Training Models for third secondary

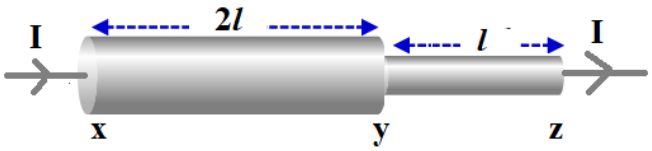
Physics

Model (06)- English

2025-2026

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

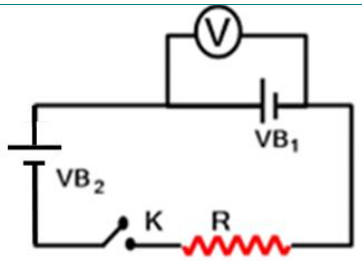
1. Two electric conductors (xy) and (yz) made of the same material are connected together as shown in the figure.



If the cross-sectional area of conductor (xy) is three times that of conductor (yz), then the relation between the potential difference across conductor (xy) and the potential difference across conductor (yz) is .....

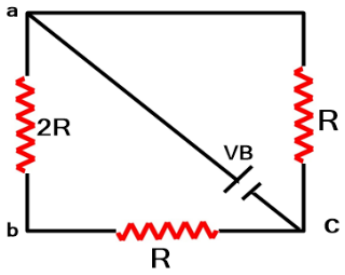
A	$V_{xy} = 3\ V_{yz}$
B	$V_{xy} = 2\ V_{yz}$
C	$V_{xy} = 1.5\ V_{yz}$
D	$V_{xy} = \frac{2\ V_{yz}}{3}$

2. In the figure, it is observed that when switch K is closed, the voltmeter reading does not change. This means that.....



A	Battery (V_{B1}) in charging state
B	Battery (V_{B2}) in discharging state
C	Battery (V_{B1}) of negligible internal resistance
D	Battery (V_{B1}) of greater electromotive force than (V_{B2})

3. **The figure represents a closed electric circuit where the equivalent resistance of the circuit is 18 Ω. If the battery is placed in place of the 2R resistor and the 2R resistor is placed in place of the battery, Then the equivalent resistance becomes.....**

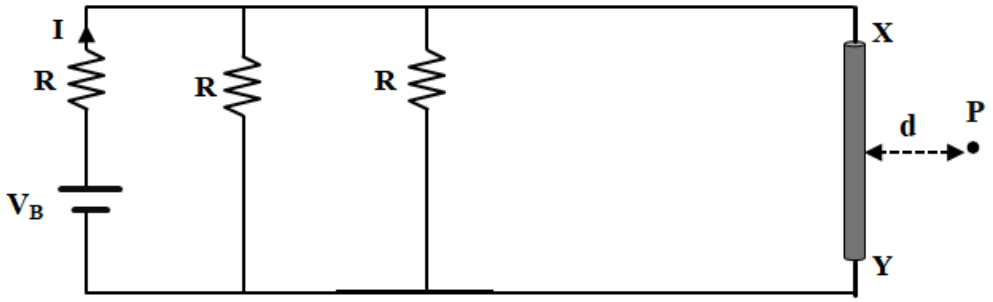


A	40 Ω
B	24 Ω
C	18 Ω
D	9.6 Ω

4. **A copper wire with length (L), cross-sectional area (A), and resistance (R). It was reshaped, increasing its resistance by (3R), the reshaping was done by .....**

A	bending the wire in the middle
B	bending the wire at one-third of its length
C	stretching the wire regularly to double its original length
D	stretching the wire regularly to reduce its diameter to its half

5. A long straight wire XY with electric resistance equal to R is connected to a set of resistors and an electric cell with negligible internal resistance, as shown in the following figure



The magnitude of the magnetic flux density at point P generated when current passes through wire (XY) is equal to.....

