No. of Printed Pages : 3

BIEL-013

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

00553 **Term-End Examination**

June, 2018

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. Drive the relation between the effective area and gain of an antenna. What do you mean by polarization of an antenna ? *10*

2. (a) Define antenna efficiency. What are the different losses associated with antenna systems ? *5*

   (b) Explain the various types of antenna arrays. *5*

3. (a) Define array. What is the gain of horn antenna compared to an isotropic antenna ? 5

(b) The radiation resistance of an antenna is 80 Ω and loss-resistance is 10 Ω. What is the directivity, if the power gain is 20 ? 5

4. Write short notes on any ***two*** of the following : $2 \times 5 = 10$

(a) Babinet's principle and complementary antenna

(b) Far field pattern of circular loop

(c) Ultra-wideband antennas

5. What is a half-wave dipole ? How is it formed ? What are the voltage and current patterns of the half-wavelength dipole ? 10

6. (a) What is the operating principle of the log-periodic antenna ? What is its gain ? 5

(b) What is a slot antenna ? Why is it often used on array of slots ? 5

7. (a) What is a ground wave ? How does it propagate ? 5

(b) A communication link is to be established between two stations using half wavelength antenna for maximum directive gain. Transmitter power is 2 kW, distance between transmitter and receiver is 200 km. What is the maximum power received by the receiver ? Frequency of operation is 150 MHz. *5*

8. Derive the relation between the refractive index, concentration of ions and frequency of transmitted signal in ionospheric wave propagation. Also write down the advantages of ionospheric wave propagation over tropospheric wave propagation. *10*

9. Define radiation intensity, effective height, beam efficiency, beam area and antenna temperature, with appropriate diagrams. *10*
