Exam. Code : 103201
Subject Code : 1280

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

PHYSICS

Paper–B (Electricity and Magnetism)

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's 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