A	$B = \frac{\mu I}{3\pi d}$
B	$B = \frac{\mu I}{2\pi d}$
C	$B = \frac{3\mu I}{2\pi d}$
D	$B = \frac{\mu I}{6\pi d}$

6. A coil of a surface area (A) and a number of turns (N) is connected to an ideal voltage source with an electromotive force (V_B), producing a magnetic field with a flux density (B) at the center of the coil. If the coil is recoiled so that its surface area is reduced to $\frac{A}{4}$, in order for the magnetic flux density at its center (B) to remain the same, the source must be replaced with another one with electromotive force of.....

A	$2\,V_B$
B	$\frac{V_B}{2}$
C	$4\,V_B$
D	$\frac{V_B}{4}$

7. **In which of the four cases is the resultant of the magnetic flux density at point m <u>is equal</u> to zero? (All coils used consist of only one turn and the wires are very long.)**

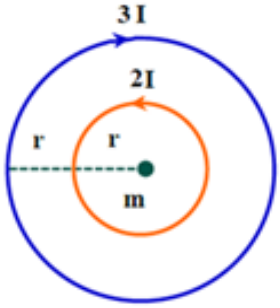


Figure (1)

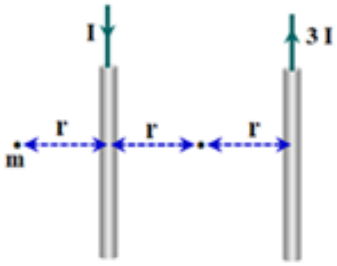


Figure (2)

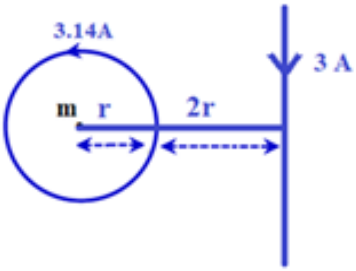


Figure (3)

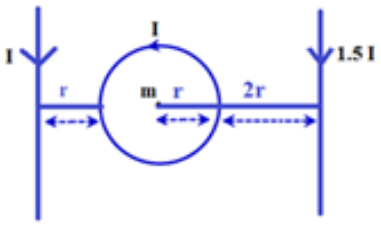
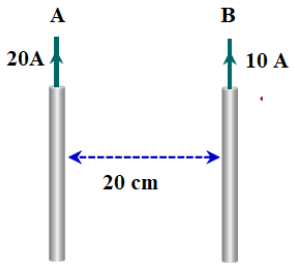


Figure (4)

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

8. **Two straight long parallel wires (A and B) carry a direct electric current of intensity 20 A and 10 A, respectively, as shown in the figure.**
If the magnetic force acting on a unit length of wire (B) is equal to (F), then when a third wire is placed parallel to them at mid-distance between them and a direct current of intensity (I) passes through it, the magnetic force acting on a unit length of wire (B) is reduced to a half of its original value.



The intensity and direction of the current passing through the third wire are, respectively.....

A	10A , upwards
B	5 A , upwards
C	10A , downwards
D	5 A , downwards

9. **In a sensitive galvanometer, when a direct electric current passes through its coil, the pointer moves from zero until it stops at the middle of the scale. The statement that describes the magnetic torque acting on the galvanometer coil during this movement of the pointer is.....**

A	increases until it reaches a maximum value.
B	increases until it equals the torque acting on the spring coils.
C	decreases until it vanishes, and the pointer stops.
D	remains constant during the rotation of the coil.

10.	The pointer of a galvanometer with a coil resistance R_g deviates from the zero position by an angle of (80°) when a current of (10mA) passes through it. When a resistor (R) is connected in parallel to the galvanometer coil to convert it into an ammeter, the ammeter pointer deflects at an angle of (40°) when a current of intensity (50mA) passes through it. The ratio between the value of the resistor (R) and the value of the galvanometer resistance R_g $(\frac{R}{R_g})$ is equal to.....

