KENDRIYA VIDYALAYA SANGATHAN:

DEHRADUNE REGION

PRE-BOARD EXAMINATION (TERM-1)

CLASS: XII

SUBJECT: PHYSICS

(042)

Time: 90 Minutes
Max. Marks: 35

General

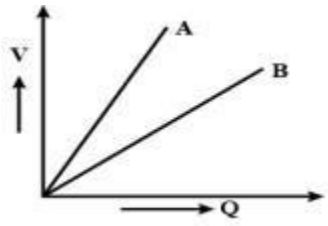
Instructions:

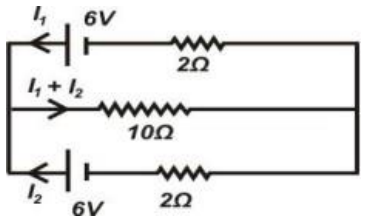
1. **The Question Paper contains three sections.**
2. **Section A has 25 questions. Attempt any 20 questions.**
3. **Section B has 24 questions. Attempt any 20 questions.**
4. **Section C has 6 questions. Attempt any 5 questions.**
5. **All questions carry equal marks (0.77).**
6. **There is no negative marking.**

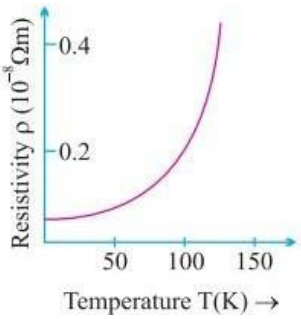
SECTION: A

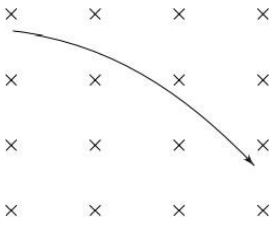
This section consists of 25 multiple choice questions with overall choice to attempt any 20 questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.

Q1	Electric field lines contracts lengthwise, It shows (A) Repulsion between same charges (B) Attraction between opposite charges (C) No relation between force & contraction. (D) Electric field lines do not move on straight path.

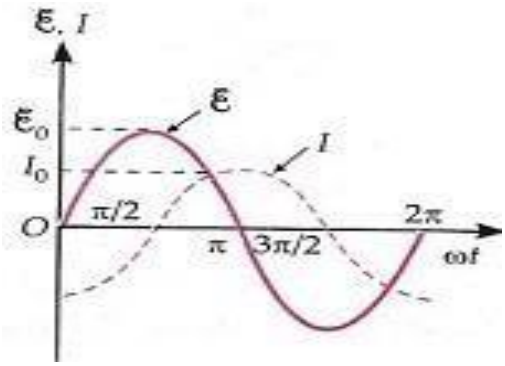
Q2	The value of electric field inside a conducting sphere having radius R and charge Q will be: (A) KQ/R^2 (B) KQ/R (C) Zero (D) $2KQ/R^2$
Q3	Force between two stationary charges, when placed in free space is 10 N. If they are placed in a medium of relative permittivity 5, the force between them is (A) 50 N (B) 2 N (C) 0.5 N (D) 10 N
Q4	The work done in carrying a charge once round the circle of radius R with charge Q at the centre of the circle is (A) Zero (B) KQ/R (C) KQ^2/R (D) KQ/R^2
Q5	Charge on a body is integral multiple of ±e. It is given by the law of (A) Conservation of charge (B) Conservation of mass (C) Conservation of energy (D) Quantization of charge
Q6	Which physical quantity have unit Newton /coulomb (A) Electric charge (B) Electric force (C) Electric field (D) Electric potential
Q7	The graph shows the variation of voltage 'V' across the plates of two capacitors A and B versus increase of charge 'Q' stored on them. Which of the two capacitors has higher capacitance?  (A) Capacitor A

	(B) Capacitor B (C) Both have same capacitance (D) Incomplete information
Q8	Two wires A and B of the same material, having radii in the ratio 1: 2 and carry currents in the ratio 4: 1. The ratio of drift speeds of electrons in A and B is (A) 16:1 (B) 1:16 (C) 1:4 (D) 4:1
Q9	A copper wire of resistance R and resistivity ρ is uniformly stretched till its length is increased to n times its original length. What will be its new resistance and resistivity? (A) n^2 R and n^2 ρ (B) n^2 R and n ρ (C) n R and n ρ (D) n^2 R and ρ
Q10	Electric current through resistance 10 **Ω**, in the given circuit is:  (A) 0 amp (B) 0.5 amp (C) 6/11 amp (D) 2 amp

