

B.Sc. Semester - 3 (CBCS) Examination
Oct/Nov - 2024 (As Per Syllabus Year June-2017)
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 any one question. (07)
- (1) Explain scalar and vector triple product.
 - (2) Explain vectors transform.
- Que.1(B) Answer any one question. (04)
- (1) Write a note on divergence.
 - (2) Explain operator ∇ .
- Que.1(C) Answer any three questions. (03)
- (1) $\hat{k} \cdot \hat{k} =$ _____.
 - (2) $\hat{j} \times \hat{j} =$ _____.
 - (3) $\hat{i} \times \hat{j} =$ _____.
 - (4) The fundamental theorem for curls is also known as _____.
 - (5) The divergence of a vector function $\vec{V}$ is a _____ quantity.
- Que.2(A) Answer any one question. (07)
- (1) Explain electric field around charged spherical shell.
 - (2) Derive the Gauss's theorem.
- Que.2(B) Answer any one question. (04)
- (1) Explain electric field.
 - (2) Write a note on electric flux.
- Que.2(C) Answer any three questions. (03)
- (1) Electric field $\vec{E} =$ _____.
 - (2) Flux is _____ quantity.
 - (3) Unit of flux is _____.
 - (4) The value of flux is zero if $\theta =$ _____.
 - (5) The electric field inside a spherical charged shell is _____.
- Que.3(A) Answer any one question. (07)
- (1) Explain vector potential.
 - (2) Derive an equation of magnetic field above a straight wire.
- Que.3(B) Answer any one question. (04)
- (1) Explain steady current.
 - (2) Write a note on cyclotron motion.
- Que.3(C) Answer any three questions. (03)
- (1) $\text{div } \vec{J} =$ _____.
 - (2) The divergence of the magnetic field is _____.
 - (3) The magnetic field inside the toroidal is _____.
 - (4) $\vec{V} \times \vec{B} =$ _____.
 - (5) Write the Lorentz force equation.

- Que.4(A) Answer any one question. (07)
- (1) Explain the field inside a dielectric.
 - (2) Explain the bound currents in magnetized object.
- Que.4(B) Answer any one question. (04)
- (1) Explain the Gauss's law in the presence of dielectrics.
 - (2) Explain Ampere's law in magnetized materials.
- Que.4(C) Answer any three questions. (03)
- (1) Magnetic susceptibility $\chi = \underline{\hspace{2cm}}$.
 - (2) Relative permittivity is also known as $\underline{\hspace{2cm}}$.
 - (3) $\vec{P} = \alpha \vec{E}$, where α is called $\underline{\hspace{2cm}}$.
 - (4) The electric susceptibility is dimensionless quantity. Is it true?
 - (5) Diamagnetic substance has negative susceptibility. Is it true?
- Que.5(A) Answer any one question. (07)
- (1) Explain faithful amplification in detail.
 - (2) Explain phase reversal with graphical demonstration.
- Que.5(B) Answer any one question. (04)
- (1) Explain operating point.
 - (2) Write a note on voltage gain.
- Que.5(C) Answer any three questions. (03)
- (1) The zero signal values of I_C and V_{CE} is known as the $\underline{\hspace{2cm}}$.
 - (2) Current gain $\beta = \underline{\hspace{2cm}}$.
 - (3) The bandwidth $f = \underline{\hspace{2cm}}$.
 - (4) The range of current gain β is $\underline{\hspace{1cm}}$ to $\underline{\hspace{1cm}}$.
 - (5) The phase difference between input and output voltage in CE amplifier is $\underline{\hspace{2cm}}$.
