Training Models For third secondary

Physics

Model (10)- English

2025-2026

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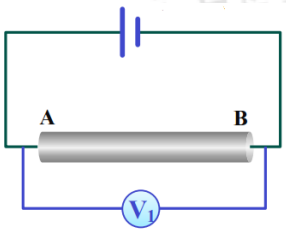
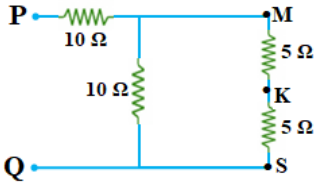
Part One: Objective questions (multiple choice) "each question has one Mark

1 **The figure represents an electric circuit. When the temperature of conductor AB increases, the voltmeter reading (V_1) does not change. Then the reason that the voltmeter reading (V_1) does not change is.....**



A	change the temperature does not affect the potential difference between two ends of the conductor.
B	change in temperature does not affect the resistance of the conductor.
C	the battery has an internal resistance equal to the resistance of the conductor.
D	the battery has no internal resistance.

2 **The figure represents a part of an electric circuit, If the potential difference between Q and P equals 15 V, then the potential difference between K and S equals.....**



A	15 V
B	7.5 V
C	5V
D	2.5 V

3 **The data table represents length and radius of three cylindrical wires A, B, and C that are made of copper. If the three wires are connected together in series with a battery of negligible internal resistance, then.....**

Wire	length	radius
A	L	r
B	2 L	2r
C	3 L	3r

A	resistances of the three Wires A , B, and C are equal
B	resistance of wire C is a half of that of wire B
C	current intensity passing through wire B is double of that passing through wire A
D	potential difference between the two ends of wire A is three times that between the two ends of wire C.

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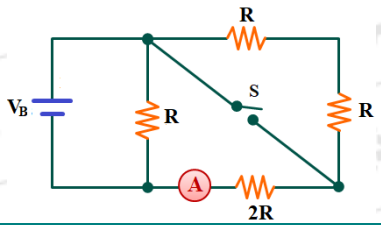
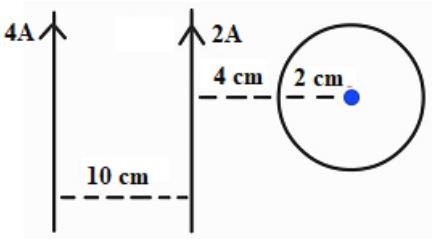
4 The electric circuit shown in the figure contains a battery of electromotive force V_B of negligible internal resistance. If the ammeter reading is I When the switch (S) is opened, so its reading when the switch is closed will be.....



A	0.5 I
B	2I
C	3I
D	4I

5 The figure shows a circular coil carries an electric current of intensity $\frac{1}{6\pi}$ A. If the resultant magnetic flux density produced by the three currents at the center of the circular coil is zero.

Then the correct choice that expresses the direction of the current flow through the coil and the number of turns of the coil are .....



	The number of turns of the coil	The direction of the current flowing in the coil
A	7	clockwise
B	7	Counterclockwise
C	70	clockwise
D	44	Counterclockwise

6 A circular coil of radius r and number of turns N produces a magnetic field of flux density B at its center when its terminals are connected to a battery of negligible internal resistance.

If the number of turns of the coil is doubled without changing its diameter and connecting its terminals to the same battery, so the magnetic flux density at the center of the coil is.....

A	0.5 B
B	B
C	2B
D	4B

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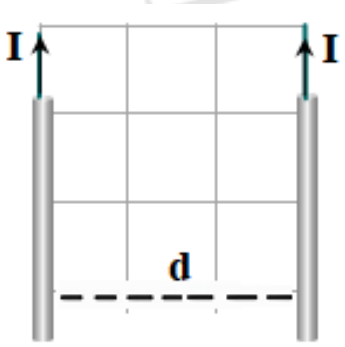
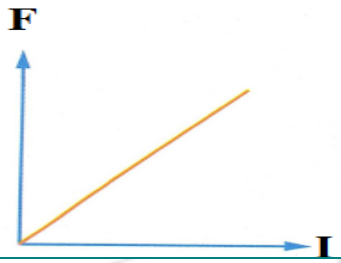
The figure shows two long, straight, parallel wires, each carrying a direct electric current of intensity I and separated by a distance of d.

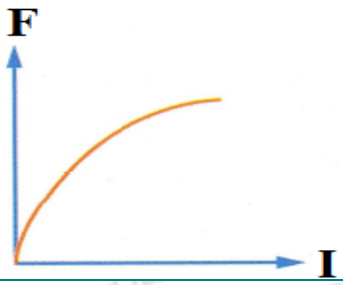


Which of the following graphs <u>correctly</u> represents the relation between the mutual magnetic force per unit length F of the two wires and the current intensity I at constant the distance between the two wires?

