BYJU'S Full Test for Board Term I

(CBSE Grade 12)

PHYSICS QUESTIONS

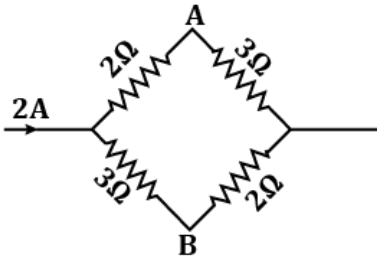
Time: 90 minutes **Maximum Marks: 35**

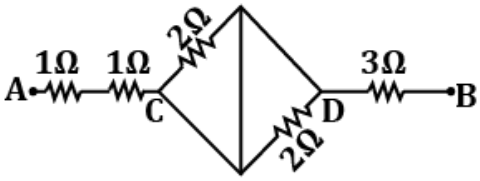
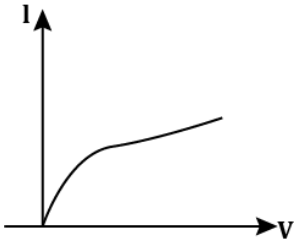
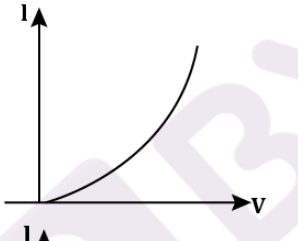
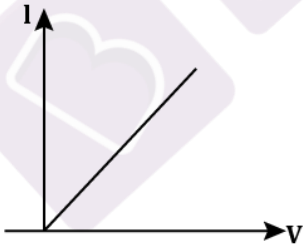
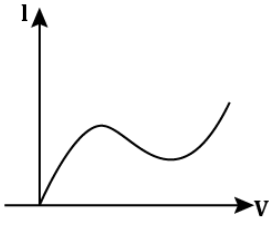
General Instructions:

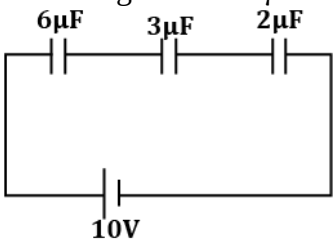
1. The Question Paper contains three sections
2. Section A has 25 questions. Attempt any 20 questions.
3. Section B has 24 questions. Attempt any 20 questions.
4. Section C has 6 questions. Attempt any 5 questions.
5. All questions carry equal marks.
6. There is no negative marking.

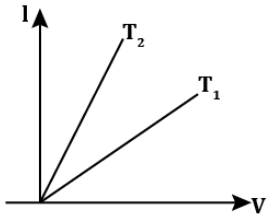
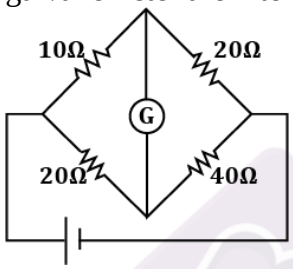
SECTION A

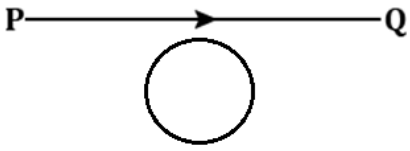
This section consists of 25 multiple choice questions with overall choice to attempt any 20 questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.

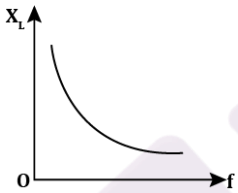
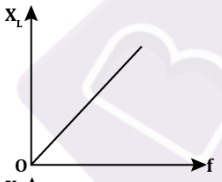
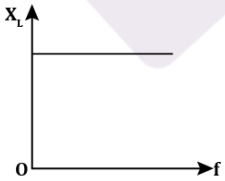
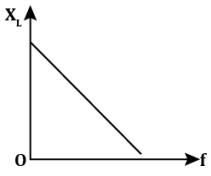
Q1	When a person combs his hair, static electricity is sometimes generated by which process? A. Induction between the comb and hair B. Friction between the comb and hair results in the transfer of electrons C. Nuclear force between the comb and hair D. Contact between comb and hair results in a charge transfer	(0.77)
Q2	A sphere encloses an electric dipole within it. The total flux through the sphere is A. Zero B. Double that due to a single charge C. Half that due to a single charge D. Dependent on the position of dipole with in the sphere	(0.77)
Q3	The potential difference between *A* and *B* for the circuit shown in the figure is  A. 2V B. 1V C. 3V D. Zero	(0.77)

