D 10153 (Pages : 2) Name...

Reg. No....................................

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CUCBCSS—UG)

Electronics

ELE 5B 07—ELECTRO MAGNETIC THEORY

Time : Three Hours   Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. What is gradient of a scalar field ?

2. Mention the unit vectors of cylindrical coordinate system.

3. Write the relation between Electric field intensity and Electric potential.

4. What is the SI unit of Electric Potential ?

5. Write the relation between magnetic flux density and magnetic field intensity.

6. Linear polarization can be obtained only if the wave consists of —————.

7. The ratio of magnitudes of electric field intensity to the magnetic field intensity is considered as —————.

8. Mention the theorem that gives the relation of energy transfer between the electric and magnetic fields.

9. Give an expression for the energy stored in a capacitor.

10. What is an isotropic radiator ?

(10 × 1 = 10 marks)

Part B

Answer any **five** *questions.*
Each question carries 2 *marks.*

11. State Coulombs law.

12. Express spherical coordinates in terms of rectangular Cartesian coordinates.

13. Define Electric field intensity.

14. What is the physical significance of Curl of a vector field ?

Turn over

15. What is a TEM wave ?

16. Define polarisation.

17. Write the Maxwell's equations in point form.

(5 × 2 = 10 marks)

Part C

Answer any **six** *questions.*
Each question carries 5 *marks.*

18. What are the different types of polarization ?

19. State and prove Gauss Law.

20. Compare conduction current and displacement current.

21. Explain Faradays' laws of electromagnetic induction and obtain its differential form.

22. What are the boundary conditions for magneto static fields ?

23. Explain the inconsistency of Amperes circuital law.

24. What is magnetic vector potential ?

25. Derive Poisson's equation.

(6 × 5 = 30 marks)

Part D

Answer any **two** *questions.*
Each question carries 15 *marks.*

26. Explain Coulombs Law. Point charges 5nC and 1nC are located at (2, 0, 4) and (1, –3, 7), respectively. Determine the force acting on the 1nC charge.

27. Derive an expression for the force between two parallel current carrying conductors.

28. State, Prove and Explain Poynting Theorem.

29. Derive the electrostatic boundary conditions at the interface of two dielectrics.

(2 × 15 = 30 marks)