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**Reg. No. :**

**Question Paper Code: 46043**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Sixth Semester

Electronics and Communication Engineering

14UEC603 - ANTENNA AND WAVE PROPAGATION

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Consider a lossless antenna with a directive gain of +6 dB. If 1 mW of power is fed to it, the load power radiated by the antenna will be

(a) 4mW (b) 1mW (c) 7mW (d) 1/4mW

2. Effective aperture is always ----------- than Physical aperture.

(a) Higher (b) Lower (c) Both a and b (d) None

3. A dipole antenna of λ/8 length has an equivalent total loss resistance of 1.5Ω. The efficiency of the antenna is

(a) 0.89159% (b) 8.9159%(c) 89.159% (d) 891.59%

4. Radiation resistance of antenna is-------------

(a) Physical resistance (b) Virtual Resistance (c) Both a and b (d) None

5. The relation between slot and dipole impedances is

(a) ZSZd=Zi2/4 (b) ZSZd=Zi2/2 (c) ZSZd=Zd2/4 **(**d) ZSZd=Zd2/2

6. In dielectric lens, difference in electrical path length may be caused due to …………

(a) Length (b) Width (c) Thickness (d)None

7. For a Hertz dipole antenna, the Half Pore Beam Width (HPBW) in the E-Plane is

(a) 360ᴏ (b)180ᴏ (c) 90ᴏ (d) 45ᴏ

8. Yagi-Uda antenna consists of-----

(a) Folded Dipole (b) Reflector (c) Director (d) All above

9. A pulse of a given frequency transmitted upward is received back after a period of 5ms. The virtual height of the reflecting layer is

(a) h=CT/2 (b) h=2CT (c) h=T/2C (d) h=C/2T

10. The line of sight (LOS) distance is the distance travelled by the …………….wave.

(a) Diffracted (b) Scattered (c) Reflected (d) Direct

PART - B (5 x 2 = 10 Marks)

11. Write the principle of pattern multiplication.

12. Recall the concept of Uniform Array.

13. Define a Hertzian dipole.

14. Write the formula for Spacing factor.

15. What are the factors that affect the propagation of radio waves?

PART - C (5 x 16 = 80 Marks)

16. (a) Illustrate reciprocity principle with regards to antenna in detail with neat sketch.(16) Or

(b) Explain in detail about the types of Polarization of an antenna. (16)

17. (a) Deduce the field associated with short dipole and also explain power radiated and radiation resistance of short dipole. (16) Or

(b) Describe the radiation mechanisms of linear array uniform amplitude and spacing with neat sketches and derive the expression for array factor. (16)

18. (a) Express the importance of Babinet’s principle on complementary antennas in

detail. (16)

Or

(b) Draw a neat block diagram for antenna radiation pattern and gain measurement. Explain the procedure in detail. (16)

19. (a) Explain the radiation mechanism of a 2 element Yagi-Uda Antenna. Derive its gain expression. (16)

Or

(b) With necessary sketches, illustrate the radiation mechanism of a microstrip patch

antenna (16)

20. (a) At a 150 km height in the ionosphere, the electron density at night is about

2×1012 m-3 and the signal MUF is 1.5 times the critical frequency for a transmission

distance of 600km. Compute the following: (i) Critical frequency (ii) Relative

dielectric constant (iii) Phase constant (iv) Wave impedance (v) Wave velocity. (16)

Or

(b) Discuss in detail the effects of earth’s magnetic field on ionosphere radio waves and

the structure of ionosphere. (16)