Hall Ticket Number :										

R-15

Code: 5G234

II B.Tech. I Semester Supplementary Examinations June 2024

Electromagnetic Fields

(Electrical and Electronics Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

****

UNIT–I

1. a) State and explain Gauss law in Integral form. 7M
   b) Derive and explain Maxwell's second equation? 7M

OR

2. a) Define Potential and Potential difference? 7M
   b) Derive the expression for energy density in an electrostatic field. 7M

UNIT–II

3. a) Explain Polarization of dielectric materials? 7M
   b) Give the expression for capacitance of a coaxial cable with two dielectrics? 7M

OR

4. a) Derive Laplace Equation from fundamentals. 8M
   b) State the properties of Dielectric materials 6M

UNIT–III

5. A uniform solenoid 100 mm in diameter and 400 mm long has 100 turns of wire and a current of I=3A.Find the magnetic field on the axis of the solenoid
   (a) At the center (b) At one end (c) Half way from the center to one end. 14M

OR

6. a) State and explain Biot-savart's law? 7M
   b) Obtain an expression for Magnetic field intensity due to an infinitely long current carrying conductor? 7M

UNIT–IV

7. Derive the expression for force between two long parallel current carrying conductors placed in a magnetic field. 14M

OR

8. a) Derive the self-inductance of a solenoid 7M
   b) What is a magnetic dipole? How does it differ from an electric dipole? 7M

UNIT–V

9. a) Derive the equation for modified Amperes circuital law for time varying fields. 7M
   b) Distinguish between Conduction Convection and Displacement Currents. 7M

OR

10. a) Explain the significance of Displacement current? 6M
    b) Find the displacement current density if the magnetic field intensity in free space is given as $H=H_o \sin\theta a_y$ A/m, where $\theta=\omega t- \beta z$ and β is a constant quantity. Determine the displacement current density. 8M

***