Training Models For third secondary
Physics
Model (9)- English

2025-2026

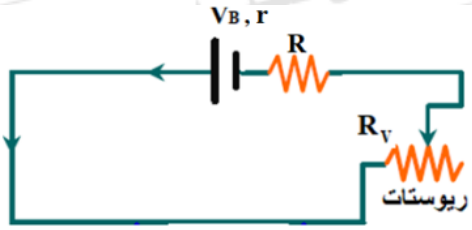
First: Objective questions (multiple choice)"all Question of one mark"

1	**According to direction of the conventional electric current, which of the following is correct?**	
	A	Positive charge flows out from the negative terminal of the battery.
	B	Negative charge flows out from the positive terminal of the battery.
	C	Positive charge flows from the negative terminal to the positive terminal inside the battery.
	D	Positive charge flows from the positive terminal to the negative terminal inside the battery.

2	**Two cylindrical conductors, X and Y, are made of two different materials, where the resistivity of the material of conductor X is half that of the conductor Y. If the diameter of conductor X is equal to half that of the conductor Y, to make the electric resistance of the two conductors equal, then the length of conductor X should be equal to.....**	
	A	length of the conductor Y.
	B	half length of the conductor Y.
	C	twice the length of the conductor Y.
	D	quarter the length of the conductor Y.

3

The figure represents a simple electric circuit that contains a fixed ohmic resistance R, a variable resistance (rheostat) R_V that connected to an electric cell its electromotive force V_B and of internal resistance r. If $R_V >> R$, then:



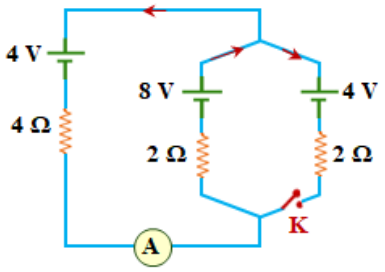
i. The potential difference across the resistance R_V increases as the value of the resistance R_V increases.
ii. The potential difference across the internal resistance r increases as the value of the resistance R_V increases.
iii. The potential difference across the terminals of the battery increases as the value of the resistor R_V increases.

Which of the above statements are <u>correct</u>?

A	i and ii only
B	i and iii only
C	ii and iii only
D	i , ii and iii

4

The figure represents an electric circuit contains three electric cells of negligible internal resistance, several resistances connected together, an open switch K, and an ammeter.
The ratio between the ammeter reading before and after closing the switch K is equal to.....



A	$\frac{5}{3}$
B	$\frac{7}{3}$
C	$\frac{8}{5}$
D	$\frac{9}{5}$

5

Figures (1, 2, and 3) represent three closed electric circuits, each circuit having an electric cell of negligible internal resistance, constant resistance, and a uniform conductor of electric resistance equal to (R). Each figure shows the value of the electromotive force of the cell, the fixed resistance (R), and the distance of point P from the conductor (d).

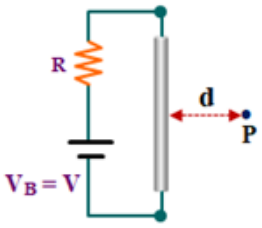


Figure (1)

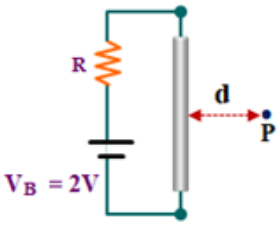


Figure (2)

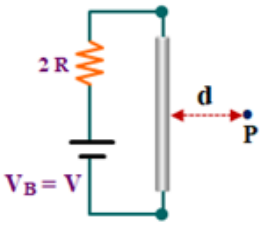
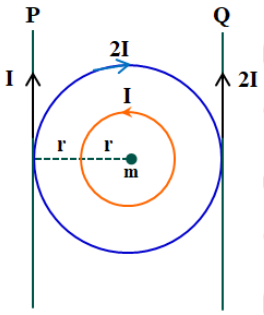


Figure (3)

Then the relation that expresses the magnetic flux density (B) in the three figures at point P is…..

A	$B_1 = B_2 = B_3$
B	$B_1 > B_2 > B_3$
C	$B_2 > B_1 > B_3$
D	$B_2 > B_3 > B_1$

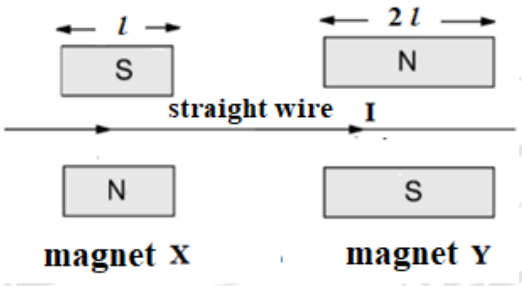
6	**Two concentric circular rings of center (m) and two straight wires P and Q , are all placed in the same page plane, an electric current passes through each of them, as shown in the figure.** **The direction of the total magnetic field at the center (m) resulting from flowing of the four currents is.....**	

