

**Department of Pre-University Education, Karnataka**  
**MODEL QUESTION PAPER FOR FIRST TEST (SEPT-2021)**

**CLASS: II PUC**

**SUBJECT: PHYSICS (33)**

Time Duration: **1 hr 30 min**

Max.Marks: **35**

**General Instructions:**

- a) All parts are compulsory.
- b) Answers without relevant diagram/figure/circuit wherever necessary will not carry any marks.
- c) Direct answers to the numerical problems without detailed solutions will not carry any marks.

**PART- A**

**I. Answer ALL the following questions:**

**5 × 1 = 5**

1. State Coulomb's law in electrostatics.
2. What is the electric potential of the earth?
3. Draw a graph showing variation of resistivity of copper with temperature.
4. Mention the SI unit of magnetic field.
5. When does a charge moving in a magnetic field experience maximum force?

**PART- B**

**II. Answer ANY TWO of the following questions:**

**2 × 2 = 4**

6. Sketch the electric field lines due to a point charge  $q$  if (i)  $q < 0$  and (ii)  $q > 0$ .
7. Give any two limitations of Ohm's law.
8. Write any two uses of potentiometer.

**PART- C**

**III. Answer ANY TWO of the following questions:**

**2 × 3 = 6**

9. Show that the electric field at any point is equal to negative potential gradient at the point.
10. What is drift velocity? Write the expression for current in terms of drift velocity and explain the terms.
11. State and explain Biot-Savart's law.
12. Obtain an expression for force experienced by a conductor carrying current placed in an external magnetic field.

**PART- D**

**IV. Answer ANY TWO of the following questions:**

**2 × 5 = 10**

13. State Gauss's law in electrostatics. Obtain an expression for electric field at a point due to an infinitely long straight uniformly charged wire using Gauss's law.
14. Derive an expression for electric potential at a point due to an isolated point charge.
15. Derive the condition for balance of a Wheatstone's network using Kirchhoff's laws. Name a device which works on the principle of balanced Wheatstone's network.

**PART- E**

**V. Answer ANY TWO of the following questions:**

**2 × 5 = 10**

16. Two point charges  $2 \mu\text{C}$  and  $3 \mu\text{C}$  are placed at two corners of an equilateral triangle of side 20 cm in free space. Calculate the magnitude of resultant electric field at the third corner of the triangle. If an  $\alpha$  – particle is placed at the third corner, what is the force acting on it? (Charge on  $\alpha$  – particle is  $3.2 \times 10^{-19} \text{ C}$ ).
17. In a parallel plate capacitor, each plate has an area of  $6 \times 10^{-3} \text{ m}^2$  and distance between the plates is 3 mm. Calculate the capacitance of the capacitor. If this capacitor is connected to 100 V supply, what is the charge on each plate of the capacitor?
18. Two cells of emf 1 V and 2 V and having respective internal resistances  $2 \Omega$  and  $1 \Omega$  are connected in parallel so as to send a current through an external resistance of  $1 \Omega$  in the same direction. Find the current through the cells and the current through the external resistance.

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