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SUBJECT CODE NO: -BB-2394
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. (CBCGS) (Pattern 2022) T.Y SEM V
Examination November / December 2024
Physics-XVIII Electrodynamics

[Time: 1:30 Hours]

[Max. Marks: 40]

Please check whether you have got the right question paper.

N. B

- 1) All questions are compulsory.
- 2) All questions carry equal marks.

Given data :-

- 1) $\epsilon_0 = 9 \times 10^{-12}$ SI units
- 2) $C = 3 \times 10^8$ meter/ see
- 3) $\mu_0 = 4\pi \times 10^{-7}$ Weber/ Amp.

**Q.1 Solve any one.****10**

- A) State the Gauss's law and derive an expression for electric field due to uniform charged extender.
- B) What are the Boundary conditions for a plane wave reflected at the boundary of dielectric & hence obtain Snell's law.

Q.2 Solve any one.**10**

- A) Derive an expression for max-well's equations.

$$\nabla \cdot \vec{E} = \frac{\rho}{\epsilon_0}$$

$$\nabla \cdot \vec{B} = 0$$

- B) Determine the boundary conditions satisfied by $\vec{B}$ & $\vec{H}$ at the interface between two meda of different perm - eabilities & dielectric constants.

Q.3

- A) Define electric field lines and write its properties.

5

- B) Explain the plane electromagnet's waves in vaccum.

5**OR**

- A) Magnetic field through a coil having 250 turns and cross-sectional area 0.04m^{-2} changes from 0.1 wb m^{-2} to 0.04 wb m^{-2} in 0.04 sec. find induced emf. 5
- B) The red light through prism is show air on to the glass curette at an angle of 30° to the normal. What angle to normal does the light have it is in the glass? (Refreesive index of air is 1 and glass is 1.6) 5

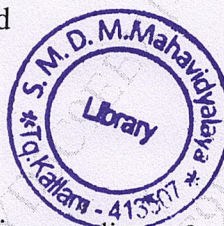
Q.4 Multiple choice question.

10

- Electrostatics study relates to _____
 A) Moving charges
 B) Charges at rest
 C) Current
 D) Both A & B
- S. I unit of electric field
 A) N/c
 B) N/c^2
 C) Nmc^2
 D) N/mc
- Electric field due to uniform charged sphere is proportional to _____
 A) $1/r$
 B) $1/r^2$
 C) r
 D) r^2
- Transformer works on the principal of _____
 A) Self-inductance
 B) mutual-Inductance
 C) Displacement current
 D) Both A & B
- Lenz's law is consequence of law of conservation of _____
 A) Energy
 B) Charge
 C) Momentum
 D) Angular momentum
- Electromagnetic waves are _____ in nature.
 A) Transverse
 B) Longitudinal
 C) Stationary
 D) None of them
- What is the net electrostatic field in the interior of a conductor?
 A) Positive
 B) Negative
 C) Zero
 D) Depends on nature of conductor
- The direction in which electromagnetic waves propagate is the same as that of
 A) $\vec{E} \times \vec{B}$
 B) $\vec{B} \times \vec{E}$
 C) $\vec{E}$
 D) $\vec{B}$

9. Which of the following can be used to produce a propagating electromagnetic wave?

- A) Charge moving at a constant speed
- B) Charge less particle
- C) Stationary charge
- D) An accelerating charge.



10. The velocity of electromagnetic radiation in a medium of permittivity ϵ_0 and permeability μ_0 is given by _____.

A) $\sqrt{\epsilon_0 / \mu_0}$

B) $\sqrt{\epsilon_0 \mu_0}$

C) $1/\sqrt{\epsilon_0 \mu_0}$

D) $\sqrt{\mu_0 / \epsilon_0}$