G 520 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

SAINTGITS COLLEGE OF ENGINEERING LIBRARY KOTTAYAM

Fourth Semester

Branch : Electrical and Electronics Engineering

EE 010 404—ELECTROMAGNETIC THEORY (EE)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Mention the features and applications of spherical coordinate system.
2. Define Dipole. Explain the dipole structure.
3. Define polarization. Explain the types of polarization.
4. State and explain Stoke's theorem.
5. Explain the concept of displacement current.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. State and explain Gauss law and its applications with examples.
7. Derive an expression for far electric field intensity of an electric dipole.
8. Derive an expression describing polarization ellipse. Explain its significance.
9. Define Vector Magnetic potential. Derive an expression for it.
10. Derive the potential functions for sinusoidal oscillations.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*
Each question carries 12 *marks.*

11. (i) Compare and contrast cylindrical and spherical coordinate systems.

    (ii) Explain dot and cross products with examples.

Or

12. (i) Derive general form of Maxwell's first equation.

(ii) Explain Del operator and its significance with an example.

13. (i) Derive the electric potential between two points.

(ii) What are magnetic dipoles ? Explain in detail.

Or

14. (i) Derive Laplace and Poisson equations.

(ii) Bring out Maxwell's curl equation for electrostatic fields.

15. (i) Derive the equation of continuity.

(ii) Derive the point form of Ohm's law.

Or

16. (i) Derive an expression for energy stored in capacitor and inductor.

(ii) Explain the Image theory and its applications in detail.

17. (i) State and prove Biot Savart's law.

(ii) Obtain an expression for Magnetic field intensity due to an infinite current sheet.

Or

18. (i) Differentiate self and mutual inductances. Explain the difference.

(ii) Derive the inductance of Solenoid and Toroid.

19. (i) Derive the standard wave equations from Maxwell's equations.

(ii) State and explain Poynting theorem. Derive the complex pointing vector.

Or

20. (i) Write a technical note on "Numerical methods for Electromagnetics".

(ii) Derive Maxwell's equations in point form and integral form.

(5 × 12 = 60 marks)