No. of Printed Pages : 3 **BIEL-013**

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B. Tech. ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

June, 2013

BIEL-013 : ANTENNAS AND PROPAGATION

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Attempt **any seven** questions out of **ten** questions.*
(ii) Use of scientific calculator is allowed.

1. (a) Derive the relationship between gain and effective aperture of antenna. **6**

   (b) Calculate the effective length of antenna if frequency is 100 MHz and length of dipole is 15m. **4**

2. (a) Derive the relationship between gain and beam solid angle of antenna. **6**

   (b) Calculate the effective aperture of antenna if Effective length of antenna (*le*) is 5m and Radiation resistance (Rr) is 100 Ω. **4**

3. (a) Derive formula for directivity of broadside antenna array. **6**

   (b) What is pattern multiplication theorem ? **4**

4. (a) Derive formulas for electric and magnetic field components of $\frac{\lambda}{2}$ dipole. 6

(b) Compare folded dipole with linear dipole antenna. 4

5. (a) What are the different types of horn antennas ? 6

(b) What are the different types of errors in direction finding process by loop antenna ? 4

6. (a) Explain principle of YAGI - UDA Antenna. How gain can be increased by using more directors ? 6

(b) Calculate gain and Half - Power Beam width (HPBW) of parabolic reflector if frequency *f* is 5GHz and d (diameter of mouth of paraboloid) is 2m. 4

7. (a) Explain working principle of Omni directional Antennas. 6

(b) Compare corner reflector antenna with parabolic reflector antenna. 4

8. (a) Derive formula for refractive index of ionosphere. 6

(b) Calculate free space path loss if frequency is 100 MHz, 4

$Gt = Gr = 0.8$ (where Gt and Gr are the transmitting and receiving antenna respectively) and d (Distance between antenna) is 50Kms.

9. (a) Derive formula for range of space wave. 5

(b) Calculate the range of space wave if. 5

Height of Tx Antenna is 25m,

Height of Rx Antenna is 16m,

Frequency is 100MHz.

for standard form of refraction.

10. Attempt *any two* of followings : 2x5=10

(a) Critical frequency

(b) Effect of earth magnetic field on wave propagation

(c) Lens antenna