

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

Term-End Examination

June, 2014

00044

BIEL-013 : ANTENNAS AND PROPAGATION

Time : 3 hours

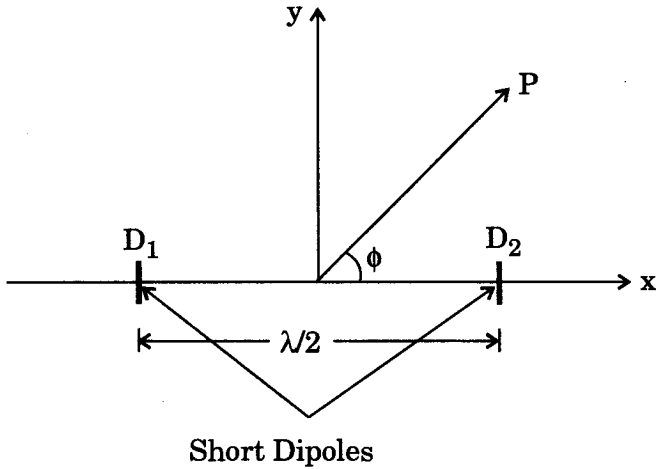
Maximum Marks : 70

Note : *Attempt any seven questions. All questions carry equal marks.*

1. (a) Explain Helical Antenna with neat diagrams. 5
 - (b) If a helical antenna has a spacing between turns 0.05 m, diameter 0.1 m, number of turns equal to 20 and operates at 1000 MHz, find NULL-to-NULL beam width of the main beam and also half-power beam width and directivity. 5
2. (a) Write down the salient features of loop antenna. Also derive the expression for radiation resistance. 5
 - (b) Describe the term Reflectors. Also describe the different types of reflectors in brief. 5

- 3.** (a) Define dipole arrays. Differentiate between Broadside arrays and End-fire array. 5
- (b) Find directivity and effective area of Half Wave dipole which operates at 500 MHz. 5
- 4.** (a) Define EM wave and also derive expression for uniform plane wave equation. 5
- (b) Define Antenna and its functions. Also list the antenna parameters with required expressions. 5
- 5.** (a) Define the following terms in brief : 5
- (i) Critical frequency
- (ii) Skip distance
- (iii) Maximum usable frequency
- (iv) Line of sight
- (b) A receiving antenna is located at 80 kms from the transmitting antenna. The height of the transmitting antenna is 100 m. What is the required height of the receiving antenna ? 5
- 6.** (a) If an array of isotropic radiators is operated at 6 GHz and is required to produce a broadside beam, find NULL-to-NULL beam width if the array length is 10 m. Also find directivity. 5

- (b) Obtain the resultant pattern of two short vertical dipoles as shown in figure at point P. 5



7. (a) A paraboloid reflector operates at a frequency of 10 GHz and it provides a power gain of $g_p = 75$ dB. Find the capture area of the paraboloid and beam width. 5
- (b) Two dipoles of gain 1.64 each are used for transmitting and receiving purposes. They are separated by a distance of 10 m. The radiated power by the transmitting antenna is 15 W at a frequency of 60 MHz. Determine the receiving power. 5
8. (a) Discuss turnstile antenna with its applications. 5
- (b) Explain Ionospheric wave propagation and its characteristics. 5

9. (a) Derive the expression for radiated power and radiation resistance of current element. 5
- (b) Differentiate Resonant Antenna and Non-resonant Antenna. 5
10. Define any *two* of the following in brief : $2 \times 5 = 10$
- (a) Duct propagation
- (b) Balinet Principle
- (b) Log Periodic Antenna
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