

Exam. Code : 103201

Subject Code: 1281

B.A./B.Sc. 1st Semester

PHYSICS PAPER—B

(Electricity &amp; Megnetism)

Time Allowed—3 Hours]

[Maximum Marks—35

**Note** :— Attempt **FIVE** questions, selecting at least **ONE** question from each section. The **FIFTH** question may be attempted from any Section.

**SECTION—A**

1. (a) What do you understand by gradient of a scalar function ? Give its physical interpretation. 5
- (b) What is the geometrical interpretation of gradient of a scalar function. 2
2. (a) Explain electric flux density. 2
- (b) State and prove Gauss's theorem in electrostatics. 5

**SECTION—B**

3. Define electric potential and its units in SI system. Prove that the line integral of an electric field due to a point charge between two points is path independent. 7

4. (a) What are Poisson's and Laplace equations in electrostatics ? 5  
(b) Derive relation between volt and stat-volt. 2

### SECTION—C

5. Derive and explain equation of continuity and conservation of charge. 7
6. (a) Starting from vector statement of Ohm's Law  $\vec{J} = \sigma \vec{E}$ , how will you derive the same law in conventional form  $V = IR$  ? 5  
(b) What is the atomic view of Ohm's law ? 2

### SECTION—D

7. Find an expression for the electric field of a point charge moving with a uniform velocity. How does it differ from the field due to a stationary charge ? 7
8. Define intensity of magnetisation, magnetic susceptibility, permeability and then differentiate between diamagnetic, paramagnetic and ferromagnetic substances on the basis of these properties. 7