A	$\frac{1}{10}$
B	$\frac{10}{1}$
C	$\frac{1}{9}$
D	$\frac{9}{1}$

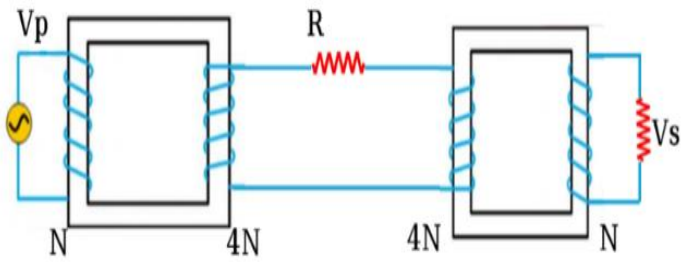
11.	A direct electric current passes through a rectangular coil (20 cm × 10 cm) placed in a uniform magnetic field, and the coil rotates around an axis perpendicular to the field lines. If the maximum magnetic torque acting on the coil is 0.5 N.m, then the magnitude of the magnetic force acting on one of the sides parallel to the axis of rotation of the coil, in the position where the plane of the coil is perpendicular to the field lines, is equal to .....

A	0.1 N
B	5 N
C	2.5 N
D	Zero

12. **The total internal resistance of ohmmeter is (3000 Ω) operates with a battery of electromotive force 3V. After a period of use, it was observed that the electromotive force of the battery decreased to (2.4V). However, the maximum current that can be measured by the galvanometer (I_g) remained the same.**
To recalibrate the ohmmeter so that its pointer returns to the end of the scale when there is no external resistance, the variable resistance must be.....

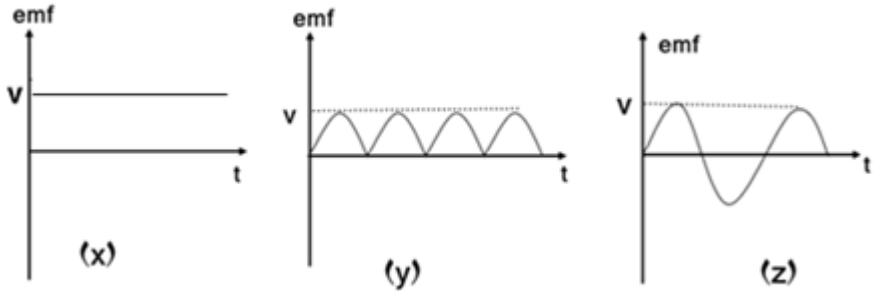
A	increased by 2400Ω
B	decreased by 2400Ω
C	increased by 600Ω
D	decreased by 600Ω

13. **In the figure, two identical transformers are combined in the circuit shown, so that.....**



A	$V_S > V_P$
B	$V_S < V_P$
C	$V_S = V_P$
D	$V_S = 0$

14.

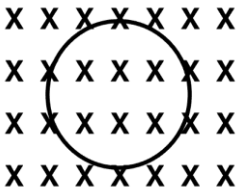


The three above figures represent the relation between (emf- t) for three dynamo models.
The <u>correct</u> order for them in terms of the effective value of the induced electromotive force in each of them is.....

A	z > y > x
B	x > y > z
C	x > y = z
D	z > y = x

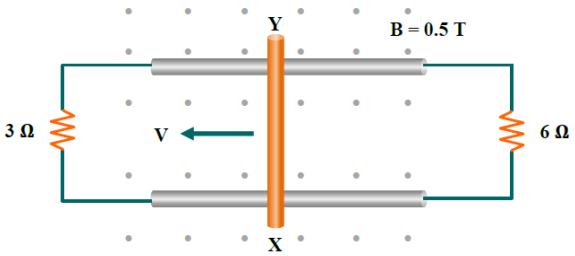
15.

In the figure, a metal ring with an area of 0.6 m² is placed so that its plane is perpendicular to a uniform magnetic field of flux density (B). An induced emf of 0.6 V is generated across the ring. When the magnetic flux density decreases to 40% of its original value in 0.1 s. The magnetic flux density (B) is equal to .....



A	0.4 T
B	0.36 T
C	0.25 T
D	0.167 T

16. The opposite figure shows a copper rod with a resistance of 1Ω moving at a speed of 3m/s on two metal rails with negligible resistance and a distance of 40cm between them. A uniform magnetic field of flux density 0.5T perpendicular to the page outward affects them.



