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

□□⁊1⌐ Term-End Examination
December, 2017

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 permitted. Missing data, if any, may be suitably assumed.*

1. What do you mean by radiation pattern of an antenna ? Explain its types. Find the expression of radiation pattern for E and H fields of a short dipole. *10*

2. (a) Distinguish between antenna bandwidth and beamwidth. *5*

   (b) Calculate the approximate gain and beamwidth of a paraboloidal reflector antenna at operating frequency 4 GHz, diameter 20 metres and illumination efficiency 55%. *5*

3. What is an Antenna Array ? What are the reasons for using antenna arrays ? Explain in detail, the behaviour of broad-side and end-fire arrays. *10*

4. (a) Discuss the radiation pattern and bandwidth of the long wire antenna. *5*

   (b) Define Folded Dipole Antenna. Derive its input impedance. *5*

5. (a) What is a Slot Antenna ? Why is it often used as array of slots ? *5*

   (b) Given a pyramidal horn antenna with aperture dimensions of 9 × 8 cm and operating at a frequency of 5 GHz, calculate

   (i) beam width,

   (ii) gain as a power ratio in dB. *5*

6. Write short notes on any *two* of the following : *2×5=10*

   (a) Yagi-Uda Antenna

   (b) Plasma Antenna

   (c) Balinet's Principle

7. (a) What is the role of the ionospheric layer in propagation ? How do refraction and reflection occur ? *5*

   (b) What is a space wave propagation ? *5*

8. (a) Explain the principles of pattern multiplication with the help of appropriate example. *5*

(b) Differentiate between omnidirectional and isotropic antennas. Write down some salient features of the turnstile antenna. *5*

9. (a) Describe the various electrical properties of the ionosphere layer. *5*

(b) How do radio waves propagate through diffraction ? Explain with the help of an appropriate diagram. *5*

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