A	Perpendicular to the page plane and inward
B	Perpendicular to the page plane and outward
C	Parallel to the page plane and inward
D	Parallel to the page plane and outward

7	**A solenoid of length (L) and number of turns (N) is connected between its two ends to a battery of electromotive force V_B of negligible internal resistance. A magnetic field of flux density B is produced at a point inside it at the center of its axis. When the turns of the solenoid are compressed uniformly to form a circular coil with a diameter of (2r), and it is connected to a battery of electromotive force $0.5V_B$ of negligible internal resistance. If you know that the ratio between the solenoid length and the circular coil radius $\frac{L}{r}$ is equal to $\frac{20}{1}$. Then the magnetic flux density at the center of the circular coil.....**

A	Increases by 8B
B	Increases by 7B
C	Increases by 4B
D	Increases by 3B

8 **The figure represents a straight wire carrying a DC electric current of intensity I placed between two magnets X and Y, as shown. If the magnetic flux density of magnet X is (B) and the magnetic flux density of magnet Y is (1.25 B). Assuming that there is no magnetic field outside the space between the poles.**



The correct choice that expresses the magnitude and direction of the resultant magnetic force acting on the straight wire is.....

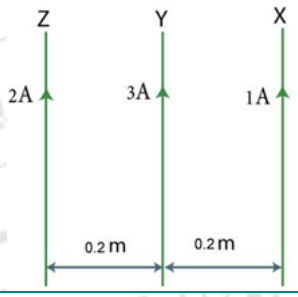
A	3.5 B I L – out of the page
B	3.5 B I L – into the page
C	1.5 B I L – out of the page
D	1.5 B I L– into the page

9 **A straight wire of length L was reshaped to form a circular coil X of one turn. Then the same wire was reshaped again to form a circular coil Y of two turns.**

If the same current passes through both cases, the ratio between $\frac{\text{Magnetic dipole moment of coil X}}{\text{Magnetic dipole moment of coil Y}}$ is……

A	$\frac{1}{4}$
B	$\frac{1}{2}$
C	$\frac{2}{1}$
D	$\frac{4}{1}$

10 Three long straight parallel wires X, Y, and Z, each carrying a direct electric current in the directions shown in the figure. If the resultant magnetic force acting on wire Y is equal to F. When the direction of the current flowing through wire X is reversed, the net magnetic force on wire Y becomes……



A	1.5F
B	2.5F
C	3F
D	5F

11 A galvanometer whose coil resistance R_g, maximum current intensity I_g (full scale deflection) can withstand by the device, and potential difference across its coil is V_g.
When a resistance of $5R_g$ connected in series with the galvanometer coil, the maximum voltage that can be measured is equal to V. When another resistance of $9R_g$ (instead of the resistance $5R_g$)is connected in series with the same galvanometer, the maximum voltage that can be measured is equal to .....

A	$\frac{5\ V}{3}$
B	$\frac{9\ V}{5}$
C	$\frac{3\ V}{2}$
D	2 V

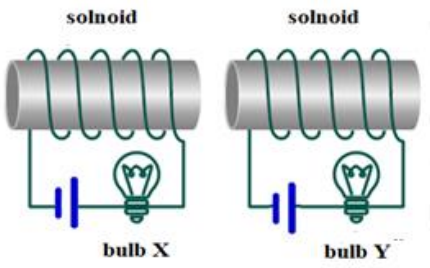
12 **An ohmmeter whose resistance 3 kΩ, has a circuit contains a galvanometer, a fixed resistor, a rheostat, and a battery of electromotive force V_B of negligible internal resistance. When the two ends of the ohmmeter are connected, its pointer deflects to the end of the current scale. When the battery is replaced by another battery of electromotive force 0.95 V_B of negligible internal resistance, which of the following changes is required to return the pointer to the end of the current scale?**

A	Increase the resistance taken from the rheostat by 150 Ω
B	Decrease the resistance taken from the rheostat by 150 Ω
C	Increase the resistance taken from the rheostat by 2850 Ω
D	Decrease the resistance taken from the rheostat by 2850 Ω

13 **When a magnet of flux density B is moved with a velocity v towards a solenoid of number of turns N, the average induced electromotive force between ends of the solenoid is equal to 4V. When the number of turns in the coil is doubled and the same magnet is moved in the same direction but with a velocity of 2v towards the solenoid, the average induced electromotive force between ends of the solenoid will be .....**

