Time: 3 Hours **Max. Marks: 80**

Note: (1) Question number 1 is compulsory.
(2) Solve any THREE out of remaining.
(3) Assume suitable data if necessary.
(4) Figures to the right indicate full marks.

Q.1 Attempt any **FOUR**

(A) State and explain Gauss's Law. **(5)**

(B) Explain ground wave propagation. Which type of polarization is used for ground wave? **(5)**

(C) Explain FDM importance and advantages **(5)**

(D) Explain isotropic, omnidirectional and directional antenna with suitable examples. **(5)**

(E) In free space, $E=e^{j(wt-4x)}$ az V/m .Find H **(5)**

Q. 2 **(A)** Derive Maxwell's equation in integral & Point form for time varying field. **(10)**

(B) An electric field in a medium which is source free given by $E=1.5\cos(10^{8t} - \beta z)ax$ V/m where Em is given amplitude of E, ω is angular frequency & β is phase constant .Obtain D, B, H. Assume $\varepsilon_r=1$, $\mu_r=1$. **(10)**

Q.3 **(A)** Explain Poynting vector. Derive Poynting theorem and describe significance of each term. **(10)**

(B) Explain MOM method in detail. State its advantages and drawbacks in detail. **(10)**

Q.4 **(A)** Derive the expression for radiation resistance in far field region of an infinitesimal dipole **(10)**

(B) Explain ionospheric propagation. A high frequency radio link has to be established between two points at a distance of 2000 km. on the earth's surface. Considering the height of 200 km and critical frequency of 5 MHz. Calculate MUF for given path. **(10)**

Q.5 **(A)** Classify and Explain different types of wave propogation. **(10)**

(B) What is line of sight propagation? Obtain expression for range of line of sight for space wave propagation in terms of antenna's transmitting and receiving heights. **(10)**

Q.6 Attempt any **TWO**

(A) Explain folded dipole antenna and its applications. **(10)**

(B) Boundary conditions for static E and M fields. **(10)**

(C) Give the comparison of FDM, FEM and MOM. **(10)**

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