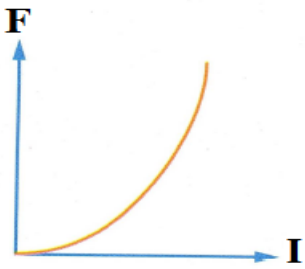
A



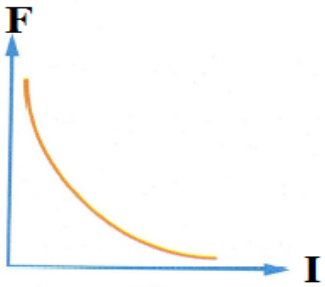
B



C



D



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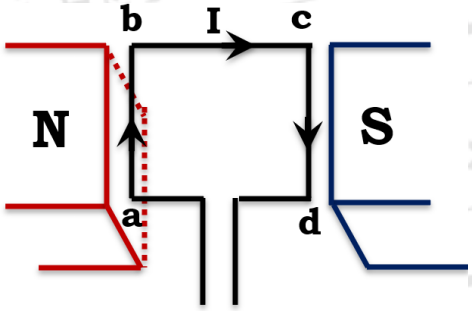
8 Two wires made of the same material and having the same length are used to form two coils of single turn: The first is a square and the other is a circle, then the same electric current flows through both coils. At placing the square coil in a uniform magnetic field of flux density B making angle of 60° with the field while the circular coil is placed in the same uniform magnetic field making angle of 30°, so the ratio between the magnetic dipole moment of the square coil (m_{d1}) to that of the circular coil (m_{d2}) $\frac{m_{d1}}{m_{d2}}$ equals .....

A	$\frac{\pi^2}{\sqrt{3}}$
B	$\frac{\pi^2}{4}$
C	$\frac{\pi}{\sqrt{3}}$
D	$\frac{\pi}{4}$

9 A current-carrying coil is placed between two poles of the magnet as shown in the figure.

The force acting on the side (ab) of the coil during the rotation of the coil .....



A	Decreases without vanishing
B	remains constant
C	increases
D	vanishes

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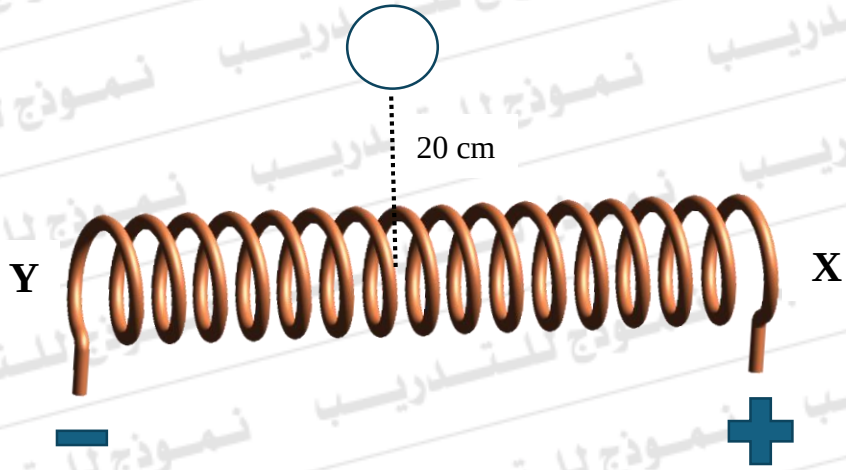
Carrying-current straight wire I



The figure shows a solenoid having a number of turns per unit length equal to 200 turns. m^{-1}, carrying an electric current of intensity $\frac{0.2}{\pi}$ A. It produces a magnetic field of flux density B at a point inside it at the midpoint of the axis solenoid. A long straight wire carrying an electric current of intensity I placed near the solenoid at a distance of 20 cm.

The direction and magnitude of the current I flowing through the straight wire that makes the resultant magnetic flux density due to the two currents at the midpoint of the axis of the solenoid is directed toward point Y and has a magnitude of $\frac{5\,B}{4}$ are .....

(Magnetic permeability of air = $4\pi \times 10^{-7}$ T.m.A^{-1})

A	Into the page - 4 A
B	Out of the page - 24 A
C	Out of the page - 12 A
D	Into the page - 2A

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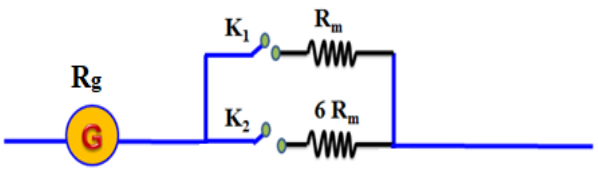
11 The figure shows a galvanometer whose coil resistance is R_g and withstands maximum current I_g. It is required to convert it into a voltmeter to measure large potential differences.



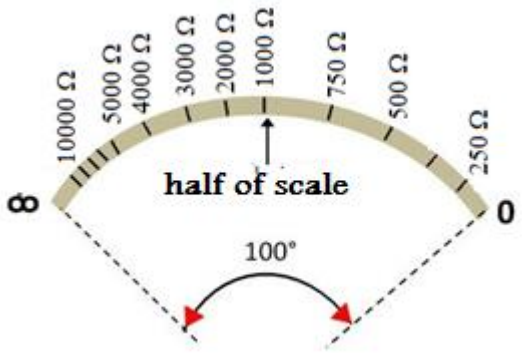
When switch K_1 only is closed, the full-scale deflection of the voltmeter is V_1 while at closing switch K_2 only, the full-scale deflection of the voltmeter becomes $5V_1$.

