Reg. No. : ....

Name : ....

Sixth Semester B.Tech. Degree Examination, May 2016
(2008 Scheme)
08.605 : ANTENNA AND WAVE PROPAGATION (T)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions.

1. Compute the directivity of a current element Idl.

2. An antenna has directivity of 20 and a radiation efficiency of 90%. Compute the gain of the antenna.

3. What is retarded potential ?

4. A certain antenna is used to radiate a 0.2 GHz signal to a satellite in space. The radiation resistance of the antenna is 31.6 Ohms. What is the type of antenna ?

5. Draw Log periodic antenna array for UHF and VHF ranges. Explain their applications.

6. State and explain reciprocity theorem.

7. Sketch the resultant pattern of an array of 2 short vertical dipoles with $d = \lambda/4, \alpha = 0$ using pattern multiplication principle.

8. Derive an expression for LOS propagation distance.

9. Enumerate the characteristic of ionized region.

10. What are the advantages and applications of multihop propagation ? **(10×4=40 Marks)**

PART – B

Answer **2** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Derive the far electric and magnetic field components of $\lambda/2$ antenna and hence obtain its radiation resistance.

12. A mobile phone base station transmitter delivers 20 W into a 10dB gain antenna at 900 MHz. Compute the power in "W" available from a receiving antenna 30 km away with a gain of 5 dB.

13. Explain methods for the measurement of impedance and gain of an antenna.

Module – II

14. Design a horn antenna (find the dimensions) to give a HPBW of 30 deg. in both the E and H planes at a frequency of 9 GHz. The horn is to be mounted on an X band waveguide. Assume the flare angle to be 15 deg. Calculate the gain of the horn.

15. What are Dolph Chebyshev arrays ? Design an array with $n = 4$ and $d = \lambda/2$.

16. Explain the significance of antenna arrays. Derive an expression for antenna array factor.

Module – III

17. Explain the characteristics of Ionosphere. Derive the characteristic equations of ionosphere.

18. a) What is troposcatter propagation ?

    b) Derive the expression for field strength of space wave.

19. At a 300 Km height in ionosphere, the electron density at night is about $3 \times 10^{12}\ m^{-3}$ and the signal MUF is $f = 2f_{cr}$ for a transmission distance of 600 Km. Compute f_{cv}, ε_r, η, β, V_p, V_g and θ_t.

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