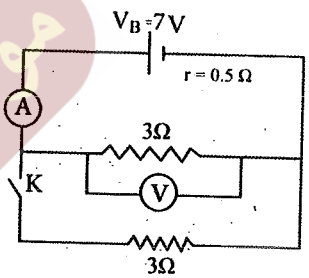
(A) In the circuit shown in the finger three lamps with different resistance each lamp is working on 6 volt, so the emf (V_B) of the battery needed to operate these lamps is equal to



(a) 18 V (b) 12 v

(c) 9V (d) 6 V

(B) In the opposite circuit when the switch K is closed, which of the following choices represent the change in the reading of the ammeter and voltmeter?



Choice	Reading of Voltmeter	Reading of Ammeter
A	Increases	Increases
B	Increases	decreases
C	decreases	Increases
D	No change	Increases

11-Ammeter reads up to Ig and has a resistance of 0.1 Ω. What is the value of required shunt resistance to increase its reading 10 times original?

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12-Choose to answer (A) or (B) only

Give reason for:

(A)Step up transformer is used at generating station to transfer electric energy to zones of distribution

(B)The standerd resistors are made of double wounded coils.

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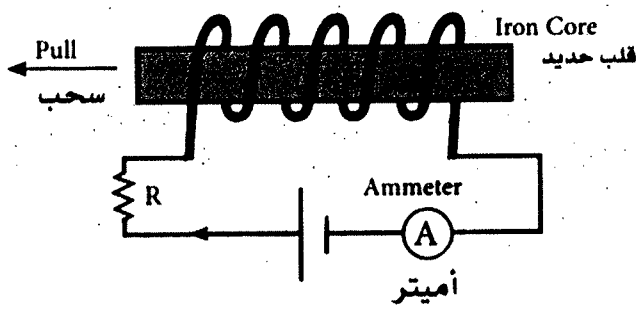
13-In the opposite figure the coil with iron core able to move, Ammeter and battery in series, what happen to the reading of Ammeter if the iron core is withdrawn from the core rapidly?



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14-Choose to answer (A) or (B) only.
Give reason for:
(A)The line spectrum of X ray may be not appears
(B)The wavelength in Leyman's series has the shortest wavelength in hydrogen spectrum

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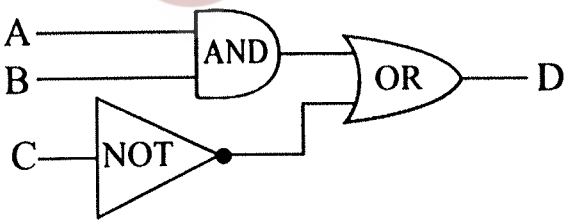
15- In the logic circuit as shown which one choice in the truth table makes the D=1



Choice	A	B	C
A	0	0	1
B	1	0	1
C	1	0	0
D	0	1	1

16- Write the relation of Ampere's circular law.

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17-What is the function of the magnetic field of the permanent magnet in the electric motor?

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18- Inductive coil with ohmic resistance 10Ω is connecting with AC source of emf=10V calculate its inductive reactance when the intensity of the electric current in the circuit = 0.8 Amp.

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19-Choose to answer (A) or (B) only.

(A) Mention the effect of high direct potential on the electrons which emitted from the filament in Coolidge tube

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(B) Choose the correct answer

X-ray spectrum which generated when emitted electrons from the filament loses its energy gradually when passes near the target atoms

a) Absorption line spectrum
b) Absorption continuous spectrum
c) Emission line spectrum
d) Emission continuous spectrum

20-Choose to answer (A) or (B) only.

Compare between:

(A)Point of comparison	Step-up transformer	Step-down transformer
Electric current intensity in the secondary coil with regard to current intensity in the primary coil		

(B)Point of comparison	Phenomenon of self-induction	Phenomenon of mutual induction
Physical concept		

21-Choose to answer (A) or (B) only.

(A) Choose the correct answer:

Ratio between total impedance and the ohmic resistance in the oscillating circuit at resonance is:

a) More than one b) Equal to one

c) Less than one d) Equal to zero

(B) Give reason for:

The platinum –iridium wire in hot wire ammeter is mounting on a plat made of a metal having the same expansivity as that of the hot wire itself and both are isolated from each other.

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22-Choose the correct answer:

The associated wavelength (λ) for a moving particle has a mass (m) and velocity (v) is proportional with:

a) More than one b) Equal to one

c) Less than one d) Equal to zero

23-Choose the correct answer:

Coherent photons in the optical ray's means:

a) Emitted by variable phase difference

b) Moving in parallel beams

c) Emitted by constant phase difference

d) Does not obey inverse square law

24-Choose the correct answer

The potential difference between two points when a work of 30 joules needed to transfer 10 coulombs between two points is equal to:

a) 0.3 V b) 3 V

c) 30 V d) 300 V

25-Compare between:

Point of comparison	Ohmmeter	Hot wire ammeter
Reason of not equal division scale		

26-Transistor has $\beta_e = 50$, find α_e, then calculate the collector current if the base current = 5×10^{-5} A.