A	2 V
B	4 V
C	8 V
D	16 V

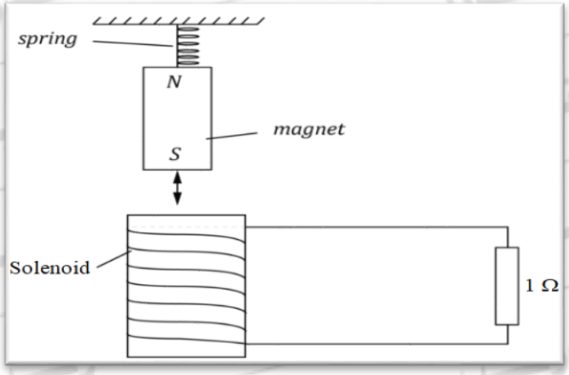
14 **The figure represents two identical adjacent solenoids, each connected to a battery of electromotive force V_B of negligible internal resistance, and a bulb. When the two solenoids are moved away from each other, then……**

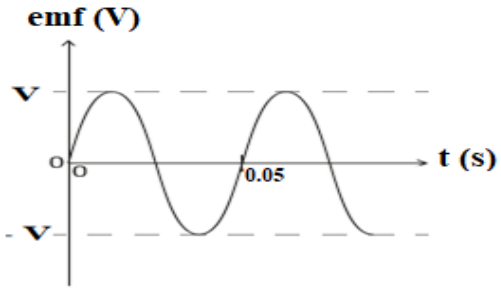


A	The brightness of both bulbs X and Y increase.
B	The brightness of both bulbs X and Y decrease.
C	The brightness of bulb X increases while the brightness of bulb Y decreases.
D	The brightness of bulb X decreases while the brightness of bulb Y increases.

15

A magnet attached to a spring oscillates above a coil with 240 turns, as shown. While The graph shows the change in the induced electromotive force (emf) generated across the coil with time (t) during a complete cycle of periodic time 0.05 s.





when the spring replaced by another one that allows the magnet to oscillate at a higher frequency, the graph that correctly expresses the relation between the current passing through the fixed resistance I and time t during a complete cycle is ……..

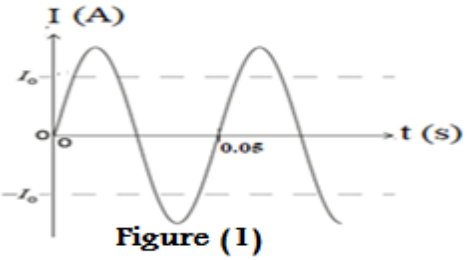


Figure (1)

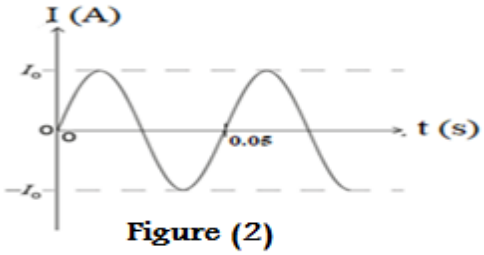


Figure (2)

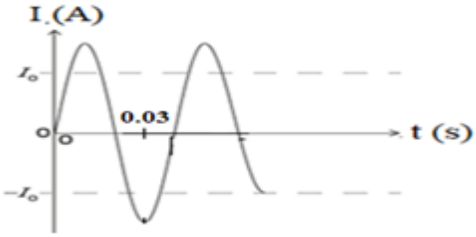


Figure (3)

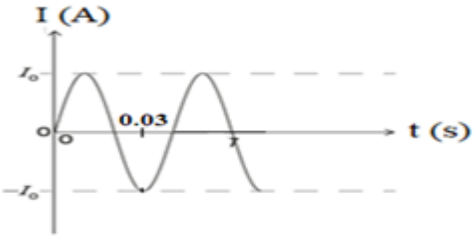


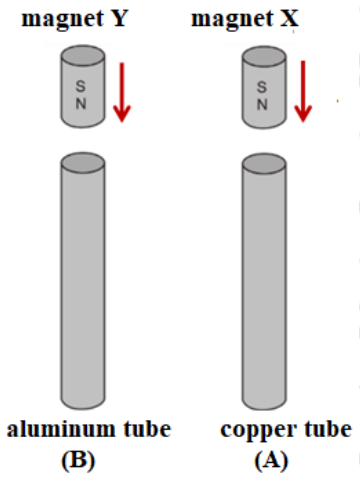
Figure (4)

A	Figure (1)
B	Figure (2)
C	Figure (3)
D	Figure (4)

16 **Two long solenoids X and Y have the same dimensions. If the ratio between their self-inductance is $\frac{L_X}{L_Y} = \frac{16}{9}$, and if the number of turns of the coil X per unit length is 200 turn.m^{-1}, then the number of turns of coil Y per unit length is.....**

A	63.28 turn.m^{-1}
B	112.5 turn.m^{-1}
C	150 turn. m^{-1}
D	266.67 turn.m^{-1}

17 **The figure represents the falling of two identical magnets (X, Y) through two tubes (A, B) have the same of dimensions and size, one of them made of copper and the other of aluminum (the electrical conductivity of copper is greater than that of aluminum), without touching the walls of the tubes. If the time taken for magnet X to reach the bottom of tube A is t_1, and the time taken for magnet Y to reach the bottom of tube B is t_2 , then.....**