The choice that <u>correctly</u> expresses the relation between R_m and R_g is....

A	$R_m = 3R_g$
B	$R_m = 4R_g$
C	$R_m = 5Rg$
D	$R_m = 6Rg$

12 The figure represents the scale diagram of an ohmmeter used to measure an unknown (external) resistance.

Using the data given in the figure, the ratio between the value of the unknown resistance R_1 that causes the galvanometer pointer to deflect through an angle of 40° and the value of the unknown resistance R_2 that causes the pointer to deflect through an angle of 80° $\frac{R_1}{R_2} = \cdots$



A	$\frac{4}{1}$
B	$\frac{6}{1}$
C	$\frac{3}{1}$
D	$\frac{2}{1}$

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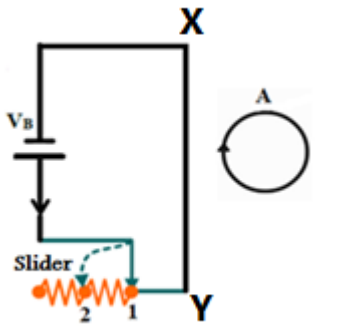
13 **In the electric circuit shown in the figure, an induced current is produced in ring (A) in the direction shown due to the change in the flowing current through the wire XY when:**

I. The slider of the rheostat moves in the direction from (2) to (1).

II. The slider of the rheostat moves in the direction from (1) to (2).

III. The source is disconnected from the circuit.

Which of the following choices is <u>correct</u>?



A	I ,II only
B	I, III only
C	II ,III only
D	I, II ,III

14 **In an experiment of mutual induction between two adjacent coils, one of them is the primary coil of ohmic resistance 20 Ω and the other is the secondary coil of ohmic resistance 5 Ω.**

At what rate must the current in the primary circuit be changed to produce a backward induced current of intensity 0.4 A in the secondary coil?

(Note that the coefficient of mutual inductance equals 0.5 H)

A	1.6 A/s
B	4 A/s
C	8 A/s
D	16 A/s

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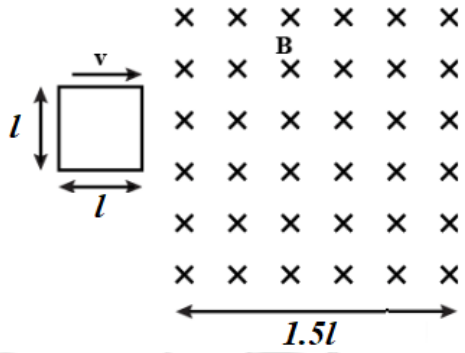
15 **A square frame of side length l moves at a speed of v in the plane of the frame towards a uniform magnetic field of flux density B which is perpendicular to the plane of the frame as shown in the figure.**

The choice that <u>correctly</u> describes the magnitude of the average induced electromotive force (emf) generated in the frame from the moment of entering the field till the moment exiting from it is.....



A	No induced emf is generated
B	The induced emf during the entering is greater than that duing the exiting
C	The induced emf during the entering is equal to that duing the exiting
D	The induced emf during the entering is less than that duing the exiting

16 **A solenoid X made of well insulated copper wire, has magnetic permeability μ, number of turns N , cross-sectional area A, and self-inductance L.**

Another solenoid Y made of the same wire of solenoid X, has magnetic permeability 1000μ, cross-sectional area 2A, and number of turns 2N.

So, the self-inductance of solenoid Y equals .....

(Note that the length of the two coils X,Y is the same)

A	8000 L
B	4000 L
C	2000 L
D	1000 L

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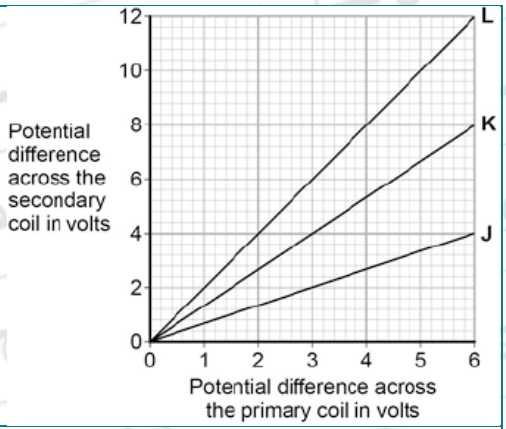
The graph shows the relation between the electromotive force of the secondary coil (Vs) and that of the primary coil (Vp) for three ideal transformers J, K, and L. where the number of turns of the primary coil of each transformer is 50 turns.

Which of the three transformers is a step-down voltage transformer, and which one whose secondary coil has a number of turns =100 turns?