Which of the following electric circuits is equivalent to the previous circuit?

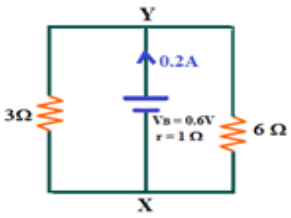


Figure (1)

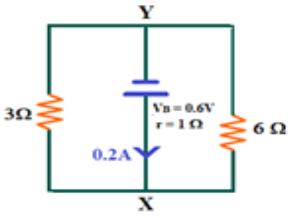


Figure (2)

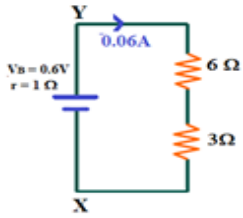


Figure (3)

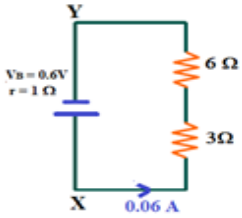
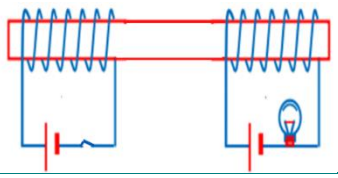


Figure (4)

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

17. In the figure, when the iron rod is pulled out from the two coils, the lamp illumination will

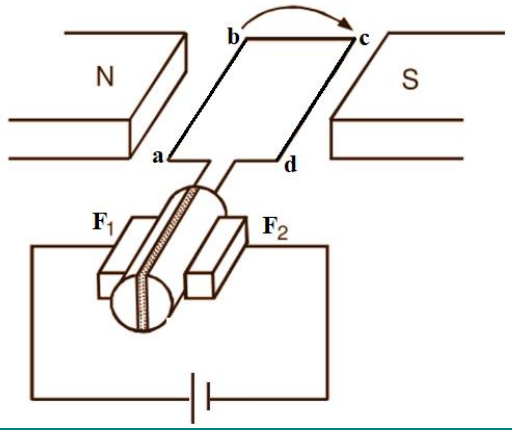


A	decrease
B	increase
C	remain constant
D	vanish

18.	**A circular coil with a radius of 10 cm, number of turns (N), and resistance per turn equal to (1 Ω) is placed perpendicularly in a magnetic field of flux density (1 T).** **If the magnetic flux density vanishes within (0.01 sec), the current passing through the coil during that period will be.....**

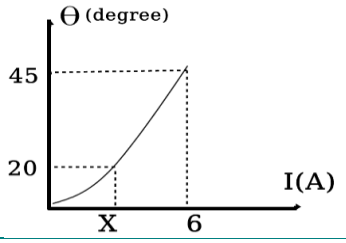
A	3.14 A
B	0.314 A
C	6.28 A
D	0.628

19.	**The figure shows a DC electric motor. When the motor coil rotates between two plane poles magnet from the position shown in the figure until the coil becomes perpendicular to the magnetic field, the ratio between the forces acting on sides bc and ab, respectively,** $\left(\frac{F_{ab}}{F_{bc}}\right)$**.....**



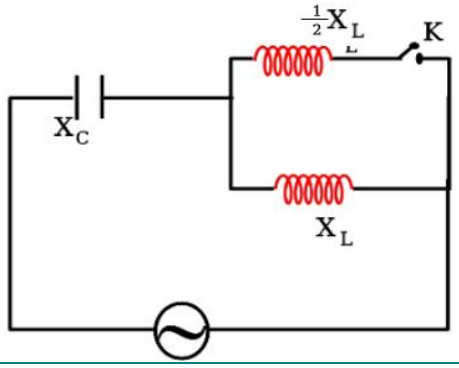
A	increases
B	decreases
C	remains constant
D	may be increased or decreased

20. The figure represents the graphical relationship between the intensity of the current passing through a hot wire ammeter (**I**) and the angle of deflection of its pointer (θ) from zero.
The value of(X) is equal to.....