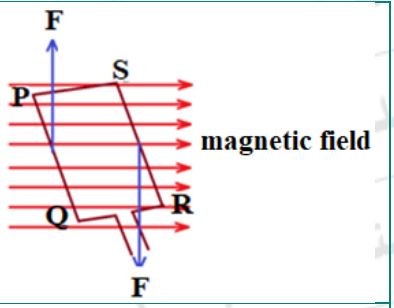


A	$t_1 > t_2$, because the eddy currents generated in tube A are less than that generated in tube B.
B	$t_1 < t_2$, because the eddy currents generated in tube A are less than that generated in tube B.
C	$t_1 < t_2$, because the eddy currents generated in tube A are greater than that generated in tube B.
D	$t_1 > t_2$, because the eddy currents generated in tube A are greater than that generated in tube B.

18 **If the output power produced at the secondary coil of a non-ideal transformer is 20W, the current flowing in the primary coil is 2A, and the potential difference between the two ends of the secondary coil is 50V. The correct choice that expresses the ratio between the number of turns in the primary coil N_P and the number of turns in the secondary coil N_S respectively $(\frac{N_P}{N_S})$ and the type of transformer is .....**

	$(\frac{N_P}{N_S})$	type of transformer
A	$\frac{1}{5}$	Step up for voltage
B	$\frac{1}{5}$	Step down for voltage
C	$\frac{5}{1}$	Step up for voltage
D	$\frac{5}{1}$	Step down for voltage

19 **The figure represents the rotation of a dynamo coil in a uniform magnetic field. The correct choice that expresses the direction of the induced current in the sides PQ and RS is.....**

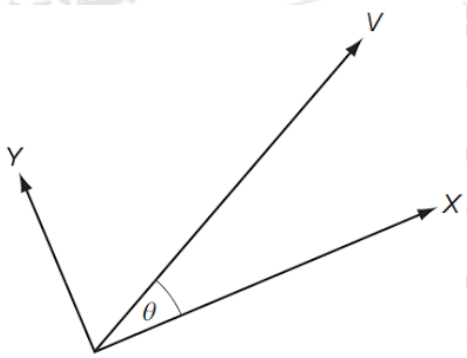


	Direction of induced current through PQ	Direction of induced current through RS
A	From P to Q	From S to R
B	From P to Q	From R to S
C	From Q to P	From S to R
D	From Q to P	From R to S

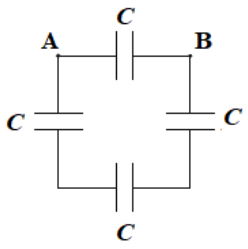
20	**In an alternating current circuit containing an ohmic resistance of R and a capacitor of capacitive reactance equal to R.** **If the instantaneous induced electromotive force is given by the relation** $V_{ins} = V_{max} \sin(\omega t)$ **then the power consumed (dissipated) in the circuit is given by the relation…..**

A	$\frac{V_{max}^2}{R}$
B	$\frac{V_{max}^2}{2R}$
C	$\frac{V_{max}^2}{4R}$
D	$\frac{V_{max}^2}{8R}$

21	**The diagram represents a phasor diagram in an alternating current circuit containing an ohmic resistor (R) and a pure inductor (L) of core is made of soft iron, connected in series with an alternating current dynamo of effective voltage V. If the phase angle between the total voltage V and the total current is equal to θ.** **The correct choice that expresses the necessary action to increase the phase angle θ is...**



A	Replace the AC dynamo by another one that has a lower frequency.
B	Connect an air-core pure inductor in series with the present inductor.
C	Connect another pure inductor in parallel with the present inductor in the circuit.
D	Remove the iron core from the pure inductor and connect an ohmic resistor in series in the circuit.

22	**Four identical capacitors, each has a capacitance of *C*, are connected together as shown in the figure. Then the total capacitance between points A and B is equal to.....** 

A	$\frac{C}{4}$
B	$\frac{C}{3}$
C	$\frac{4\,C}{3}$
D	$4\,C$

23	**When a photon of energy E and of wavelength λ from gamma rays falls on a free electron, the statement that correctly describes the scattered photon after the collision is……...**
A	The wavelength of the scattered photon is less than λ, while the energy of the scattered photon is greater than E.
B	The momentum of the scattered photon is greater than $\frac{h}{\lambda}$, while the energy of the scattered photon is less than E.
C	The equivalent mass of the scattered photon is less than $\frac{h}{c\,\lambda}$, while the frequency of the scattered photon is less than $\frac{E}{h}$.
D	The speed of the scattered photon is less than c, while the frequency of the scattered photon is greater than $\frac{E}{h}$.

