

**B.Tech. - VIEP - ELECTRONICS AND  
COMMUNICATION ENGINEERING  
(BTECVI)**

**Term-End Examination**

**June, 2016**

00886

**BIEL-013 : ANTENNAS AND PROPAGATION**

*Time : 3 hours*

*Maximum Marks : 70*

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**Note :** Attempt any *seven* questions. All questions carry equal marks. Use of scientific calculator is allowed. Missing data, if any, may be suitably assumed.

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1. (a) Derive the relationship between effective aperture and beam area of an antenna. 5
- (b) For a parabolic reflector antenna operating at a frequency of 4 GHz with a diameter of 30 m and efficiency of 55%, calculate its gain and bandwidth. 5

2. (a) What is an antenna array ? Explain the difference between driven and parasitic elements in an antenna array. 5
- (b) Explain the principles of pattern multiplication with examples. 5
3. (a) Draw and explain end fire array. 5
- (b) Derive the expression for the radiation resistance of  $\frac{\lambda}{2}$  antenna. 5
4. Explain the working, construction details and radiation pattern of a folded dipole antenna. 10
5. Derive the expression for the induced voltage and field strength for a circular loop antenna. Draw its radiation pattern also. 10
6. (a) Differentiate among isotropic radiator, directional antennas and omnidirectional antennas with their radiation patterns. 5
- (b) A pyramidal horn antenna has an aperture of 20 cm × 15 cm. If the operating frequency is 6 GHz and field distribution is uniform over the aperture, calculate the maximum directivity and the beam width of the antenna. 5
7. (a) Describe a log periodic antenna and explain its operation. 5
- (b) Write down the salient features of ultra wide band antennas. 5

8. (a) What is a Yagi-Uda antenna ? Explain its construction and properties with reference to directivity and bandwidth. 5
- (b) Discuss the electrical properties of the ionosphere. 5
9. (a) Describe ground wave propagation with frequency use and applications. 5
- (b) Find the maximum electron density of the ionospheric layer corresponding to refractive index of 0.65 at the frequency of 12 MHz. 5
10. Write short notes on any *two* of the following :  $2 \times 5 = 10$
- (a) Low-side Lobe Arrays
- (b) Turnstile Antenna
- (c) Embedded Antennas
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