

B.Sc. Semester - 3 (CBCS) Examination
December. -2020 [OLD COURSE]
PHYSICS(CORE)

Time: 1:30 Hours**Marks: 42****Instructions:**

1. Figure to the right indicate marks.
 2. There are five questions in the question paper.
 3. Answer any three of the following questions.
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- 1(a) Answer the following questions (any one). [7]
(1) Explain in detail how vectors transform.
(2) Write a note on Gauss's theorem and Stokes theorem.
- 1(b) Answer the following questions (any one). [4]
(1) Write a note on vector triple product.
(2) Write a note on gradient.
- 1(c) Answer the following questions (any three). [3]
(1) The dot product of two mutually perpendicular vectors is _____.
(2) What is called scalar triple product?
(3) Define divergence.
(4) State fundamental theorem for gradient.
(5) Addition of vectors is obtained by addition of _____ components.
- 2(a) Answer the following questions (any one). [7]
(1) Define Coulomb's law. State and prove Gauss's law.
(2) Derive formula of electric field due to infinite line of charge by using Gauss's law.
- 2(b) Answer the following questions (any one). [4]
(1) Write a note on electric potential.
(2) Write a note on electric field.
- 2(c) Answer the following questions (any three). [3]
(1) Unit of surface charge density (σ) is _____.
(2) Write dimension formula of electric field.
(3) In _____ magnetic field, field lines are parallel to each other.
(4) The electric field inside a spherical charged sheet is _____.
(5) What is an equipotential?
- 3(a) Answer the following questions (any one). [7]
(1) Defining steady current, explain magnetic field of a steady current.
(2) Describe magnetic field on the axis of a current carrying circular loop.
- 3(b) Answer the following questions (any one). [4]
(1) Write a note on magnetic forces.
(2) Describe magnetic field above a straight wire.
- 3(c) Answer the following questions (any three). [3]
(1) Biot – Savart law only applies to _____ current.
(2) The divergence of the magnetic field is always _____.
(3) The value of permeability of free space (μ_0) = _____.
(4) The curl of electrostatic field is always _____.
(5) Magnetic field is given by the _____ of vector potential.
- 4(a) Answer the following questions (any one). [7]
(1) Explain the bound charges in polarized object.
(2) Explain in detail physical interpretation of Bound currents.

- 4(b) Answer the following questions (any one). [4]
- (1) What are polar molecules? Write equation of torque acting on an electric dipole.
 - (2) Explain effect of a magnetic field on atomic orbits.
- 4(c) Answer the following questions (any three). [3]
- (1) _____ is called dipole moment per unit volume.
 - (2) The value of relative permittivity of vacuum is _____.
 - (3) Diamagnetic substance has _____ magnetic susceptibility.
 - (4) Electric susceptibility of the medium is a _____ quantity.
 - (5) If magnetic field is uniform, the net force on a current loop is _____.
- 5(a) Answer the following questions (any one). [7]
- (1) Describe voltage divider bias method for transistor biasing.
 - (2) Explain phase reversal with graphical demonstration.
- 5(b) Answer the following questions (any one). [4]
- (1) Write a note on stability factor.
 - (2) Explain frequency response of R-C coupled single stage CE transistor amplifier.
- 5(c) Answer the following questions (any three). [3]
- (1) Operating point is known as _____ point.
 - (2) For low powered transistor, the value of input resistance is _____.
 - (3) The value of current gain β ranges from _____.
 - (4) For greater thermal stability, stability factor should be as _____ as possible.
 - (5) The voltage gain of transistor amplifier varies with _____.