A	2.85A
B	3 A
C	4 A
D	$\sqrt{6}$ **A**

21. The circuit shown represents an alternating current circuit containing inductors of negligible ohmic resistance, and $X_C = \frac{1}{2} X_L$.
When switch (K) is closed, the phase angle between the total voltage and the current.....



A	increases by (90°)
B	increases by (180°)
C	decreases by (180°)
D	remains constant

22.	A wireless receiver circuit used to receive a signal with a frequency of 600 KHz, consisting of a capacitor with a capacity of (C) and an inductive coil (solenoid) of its length (L_1). If we want to adjust the circuit to receive another signal with a frequency of 1200 KHz by separating the coil turns from each other so that its length becomes (L_2) while keeping the number of turns and the area of its face constant, then the ratio $\frac{L_2}{L_1}$ is equal to	
	A	$\frac{1}{2}$
	B	$\frac{4}{1}$
	C	$\frac{1}{4}$
	D	$\frac{2}{1}$

23.	A hot glowing body has an absolute temperature (T) and a wavelength associated with maximum radiation intensity is (λ). When its temperature is raised by 4000K, the wavelength associated with maximum radiation intensity decreases by ($\frac{2}{3}\lambda$) . The temperature (T) is equal to.....	
	A	8000K
	B	4000 K
	C	2666.67 K
	D	2000 K

24.	Two electrons (X, Y), electron (X) was accelerated under a potential difference of V, and electron (Y) was accelerated under a potential difference of (9V). The ratio between the wavelengths associated with each of them $(\frac{\lambda_x}{\lambda_y})$ is equal to	
	A	$\frac{81}{1}$
	B	$\frac{1}{3}$
	C	$\frac{3}{1}$
	D	$\frac{9}{1}$

25.	Compton experiment was conducted in two different ways, as follows: In the <u>first experiment</u>, a photon of wavelength λ_1 was incident, and in the <u>second experiment</u>, a photon with wavelength λ_2 was incident, where $\lambda_2 > \lambda_1$. If the two experiments were conducted on the same target (free electron) but in two separate experiments. the two photons will be scattered in a way that causes the same change in the scattered wavelength ($\Delta\lambda_1 = \Delta\lambda_2$) , then the ratio of the kinetic energy gained by the electron in the two experiments $\left(\frac{K.E_1}{K.E_2}\right)$ is	
	A	more than one
	B	less than one
	C	equal to one
	D	varied based on the value of $\Delta\lambda$

26.	**In one of the electron transitions in a hydrogen atom from a high energy level to a lower energy level, a photon with a momentum of 5.45 x 10^{-27} kg.m/s is emitted. The series to which it belongs is ..... series. (h = 6.625×10^{-34} J.s)**

A	Bracket
B	Paschen
C	Balmer
D	Lyman

27.	**If you know that the first energy level in a hydrogen atom is equal to (-13.6 eV), this means that...**

A	the electron gains energy of 13.6 eV when it transfers to this level.
B	the electron emits energy of 13.6 eV during its revolution at this level.
C	the energy required to release the electron from this level is equal to (13.6 eV).
D	the electron emits energy equal to 13.6 eV when it transfers to this level from the second level.

28.	**A laser beam falls on a barrier 3 m away, forming a spot of light with a radius of 0.3 cm on this barrier. If the distance increases to 6 m, the radius of the spot of light will be .....**

A	0.6 cm
B	0.3 cm
C	0.04 cm
D	0.1 cm

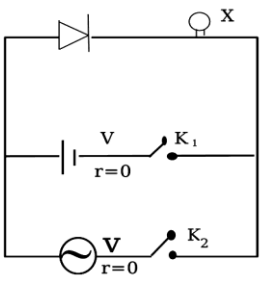
29. **In a helium-neon laser, if the pressure of the helium gas is greatly reduced, the expected result is.....**

A	increased rate of stimulated emissions in neon atoms
B	decreased efficiency of energy transfer to neon atoms
C	increased wavelength of the resulting laser
D	disappearance of the time-coherence property of photons