24	**Light incident on a surface of metal X, photoelectrons from the surface are emitted. When the same light incident on another surface of metal Y, but with a different intensity, photoelectrons were also emitted. If the maximum speed of the electron emitted from surface X was greater than the maximum speed of the electron emitted from surface Y. This means that…...**
A	The work function of metal X is less than that of metal Y.
B	The work function of metal X is greater than that of metal Y.
C	The intensity of incident light on metal X is less than that of incident light on metal Y.
D	The intensity of incident light on metal X is greater than that of incident light on metal Y.

25 The following statements describe the behavior of electrons:
i. Using a beam of electrons to study the crystalline structure.
ii. Diffraction a beam of electrons when passing through two narrow parallel slits.
iii. Emission of electrons from the metallic surface when light incident on it, its frequency is greater than the critical frequency.
Which of the statements above **correctly** explains the wave nature of electrons?

A	i and ii only
B	i and iii only
C	ii and iii only
D	i , ii and iii

26 According to Bohr's atomic model, if the radius of one of the hydrogen atom orbits is (r) and the momentum of the electron in this orbit is given by the relation $P = \frac{2h}{\pi r}$ (Where (h) is Planck's constant).
Then this electron rotates in the orbit.....

A	L
B	M
C	N
D	O

27 In Coolidge tube, the voltage difference between the filament and the target material was changed from (V) to (5V). The maximum frequency in the continuous spectrum of the resulting X-rays changed from (ν) to.....

A	5 ν
B	4 ν
C	0.8 ν
D	0.2 ν

28 **In 3 D imaging (holography), the reference rays are always……...**

A	equal in intensity and are in phase
B	different in intensity and are in phase
C	equal in intensity and are out of phase
D	different in intensity and are out of phase

29 **Figures (1) and (2) represent two light beams, each produced from a source different than the other.**

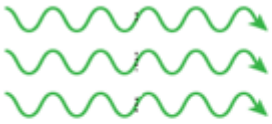


Figure (1)

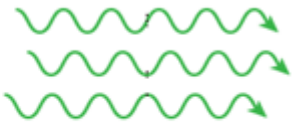


Figure (2)

If the distance between the source and the barrier used to receive each beam separately is equal to d, the intensity of illumination was I. If the barrier used to receive each beam is moved a distance of 2d, the choice that correctly expresses the intensity of illumination for each source is……

	The illumination intensity of source (1)	The illumination intensity of source (2)
A	I	$\frac{I}{4}$
B	$\frac{I}{4}$	I
C	I	$\frac{I}{9}$
D	$\frac{I}{9}$	I

30 **The population inversion occurs in helium-neon laser due to……**

A	Electric discharge by using a high-voltage source
B	Inelastic collision between the excited helium atoms and unexcited neon atoms
C	Optical pumping by using fluorescent lamps
D	Energy resulting from the chemical reaction between atoms of the active medium

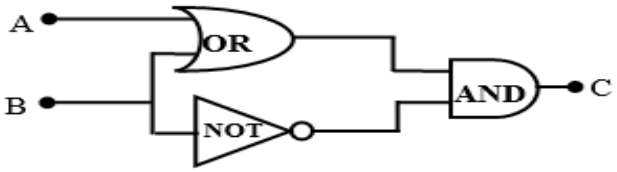
31 **The depletion region (transition region) in diode (P-N junction) is formed as a result of ……..**

A	diffusion of electrons only
B	diffusion of holes only
C	movement of impurity atoms in the doped crystal
D	diffusion of electrons and holes through the doped crystal

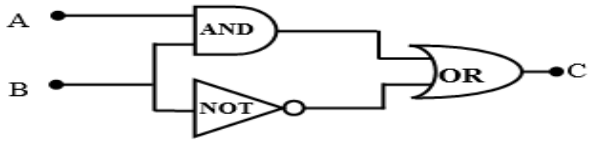
32 **Which of the following logic gates achieves the opposite truth table?**

A	B	C
0	0	1
0	1	0
1	0	1
1	1	1

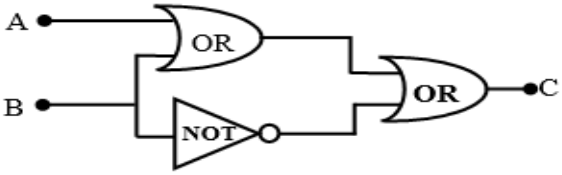
A



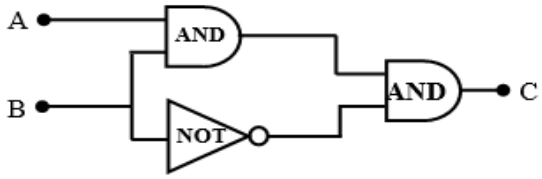
B



C

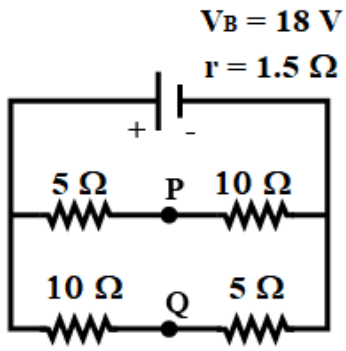


D



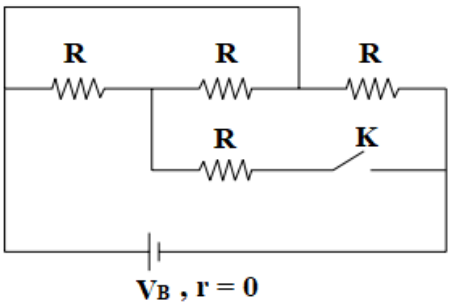
Second, objective questions (multiple choice) "Each question two marks"