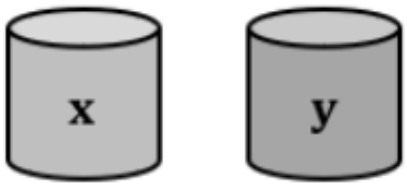
	Step-down transformer	The transformer whose secondary coil has a number of turns =100 turns
A	K	L
B	J	L
C	K	J
D	**L**	J

18

Two different solid metallic cylinders, **X** and **Y**, are initially at the same temperature. They are placed in a **variable magnetic field** that is directed parallel to their longitudinal axes.

After a period of time, it is observed that the temperature of cylinder **X** increases more rapidly and becomes higher than the temperature of cylinder **Y**.

Which of the following statements best explains this observation?



A	The metal in cylinder **X** has a lower electrical conductivity and a greater magnetic permeability.
B	The metal in cylinder **Y** has a lower electrical conductivity and a lower magnetic permeability.
C	The metal in cylinder **X** has a lower electrical conductivity and a lower magnetic permeability.
D	The metal in cylinder **Y** has a greater electrical conductivity and a greater magnetic permeability.

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Figure (1) represents a simple model of an electric generator (AC dynamo) at position Q in which a coil rotates between the poles of a U-shaped magnet. Figure (2) shows the graphical relation between the instantaneous value of the induced current I and time t where the positive value of the induced current on the graph indicate that the potential at point X is higher than that at point Y.

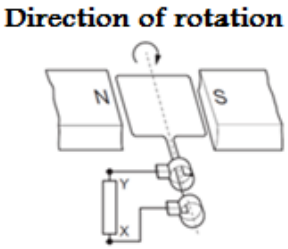


Figure (1)

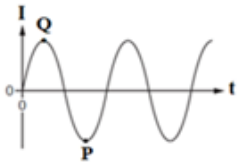
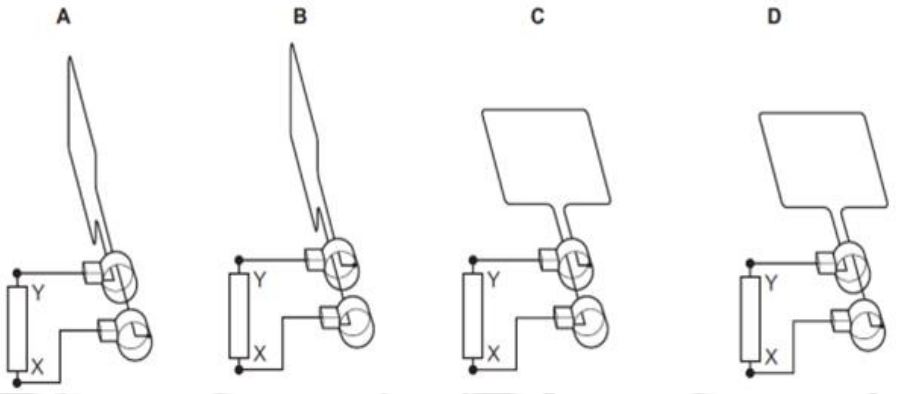


Figure (2)

19 Which of the following diagrams correctly shows the position of the coil relative to the magnetic field at point P on the graph?



A	Figure (A)
B	Figure (B)
C	Figure (C)
D	Figure (D)

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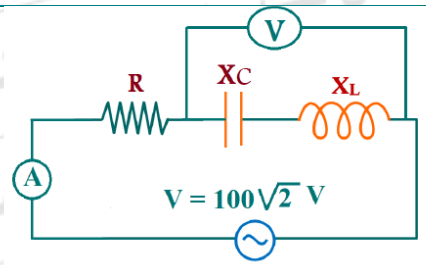
20 In RLC (AC) circuit shown in the figure, if the phase angle between the total voltage and the current is 45°, then the voltmeter reading is equal to .....

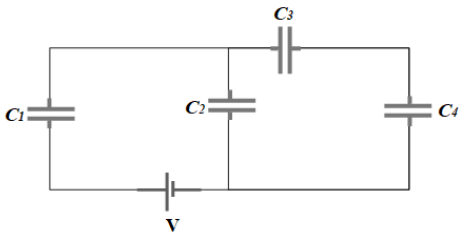


A	25 V
B	50 V
C	$50\sqrt{2}$ V
D	100 V

21 The electric circuit shown in the figure represents a battery connected to four capacitors C_1, C_2, C_3 , and C_4 as shown, where:

- $C_1 = C_3 = C_4 = 2C$
- $C_2 = C$

The correct relation between the amount of charge Q stored on one of the two plates of each capacitor is .....



