(3 Hours) **[Total Marks : 80]**

Note: Question no. 01 is compulsory, solve any thee questions from the remaining questions. Assume suitable data if required, figures to the right indicate full marks.

Q.1: (Solve any four questions.)

a) Explain Polarization of antenna. 5

b) What are the feed mechanism of Microstrip antenna, explain any one. 5

c) Explain single wire radiation mechanism. 5

d) Describe five controls of array antenna. 5

e) Derive the expression for FRIIS transmission equation. 5

Q2: a) With neat sketch, describe formation and detachment of electric field lines for short dipole. 10

b) With neat sketch explain Horn antenna, also describe how radiation pattern can be modified using physical dimensions of the same antenna. 10

Q.3:a) With respect to elements of Yag-Uda antenna, describe how radiation pattern of the same can be modified. 10

b) With input impedance expression, explain Folded dipole antenna. 10

Q.4:a) Derive expression for array factor of array antenna, also explain pattern multiplication of the same. 10

b) Obtain radiation pattern for 8- isotropic antennas of equal magnitude & spaced by $\lambda/2$ for array. 10

Q.5: a) Design circular microstrip antenna for 10 GHz frequency application using substrate ε_r=2.2 with thickness of 1.588 mm. 10

b) Explain the mechanism of ionospheric propagation. Define critical frequency & MUF. 10

Q.6: Write short notes on (any four questions, each carry five marks)

a) Polarization measurement of antenna.

b) Ground wave propagation.

c) Microstrip array.

d) Parabolic reflector antenna..

e) Near field and far field radiation
