Reg. No.										

B.Tech. DEGREE EXAMINATION, MAY 2023
Third Semester

EE0205 – ELECTROMAGNETIC THEORY
(For the candidates admitted from the academic year 2007-2008 to 2012-2013)

Time: Three hours Max. Marks: 100

Answer **ALL** Questions

PART – A (10 × 2 = 20 Marks)

1. Mention the applications of Coulomb's law.
2. When a vector filed is said to be solenoidal or irrotational?
3. Why is the electrostatic potential continuous at the boundary?
4. Define Lameller's field.
5. A circular coil of radius 2 m carries current of 4 A. What is the value of magnetic field intensity at the center?
6. Why $\nabla X\vec{E} = 0$?
7. List the difference between diamagnetic, paramagnetic and ferromagnetic materials.
8. Write the capacitance of co axial cable.
9. Compare electric field and circuit theory.
10. List the applications of Poynting vector.

PART – B (5 × 16 = 80 Marks)

11. a. Derive the expression to find electric field intensity and electric flux density due to a infinite line charge placed along z-axis.

(OR)

b. Write short notes on
   (i) Gradient
   (ii) Curl
   (iii) Divergence
   (iv) Electric potential

12. a. Deduce the boundary condition between two perfect dielectric medium in an electrostatic field. Also derive the equation to find the permittivity of the mediums.

(OR)

b. Derive the equation of capacitance for a two wire transmission line by using the equation of capacitance of a co-axial cable.

13. a. Verify that within a long straight conductor carrying a current I, the magnetic field strength at a distance 'r' from the center of the wire is given by $H = \frac{Ir}{2\pi R^2}$, where 'R' is the radius of the wire.

(OR)

b. Two narrow coils A and B have a common axis and are placed 15 cm apart, coil A has 10 turns of radius 5 cm with a current of 2 A passing through it. Coil B has a single turn of radius 8 cm. if the magnetic field at the center of the coil is to be zero, what current must be passed through coil B?

14. a. Assuming static conditions, derive the boundary relations for magnetic fields.

(OR)

b.i. Derive an expression for a torque on a closed rectangular loop placed in the uniform magnetic field.

ii. Derive an expression for the force between two parallel wires carrying currents in the same direction.

15. a. Derive the integral and differential form of Maxwell's equation for time invarying fields.

(OR)

b. Obtain the expression for power equation using Poynting theorem.

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