(NO. OF PAGES: 2)

(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2021-22 ONLY)

SUBJECT CODE 21PPS205

REG.NO.

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

END-OF-SEMESTER EXAMINATIONS: JULY-2022

M.Sc. PHYSICS **MAXIMUM MARKS: 70**

SEMESTER - II **TIME: 3 HOURS**

ELECTROMAGNETIC THEORY AND ELECTRODYNAMICS

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

MULTIPLE CHOICE QUESTIONS. (K1)

1. Certain materials that exhibit the property that their electrons are not free to move the influence of an electron are known as---------.

(a) Conductors (b) Semi-Condutors (c) insulators (d) semi- metals

2. The equation of continuity is an expression of the experimental fact that ----------is conserved.

(a) electric charge (b)electric energy (c) momentum (d)force

3. In EM wave, the electric and magnetic vectors are mutually ----------.

(a) perpendicular (b)orthogonal

(c) parallel (d) perpendicular to each other

4. The differential scattering cross section has the dimension of ----------.

(a) area (b) volume (c) length (d) mass

5. The three dimensional formulae are not ----------under Lorentz transformation.

(a) Invariant (b) covariant (c) constant (d) contra variant

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

6. State Coulomb's Law.
7. Write down all the four Maxwell's equation.
8. Give the equation for the velocity of light.
9. What are Evanescent waves?
10. What do you mean by covariance?

SECTION – B (5 X 4 = 20 MARKS)

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

11. (a) Deduce the Debye relation and study the structure of molecules.

(OR)

(b) State and explain the Biot- Savart law.

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12. (a) Discuss the Worthy points of Displacement Current.

(OR)

(b) Explain in detail the Lorentz Gauge.

13. (a) Write a note on the propagation of E.M.W. in anisotropic dielectric medium.

(OR)

(b) Discuss the frequency dependence of conductivity.

14. (a) Obtain an expression for reflectance in the case of Metals.

(OR)

(b) Discuss the results of Rayleigh scattering while scattering takes place by bound a electron.

15. (a) Get the transformation equations for the EM potentials A and φ.

(OR)

(b) Deduce the equation for the covariant form of Lorentz Force.

SECTION – C (4 X 10 = 40 MARKS)

ANSWER ANY FOUR OUT OF SIX QUESTIONS. (K4 (Or) K5)
(16thQUESTION IS COMPULSORY AND ANSWER ANY THREE QUESTIONS FROM Qn. No : 17 to 21)

16. Obtain Claussius – Mossotti relation, from the Lorentz equation for molecular field.

17. Get the Langevin's equation in polarization of Polar molecules.

18. Deduce an expression for Radiation Pressure in EM fields.

19. Discuss the propagation of E.M.W. in Ionised gases.

20. Write a note on propagation of EM waves between parallel and perpendicular conducting planes.

21. Obtain the covariance of Maxwell equations in 4- tensor form.

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