Reg. No. : | | | | | | | | | | |

Question Paper Code: 49417

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Elective

Electronics and Communication Engineering

14UEC917 - SATELLITE COMMUNICATION PRINCIPLES AND APPLICATIONS

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The equatorial plane is tilted at angle of _____to the elliptical plane.

   (a) 18° (b) 23.4° (c) 24.3° (d) 25.3°

2. Elevation is measured

   (a) Upward from local horizontal
   (b) North eastward to the projection of the satellite path
   (c) North westward to the projection of the satellite path
   (d) South eastward to the projection of the satellite path

3. Transponders are

   (a) Power systems used in satellites (b) Used to stabilize the satellite
   (c) Launch vehicles for satellites (d) Receiver transmitter units

4. Telemetry means

   (a) Measuring using Instruments (b) Measurement at a distance
   (c) Shift in attitude of satellite (d) Stabilizing the satellite from distance

5. A fundamental difference between analog and digital signals is that we can improve the bit error rate of a digital signal by the use of

   (a) Stop and wait ARQ system (b) Go back ARQ system
   (c) Error correction technique (d) Select and repeat ARQ system

6. What is ratio of bit rate IF bandwidth?

(a) Rb/BH=m/(1+p) (b) Rb/BH=m2/(1+p)
(c) Rb/BH=m/(1+p)2 (d) None of these

7. The frequencies for direct broadcast satellites vary from region to region throughout the world, although these are generally in the

(a) Ku band (b) Ka band (c) C-band (d) None of these

8. The alphabets used in colour TV signals are

(a) Y,T and V (b) Y,I and Q (c) Y,A and M (d) Y,C and R

9. The following parameter is considered for evaluating performance of internet system

(a)Users (b) Bit Error Rate (c) Security (d) Mobility

10. The CATV system employs a single_____, with separate feeds available for each sense of polarization.

(a) Outdoor unit (b) Indoor unit (c) TV unit (d) None of these

PART - B (5 x 2 = 10 Marks)

11. State Kepler's first law.

12. