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BIEL-013

B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

00936

Term-End Examination

June, 2015

BIEL-013 : ANTENNAS AND PROPAGATION

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is allowed.*

1. (a) Explain the following : *6*

(i) Radiation pattern

(ii) Antenna height

(iii) Beam efficiency

(b) What is the difference between directivity and gain of the antenna ? Relate gain and directivity of the antenna. *2+2=4*

2. (a) Derive the Electric field expression for the array of two-isotropic point sources with same amplitude and phase. *6*

(b) Find the location of the first nulls on either side of the beam center for linear array of 80° in phase elements, fed with equal amplitude current, which are $\lambda/2$ apart. *4*

3. (a) Explain the principle of pattern multiplication. 6

(b) What is antenna array ? What specific properties does it have that make it so useful at high frequency ? 4

4. (a) What is the radiation resistance of an antenna ? What do you mean by far-field of the antenna ? 3+3

(b) Find the directivity of a paraboloid reflector antenna having illumination efficiency of 0·65, reflector diameter of 5 m and operating frequency of 10 GHz. 4

5. (a) Write a short note on folded dipole antenna. 5

(b) At what distance does the radiation component of magnetic field become twice the induction component ? 5

6. (a) Explain the principle of equality of path length in horn antenna. 5

(b) Write the formulae for electric and magnetic field components of short dipole. 5

7. (a) How is loop antenna used for direction finding ? Explain briefly. 5

(b) A paraboloid reflector is required to have a power gain of 2,500 at an operating frequency of 3 GHz. Determine the diameter of the aperture and half power beam width of the antenna. 5

8. (a) Explain the operation of log-periodic antenna with constructional detail. *5*

(b) Draw and explain the different components of Yagi-Uda antenna. *5*

9. Derive the expression for the refractive index of the ionosphere. Find the maximum electron density of the ionosphere layer corresponding to refractive index of 0·65 at the frequency of 12 MHz. *7+3=10*

10. Write short notes on any ***two*** of the following : *5+5=10*

(a) Tropospheric Scatter

(b) Turnstile Antenna

(c) Effect of Earth's magnetic field on the ionospheric propagation