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Uni. Roll No. …….

Program: B.Tech.

Semester: 5

Name of Subject: Antenna and Wave Propagation

Subject Code: PCEC-113

Paper ID: 16420

15-01-2022(E)

Time Allowed: 02 Hours **Max. Marks: 60**

NOTE:

1) Each question is of 10 marks.
2) Attempt any six questions out of nine
3) Any missing data may be assumed appropriately

1. Discuss the principle of radiation through wire antenna. How can a two wire antenna act as a source of radiation? **(10 marks)**

2. a) Distinguish between antenna bandwidth and antenna beamwidth. **(6 marks)**
   b) Explain what is directivity. Comment on directivity of isotropic antenna and non-isotropic antenna **(4 marks)**

3. a) The radiation resistance of an antenna is 65 ohm and the loss resistance is 7 ohm. What is the directivity in dB if the power gain is 15? **(5 marks)**
   b) The noise figure of an amplifier at room temperature (T= 290^0 K) is 0.3 dB. Find the equivalent temperature. **(5 marks)**

4. a) When do we call a dipole as Hertzian dipole ? Analyse the field due to Hertzian Dipole **(7 marks)**
   b) Explain why electrically short antenna have low efficiency? **(3 marks)**

5. a) Describe the concept of pattern multiplication using isotropic sources. **(3 marks)**
   b) Why is Hansen Woodyard endfire array preffered over ordianry endfire array? Also discuss the properties of ordinary endfire array. **(7 marks)**

6. a) Can we use waveguide as an antenna? Explain your answer. **(2 marks)**

b) Are the waves coming out of a horn regarded as plane waves? Comment. For a Horn antenna, derive and analyse the expression for Horn Length and Directivity. **(8 marks)**

7. a) Which type of polarisation is considered superior for surface wave propagation and why? **(2 marks)**
   b) How is the inversion layer being formed? Discuss in detail duct propagation. **(8 marks)**

8. a) What is critical frequency? Derive an expression for critical frequency. **(5 marks)**
   b) Calculate the maximum electron density of E layer and F layer if the critical frequencies of E and F layers are observed at a particular time are 3 MHz and 10 MHz respectively. **(5 marks)**

9. a) Mention diffrent types of polarisations. Point out the requirements for linear polarisation? **(4 marks)**
   b) Obtain and discuss Friss Free Space Propagation equations **(6 marks)**

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