A	$Q_1 = 2Q_2 = 2Q_3 = 2Q_4$
B	$Q_1 = 0.5\ Q_2 = 0.5\ Q_3 = 0.5\ Q_4$
C	$3Q_1 = 2Q_2 = Q_3 = Q_4$
D	$3Q_1 = Q_2 = 2Q_3 = 2\ Q_4$

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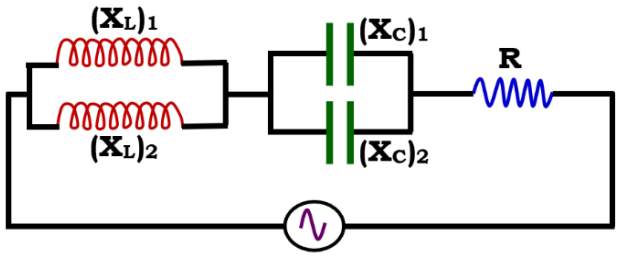
22 The circuit shown represents an RLC alternating current circuit containing an ohmic resistor R, two inductors of inductive reactance X_{L1} and X_{L2}, and two capacitors with capacitive reactance's X_{C1} and X_{C2}.

The circuit components are connected as shown in the figure.



If : $X_{L1} = X_{L2} = X_{C1} = X_{C2}$, then the circuit has ..... characteristics.

A	Inductive
B	capacitive
C	pn junction
D	ohmic resistance

23 A light beam of power 10^{-3} W and wavelength 5000 Å is incident on cathode of the photoelectric cell, causing photoelectrons to be emitted.

If the current flowing in the photoelectric cell is 0.16 μ A, the percentage of number of the incident photons that produce photoelectrons equals .....

A	25%
B	2.5%
C	0.4%
D	0.04%

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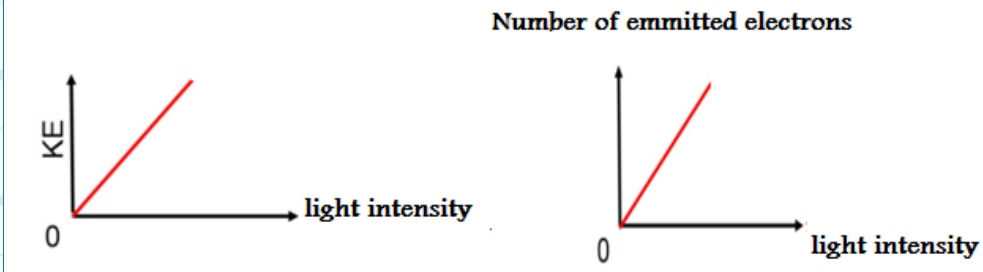
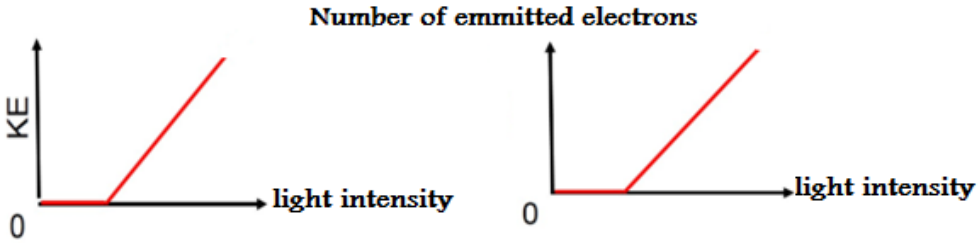
In an experiment, monochromatic violet light is incident on a photosensitive metal surface, causing photoelectrons to be emitted from the metal surface.

Which of the following graphs <u>correctly represents</u> the relation between number of emitted photoelectrons and the maximum kinetic energy (KE) of the emitted electrons versus the intensity of the incident violet light?

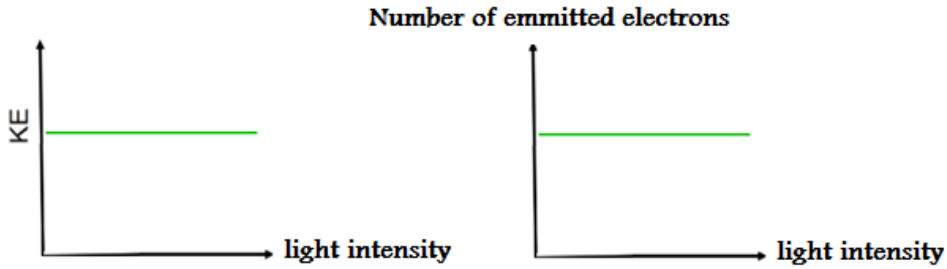
A



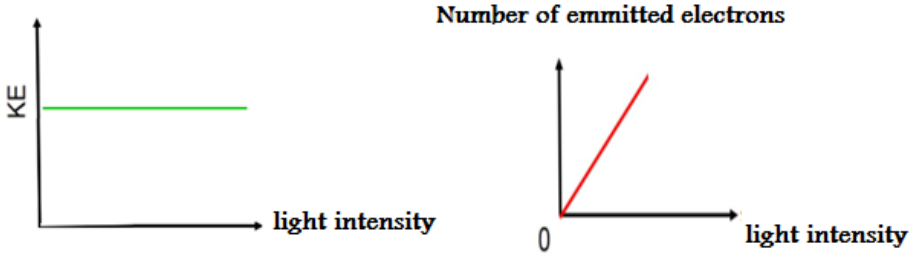
B



C



D



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25 In the cathode ray tube (CRT), when an electron is accelerated under a potential difference V, it moves with a maximum speed v.
If the accelerating potential difference is increased to 2V, the maximum speed of the electron becomes.....

