



08-08-2023

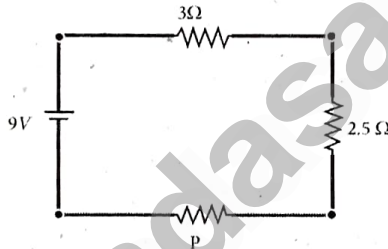
**Standard 12****PHYSICS**

Time: 1.30 Hrs.

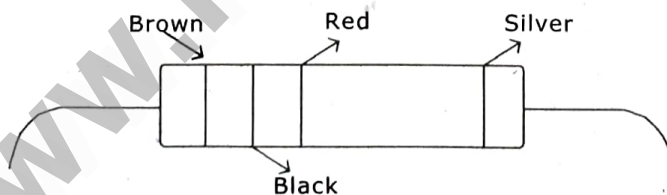
Marks: 35

**Part - A****I. Answer ALL questions:****10×1=10**

- If voltage applied on a capacitor is increased from  $V$  to  $2V$ , choose the correct conclusion.
  - $Q$  remains the same,  $C$  is doubled
  - $Q$  is doubled,  $C$  is doubled
  - $C$  remains same,  $Q$  doubled
  - Both  $Q$  and  $C$  remain same
- An electric dipole is placed at an alignment angle of  $30^\circ$  with an electric field of  $2 \times 10^5 \text{ NC}^{-1}$ . It experiences a torque equal to  $8 \text{ Nm}$ . The charge on the dipole if the dipole length is  $1 \text{ cm}$  is.
  - $4 \text{ mC}$
  - $8 \text{ mC}$
  - $5 \text{ mC}$
  - $7 \text{ mC}$
- The internal resistance of a  $2.1 \text{ V}$  cell which gives a current of  $0.2 \text{ A}$  through a resistance of  $10 \Omega$  is
  - $0.2 \Omega$
  - $0.5 \Omega$
  - $0.8 \Omega$
  - $1.0 \Omega$
- There is a current of  $1.0 \text{ A}$  in the circuit shown below. What is the resistance of  $P$ ?



- $1.5 \Omega$
  - $2.5 \Omega$
  - $3.5 \Omega$
  - $4.5 \Omega$
- 5) What is the minimum value of resistance of the following resistor?



- $1000 \Omega$
  - $900 \Omega$
  - $1100 \Omega$
  - $1.1 \text{ K}\Omega$
- The temperature co-efficient of resistance of a wire is  $0.00125 \text{ per } ^\circ\text{C}$  at  $20^\circ\text{C}$  its resistance is  $1 \Omega$ . The resistance of the wire will be  $2 \Omega$  at
    - $800^\circ\text{C}$
    - $700^\circ\text{C}$
    - $850^\circ\text{C}$
    - $820^\circ\text{C}$
  - A circular coil of radius  $10 \text{ cm}$  and  $50$  turns carries a current of  $3 \text{ amphere}$ . The magnetic dipole moment of the coil is nearly
    - $1.0 \text{ Am}^2$
    - $1.2 \text{ Am}^2$
    - $4.7 \text{ Am}^2$
    - $0.5 \text{ Am}^2$
  - The vertical component of Earth's magnetic field at a place is equal to the horizontal component. What is the value of angle of dip at this place?
    - $30^\circ$
    - $45^\circ$
    - $60^\circ$
    - $90^\circ$

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2

- 9) The potential energy of magnetic dipole whose dipole moment is  $\vec{P}_m = (-0.5\hat{i} + 0.4\hat{j}) \text{ Am}^2$  kept in uniform magnetic field  $\vec{B} = 0.2\hat{i} \text{ T}$ .
- a)  $-0.1\hat{j}$                       b)  $-0.8\hat{j}$                       c)  $0.1\hat{j}$                       d)  $0.8\hat{j}$
- 10) Electric field due to electric dipole at its axial line is  $8\hat{i} \text{ NC}^{-1}$ . What is the electric field due to the same dipole at its equatorial line at same distance from the centre of the dipole is
- a)  $4\hat{i} \text{ NC}^{-1}$                       b)  $-4\hat{i} \text{ NC}^{-1}$                       c)  $16\hat{i} \text{ NC}^{-1}$                       d)  $-16\hat{i} \text{ NC}^{-1}$

**Part - B****II. Answer any three questions. Qn. No. 12 is compulsory: 3×2=6**

- 11) Give the Gauss Law.
- 12) During lighting accompanied by a thunderstorm. It is always safer to sit inside a bus than in open ground or under a tree.
- 13) Define: Temperature coefficient of resistance.
- 14) Give the Kirchhoff's second law.
- 15) Write down the Fleming's left hand rule.

**Part - C****III. Answer any three questions. Qn.No. 18 is compulsory: 3×3=9**

- 16) Write the special features of magnetic Lorentz force.
- 17) How will you convert the galvanometer into the voltmeter explain with diagram?
- 18) In a meter bridge experiment, the value of resistance in the resistance box connected in the right gap is  $10\Omega$ . The balancing length is  $l_1 = 55 \text{ cm}$ . Find the value of unknown resistance.
- 19) Find the effective capacitance of the capacitors connected in series.
- 20) Obtain the Gauss Law from Coulomb's Law.

**Part - D****IV. Answer for all the questions: 2×5=10**

- 21) Derive the expression for the potential due to the dipole.

**(OR)**

Derive the expression for the bridge balance condition for Wheatstone's bridge.

- 22) Obtain the expression for the electric field due to dipole at its axial line.

**(OR)**

Derive the expression for the force acting on the current carrying conductor placed in a uniform magnetic field.

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