PVP 14

Code: EE3T5

II B.Tech - I Semester – Regular Examinations – December 2015

ELECTROMAGNETIC FIELDS
(ELECTRICAL AND ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11x 2 = 22 M

1. a) Convert the point P(-2,6,4) into cylindrical coordinates.
   b) Determine the force between two charge 30mC at A(2,3,4) and -50mC at Q (2,6,8)
   c) Define Absolute Potential.
   d) Write down the Ohms law in point form.
   e) State Divergence Theorem.
   f) Define Electric Dipole.
   g) Explain magnet flux.
   h) Define mutual inductance.
   i) What do you mean by displacement current?
   j) What is Polarization?
   k) Write Poynting theorem?

PART – B

Answer any ***THREE*** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) Derive Gauss Law in point form from fundamentals and also write the limitations of Gauss Law. 8 M

b) A charge of -0.3μC is located at A (25, -30, 15) cm and a second charge of 0.5 μ C is located at B (-10, 8, 12) cm. Find the electric field strength, E at: i) The origin and ii) Point P (15, 20, 50) cm. 8 M

3. a) Explain the Electrostatic Boundary conditions. 8 M

b) A parallel plate capacitor consists of three dielectric layers. If $Er_1 = 1$, $d_1 = 0.4$ mm, $Er_2 = 1$, $d_2 = 0.6$ mm, $Er_3 = 1$, $d_3 = 0.8$ mm and area of cross-section 20 sqcm. Find Capacitance. 8 M

4. a) State and explain Biot-Savart's law and also Define the magnetic field intensity ($\bar{H}$). 8 M

b) An infinite long conducting filament is placed along the z-axis and carries a current of 5mA in the z direction. Find H at (2,6,8). 8 M

5. a) Obtain the expression for inductance of a toroid. 8 M

b) A solenoid of 10 cm in length consists of 1000 tuns having the cross-section radius at 1 cm. Find the inductance of solenoid. What is the value of current required to maintain a flux of 1 mwb in the toroid. Take $\mu_r = 1500$. 8 M

6. a) Explain the importance of Maxwell's equations and express those equations in point form and integral form. 8 M

b) A parallel-plate capacitor with plate area of 5 cm^2 and plate separation of 3 mm has a voltage 50 sin 10ω t volts applied to its plates. Calculate the displacement current. Assuming $\varepsilon = 2\ \varepsilon_0$. 8 M