PVP 14

Code: EE3T5

II B.Tech - I Semester–Regular/Supplementary Examinations – November 2017

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) What is potential gradient?
b) State Laplace's equation in cylindrical form.
c) What is dipole? Write the expression for electric potential due to dipole.
d) What is polarization?
e) Define magnetic field intensity.
f) State Maxwell's third equation.
g) Define magnetic dipole moment.
h) State Lorentz's force equation.
i) Distinguish the terms static fields and time varying fields.
j) Define volume charge density.
k)State poynting theorem.

PART – B

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

2. a) A point charge of 10 C is located at (1,1,2) in free space, while a charge of 1 C is at (4,1,3). Find the coordinates of the point at which a point charge experience no force. 8 M

   b) State and prove Gauss's Law. 8 M

3. a) Derive an expression for Capacitance of a parallel plate capacitor with two different media. 8 M

   b) Discuss about behaviour of conductors in presence of an electric field. 8 M

4. a) A filamentary current of 15A is directed in from infinity to the origin on the positive x axis, and then back out to infinity along the positive y axis. Use the Biot-Savart's law to find *H* at P (0, 0,1) ? 8 M

   b) State Ampere's circuital law and explain any two applications of Ampere's circuital law. 8 M

5. a) Two infinitely long parallel conductors are separated by a distance 'd'. Find the force per unit length exerted by one of the conductor on the other if the currents in the two

conductors are I_1 and I_2. 8 M

b) Derive an expression for self and mutual inductances. 8 M

6. a) From the Maxwell's equations derive the expression for Poynting vector. Also, explain the applications of the Poynting vector. 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 10^3t) V applied to its plates. Calculate the displacement current assuming $\varepsilon = 2\varepsilon_o$. 8 M