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27-What is meant by ?

The effective value of AC =2A

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28-Choose the correct answer:

Straight wire its length 1m carries a current 2A is placed normally in a uniform magnetic field, the wire is affected by a force 3N so magnetic flux density of the field is equal to

a) 1.5 T b) 2.5 T

c) 3 T d) 3.5 T

29-Choose to answer (A) or (B) only.

Give reason for

(A) The P-N junction is used to rectify AC.

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(B) The conductivity of semiconductor is increased with increasing its temperature.

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30- Give reason.

Laser beam is used to determine the astronomical distance

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31-Write down the mathematical relation which is used to calculate the energy of any level in hydrogen atom.

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32-Define the alternating current.

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33-Give reason for.

The magnetic torque acting on rectangular coil carries a current is placed in magnetic field and its plane parallel to field is decreased gradually until reach the normal position.

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34-Choose to answer (A) or (B) only:

Choose the correct answer

(A) when the length of the wire is increasing to double and its cross sectional area decreases to its half the resistivity of the wire becomes

a) Increase four times b) Increases three times

c) Increase to double d) Does not change

(B) If the intensity of electric current in a conductor is 2A. so the quantity of electricity (charge) which passes through the cross section of the conductor in one minute is :

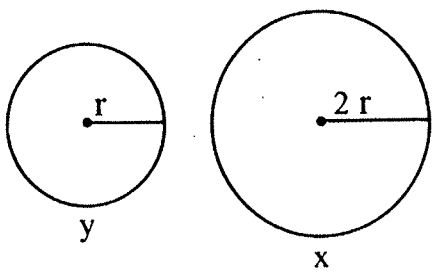
a) 120 C b) 60 C

c) 30 C d) 2 C

35-In the opposite figure, two metal rings its resistance negligible in the same plane is affected by varied and normal magnetic field, the ratio between e.m.f generated in coil (Y) to the e.m.f generated in the ring (X) is equal to:

a) 4 b) 2

c) 0.5 d) 0.25



36-Photon with wavelength 4×10^{-7} m falls on a surface of metal with work function 2.3×10^{-19} j find the kinetic energy of emitted electron from a surface of the metal, given that speed of light in air=3×10^{8} m/s and Planck's constant 6.625×10^{-34} j.s

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37-Choose to answer (A) or (B) only:

(A) Mention one example for electronic specialize devices.

(B) Mention the name of device which convert continuous signals to digital signals.

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38- Choose to answer (A) or (B) only:

(A) What is meant by optical pumping?

(B) What is meant by the laser beam does not obey invers square law?

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39- Choose to answer (A) or (B) only:

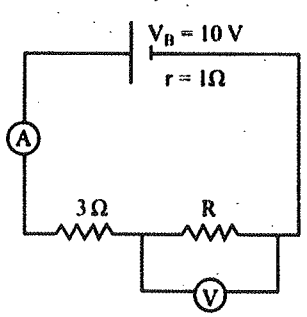
Choose the correct answer

(A) The equivalent resistance of three identical resistors is connected in parallel =2Ω so its equivalent resistance in series is equal to:

a) 6 Ω b) 12 Ω

c) 18 Ω d) 24 Ω

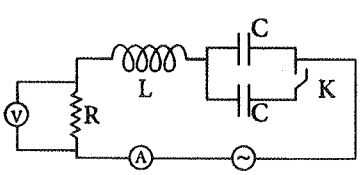
(B) In the circuit as shown in the figure, if the reading of Ammeter 1A the reading of Voltmeter is:



a) 3 V b) 3 V

c) 7 V d) 9 V

40-In the circuit shown in the figure, it's a circuit in resonance, what happen to the reading of voltmeter when the switch K is closed?



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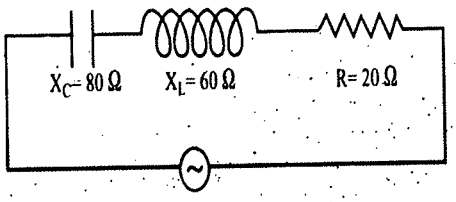
41- In the circuit shown in figure the phase angle between total voltage (V) and current (I) passing through the circuit is:



a) +90 b) +45
c) -45 d) -90

42-Give reason for:

The resolving power of electron microscope is very high.

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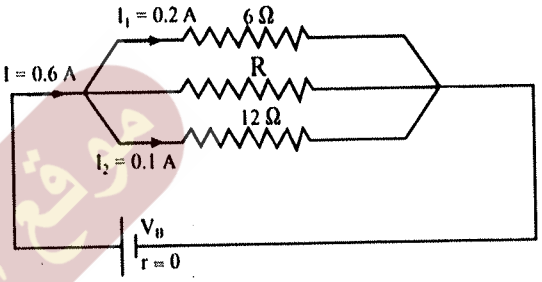
43- In the circuit shown in the figure, calculate:

(1) Current intensity passing through the resistance R
(2) The value of the resistance R.