30. **At using a laser beam in 3D imaging, the path difference between the rays reflected from the body was equal to (2000Å) while the phase difference between these rays was equal to ($\frac{2}{3}\pi$), then the wavelength of the light used = ...**

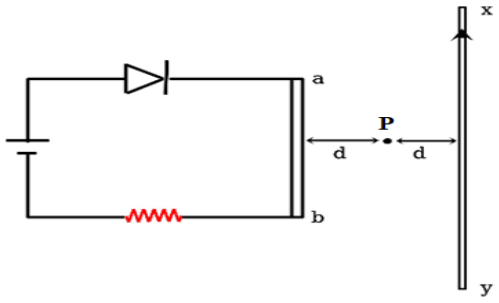
A	300 nm
B	600 nm
C	900 nm
D	1200 nm

31. **Lamp X is connected in the circuit shown, if the electromotive force of the battery = the effective value of the generated voltage from the AC source = V, and the diode resistance is negligible in the forward bias and infinite in the reverse bias, so the lamp illumination will be .....**



A	higher when only K_1 is closed
B	higher when only K_2 is closed
C	equal when K_1 or K_2 is closed
D	vanished when K_1 or K_2 is closed

32. The figure shows a long straight wire (xy) and an electric circuit with an electric cell of negligible internal resistance, an ideal diode, and a straight wire (ab) parallel to the wire (xy). If the poles of the battery in the electric circuit is reversed, the magnetic flux density at point P.....

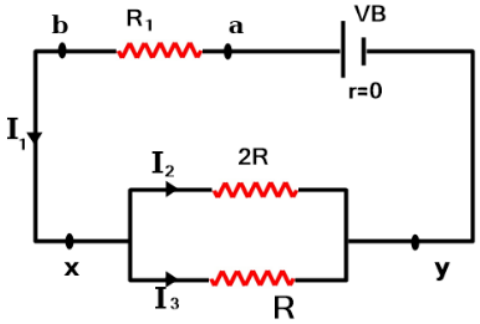


A	increases
B	decreases
C	remains constant
D	vanishes

Second, Objective questions (multiple choice) "each question is two marks"

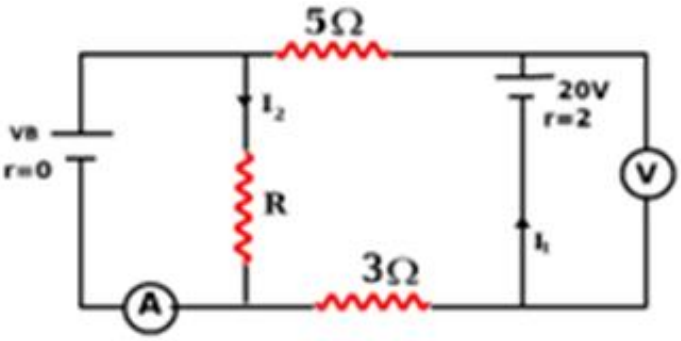
33. In the figure, if the potential difference between (x, y) is (V) and the potential difference between (a, b) is (6V).

Which of the following are possible values for R and R_1, respectively?



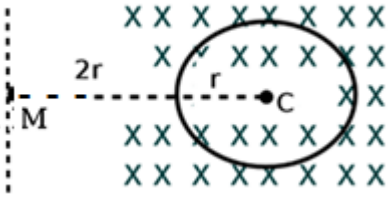
A	R=8 Ω , R_1=24 Ω
B	R=3 Ω , R_1=12 Ω
C	R=2 Ω , R_1=6 Ω
D	R=12 Ω , R_1=3 Ω

34. In the figure, both the voltmeter and ammeter are ideal, and the voltmeter reading is 19V, while the ammeter reading is $\frac{3}{2}$ A. The values of V_B and R are ..... and ..... respectively.



