

B.Sc. Semester - 3 (CBCS) Examination
Oct/Nov. -2019 (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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1(a) Answer the following question (any one).

(7)

- (1) Explain scalar and vector tripple product.
- (2) State and prove the product rules for curl.

1(b) Answer the following question (any one).

(4)

- (1) Discuss gradient.
- (2) Describe divergence of a vector.

1(c) Answer the following question (any three).

(3)

- (1) $\hat{i} \cdot \hat{j}$
- (2) $\hat{i} \cdot \hat{j}$
- (3) $\hat{i} \times \hat{j} = \dots\dots\dots$
- (4) $\hat{k} \times \hat{j} = \dots\dots\dots$
- (5) $\nabla \times (f\vec{A}) = f(\nabla \times \vec{A}) - \dots\dots\dots$

2(a) Answer the following question (any one).

(7)

- (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.

2(b) Answer the following question (any one).

(4)

- (1) Explain contineous charge distribution of various types.
- (2) Write a short note on energy of point charge distribution.

2(c) Answer the following question (any three).

(3)

- (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 positive if θ 90° .
- (5) Laplace equation is $\nabla^2 V = \dots\dots\dots$

3(a) Answer the following question (any one).

(7)

- (1) Give the quatitative explanation of cycloid motion.
- (2) Discuss: magnetostatic boundry conditions.

3(b) Answer the following question (any one).

(4)

- (1) Explain Biot-Savart law.
- (2) Explain divergence of a magnetic field $\vec{B}$.

3(c) Answer the following question (any three).

(3)

- (1) The equation of Lorentz force law is
- (2) For stationary current $\vec{\nabla} \cdot \vec{j}$
- (3) Unit of μ_0 in mks is
- (4) Unit of magnetic field B is
- (5) Divergence of the magnetic field is

4(a) Answer the following question (any one).

(7)

- (1) Write a note on physical interpretation of bound charges.
- (2) Give the physical interpretation of bound currents.

4(b) Answer the following question (any one).

(4)

- (1) Explain the electric field inside a dielectric.
- (2) Explain: Magnetization in dia, para and ferromagnets.

4(c) Answer the following question (any three).

(3)

- (1) The net electric field inside the conductor is when it is placed in an electric field.
- (2) The value of atomic polarizability is depends on
- (3) Value of χ_e in vacuum is
- (4) The Ampere's law can also be written as $\nabla \times \vec{H} = \dots\dots\dots$
- (5) The dimension of magnetic susceptibility is

5(a) Answer the following question (any one).

(7)

- (1) Write a note on transistor lead identification and testing.
- (2) Write a note on d.c. and a.c. load lines.

5(b) Answer the following question (any one).

(4)

- (1) Explain stabilization of operating point.
- (2) Write short note on d.c. loadline.

5(c) Answer the following question (any three).

(3)

- (1) In all transistor connections the emitter is always biased in thedirection.
- (2) Unit of current gain is
- (3) Effect of rise of temperature of the transistor is called runaway.
- (4) In phase reversal, the phase difference between input and output signal is
- (5) The curve between voltage gain and signal frequency of an amplifier is known as