Q4	The equivalent resistance between points *A* and *B* is  A. 5 Ω B. 6 Ω C. 9 Ω D. 7 Ω	(0.77)
Q5	Which among the following *I*-*V* characteristic represents ohmic conductors? A.  B.  C.  D.  	(0.77)
Q6	In a potentiometer, a cell of emf 2.5 V gives a balance point at 42 cm length of the wire. If this cell is replaced by another cell, then the balance point shift to 105 cm, then the emf of the second cell is A. 6.25 *V* B. 7.5 *V* C. 5.75 *V*	(0.77)

	D. $5.25\ V$	
Q7	During charging of a capacitor, the ratio of energy stored in the capacitor to the energy dissipated in the form of heat is A. 1 : 2 B. 2 : 1 C. 1 : 3 D. 1 : 1	(0.77)
Q8	The charge on the 3 μF capacitor as shown in the figure  A. 1 μC B. 10 μC C. 100 μC D. 7 μC	(0.77)
Q9	In a parallel plate capacitor, the capacitance increases if A. Area of plate is decreased B. Area of plate is increased C. Distance between plates is increased D. Charge on capacitor is increased	(0.77)
Q10	A parallel plate capacitor is charged and then isolated. The effect of increasing the plate separation on charge, potential difference and capacitance respectively are. A. Constant, Increases, Decreases B. Constant, Decreases, Increases C. Increases, Decreases, Constant D. Decreases, Constant, Increases	(0.77)
Q11	The electric field and the electric potential of a short electric dipole at axial position vary with distance r as A. $\frac{1}{r}, r$ B. $\frac{1}{r^3}, \frac{1}{r^2}$ C. $\frac{1}{r^2}, \frac{1}{r^2}$ D. $\frac{1}{r^2}, \frac{1}{r}$	(0.77)
Q12	The voltage (V) and current (I) graph for a conductor at two different temperatures, T_1 and T_2 are shown in the figure, Then	(0.77)

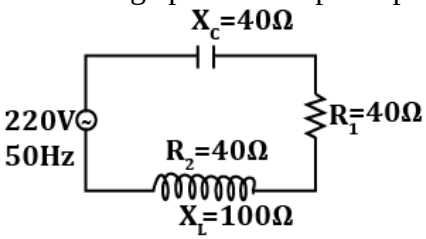
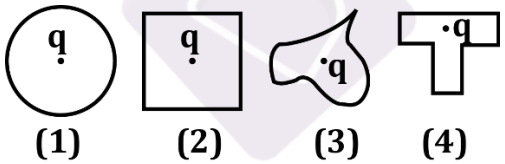
	 A. $T_1 = T_2$ B. $T_1 < T_2$ C. $T_1 > T_2$ D. $T_1 = \frac{1}{T_2}$	
Q13	A current in a wire is given by equation, $I = (3t^2 - 2t + 5)\,A$. The charge flowing through the cross-section of wire in time interval t = 0 to t = 3 s is. A. 33 C B. 18 C C. 27 C D. 36 C	(0.77)
Q14	In a Wheatstone bridge shown in the figure, if position of the battery and galvanometer are interchanged, then the deflection in galvanometer will  A. Be towards right B. Be towards left C. Remain zero D. None of these	(0.77)
Q15	The magnetic force on a current carrying conductor of length L placed in an external uniform magnetic field $\vec{B}$ is given by (I is the current through conductor) A. $\frac{\vec{L} \times \vec{B}}{I}$ B. $I(\vec{B} \times \vec{L})$ C. $I(\vec{L} \times \vec{B})$ D. $I(\vec{L} \cdot \vec{B})$	(0.77)
Q16	The SI unit of magnetic moment is A. Am B. Am^2 C. Nm^2 D. Cm	(0.77)

