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A – 2752

Reg. No. : .....

Name : .....

**Sixth Semester B.Tech. Degree Examination, May 2016  
(2013 Scheme)**

**13.605 : ANTENNA AND WAVE PROPAGATION (T)**

Time : 3 Hours

Max. Marks : 100

**PART – A**

Answer **all** questions, **each** question carries **2** marks.

1. What is grating lobe ?
2. What are the applications of rhombic antenna ?
3. Derive the relation between MUF and critical frequency.
4. Explain smart antenna.
5. What is pattern multiplication ?
6. Explain skip distance.
7. Explain characteristics of ionized region.
8. Explain the properties of binomial arrays.
9. Define virtual height.
10. Write a note on UHF mobile radio propagation.



**PART – B**

Answer **any one** question from **each** Module.

**Module – I**

11. a) Write a note on Basic antenna parameters. 10
- b) Prove that effective aperture for half wave dipole antenna is  $0.13\lambda^2$  10
- OR
12. a) State and prove the reciprocal theorem with regards to antennas. 10
- b) Radiation resistance of antenna is  $72\Omega$  and low resistance is  $8\Omega$ . What is the directivity if the power gain is 16 ? 10

P.T.O.



### Module - II

13. a) Differentiate between broad side array and end-fire array. 10  
 b) An array 'n' isotropic sources of equal amplitude and spacing are arranged as a broad-side Array. Calculate the pattern minima and maxima. 10

OR

14. a) Find the relation between maximum effective aperture and directivity. 5  
 b) An antenna has a field pattern given by  $E(\theta) = \cos \theta \cos 2\theta$  for  $0 \leq \theta \leq 90$ . Find  
 i) Half power beam width  
 ii) The beam width between first nulls 5  
 c) Derive the expression for the field intensity in the case of n number of isotropic source with equal spacing. 10

### Module - III

15. a) Explain features of helical antenna and its practical design consideration. 10  
 b) Explain the principle of horn antenna and give expression for E, H and gain. 10

OR

16. a) Explain the principle and applications of V antenna. 10  
 b) Explain on antennas for mobile base station and handsets. 10

### Module - IV

17. a) What are the effects of earth's magnetic field on propagation of radio waves? 10  
 b) Derive the expression for critical frequency of a ionized layer. 10

OR

18. a) Explain modes of propagation. 10  
 b) A VHF communication is to be established at 90MHz, with the transmitter power of 35 Watts. Calculate the LOS communication distance, if the heights of transmitter and receiver antennas are 40 m and 25 m respectively. 10