33 The shown figure represents a closed electric circuit. If V_P and V_Q are the electric potentials of the two points P and Q, respectively, then the choice that expresses the relation between the potential at the two points and the potential difference between them is……



	the relation between the potential of the two points	the potential difference between them is
A	$V_P < V_Q$	5 V
B	$V_P > V_Q$	5 V
C	$V_P < V_Q$	15 V
D	$V_P > V_Q$	15 V

34 The figure represents a circuit containing several identical resistances connected together, an electric cell of negligible internal resistance, and an open switch K. The ratio between the equivalent resistance of the circuit before and after closing switch K is equal to.....

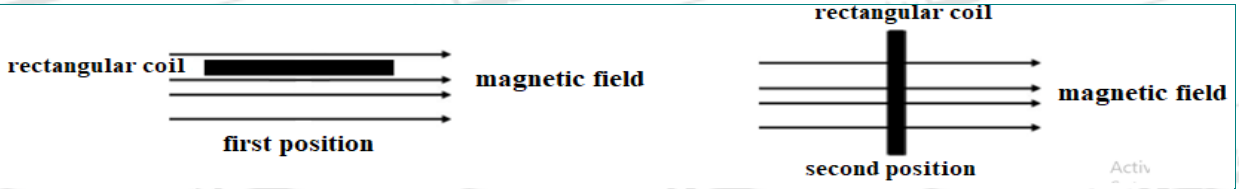


A	$\frac{3}{1}$
B	$\frac{5}{2}$
C	$\frac{2}{1}$
D	$\frac{5}{3}$

35 **A moving coil galvanometer whose coil resistance (R), its pointer deflects to end of the scale when an electric current of intensity (Ig) passing through it .When a shunt resistance of (0.2R) only is available to convert it into an ammeter that measures a maximum current of (I), the value of the resistance X that needs to be added to convert the galvanometer into an ammeter that measures a maximum current of (2I) is equal to ....**

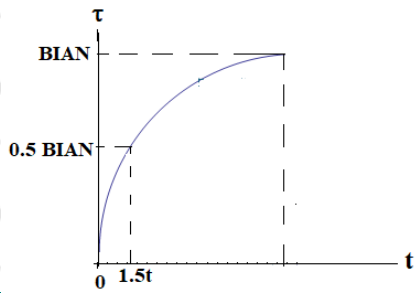
	value of The resistance X	connection way of the resistance X
A	$\frac{R}{12}$	In series with the shunt resistance
B	$\frac{R}{11}$	In series with the shunt resistance
C	$\frac{R}{6}$	In parallel with the galvanometer coil
D	$\frac{R}{5}$	In parallel with the galvanometer coil

36

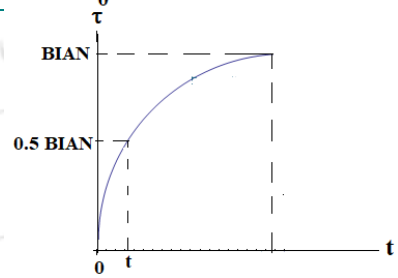


The figure above shows a side view of a rectangular coil that has number of turns (N) and cross-sectional area (A), current of intensity(I) passing through it, which rotates at a constant speed in a uniform magnetic field of flux density (B) in clockwise direction.
Which of the following graphs represents the relation between the magnitude of the magnetic torque acting on the rectangular coil (τ) and time (t) during its rotation starting from the first position until reaching the second position through an interval of time 3t?

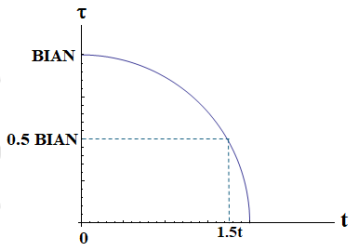
A



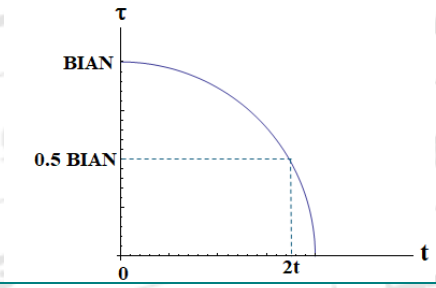
B



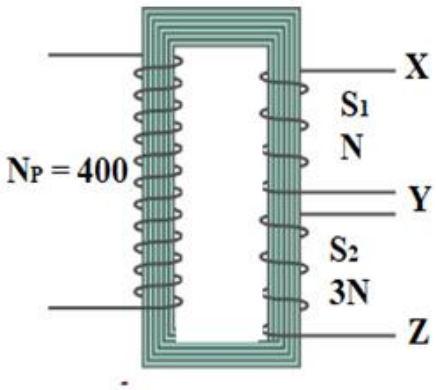
C



D



37 **The figure represents an ideal transformer operating at 220 V. If the output voltage between X and Y is 27.5 V, what is the output voltage between X and Z?**