Q11	The variation of electrical resistivity with temperature for a material is shown in the graph.  The material is - (A) conductor (B) insulator (C) semiconductor (D) superconductor
Q12	A cell supplies a current of 0.9 A through a 2 Ω resistor and a current of 0.3 A through 7 Ω resistor. The internal resistance of the cell is (A) 2.0 Ω (B) 1.5 Ω (C) 1.0 Ω (D) 0.5 Ω
Q13	The horizontal component of earth's magnetic field at a place is $\sqrt{3}$ times the vertical component. The angle of dip at that place is (A) π/2 (B) π/3 (C) π/6 (D) 0
Q14	To convert a moving coil galvanometer into on ammeter of given range, we must connect: (A) A suitable low resistance in series (B) A suitable low resistance in parallel (C) A suitable high resistance in parallel (D) A suitable high resistance in series
Q15	An electric current pass through a long straight copper wire. At a distance 5 cm

	from the straight wire, the magnetic field is B. The magnetic field at 20 cm from the straight wire would be (A) B/6 (B) B/4 (C) B/ 3 (D) B/2
Q16	Choose the incorrect statement (A) Tangent to the magnetic field lines represents the direction of net magnetic field (B) magnetic field lines have a tendency to contract longitudinally (C) no two magnetic field lines can intersect each other (D) magnetic field lines of a magnet are discontinuous
Q17	A positive charge particle is moving with uniform velocity 'v' enters a region of crossed electric and magnetic fields E and B and the particles remains undeflected from its path then (A) $v = E B$ (B) $v = E^2 B$ (C) $v= E/B$ (D) $v = B/E$
Q18	A particle is projected into a uniform magnetic field acting perpendicular to the plane of the paper. The field points into the paper, indicated by x which represents the tail of the field vector. The trajectory shown could be that of a (see Fig.)  (A) neutron

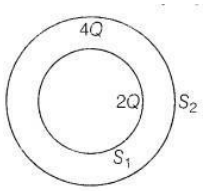
	(B) proton (C) alpha particle (D) electron
Q19	Oscillating metallic pendulum in a uniform magnetic field directed Perpendicular to the plane of oscillation- (A) Slows down due to conduction current (B) becomes faster due to eddy current (C) remains unaffected due to displacement current (D) Slows down due to eddy current
Q20	The direction of induced current is such that it opposes the very cause that has produced it. This is the law of (A) Lenz (B) Faraday (C) Kirchhoff (D) Fleming
Q21	If both the number of turns and core length of an inductor is doubled keeping other factors constant, then its self-inductance will be- (A) Unaffected (B) doubled (C) halved (D) quadrupled
Q22	An AC voltage source is connected in series with a bulb and an air-filled capacitor, the bulb glows with certain brightness, what is the effect in the brightness of the bulb if a mica sheet is fully filled between the plates of the capacitor (A) The bulb glows brighter (B) The bulb glows dimmer (C) The bulb will not glow (D) No change in the brightness of the bulb
Q23	The ratio of no. of turns of primary coil to secondary coil in a transformer is 2:3. If 6 V a.c is connected across the primary coil, then voltage across the secondary coil will be (A) 3 V (B) 6 V (C) 9 V (D) 12 V

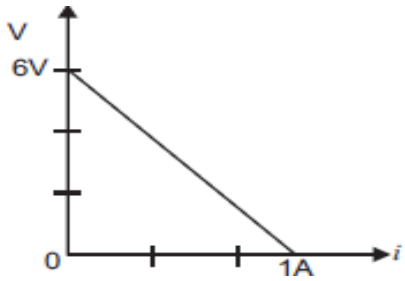
Q24	The value of power factor in L-C-R series circuit at resonance is (A) zero (B) 1 (C) – 1 (D) π/2
Q25	An ac source is connected across an element X. The variation of voltage (E) and current (I) with ωt is shown in the figure then the element X is  (A) Inductor and voltage lags the current by π/2 (B) Capacitor and voltage leads the current by π/2 (C) Capacitor and voltage leads the current by π/2 (D) Inductor and voltage leads the current by π/2

SECTION B

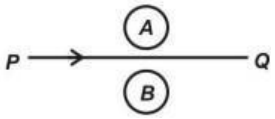
This section consists of 24 multiple choice questions with overall choice to attempt any 20 questions. In case more than desirable number of questions are attempted, ONLY first 20 will be considered for evaluation.

