C 1105 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER B.TECH. (ENGINEERING) (09 SCHEME) DEGREE EXAMINATION, APRIL 2016

EC/PTEC 09 603—RADIATION AND PROPAGATION

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. Define half power beam width.
2. What is meant by an isotropic radiator ?
3. Mention the difference between broad side and end fire array.
4. Design a 3 element Yagi-uda antenna to operate at a frequency of 200 MHz.
5. Find the maximum distance that can be covered by a space wave, when the antenna heights are 60 m and 120 m.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Derive the electric and magnetic field components of an ideal dipole.
7. State and verify reciprocity theorem for antenna.
8. Explain the principle of pattern multiplication.
9. Discuss the radiation pattern of loop antenna.
10. Explain the complementary nature of slot and dipole antenna.
11. Discuss the mechanism of selective fading.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*

12. (a) (i) Explain the different types of polarization exhibited by an antenna. (5 marks)

(ii) Discuss the radiation created by monopoles on a finite ground plane. (5 marks)

Or.

Turn over

(b) Explain the following terms with respect to antenna :

(i) Directivity.

(ii) Effective aperture.

(iii) Directive and power gain.

(iv) Radiation intensity.

(v) Radiation resistance.

13. (a) What is an array factor ? Derive an expression to obtain the direction of pattern maxima and minima for an array of an isotropic sources uniformly excited and equally spaced along a line.

Or

(b) Write short notes on :

(i) Dolph-Tchebysceff array.

(ii) Rectangular array.

14. (a) (i) Derive the directivity of half wave dipole antenna. (4 marks)

(ii) Explain the construction of V-antenna. Differentiate it from Rhombic antenna. (6 marks)

Or

(b) What are the different modes of operation of helical antenna ? Explain them in detail.

15. (a) Explain the theory of propagation of electromagnetic waves through the ionosphere.

Or

(b) (i) Draw a 2 ray model of sky wave propagation and explain it in detail. (6 marks)

(ii) Explain the terms: skip distance and maximum usable frequency. (4 marks)

[4 × 10 = 40 marks]