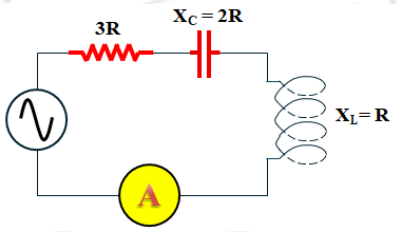


A	27.5 V
B	55 V
C	82.5 V
D	110 V

38 **A dynamo coil starts its rotation in a uniform magnetic field from a position where the coil plane is perpendicular to the magnetic field. Which of the following statements is incorrect?**

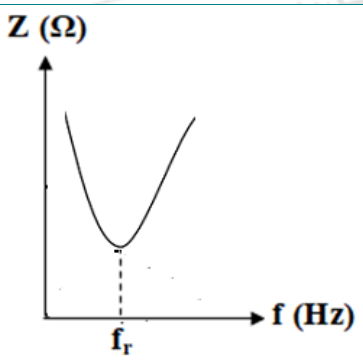
A	The average induced emf through $\frac{1}{4}$ cycle is 0.637 of the maximum value
B	The average induced emf through $\frac{1}{5}$ cycle is 0.55 of the maximum value
C	The average induced emf through $\frac{1}{6}$ cycle is 0.477 of the maximum value
D	The average induced emf through $\frac{1}{8}$ cycle is 0.707 of the maximum value

39 **An AC source is connected to a resistor, capacitor, and pure inductor in series, as shown in the figure. The choice that correctly expresses the phase angle between the total voltage of the circuit and the total current, and the reading of the hot wire ammeter when the inductive reactance of the inductor is doubled, is**



	The phase angle	reading of the hot wire ammeter
A	changed by 18.44°	increased
B	become 18.44°	increased
C	changed by 18.44°	decreased
D	become 18.44°	decreased

40 **The graph shows the relation between impedance (Z) and frequency (f) of an alternating current source in an RLC circuit. Which of the following statements is <u>correct</u>?**



A	The total voltage leads the current in the circuit and has inductive properties when the source frequency is less than f_r.
B	The current leads the total voltage in the circuit and has inductive properties when the source frequency is greater than f_r.
C	The total voltage leads the current in the circuit and has capacitive properties when the source frequency is greater than f_r.
D	The current leads the total voltage in the circuit and has capacitive properties when the source frequency is less than f_r.

41	An electron microscope is used to magnify an object of its length 0.4 nm; a potential difference of V was required. If this microscope is used to magnify an object of its length 0.3 nm, the potential difference used must be increased by……..

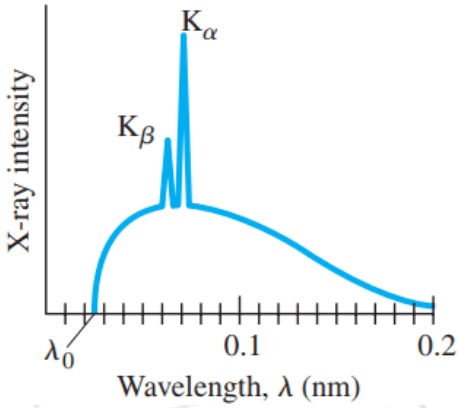
A	$\frac{16\ V}{9}$
B	$\frac{7\ V}{9}$
C	$\frac{9\ V}{16}$
D	$\frac{9\ V}{7}$

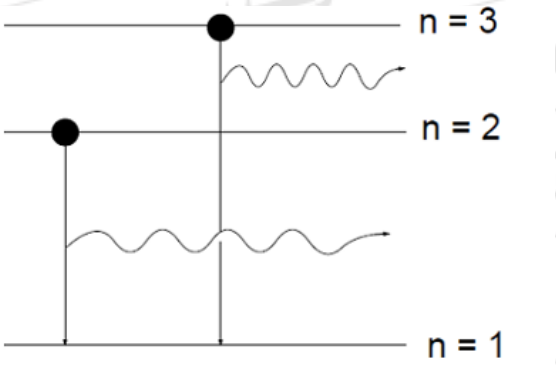
42	Two Photons X, Y. If the frequency of photon X is greater than that of photon Y by 20%. Then the energy of photon Y is equal to……..…….