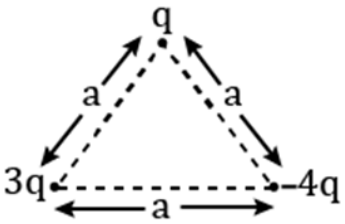
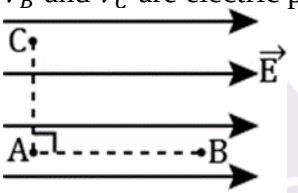
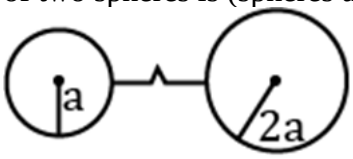
Q17	An electron having linear momentum $2.4 \times 10^{-24}\ kg\ m\ s^{-1}$ enters a region of uniform magnetic field of 0.15 T. The field vector makes an angle of 30° with the initial velocity vector of the electron. The radius of the helical path of the electron in the field will be A. 2 mm B. 1 mm C. 5 mm D. 0.05 mm	(0.77)
Q18	The angle of dip at magnetic poles and magnetic equator are A. $30^0, 60^0$ B. $10^0, 90^0$ C. $90^0, 0^0$ D. $45^0, 11.5^0$	(0.77)
Q19	At a given place on earth's surface, the horizontal component of earth's magnetic field is $2 \times 10^{-5}\ T$ and resultant magnetic field is 0.4 G. The angle of dip at this place is A. 60^0 B. 30^0 C. 45^0 D. 37^0	(0.77)
Q20	The coefficient of mutual inductance of two coils can be increased by A. Decreasing the number of turns in the coils B. Increasing the number of turns in the coils C. Winding the coil on wooden core D. Placing the coils in perpendicular orientation	(0.77)
Q21	Lenz's law is a consequence of the law of conservation of A. Charge B. Energy C. Induced emf D. Momentum	(0.77)
Q22	In the given figure, current from *P* to *Q* in the straight wire is increasing. The direction of induced current in the circular conducting loop is  A. Clockwise B. Anticlockwise C. Changing D. Nothing can be said	(0.77)

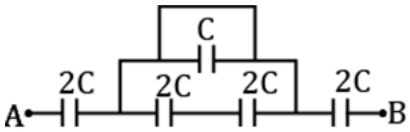
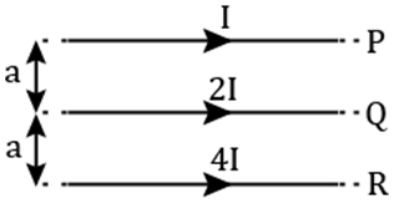
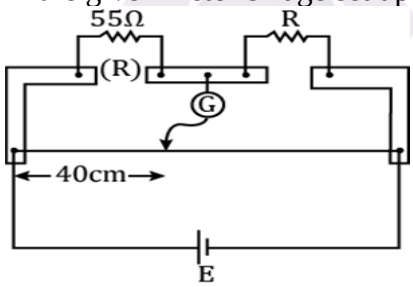
Q23	The voltage over a cycle varies as $\begin{cases} V_0 \sin \omega t \; for \; 0 \le t \le \frac{\pi}{\omega} \\ -V_0 \sin \omega t \; for \; \frac{\pi}{\omega} \le t \le \frac{2\pi}{\omega} \end{cases}$ The average value of the voltage for one cycle is A. $\frac{V_0}{\sqrt{2}}$ B. $\frac{V_0}{2}$ C. $\frac{2V_0}{\pi}$ D. $\frac{V_0}{\pi}$	(0.77)
Q24	The quality factor has the dimensions same as that of A. Time B. Angle C. Power D. Frequency	(0.77)
Q25	Which among the following graphs represents the correct variation of the inductive reactance (X_L) with frequency (f)? A.  B.  C.  D. 	(0.77)

