

QP Code : 31046

(3 Hours)

[Total Marks : 80

- N. B. :** (1) Question no 1 is compulsory.
 (2) Solve any three from Question no 2 to Question no 6.
 (3) Assume suitable data if required.
 (4) Right figures indicate the marks.

Attempt any four :-

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- (a) Point charges $Q_2=300\mu\text{C}$ located at (2,-1,-3) m experiences a force $\vec{F}_2 = 8\vec{a}_x - 8\vec{a}_y + 4\vec{a}_z$ N. due to point charge Q_1 at (3,-4,-2)m. Determine Q_1
- (b) The height of a monopole antenna is $\lambda/100$. What is radiation resistance of antenna
- (c) State and explain Biot-Savart's law
- (d) Find out the divergence and curl of the following function
 $\vec{F} = 2x^2y\vec{a}_x + x^2z\vec{a}_y + yz^3\vec{a}_z$
- (e) Explain what do you mean by skin depth for lossy media with respect to signal passing through lossy media.

- (a) Derive Maxwells integral and point form of equations for static fields 10
 (b) Find electric field intensity E due to an infinite surface charge. 10

3. (a) Define the polarization of wave. Explain different types of polarization 10
 (b) Derive boundary conditions for electric and magnetic fields at the boundary of two dielectric media 10

4. (a) Explain in detail FDM method also state advantage and drawback of it. 10
 (b) State Poynting theorem and derive the average poynting vector. 10

5. (a) Explain the significance of the term 'effective area of an antenna'. Derive the relationship between effective area and directivity of any antenna 10
 (b) Explain the principle modes of operation of helical antenna and draw its radiation pattern 10

6. (a) Classify and explain different types of wave propagation. 20
 (b) Explain folded dipole antenna and its applications
 (c) Explain following terms critical frequency, virtual height, maximum usable frequency

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