A	$\frac{6}{5}$ of photon energy X
B	$\frac{5}{6}$ of photon energy X
C	$\frac{4}{5}$ of photon energy X
D	$\frac{1}{5}$ of photon energy X

43

The graph represents the relation between X-rays intensity (I) and the wavelength (λ) when using a certain element as a target material in Coolidge tube. While the diagram represents the production of the characteristic spectrum of X-rays K_α and K_β when electrons emitted from the filament are accelerated using a high potential difference

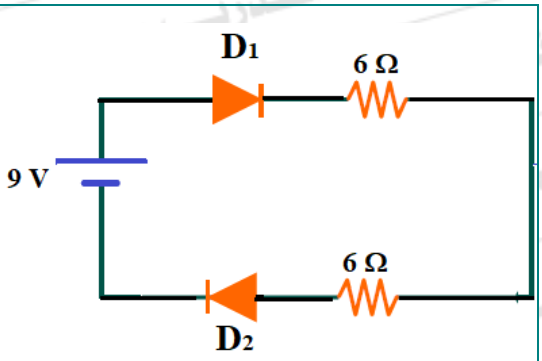




Using the data given in the two figures, then…….

	K_α	K_β	Max. Energy
A	0.06 nm Due to transition from n = 2 to n = 1	0.07 nm Due to transition from n = 3 to n = 1	7.95×10^{-15} J
B	0.07 nm Due to transition from n = 2 to n = 1	0.06 nm Due to transition from n = 3 to n = 1	7.95×10^{-15} J
C	0.06 nm Due to transition from n = 2 to n = 1	0.07 nm Due to transition from n = 3 to n = 1	9.94×10^{-16} J
D	0.07 nm Due to transition from n = 2 to n = 1	0.06 nm Due to transition from n = 3 to n = 1	9.94×10^{-16} J

44 **The opposite circuit represents an electric circuit containing an electric cell of negligible internal resistance, two electric resistances, a diode D_1 is made of silicon whose voltage barrier is 0.7 V, diode D_2 is made of germanium whose voltage barrier is 0.3 V. If the resistance of each diode is 2 Ω in case of forward bias and infinite in case of reverse bias, then the intensity of the current passing through the circuit is.....**

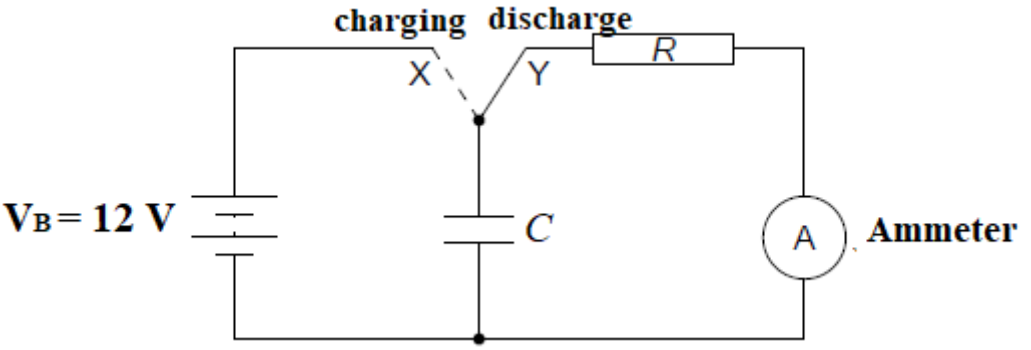


A	$\frac{3}{4}$ A
B	$\frac{2}{3}$ A
C	$\frac{9}{16}$ A
D	$\frac{1}{2}$ A

Third, essay questions: each question has two marks.

45

The following circuit shows a capacitor that is charged by a battery of electromotive force 12 V after connecting the switch to terminal X . (The resistance of the ammeter is negligible).

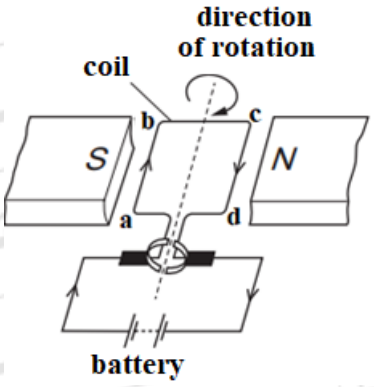


a) When placing a pure inductor instead of the ammeter, explain why an induced electromotive force is generated in the coil from the moment the switch is reached the position Y.

b) To increase the value of the induced electromotive force in the inductor, what change must be made to the discharge circuit, without making any changes to the coil?

46

The figure represents a simple electric motor with a single loop connected to a battery. It starts rotating between the poles of a magnet from the shown position and direction.



A. Mention two ways by which you can change the direction of rotation of the coil.

B. When the coil reaches a position after rotating at an angle of 90° from the position specified in the figure:

1. Explain why the current passing through the coil vanishes.

2- Explain why the coil continues to rotate.