**Pokhara University**

Level : Bachelor Year : 2015

Programme: BE Full Marks: 100

Course: Electromagnetic Propagation and Antenna Pass Marks: 45

*Candidates are required to give their answers in their own words as far as practicable.*

***Attempt all questions***

1. a) Define hertzian dipole. Derive the expression for the power radiated by the current element of length dl at a point r from its center. 8

b) An antenna has effective height of 100 meters and the current at the base is 450 Amperes (rms) at 40 KHz. What is the power radiated? If the total resistance of the antenna circuit is 1.12 ohm. What is the efficiency of antenna? (Take Vertically Earthed antenna into consideration) 7

1. a) What is understood by Uniform Linear Array of antennas? Derive the expression for width of principle lobe of a uniform end-fire array? 7

b) Define effective area of an antenna. Find the maximum directive gain and hence effective area of half wave dipole. 8

1. a) Define folded dipole. A primary antenna is usually placed at the focus of the parabolic antenna in order to obtain the best result, now if we consider dipole feed, will the spillover of the waves compensate? Explain. 7

b) What are the factors on which reflection coefficient depend? Derive the fundamental equation for free space wave propagation with field strength into considerations. 8

1. a) If a transmitter produces 50 W of power, express the transmit power in units of (i) dbm, and (b) dbW. If 50 W is applied to a unity gain antenna with 900 MHz carrier frequency, find the received power in dbm at a free space at a distance of 100 m from the antenna. 8

b) Define noise power? Derive the equation for antenna signal to noise ratio. 7

7

1. a) Ground wave experiences high attenuation at frequency greater than 30 MHz, Why? Which mode of propagation is generally used for VHF/ UHF communication? Explain the model in brief. 7

b) Define Virtual Height and Skip Distance. Explain structure of ionosphere in brief. 8

1. a) In the Ionospheric propagation, consider that the reflected takes place at a height of 300 Km and the maximum density in the ionosphere corresponds to refraction index of 0.8 at a frequency of 15 MHz. Determine the ground range for which this frequency is the MUF. Take the earths curvature into consideration. (R=6370 Km). 8

b) Optical fiber is immune to cross talk and interference, explain. Describe the light acceptance or gathering capability of optical fiber in brief. 7

1. Write short notes on : (**Any two)**  10
2. Duct Propagation
3. Rumsey theory.
4. Horn antenna.