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(Pages : 2)

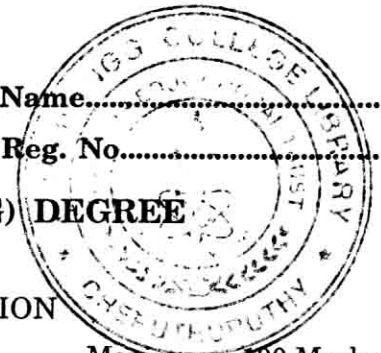## SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2012

EC 04 606—RADIATION AND PROPAGATION

Time : Three Hours

Maximum : 100 Marks

Answer all questions.

1 (a) Write in brief how radiation is accomplished due to accelerated charges.

(b) Find the maximum effective aperture for a halfwave dipole with directivity 2.15 dB.

(c) Using pattern multiplication, obtain the pattern for a 4-element array using two 2-element array of sources. Assume the spacing between the elements to be $\lambda/4$.

(d) Write the advantages of Dolph-Chebychev array.

(e) Draw the structure of 3-element Yagi-Uda antenna and mark the dimensions in terms of wavelength.

(f) What are the different types of feed available for Parabolic reflector antenna ?

(g) Draw the structure of ionosphere with different layers during Day and Night.

(h) Explain surface wave oropagation in brief.

$(8 \times 5 = 40 \text{ marks})$

2. (A) Derive the expression for field patterns of a Half-wave Dipole.

Or

(B) Find the Directivity and maximum effective aperture for radiation source with radiation intensity $U = \sin^2\theta \sin\phi$, with $0 < \theta < \pi/2$ and $0 < \phi < \pi/2$.

$(1 \times 15 = 15 \text{ marks})$

3. (A) Derive the expression for Directivity of Endfire array with N-isotropic sources.

Or

(B) Find the amplitude coefficients for the Dolph-Chebychev array of 7-elements to reduce the sidelobe level, given the HPBW = 35°.

$(1 \times 15 = 15 \text{ marks})$

Turn over

4. (A) Explain the working of long wire antennas and derive the expression for field patterns.

Or

(B) Explain the working of Broadband dipole antenna and how its differs from Narrowband dipole?

(1 × 15 = 15 marks)

5. (A) Derive the expression for refractive index of ionosphere.

Or

(B) Derive the expression for LOS distance in Spacewave Propagation including the effect of Radio Horizon.

(1 × 15 = 15 marks)

[4 × 15 = 60 marks]