

(3 hrs.)

Maximum Marks = 80

NB:

1. Question No. 1 is compulsory and solve any THREE questions from remaining questions
2. Assume suitable data if necessary
3. Draw clean and neat diagrams

- | Q1. | Answer the following: | Marks |
|------------|---|-------|
| a. | Derive an equation for Ampere Circuital Law. | 5 |
| b. | What is Skin effect? Explain applications of Skin effect. | 5 |
| c. | Define gain, bandwidth, HPBW and directivity with respect to antenna. | 5 |
| d. | Explain boundary conditions of E and H fields for two media. | 5 |
| Q2. | A. Find \vec{D} at P(6,8,-10) caused by a) a point charge of 30mC at the origin
b) a uniform line charge $\rho_L = 40 \mu\text{C/m}$ on the z axis. | 10 |
| | B. A uniform plane wave in a medium having $\sigma = 10^{-3} \text{ s/m}$, $\epsilon = 80 \epsilon_0$ and $\mu = \mu_0$ is having frequency of 10kHz. Calculate- a) attenuation constant b) phase constant c) wave length d) velocity of wave. | 10 |
| Q3. | A. Derive an expression for reflection and transmission coefficient for normal incidence in case of reflection from perfect dielectric. | 10 |
| | B. Define polarization of a wave. Explain the types of polarization. | 10 |
| Q4. | A. Derive expressions for electric and magnetic fields in far field region of an infinitesimal dipole. | 10 |
| | B. Write a note on Smith chart and explain the steps to calculate SWR from the chart. | 10 |
| Q5. | A. Write short notes on different EMI control techniques. | 10 |
| | B. A lossless transmission line is 80 cm long and operates at a frequency of 600 MHz The line parameters are $L = 0.25 \mu\text{H/m}$ and $C = 100 \text{ pF/m}$. Find characteristic impedance, the phase constant and the phase velocity. | 10 |
| Q6. | A. Starting with Maxwell's equation in differential form, explain the concept of displacement current. | 10 |
| | B. Write short notes on sources and characteristics of EMI. | 10 |