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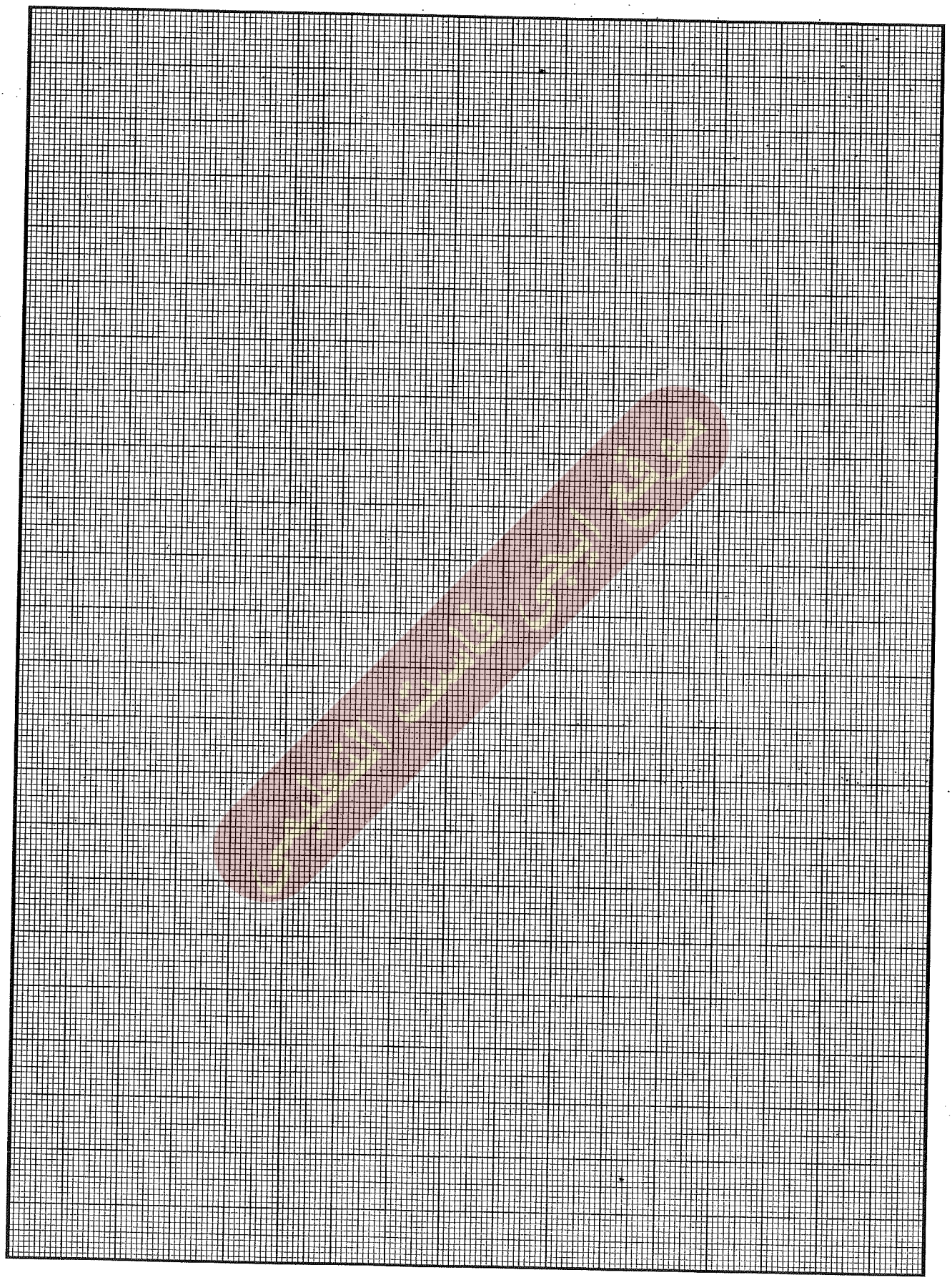
44- Choose the correct answer:

The value of instantaneous induced e.m.f in the coil of dynamo when the magnetic flux passing through the coil is maximum is equal to.

a) The maximum value b) The effective value
c) The average value d) Zero

45- A number of multipliers is used to convert galvanometer reads up to I_g to Voltmeter used to measure potential difference (V), the given table represents the relation between maximum measured voltage and the magnitude of the multipliers R_m

V (volt)	7	9	11	13	15
R_m (Ω)	300	400	500	600	700

Plot a graph between (V) on vertical axis and R_m on horizontal axis, from the graph find the current of galvanometer I_g.

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