Reg. No.										

B.Tech. DEGREE EXAMINATION, MAY 2019
Third Semester

EE0205 – ELECTROMAGNETIC THEORY
(For the candidates admitted from the academic year 2007-2008 to 2012-2013)

Time: Three hours Max. Marks: 100

Answer **ALL** Questions

PART – A (10 × 2 = 20 Marks)

1. State Coulomb's law of force between any two point charges.
2. Give the conditions to be satisfied by the special Gaussian surface.
3. Write the boundary conditions between two perfect dielectrics.
4. Define conduction current and displacement current.
5. State Biot savart's law.
6. Give the expression to find the force between two parallel current carrying conductors.
7. Brief the conservative property of electric field.
8. Define magnetic moment.
9. Compare electric field and circuit theory.
10. List the applications of Poynting vector.

PART – B (5 × 16 = 80 Marks)

11. a. Obtain an expression for an electric field due to infinite line charge having density $\rho_l \; c/m$ placed along z axis, at a point 'p' on y axis at a distance of d from the z axis.

(OR)

b. Given the flux density in free space $\bar{D} = \frac{r}{4}\bar{a}_r$

Determine

(i) Total flux leaving a sphere of r =0.5 m.

(ii) Total charge enclosed in a sphere of r = 0.4 m.

(iii) Field intensity at r = 0.3 m

12. a. Derive the boundary conditions between conductor and free space.

(OR)

b.i. Obtain the expression for capacitance of a coaxial cable.

ii. Explain the concept of method of image.

13. a. Verify that within a long straight conductor carrying a current I, the magnetic field strength at a distance 'r' from the center of the wire is given by $H = \frac{Ir}{2\pi R^2}$, where 'R' is the radius of the wire.

(OR)

b. A current sheet with surface current density K is given by $\bar{K} = K\bar{a}_z Am^{-1}$, where K is a constant coincides with the XZ plane. Find the general relation for flux density.

14. a.i. Derive the force between differential current elements. (12 Marks)

ii. Explain the classification of different magnetic materials. (4 Marks)

(OR)

b. Obtain the boundary conditions between two different magnetic medium in magnetic field.

15. a. Derive the integral and differential form of Maxwell's equation for time invarying fields.

(OR)

b. Obtain the expression for power equation using Poynting theorem.

* * * *