A	v
B	$\sqrt{2}$ v
C	2 v
D	4 v

26 A beam of violet light with wavelengths range from 380 nm to 435 nm passes through hydrogen gas in its ground state. It is expected that the hydrogen atoms .....

A	absorb some of the radiation and be excited to the second level
B	absorb some of the radiation and be excited to the third level
C	absorb none of the incident radiation
D	absorb some of the radiation and become ionized

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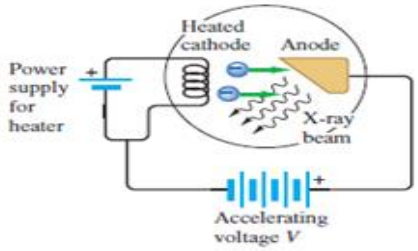
27 The figure represents a Coolidge tube. If the rate of electrons emitted from the cathode increases while the potential difference between the cathode and the anode (the accelerating voltage V) remains constant,
Then the choice that correctly describes the intensity of the X-rays and the minimum wavelength (λ_{min}) of the continuous X-ray spectrum is.....



	X-ray intensity	minimum wavelength (λ_{min})
A	increases	increases
B	increases	doesn't change
C	decreases	decreases
D	remains constant	decreases

28 In 3 D imaging (holography),The ratio of $\frac{\text{The photon energy of eference beam}}{\text{The photon energy of the reflected beam from the Object}}$ is ... ...

A	less than one
B	greater than one
C	equals One
D	equals zero

29 In water-soluble organic dye lasers,
which of the following choices is correct?

	Active medium type	Source of energy	Type of resonant cavity
A	Solid	Optical	Internal
B	Liquid	Electrical	External
C	Liquid	Optical	External
D	Gas	Electrical	Internal

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30 **In helium–neon laser, what is the correct sequence of the following processes occurring inside the laser tube?**

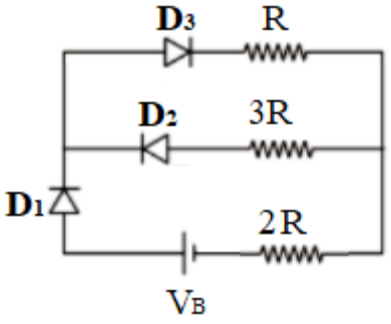
1. Excitation of neon atoms
2. Excitation of helium atoms
3. Collisions between excited helium atoms and neon atoms
4. population inversion in neon atoms

A	$2 \longrightarrow 3 \longrightarrow 1 \longrightarrow 4$
B	$1 \longrightarrow 2 \longrightarrow 3 \longrightarrow 4$
C	$2 \longrightarrow 4 \longrightarrow 1 \longrightarrow 3$
D	$4 \longrightarrow 3 \longrightarrow 2 \longrightarrow 1$

31 **The drift current through p–n junction (diode) that is not connected to an external electric source .....**

A	produced due to the difference in charge carriers' concentration between the two regions of the junction.
B	produced due to a potential difference between the ions across the two regions of the junction.
C	causes the potential of the p-region to become lower than that of the n-region.
D	represents the flow of the free electrons from the n-region to the p-region.

32 **The figure represents an electric circuit containing a battery of negligible internal resistance, three resistors, and three ideal diodes D_1,D_2, and D_3 (the resistance of a diode is zero when forward-biased and infinite when reverse-biased).**
The current flowing through diode D_3 .....



A	equal to zero
B	equal to the current flowing through D_1
C	equal to double the current flowing through D_1
D	equal to half the current flowing through D_1

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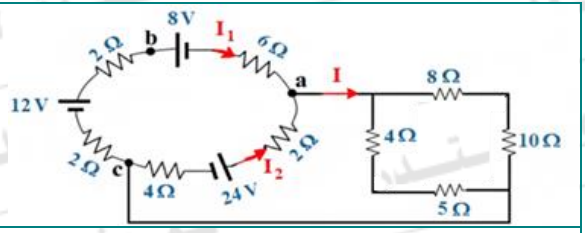
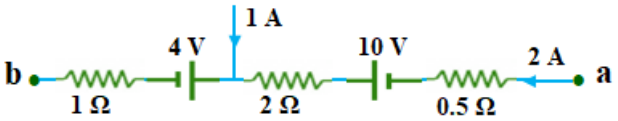
Secondly, objective questions (Multiple Choice) "Each question TWO marks"

33 In the circuit shown, the value of current intensity I equals .....



A	1.69 A
B	−5.56 A
C	7.04 A
D	12.54 A

34 The opposite figure represents a part of an electric circuit. The potential difference between points a and b is equal to .....



