

End Semester Examinations - 2015-16 Even Semester - May 2016

14EE2004 Electromagnetic Fields

Set B

Time : 3 hrs
Total Marks: 100

1. Transform the vector $F=10 a_x+8 a_y+6 a_z$ to cylindrical coordinate system and spherical coordinate system at $P(10,-8,6)$.

OR

2. State divergence theorem and illustrate it with an example

3. State Gauss's law and explain its applications

OR

4. A hollow sphere is charged to $12 \times 10^{-6} \text{ C}$ of electricity. Find the potential (a) at its surface (b) inside the sphere (c) at a distance 0.3m from the surface. The radius of the sphere is 0.1 m.

5. a) State and explain Biot -Savart's law

b) Derive expression for the magnetic flux density and field intensity at any point along the axis of a circular coil carrying a current of I .

OR

6. a) What is meant by 'displacement current' ? Obtain a mathematical equation for the same.

b) Derive an expression to find the inductance of a toroid coil

7. a) Discuss the concepts of self inductance and mutual inductance.

b) Determine the inductance of a solenoid of 2500 turns wound uniformly over a length of 0.5m on a cylindrical paper tube of 4 cm diameter. The medium is air.

OR

8. a) Discuss about motional e.m.f and transformer e.m.f

b) The field $B=-2 a_x+3 a_y+4 a_z \text{ mT}$ is present in free space. Find the vector force exerted on a straight wire carrying current in the direction a_{AB} where A is (1,1,1) and B is (2,1,1).

9. a) Derive the Maxwell's equations in integral and differential forms

b) Obtain the wave equation for electromagnetic wave propagated in a good conducting medium and its solution.

Wishing you All the Best