C 41236 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION MAY 2013

EC/PTEC 09 603—RADIATION AND PROPAGATION

(2009 Admission onwards)

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*
Each question carries 2 *marks.*

1. Define noise temperature of an antenna.
2. How is antenna efficiency found ?
3. What are scanning arrays ?
4. What are super directive arrays ?
5. What are ray paths ?

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*
Each question carries 5 *marks.*

1. Derive the expression for maximum effective aperture in terms of directivity.
2. How is directivity of an antenna found from HPBW ?
3. Write few characteristics of Chebychev polynomial.
4. Write in brief the principle of tapering of arrays.
5. Explain in brief the working of slot antenna.
6. List out few atmospheric effects in space wave propagation.

(4 × 5 = 20 marks)

Part C

Answer **all** *questions.*
Each question carries 10 *marks.*

1. Derive the expression for far field components of an half-wave dipole.

Or

2. Find the directivity using actual formula and directivity from HPBW for an antenna with radiation intensity $U = \sin\theta \sin^2\phi$, $0 < \theta < \pi/2$ and $0 < \phi < \pi/2$.

Turn over

3. Derive the array factor, directions of pattern maxima, pattern minima and HPBW for an end-fire array of n –isotropic sources.

Or

4. Calculate the Dolph-Chebychev distribution which yields the optimum pattern. Given that the beam width between first nulls is 22.5° and the number of elements in the array is 6. Spacing between the adjacent elements is $\lambda/2$.

5. Derive the e.m.f. equation for circular loop antenna.

Or

6. Draw the structure of log-periodic dipole array antenna and Explain its operation and design procedure.

7. Explain the various methods of calculating MUF.

Or

8. Explain the Normal refraction of radio waves by tropospheric layer.

(4 × 10 = 40 marks)