A	1V
B	2V
C	3V
D	4V

نموذج للتدريب

35 **A moving-coil galvanometer whose coil resistance is R and gives full-scale deflection when an electric current of intensity I passing through it. When a shunt resistance S_1 is connected to the galvanometer coil to convert it into an ammeter (A_1), the ammeter measures a maximum current of 4I.**

When the same galvanometer is connected to another shunt resistance S_2 to convert it into an ammeter (A_2), the ammeter measures a maximum current of 10I.

I. The resistance of ammeter A_1 = 2.5 × the resistance of ammeter A_2.

II. The shunt resistance S_1 = 3 × the shunt resistance S_2.

III. The sensitivity of ammeter A_1 = 2.5 × the sensitivity of ammeter A_2.

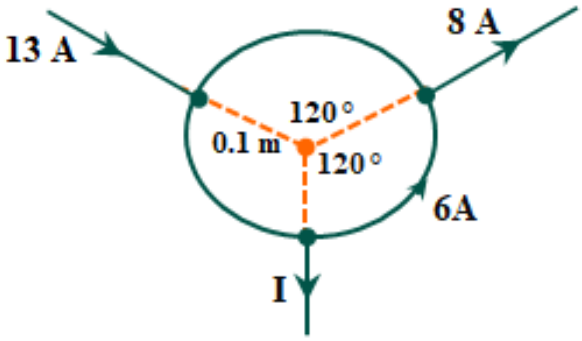
Which of the above statements is <u>correct</u>?

A	I only
B	I and II only
C	II and III only
D	I and II and III

36 **A circular ring of radius 0.1 m ,an entering electric current of intensity 13 A to it, as shown in the figure.**

The resultant magnetic flux density at the center of the ring equals .....

where μ is the magnetic permeability of air

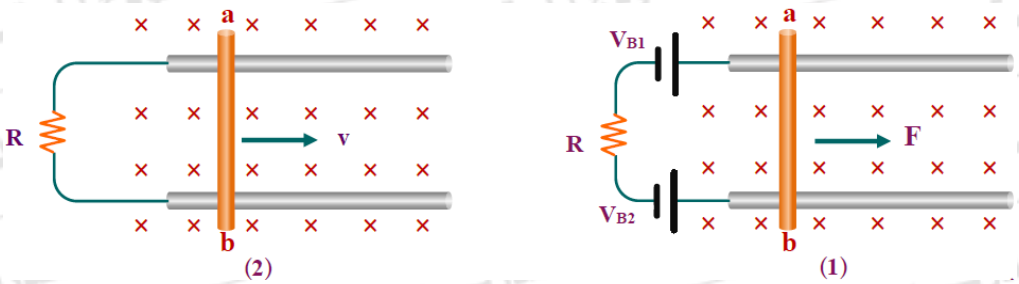


A	10 μ
B	2.5 μ
C	25 μ
D	50 μ

نموذج للتدريب

37

Figures (1) and (2) show a metallic conductor ab of negligible ohmic resistance that can move along two metallic rails. A magnetic field is applied perpendicular to the plane of the rails.
The conductor is used in two separate experiments as illustrated. (The electric sources V_{B1} and V_{B2} have negligible internal resistance).



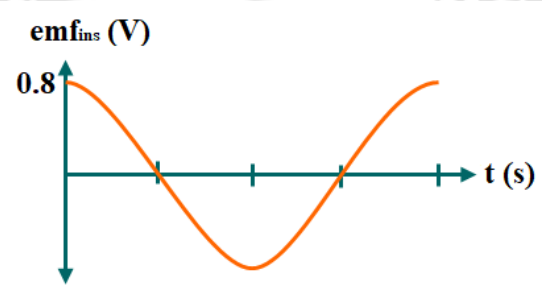
If (F) represents the magnetic force acting on the conductor due to pass of an electric current I_1, as shown in Figure (1), while v is the velocity of the conductor within the magnetic field in Figure (2), which generate an induced current I_2, then which of the following choices is <u>correct</u>?

	I_1	Direction of the induced current I_2
A	$I_1 = \frac{V_{B2} - V_{B1}}{R}$	from a to b
B	$I_1 = \frac{V_{B1} - V_{B2}}{R}$	from b to a
C	$I_1 = \frac{V_{B1} - V_{B2}}{R}$	from a to b
D	$I_1 = \frac{V_{B2} - V_{B1}}{R}$	from b to a

نموذج للتدريب

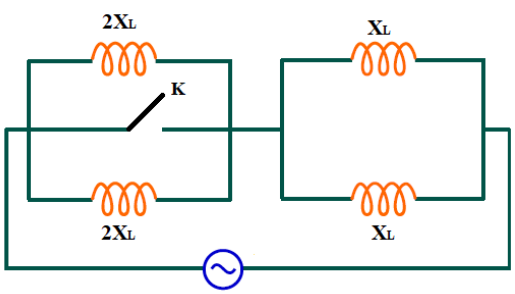
38 The graph shows the relation between the instantaneous value of the induced electromotive force (emf_{ins}) generated in the coil of a small dynamo rotating at a speed of 120 cycles/min in a uniform magnetic field and time (t).

