(NO.OF PAGES : 2)

(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2023 ONLY)

SUBJECT CODE 23PPS205

REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : MAY – 2024

M.Sc. – Physics **MAXIMUM MARKS: 75**

SEMESTER : II **TIME : 3 HOURS**

ELECTRO MAGNETIC THEORY & ELECTRO DYNAMICS

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. ……is used to calculate the amount of force between two electrically charged particles

   (a) Coulomb's law (b) Gauss law (c) Faraday's law (d) Ampere law

2. The potential energy of a collection of charges is called……..

   (a) Coulomb energy (b) Electric field (c) Electrostatic energy (d) Gauss energy

3. In an electromagnetic wave both the vectors E and H are ……to the direction of wave propagation

   (a) Parallel (b) Perpendicular (c) linear (d) Coulomb energy

4. The electromagnetic energy is transmitted in the direction of wave propagation at speed of …….....

   (a) Sound (b) Light (c) Ultrasound (d) Water

5. In Rayleigh scattering shorter the wavelength the more ……. is the incident light scattered.

   (a) weakly (b) Strongly (c) never (d) less

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES. (K2)

6. Define "Displacement current".
7. Write the SI unit of the Poynting vector.
8. What is status of frequency in the reflection and refraction of electromagnetic wave? (kinematic property).
9. How many vectors are used in Lorentz transformations?
10. What is known as field tensor?.

(CONTD …. 2)

SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) What is the integral represents of Gauss's law ? Deduce it..

(OR)

b) State and explain electrostatic energy.

12. a) Explain displacement current.

(OR)

b) What is known as Coulomb Gauge? Explain.

13. a) Draw the electromagnetic wave with vectors E and H and explain it.

(OR)

b) Describe the change in energy density of electromagnetic wave propagating in conducting media

14. a) List the kinematic properties of reflection and refraction of electromagnetic wave with explanation.

(OR)

b) Define the term 'total scattering cross section and explain.

15. a) Explain the transformation relation for charge

(OR)

b) What are known as field tensor? How are they described?

.

SECTION – C (5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K4/K5)

16. a) What are the four applications of Gauss law?

(OR)

b). What is Biot–Savart's law? Explain. Deduce the expression force.

17. a) Write the Maxwell's equations.

(OR)

b) What is known as Lorentz Gauge? Prove that Lorentz condition is invariant under Gauge transformation.

18. a) Write the Maxwell's equations for an electromagnetic wave propagating in free space and explain.

(OR)

b) Explain the propagation of electromagnetic wave in anisotropic dielectric.

19. a) Explain in detail Brewster's law and polarisation of electromagnetic wave.

(OR)

b) Explain the scattering by bound electron Rayleigh scattering.

20. a) Derive Lorentz transformation of space in four vector form.

(OR)

b) Write about electromagnetic field tensor.

****