A	R=5.75 Ω , V_B = 10 V
B	R=11.5 Ω , V_B = 5 V
C	R=7.5 Ω , V_B = 15 V
D	R=15 Ω , V_B = 15 V

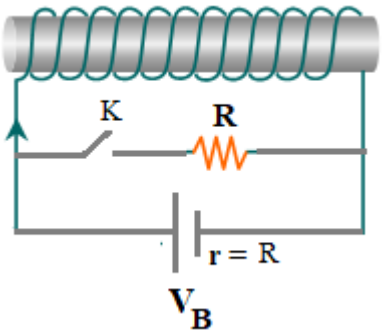
35. In the figure, a circular ring through which an electric current of intensity (I) passes, is placed perpendicular to an external magnetic field with a flux density of (1.25×10^{-5}T). It was observed that the needle of a compass placed at the center of the ring did not deflect. When the external magnetic field density was vanished and a long straight wire was placed in the plane of the ring at position (M) and a current of intensity (40A) passed through the wire, the compass needle remained undeflected. The area of the ring's face is equal to .....



A	$2.1m^2$
B	$0.143\ m^2$
C	$0.21\ m^2$
D	$4.24\ m^2$

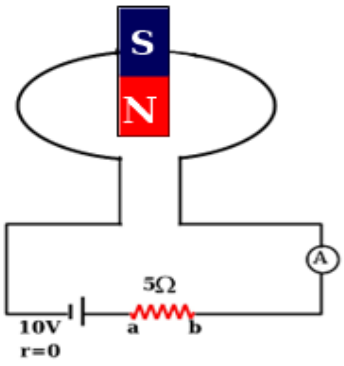
36. The figure shows an electric circuit containing a solenoid with N turns, length L, its electric resistance R, connected to an electric source of internal resistance R and electromotive force V_B, ohmic resistance R, and switch K.

If the magnetic flux density at a point on the axis of the solenoid is equal to B. When the switch K is closed, then the magnetic flux density at a point on the axis of the solenoid becomes.....



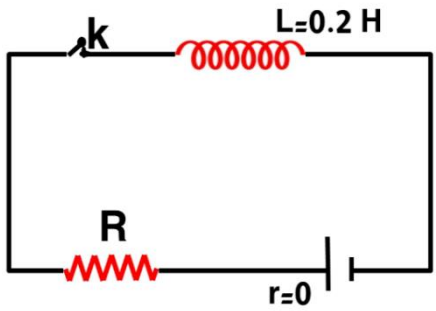
A	$\frac{4B}{3}$
B	$\frac{2B}{3}$
C	B
D	2 B

37. In the figure, if the resistance of the ring is (5Ω) and the ammeter reading at the moment of magnet movement is 2A, which of the following choices correctly expresses the movement of the magnet relative to the ring and the average value of the induced electromotive force generated in the loop?



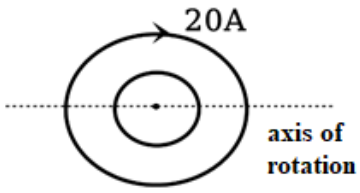
	Movement of the magnet relative to the ring	The induced electromotive force generated in the loop
A	Moves toward the ring (downward)	5V
B	Moves upward away from the ring	5V
C	Moves toward the ring (downward)	10 V
D	Moves upward away from the ring	10V

38. **In the figure, an inductor of negligible ohmic resistance is used. If the rate of the current growth at moment of the closing the switch (K) is equal to (200 A/s) and when the current intensity becomes (2A), the rate of the current growth is half its maximum value, so the rate of the current growth when the current passing through the circuit is 75% of its maximum value is equal to.....**



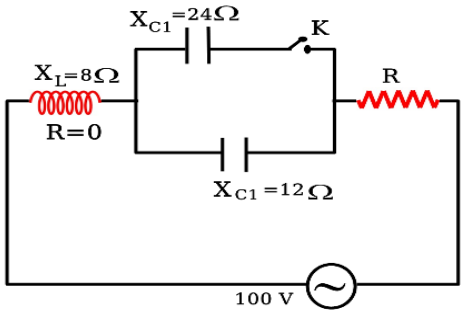
A	Zero
B	300 A/s
C	150 A/s
D	50 A/s

39 **The figure represents two concentric circular coils in the same plane, the outer coil consisting of 500 turns with a radius of 10 cm through which a direct current (20 A) flows, and the inner coil with a diameter of 10 cm consisting of 20 turns, where the resistance of each turn is 0.5 Ω. If the inner coil is rotated at an angle of 90° around an axis of rotation in the plane of the coils during a time period of 1 ms, the intensity of the induced current generated in the inner coil during this time period will be approximately..... and its direction.....**