Q26	A parallel plate capacitor with air between the plates has a capacitance of 8 pF. The separation between the plates is now reduced half and the space between them is filled with a medium of dielectric constant 5. Calculate the value of capacitance of the capacitor in second case. (A) 8 pF (B) 10 pF (C) 80 pF (D) 100 pF
Q27	A positively charged particle is released from rest in a uniform electric field. The electric potential energy of the charge

	(A) remains constant because the electric field is uniform. (B) increases because charge moves along the electric field. (C) decreases because charge moves opposite to the electric field. (D) decreases because charge moves along the electric field
Q28	Two large metal sheets having surface charge density $+\sigma$ and $-\sigma$ are kept parallel to each other at a small separation distance d. The electric field at any point in the region between the plates is (A) σ / ε_0 (B) $2\sigma / \varepsilon_0$ (C) $\sigma /2 \varepsilon_0$ (D) Zero
Q29	Consider two hollow concentric spheres S_1 and S_2 enclosing charges 2Q and 4Q respectively, as shown in the figure,  the ratio of the electric flux through them is – (A) 1:3 (B) 2:1 (C) 3:1 (D) 1:2
Q30	An oil drop of mass m carrying charge – Q is to be held stationary in the gravitational field of the earth. The magnitude and direction of the electrostatic field required for this purpose are? (A) E = mg, downward (B) E = mg/Q, upward (C) E = 2 mg/Q, downward (D) E = mg/Q, downward
Q31	A parallel plate air capacitor is charged to a potential difference of V volts. After disconnecting the charging battery, the distance between the plates of

	the capacitor is increased using an insulating handle. As a result, the potential difference between the plates (A) increases (B) decreases (C) does not change (D) becomes zero
Q32	An electric dipole of dipole moment 'p' is kept in a uniform electric field E, is turned from $\theta = 0^0$ position to $\theta = 60^0$ position. The work done by the field is (A) pE (B) - pE (C) ½ pE (D) - ½ PE
Q33	The plot of the variation of potential difference across a combination of three identical cells in series, versus current is as shown below. The emf and internal resistance of each cell is -  (A) 6V, 1 Ω (B) 3V , 2 Ω (C) 2V, 2Ω (D) 2V, 1 Ω
Q34	In a meter bridge experiment when a resistance wire is connected in the left

	gap, the balance point is found at the 30 cm. When the wire is replaced by another wire, the balance point is found at the 60 cm. The balance point when the two wires are connected in parallel in the left gap successively is (A) 70 cm (B) 50 cm (C) 30 cm (D) 25 cm
Q35	A galvanometer coil of 50-ohm resistance shows full scale deflection for a current of 5 mA. How will you convert this galvanometer into a voltmeter of range 0 to 15 V? (A) by connecting 2950 Ω resistor in series (B) by connecting 2950 Ω resistor in parallel (C) by connecting 2900 Ω resistor in series (D) by connecting 3000 Ω resistor in parallel
Q36	3 A of current is flowing in a linear conductor having a length of 40 cm. The conductor is placed in a magnetic field of strength 5×10^{-2} T and makes an angle of 30^{o} with the direction of the field. It experiences a force of magnitude (A) 2×10^{-2} N (B) 3×10^{-2} N (C) 4×10^{-2} N (D) 30×10^{-2} N
Q37	Currents of 10 A and 2 A are flowing in opposite directions through two parallel wires A and B respectively. If the wire A is infinitely long and wire B is 2 m long, then force on wire B which is situated at 10 cm from A, is (A) 8×10^{-5} N (B) 4×10^{-5} N (C) 2×10^{-5} N (D) 5×10^{-5} N
Q38	Two identical thin bar magnets each of length L and pole strength m are placed at right angle to each other with north pole of one touching the south pole of the other. Magnetic moment of the system is (A) 2mL (B) mL (C) $\sqrt{2}$ mL (D) mL/2

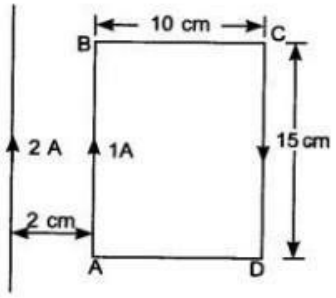
Q39	A 20 volt AC is applied to a circuit consisting of a resistance and a coil with negligible resistance. If the voltage across the resistance is 12 volt, the voltage across the coil is- (A) 10 V (B) 12 V (C) 16 V (D) 20 V
Q40	In a circuit instantaneous voltage and current are V = 15 sin 314t volt and i = 5 cos 314t ampere respectively. The nature of circuit and the power dissipated in complete cycle is (A) Inductive, zero (B) Capacitive, 75 W (C) Inductive, 3 W (D) Capacitive, zero
Q41	The magnetic flux linked with a coil at any instant t is $\varphi = (6t^2 - 8t + 5)$ Wb, the e.m.f induced in the coil at t = 2 second is- (A) -16V (B) -24V (C) +24V (D) +16V
Q42	An e.m.f. of 5 volt is produced by a self-inductance, when the current changes at a steady rate from 3 A to 2 A in 1 millisecond. The value of self-inductance is (A) Zero (B) 5 H (C) 5000 H (D) 5 mH
Q43	An increasing current is flowing through wire PQ. The direction of induced current in coils A and B are  (A). Coil A- Clockwise, Coil B – Clockwise

