

B.Sc.(FS) Semester - 3 (CBCS) Examination
July-2025 (OLD COURSE)
PHYSICS(CORE)

Time: 2:30 Hours

Marks: 70

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

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- Que-1(A) Answer the following question. (Any One) (07)**
- 1) Explain scalar and vector tripple product.
 - 2) State and prove the product rules for curl.
- Que-1(B) Answer the following question. (Any One) (04)**
- 1) Discuss gradient.
 - 2) Describe curl of a vector.
- Que-1(C) Answer the following question. (Any three) (03)**
- 1) $\hat{j} \cdot \hat{j} = \dots\dots\dots$
 - 2) $\hat{i} \cdot \hat{j} = \dots\dots\dots$
 - 3) $\hat{i} \times \hat{j} = \dots\dots\dots$
 - 4) $\hat{k} \times \hat{j} = \dots\dots\dots$
 - 5) A vector which satisfies the condition $\vec{\nabla} \cdot \vec{\nabla} = 0$ is called vector.
- Que-2(A) Answer the following question. (Any One) (07)**
- 1) Derive an equation of Gauss's law in the differential form for electric field.
 - 2) Find the value of divergence and curl of electrostatic field.
- Que-2(B) Answer the following question. (Any One) (04)**
- 1) Explain electric potential.
 - 2) Derive the equation of potential due to localized charge distribution .
- Que-2(C) Answer the following question. (Any three) (03)**
- 1) Write an equation of Coulomb's law.
 - 2) The constant ϵ_0 is called of free space.
 - 3) The unit of electric field in mks is
 - 4) Unit of electric flux is
 - 5) Laplace equation is $\nabla^2 V = \dots\dots\dots$
- Que-3(A) Answer the following question. (Any One) (07)**
- 1) Give the quatitative explanation of cycloid motion.
 - 2) Discuss: magnetostatic boundry conditions.
- Que-3(B) Answer the following question. (Any One) (04)**
- 1) Explain Biot-Savart law.
 - 2) Explain curl of a magnetic field $\vec{B}$.

- Que-3(C) Answer the following question. (Any three) (03)**
- 1) Give equation of Lorentz force law.
 - 2) For stationary current $\vec{\nabla} \cdot \vec{J} = \dots\dots\dots$
 - 3) Unit of μ_0 in mks is $\dots\dots\dots$
 - 4) Unit of magnetic field B is $\dots\dots\dots$
 - 5) Divergence of the magnetic field is $\dots\dots\dots$
- Que-4(A) Answer the following question. (Any One) (07)**
- 1) Write a note on physical interpretation of bound charges.
 - 2) Write a note on effect of a magnetic field on atomic orbits.
- Que-4(B) Answer the following question. (Any One) (04)**
- 1) Explain the electric field inside a dielectric.
 - 2) Explain: Magnetization in dia, para and ferromagnets.
- Que-4(C) Answer the following question. (Any three) (03)**
- 1) The net electric field inside the conductor is $\dots\dots\dots$ when it is placed in an electric field.
 - 2) The value of atomic polarizability is depends on $\dots\dots\dots$
 - 3) Value of ϵ_r in vacuum is $\dots\dots\dots$
 - 4) The Ampere's law can also be written as $\nabla \times \vec{H} = \dots\dots\dots$
 - 5) The dimension of magnetic susceptibility is $\dots\dots\dots$
- Que-5(A) Answer the following question. (Any One) (07)**
- 1) Write a note on transistor lead identification and testing.
 - 2) Write a note on d.c. and a.c. load lines.
- Que-5(B) Answer the following question. (Any One) (04)**
- 1) Explain stabilization of operating point.
 - 2) Write short note on frequency response of CE amplifier.
- Que-5(C) Answer the following question. (Any three) (03)**
- 1) The zero signal values of I_C and V_{CE} are known as the $\dots\dots\dots$ point.
 - 2) Unit of voltage gain is $\dots\dots\dots$
 - 3) Effect of rise of temperature of the transistor is called $\dots\dots\dots$ runaway.
 - 4) In phase reversal, the phase difference between input and output signal is $\dots\dots\dots$
 - 5) The range of frequencies over which the gain is equal to or greater than 70.7% of the maximum gain is known as $\dots\dots\dots$