The instantaneous value of the induced electromotive force after 0.667 s from the starting of rotation approximately equals .....



A	0.4 V
B	0.57 V
C	0.7 V
D	0.8 V

39 The electric circuit in the figure represents several inductive coils of negligible ohmic resistance and an open switch connected to an AC source, as shown.



Then the ratio between the total current through the circuit before and after closing the switch K

$\frac{\text{The total current flowing in the circuit before closing the switch K}}{\text{The total current flowing in the circuit after closing the switch K}}$ =.....

A	$\frac{1}{3}$
B	$\frac{3}{1}$
C	$\frac{2}{3}$
D	$\frac{3}{20}$

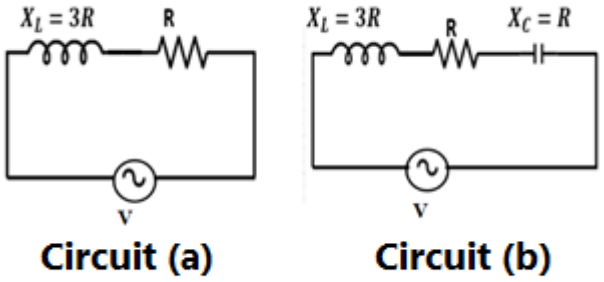
نموذج للتدريب

40	Uncharged capacitor of capacitance 16 μF is connected to a battery of negligible internal resistance and electromotive force 20 V by a switch . The capacitor is fully charged, after that the battery is disconnected and a pure inductor of self-inductance 40 mH is connected to the capacitor, forming an oscillatory circuit LC. The maximum value of the current flowing through the inductor equals .....

A	400 mA
B	200 mA
C	40 mA
D	20 mA

41 The figure shows two AC circuits, labeled (a) and (b). The ratio of the power dissipated in circuit (b), P_{wb} to the power dissipated in circuit (a), P_{wa}

$(\frac{P_{wb}}{P_{wa}}) = ...$



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

نموذج للتدريب

42 If the minimum distance that can be seen by using the electron microscope is 0.55 Å, then _____.

(Given: $h = 6.625\times10^{-34}$ J/s, $m_e = 9.1\times10^{-31}$ kg, $e = 1.6\times10^{-19}$ C)

	The potential of anode	Speed of the emitted electron
A	5 kV	1.326×10^{7} m/s
B	0.5 kV	1.326×10^{7} m/s
C	0.5 kV	1.326×10^{6} m/s
D	5 kV	1.326×10^{6} m/s

43 The table shows the radiation intensity and wavelength of several light beams, each of which is used separately to illuminate a metallic surface of a photoelectric cell.

(Given that the critical wavelength of the metal is λ_0.)

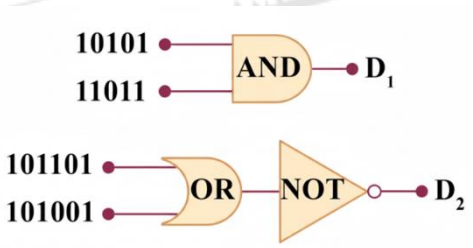
radiation	wavelength	intensity
K	$0.5\,\lambda_o$	weak
L	$0.67\,\lambda_o$	Medium
M	λ_o	High

Which of the following radiation causes <u>maximum</u> of kinetic energy of emitted photoelectrons and <u>largest</u> photocurrent?

	largest photoelectric current	maximum kinetic energy
A	M	K
B	L	K
C	M	L
D	K	M

نموذج للتدريب

44 In the figure, the sum of the decimal values of the digital outputs $D_1 + D_2$ equals.....

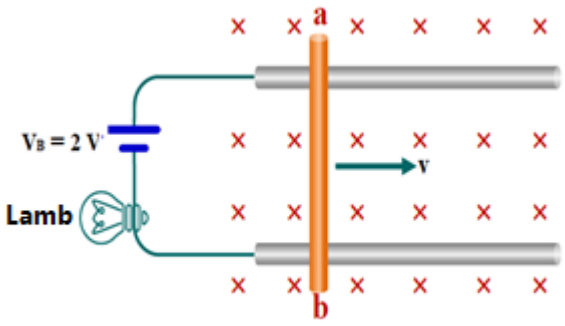


A	31
B	35
C	55
D	19

Thirdly, essay questions: each question by two marks.

45 A straight copper wire (ab) of negligible resistance is placed on two frictionless, and negligible resistance rods that are separated by distance of 125 cm. the wire is moved at a uniform speed of 2 m/s perpendicular to a uniform magnetic field of flux density 0.8T as shown in the figure.

(Knowing that: The electric source has negligible internal resistance.)



(a) Calculate the induced electromotive force generated between the two ends of the wire.

(b) What happens to the brightness of the lamp at t moving the wire? Why?

46 In the hydrogen atom spectrum, calculate the ratio between the shortest wavelength (λ_S) to the longest wavelength (λ_L) in Paschen series.

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