Nepal college of information echnology

Assessment

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| Level: Bachelor | Semester – Fall | Year : 2014 | |
| Programme: BE-ELX | | Full Marks : 100 | |
| Course: Electromagnetic Propagation and Antenna | | Time : 3hrs. | |
| *Candidates are required to give their answers in their own words as far as practicable.* | | |
| *The figures in the margin indicate full marks.* | | |
| Attempt all the questions. | | |

1. a) Derive the expression for the electric and magnetic field components due to half wave dipole assuming sinusoidal current distribution and hence show that radiation resistance of half wave dipole is 73 ohm. (15)

b) What do you mean by the term antenna array? Why do we use antenna array? Plot the radiation pattern of two element array with equal amplitude and opposite phase. (2+2+4)

2. a) Define active and parasitic elements. Highlight upon their significances in the working of Yagi Uda antenna. (3+4)

b) Distinguish between broadside array and end fire array. Derive the expression for width of main lobe in both types of array. (3+5)

3. a) State and prove reciprocity theorem for antenna system ( 5)

b) It is being said that log periodic antenna can’t be used as feed for reflector, why? Can you suggest any antenna that can be used as feeding element for reflector antenna? Explain working mechanism of any one you know. (2+2+4)

4. a) What is polarization? Derive the equation for reflector factor for the horizontal polarization. (2+5)

b) Derive FRIIS transmission equation. A satellite at a distance of 37000 km from a point on earth’s surface radiates 8W from an antenna with a gain of 20 dB in the direction of the observer. Find the power received by the antenna if the satellite is operating at 10 GHz frequency and the receiving antenna has a gain of 50 dB. (5+5)

5. a) An ionosphere has a maximum electron density of 9\*1012 electron/m3. The virtual height of the layer is 125 km. assuming a flat earth, find the MUF for communicating with a receiver situated at 100 km distance. (7)

b) Two vertically oriented half wave dipoles are spaced 0.5λ apart to form an array. Calculate HPBW of major lobes of array in horizontal plane when dipoles are fed with equal and in phase current. (5)

6. Why optical fiber has high band width? Give two reasons. Draw a block diagram of optical fiber communication and explain its working. (10)

7. Write short notes on: **(Any Two)** (2\*5)

a) Knife edge diffraction

b) SID

c) Antenna temperature and SNR