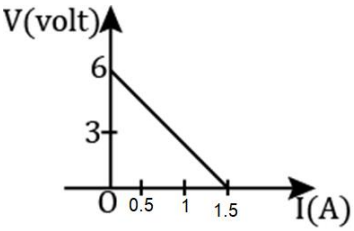
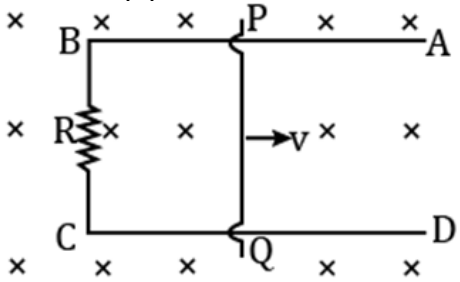
SECTION B

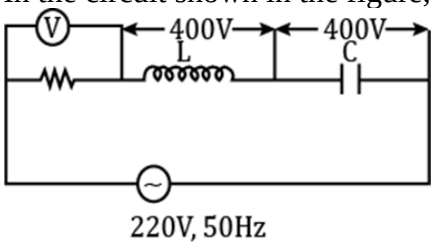
This section consists of 24 multiple choice questions with overall choice to attempt any 20 questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation

Q26	The phase difference between voltage and current in purely capacitive ac circuit is A. π B. $\frac{\pi}{2}$ C. 0 D. $\frac{\pi}{3}$	(0.77)
Q27	The average power dissipated per cycle in the circuit as shown in the figure is  A. 387.2 W B. 287.2 W C. 187.2 W D. 400.8 W	(0.77)
Q28	Which of the following statement is true regarding the electric flux through the closed surfaces shown in the figure?  A. In figure (1) is largest B. In figure (2) is least. C. In figure (2) is same as in figure (4) but is smaller than in figure (1). D. Is the same for all the figures.	(0.77)
Q29	Two point charges having charge 3 μC and 4 μC have a repulsive force of 15 N, when placed at some distance apart. If the both charges are kept closer at the half the distance of the initial value, then the force between them will now be A. 30 N B. 15 N C. 60 N D. 20 N	(0.77)
Q30	The magnitude of dipole moment of the following system is	(0.77)

	 A. $\sqrt{21}qa$ B. $\sqrt{7}qa$ C. 4qa D. $\sqrt{13}qa$	
Q31	A charge $2\sqrt{3}$ nC is placed at one of the corners of a cube of side $2\,cm$. The potential at the corner which is diagonally opposite (body diagonal) to the charge, is A. 900 V B. 700 V C. 450 V D. $20\sqrt{3}\,V$	(0.77)
Q32	Figure shows three points *A*, *B* and *C* in a region of uniform electric field $\vec{E}$. If V_A, V_B and V_C are electric potential at points *A*, *B* and *C* respectively then  A. $V_A = V_B = V_C$ B. $V_A > V_B > V_C$ C. $V_A < V_B < V_C$ D. $V_A = V_C > V_B$	(0.77)
Q33	Two charged conducting spheres of radii *a* and 2*a* are connected to each other by a conducting wire as shown in the figure. The ratio of electric fields at the surfaces of two spheres is (spheres are at large distance)  A. 1 B. 2 C. 4 D. 8	(0.77)