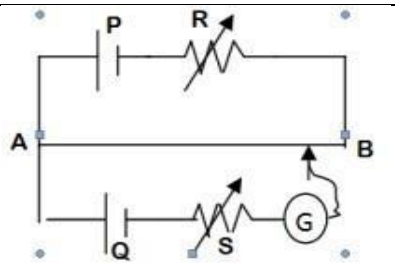
	(B). Coil A- Clockwise, Coil B – Anticlockwise (C). Coil A- Anticlockwise, Coil B – Clockwise (D). Coil A- Anticlockwise, Coil B – Anticlockwise
Q44	A series LCR circuit connected to a variable frequency 230 V source. L = 4.0 H, C = 100μF, R = 60 Ω. The angular frequency of the source which drives the circuit in resonance and the impedance of the circuit at resonance is – (A) ω = 60 rad/s , Z = 60 Ω (B) ω = 50 rad/s , Z = 60 Ω (C) ω = 50 rad/s , Z = 50 Ω (D) ω = 60 rad/s , Z = 100 Ω
Q45	Given below are two statements labelled as Assertion (A) and Reason (R) Assertion (A): No two equipotential surfaces intersect each other. Reason (R): Electric field lines are normal to the equipotential surface. 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.
Q46	Given below are two statements labelled as Assertion (A) and Reason (R) Assertion (A): At constant applied voltage, If the length of a metal wire is doubled then the drift speed of electron becomes halved. Reason (R): Mobility of electron decreases with the increase in the length of metal wire. 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 labeled as Assertion (A) and Reason (R) Assertion (A): A charged particle is moving in a circular path under the action of a uniform magnetic field. During the motion, kinetic energy of the

	charged particle is constant. Reason (R): During the motion, magnetic force acting on the particle is perpendicular to instantaneous velocity. 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.
Q48	Given below are two statements labelled as Assertion (A) and Reason (R) Select the most appropriate answer from the options given below: Assertion (A): When the magnetic flux through a loop is maximum, induced emf is maximum. Reason (R): The induced charge is directly proportional to the rate of change of magnetic flux through a loop. 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.
Q49	Given below are two statements labelled as Assertion (A) and Reason (R) Assertion (A): A small magnet takes longer time in falling in a hollow metallic tube without touching the wall. Reason (R): There is opposition of motion due to production of eddy currents in a metallic tube. 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.

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	A long straight wire is carrying a current of 2A. A rectangular loop of length 15 cm and breadth 10 cm carrying a current of 1A is placed from the wire as shown in figure. The net force on the rectangular loop is  (A) 25 X 10^{-7} N towards wire. (B) 25 × 10^{-7} N away from wire. (C) 35 × 10^{-7} N towards wire. (D) 35 × 10^{-7} N away from wire.
Q51	An electron having charge e moves with a velocity v in positive X-axis. A magnetic field acts on it in positive Y-axis. The force on the electron acts in (A) Negative Y-axis (B) Positive Y-axis (C) Positive Z-axis (D) Negative Z-axis
	Case study : Read the following paragraph and answers the questions : Potentiometer is an apparatus used for measuring the emf of a cell or potential difference between two points in an electrical circuit accurately. It is also used to determine the internal resistance of a primary cell. The potentiometer is based on the principle potential difference across any portion of uniform wire is directly proportional to length of the wire of that portion.
Q52	In the potentiometer circuit shown, the balance point is at X. How does the balance point change when the resistance R is increased, keeping all parameters unchanged.

	 (A) Balance point shifts towards A (B) Balance point shifts towards B (C) Balance point remains same (D) Balance point is not obtained.
Q53	Sensitivity of a potentiometer can be increased by (A) Decreasing length of the potentiometer wire (B) Increasing potential gradient along the wire (C) Decreasing current through the wire (D) Increasing current through the wire
Q54	In a potentiometer experiment, the balancing length is 8 m, when the two cells E_1, and E_2, are joined in series. When the two cells are connected in opposition the balancing length is 4 m. The ratio of the e. m. f. of two cells (E_1/ E_2) is (A) 1:2 (B) 2:1 (C) 1:3 (D) 3:1
Q55	A potentiometer wire of length 1 m has a resistance of 10 Ω. It is connected to a 6 V battery in series with a resistance of 5Ω. Determine the emf of the primary cell which gives a balance point at 40 cm. (A) 1.2 (B) 1.6 (C) 2.4 (D) 2.6

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