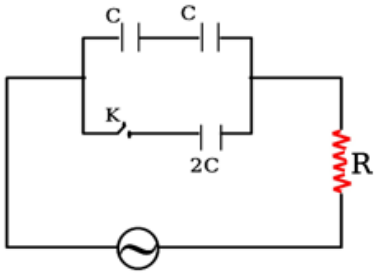
A	0.5A, clockwise
B	0.5A, counterclockwise
C	1 A , clockwise
D	1A, counterclockwise

40. In the circuit shown, if the phase angle before closing the switch (K) is equal to (θ), and when the switch (K) is closed, the current passing through the circuit becomes (10A), then the value of the resistance (R) and the value of the phase angle before closing the switch (θ) are equal to, respectively, ...



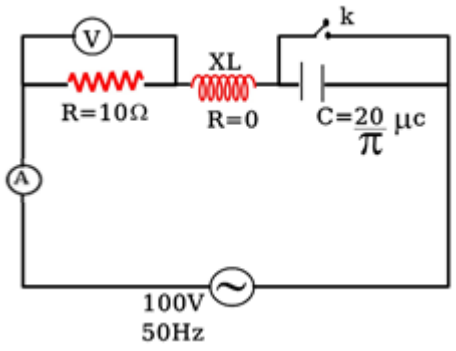
A	- 45° , 2Ω
B	- 21.8° , 10Ω
C	32° , 10Ω
D	0° , 2Ω

41. The figure represents an electric circuit containing several capacitors and an ohmic resistor (R). When the switch (K) is closed, what happens to the total capacitive reactance, total capacitance of the circuit, and the phase angle between the total voltage and total current?



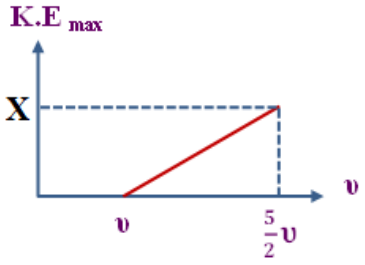
	The capacitive reactance	The total capacitance	The phase angle
A	decreases	increases	decreases
B	increases	increases	decreases
C	decreases	decreases	increases
D	increases	decreases	increases

42. In the circuit shown, if the power consumed in the circuit is 1 kW, then when the switch (k) is closed,....



	The voltmeter reading	The ammeter reading	The phase angle
A	increases	increases	increases
B	decreases	decreases	increases
C	decreases	decreases	decreases
D	increases	decreases	increases

43. The graph shows the relation between the maximum kinetic energy of photoelectrons emitted from the surface of a metal in a photoelectric cell ($K.E_{max}$) and the frequency of light incident on the metal surface (υ). If (E_w) is the work function of the metal, then if light with a frequency of $\frac{5}{2}\upsilon$ falls on the surface, the maximum kinetic energy of electrons (X) emitted from the metal surface is equal to .....



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

44. If a pure silicon crystal is doped with aluminum atoms, its free electron concentration and resistivity will ..... , ...respectively.

A	decrease, decrease
B	increase, increase
C	decrease, increase
D	increase, decrease

Third, Essay questions (each question two marks)

45 If the potential difference between the cathode and the anode in a Coolidge tube is equal to V = 50 kV.

1. Calculate the shortest wavelength of the resulting X-rays.
2. Explain how the wavelength of the resulting waves can be practically reduced and what the effect of this on the penetrating power of the X-rays?

46 The graph shows the relation between the force exerted by a beam of photons on a perfectly reflective surface (F) and the time rate of falling those photons ($Ø_L$).

Calculate the equivalent mass of one of the photons in this beam.