Q34	The equivalent capacitance between A and B for the network shown in the figure is  A. $\frac{C}{2}$ B. $\frac{2C}{3}$ C. C D. $2C$	(0.77)
Q35	Three infinitely long parallel straight current carrying wires P, Q and R are kept as shown in the figure. If the force per unit length between wire P and R is F, then force per unit length between wire P and Q will be  A. F B. 2F C. $\frac{F}{2}$ D. $4F$	(0.77)
Q36	What is the value of unknown resistance R if galvanometer shows null deflection in the given meter bridge set up?  A. 110 Ω B. 55 Ω C. 92.5 Ω D. 82.5 Ω	(0.77)
Q37	The plot of terminal potential difference (V) of a cell with current (I) is shown in the figure. The emf and internal resistance of cell are	(0.77)

	 A. $6\,V, 4\,\Omega$ B. $3\,V\ 2\,\Omega$ C. $6\,V, 2\,\Omega$ D. $3\,V, 1.5\,\Omega$	
Q38	Two electric bulbs having resistances in ratio 1 : 4 are connected in parallel to a voltage source of 220 V. The ratio of power dissipated in them is A. 2 : 1 B. 4 : 1 C. 1 : 3 D. 3 : 2	(0.77)
Q39	The angle of dip at a certain place, where the horizontal and vertical components of the earth's magnetic field are equal, is A. 45^0 B. 90^0 C. 60^0 D. 30^0	(0.77)
Q40	The magnetic flux linked with a coil is ϕ and the emf induced in it is E, then select the correct option A. If $\phi = 0, E$ must be zero B. If $\phi \neq 0, E$ must be zero C. If $E \neq 0, \phi$ may or may not be zero D. All of these	(0.77)
Q41	A conducting rod PQ of length L is moving with a constant velocity v on a frictionless frame $ABCD$ connected with a resistance R as shown in the figure. A uniform magnetic field B is directed into the plane of frame. The heat dissipated in the loop per second is 	(0.77)

	A. $\frac{B^2 L\, v^2}{2R}$ B. $\frac{B^2 L\, v^2}{R}$ C. $\frac{B^2 L^2 v^2}{2R}$ D. $\frac{B^2\, L^2 v^2}{R}$	
Q42	In the circuit shown in the figure, what will be the reading of the voltmeter?  A. 200 V B. 220 V C. 110 V D. 440 V	(0.77)
Q43	In a step up transformer, the turn ratio is 2 : 3. A dc voltage source of emf 6 V is connected across the primary coil of transformer. The voltage across the secondary coil will be A. 9 V B. 4 V C. 6 V D. Zero	(0.77)
Q44	An oil drop of 10 excess electrons is held stationary under a constant electric field $4.9 \times 10^4\ N/C$. The mass of the drop is $(g = 9.8\, m/s^2)$ A. $9 \times 10^{-15} kg$ B. $8 \times 10^{-15}\ kg$ C. $4 \times 10^{-14}\ kg$ D. $8 \times 10^{-19} kg$	(0.77)
Q45	Given below are two statements labelled as Assertion (A) and Reason (R) **Assertion (A):** Resistance of metallic wire increases with decrease in temperature. **Reason (R):** On decreasing the temperature, relaxation time decreases. Select the most appropriate answer from the options given below: A. Both A and R are true and R is the correct explanation of A. B. Both A and R are true but R is not the correct explanation of A. C. A is true but R is false. D. A is false and R is also false.	(0.77)
Q46	Given below are two statements labelled as Assertion (A) and Reason (R). **Assertion(A):** The weight of a body which is charged by rubbing may increase or decrease.	(0.77)

