$q_1 + 2 = 46$.

SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL No: [ ] Total number of pages:[2]

Total number of questions:06

B.Tech. || EE || 4th Sem
Electromagnetic Field Theory / Electromagnetic Fields
Subject Code: BTEE-403A|403 (RG|RP)
Paper ID: M|18 (for office use)
(2011 batch onwards)

Time allowed: 3 Hrs   Max Marks: 60

Important Instructions:

- All questions are compulsory
- Assume any missing data

PART A (2×10)

Q. 1.   Short-Answer Questions: All COs

(a) What do you mean by equipotential surfaces?
(b) State normal boundary conditions.
(c) State Faraday's law of electromagnetic induction.
(d) Explain Biot Savart law.
(e) State Ampere's circuital law.
(f) What is meant by homogeneous and isotropic medium?
(g) What is the physical significance of divergence of a vector field?
(h) Mention the importance of a unit vector.
(i) Explain significance of displacement current.
(j) Find the capacitance of a parallel capacitor with two different dielectrics between the plates.

PART B (8×5)

Q. 2.   a) State and prove Gauss's law.   CO1
b) Transform the vector $A = y1_x - x1_y + z1_z$ into cylindrical coordinates..

OR

a) State and prove the Gauss's theorem. Explain why it is called the   CO1
divergence theorem.
b) Find the nature of below mentioned field by determining divergence
and curl, $F_1 = 301_x + 2xy1_y + 5xz^2 1_z$

Q. 3.   a) State and prove divergence theorem.   CO1&CO2
b) Justify that the net Electric field within a conductor is always zero.

OR

Express a) $2x\vec{i} - 3y^2\vec{j} + xz\vec{k}$ in cylindrical co-ordinate   CO1&CO2
b) Write about Conductors and Dielectrics in detail.

Q. 4.   a) State and prove Poynting theorem.   CO3
b) Write and explain differential and integral forms of Maxwell's equations.

Write Maxwell's equation in free space for the time varying fields both   CO3
in differential and integral form. Why these equations are not completely
symmetrical?
                                                                             CO2

Q. 5.   a) Discuss analogies between electric and magnetic fields.
        b) Derive an expression for electric field intensity due to a charge
uniformly distributed over an infinite plane with charge density ρ_s.

                                                                              CO2

        a) Derive Poisson's and Laplace's equations
        b) Explain Coulomb's law in electrostatics.

Q. 6.   a) Define uniform plane wave propagation. Discuss its properties.
        b) Explain briefly the oblique incidence of wave on conductors.   CO4

Write about Reflection by a perfect dielectric at Normal incidence.   CO4