Reg. No. : | | | | | | | | | | |

Question Paper Code: 54043

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Fourth Semester

Electronics and Communication Engineering

15UEC403 - ELECTROMAGNETIC FIELDS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The electric flux passing through any closed surface is equal to the total charge enclosed by that surface

   (a) Faraday's laws (b) Gauss's laws
   (c) Coulomb's laws (d) none of the above

2. The unit of magnetic flux is

   (a) henry (b) weber (c) ampere-turn/weber (d) ampere/metre

3. The property of coil by which a counter e.m.f. is induced in it when the current through the coil changes is known as

   (a) self-inductance (b) mutual inductance
   (c) series aiding inductance (d) capacitance

4. A magnetic field exists around

   (a) iron (b) copper (c) aluminum (d) moving charges

5. The distance through which the amplitude of the travelling wave decreases to _____ percent of the original amplitude is called skin depth.

   (a) 37 (b) 42 (c) 63 (d) 73

PART - B (5 x 3 = 15 Marks)

6. State Gauss's law.

7. Can a magnetic field exist in a good conductor if it is static or time varying? Explain.

8. A parallel plate capacitor with d = 1m and plate area 0.8 m^2 and a dielectric relative permittivity of 2.8. A dc volt of 500 V is applied between the plates. Find the capacitance and energy stored.

9. State Snells law.

10. What is expression for the propagation constant of plane waves in good conductor in terms of medium parameters? What is the ratio of magnetic and electric energy density inside such conductor?

PART - C (5 x 16 = 80 Marks)

11. (a) Define Divergence and Gradient. Also express them in cylindrical and spherical coordinate system with mathematical expressions. (16)

Or

(b) Derive the electric field intensity equation for the finite line charge. (16)

12. (a) A wire carrying a current of 100A is bent into the form of a circle of diameter 10cm. Calculate a). flux density at the centre of the coil. b). Flux density at a point on the axis of the coil and 12 cm from it. (16)

Or

(b) (i) Derive Torque on a Rectangular loop carrying current I. (8)

(ii) Derive Magnetic Field Intensity at any point due to infinite wire carrying current I. (8)

13. (a) Obtain the expression for self-inductance of a Toroid of circular section with N closely spaced turns. (16)

Or

(b) Derive the boundary conditions of the normal and tangential components of electric field at the interface of two media with different dielectrics. (16)

14. (a) Write the Maxwell's four equations in integral form and differential form. (16)

Or

(b) State Poynting theorem and derive the expression for it. (16)

15. (a) Derive the electromagnetic wave equation in a conducting medium in terms of both electric and magnetic field. (16)

Or

(b) Describe the three different types of polarization. (16)

54043