	Reason(R): In electrification, due to rubbing few electrons are transferred from one body to other. Select the most appropriate answer from the options given below: A. Both A and R are true and R is the correct explanation of A. B. Both A and R are true but R is not the correct explanation of A. C. A is true but R is false. D. A is false and R is also false.	
Q47	Given below are two statements labelled as Assertion (A) and Reason (R). **Assertion(A):** Work done by magnetic field on a moving point charge is zero. **Reason(R):** The magnetic force is perpendicular to velocity of particle. Select the most appropriate answer from the options given below: A. Both A and R are true and R is the correct explanation of A. B. Both A and R are true but R is not the correct explanation of A. C. A is true but R is false. D. A is false and R is also false.	(0.77)
Q48	Given below are two statements labelled as Assertion (A) and Reason (R) **Assertion(A):** Induced electric field is non-conservative. **Reason(R):** Work done in a closed path in induced electric field is zero Select the most appropriate answer from the options given below: A. Both A and R are true and R is the correct explanation of A. B. Both A and R are true but R is not the correct explanation of A C. A is true but R is false. D. A is false and R is also false.	(0.77)
Q49	Given below are two statements labelled as Assertion (A) and Reason (R). **Assertion(A):** Average power in series LCR ac circuit is maximum at resonance. **Reason(R):** At resonance circuit is purely inductive. Select the most appropriate answer from the options given below. A. Both A and R are true and R is the correct explanation of A. B. Both A and R are true but R is not the correct explanation of A C. A is true but R is false D. A is false and R is also false.	(0.77)

SECTION C

This section consists of 6 multiple choice questions with an overall choice to attempt any 5. In case more than desirable number of questions are attempted, ONLY first 5 will be considered for evaluation.

Q50	An electric dipole is made of two charges 10 μC and -10 μC, placed 1 mm apart. A point *P* is a general point at a distance 1 m from the midpoint of the two charges, then A. Electric field at point *P*, if it lies on axis of dipole is 180 N/C B. Electric field at point *P*, if it lies on equatorial line is 180 N/C C. Electric field at the centre of dipole is 90 N/C D. Electric field at the point *P*, if it lies on equatorial line is 360 N/C	(0.77)
Q51	Consider two capacitors C_1 = 10 μF and C_2 = 40 μF. Which of the following statement(s) is/are true? (a) The net capacitance, if both are connected in series, is 50 μF (b) The net capacitance, if both are connected in parallel, is 50 μF (c) The net capacitance, if both are connected in series, is 8 μF A. (a) only B. (b) only C. (b) and (c) only D. (a) and (b) only	(0.77)
Case study: Read the following paragraph and answer the questions: A charged particle is released from origin with velocity $\vec{v} = V_0\,\hat{\imath}$ in a uniform magnetic field $\vec{B} = \frac{B_0}{2}\,\hat{\imath} + \frac{\sqrt{3}}{2}\,B_0\,\hat{\jmath}$. The magnetic force on a charged particle is given by $\vec{F} = q\,(\vec{v} \times \vec{B})$. The charge and mass of the particle are *q* and *m* respectively		
Q52	The path described by the charged particle is A. Circular B. Straight line C. Helical D. Elliptical	(0.77)
Q53	The time period of revolution of charged particle is A. $\frac{\pi\, m}{q\, B_0}$ B. $\frac{2\,\pi m}{q\, B_0}$ C. $\frac{2\,\pi m}{\sqrt{3}\, q\, B_0}$ D. $\frac{4\,\pi m}{\sqrt{3}\, q\, B_0}$	(0.77)
Q54	The radius of circular cross-section of path described by particle is	(0.77)

	A. $\frac{\sqrt{3}\,mv_0}{q\,B_0}$ B. $\frac{mv_0}{q\,B_0}$ C. $\frac{2\,mv_0}{q\,B_0}$ D. $\frac{\sqrt{3}\,mv_0}{2\,q\,B_0}$	
Q55	The displacement of the charged particle along the magnetic field in one time period is A. $\frac{\pi mv_0}{q\,B_0}$ B. $\frac{2\,\pi mv_0}{qB_0}$ C. $\frac{\sqrt{3}\,\pi mv_0}{qB_0}$ D. $\frac{\pi\,m\,v_0}{\sqrt{3}\,q\,B_0}$	(0.77)