SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2009

EC 04 606—RADIATION AND PROPAGATION

(2004 Admissions)

Time : Three Hours

Maximum : 100 Marks

Answer **all** *questions.*

1. (a) Define Isotropic radiator. Compute its gain.

   (b) State and explain Lorentz reciprocity theorem.

   (c) What is an uniform linear array ? Explain with an example.

   (d) Explain the potential applications of pattern multiplication principle.

   (e) Differentiate travelling wave antenna from standing wave antenna.

   (f) What are the types of microstrip patch antenna ? List and explain them.

   (g) Draw the profile diagram of Ionosphere and explain.

   (h) What is plasma frequency ? Obtain an expression for it.

   $(8 \times 5 = 40$ marks$)$

2. (a) Explain the radiation mechanism of oscillating electric dipole. Obtain an expression for radiation resistance.

   Or

   (b) (i) Explain Babinet's principle for slot antennas. (7 marks)

   (ii) Explain the antenna theorems. (8 marks)

3. (a) Differentiate BSA from EFA. Explain the difference.

   Or

   (b) (i) Derive Array factor expression for N element antenna array. (7 marks)

   (ii) Explain the working principle of Dolph-Tchebyscheff array. (8 marks)

4. (a) Explain the radiation mechanism of 2 element YAGI-UDA array. Derive an expression for gain.

   Or

   (b) Explain the structure of LPDA with neat diagrams. Bring out the design details.

5. (a) Explain the characteristics of Ionosphere. Derive the characteristic equations of ionosphere.

   Or

(b) Differentiate :

    (i)   Ground waves from Space waves.   (4 marks)

    (ii) Space waves from Sky waves.   (4 marks)

    (iii) Single hop from Multihop propagation.   (4 marks)

    (iv) Actual height from Virtual height.   (3 marks)

$[4 \times 15 = 60$ marks$]$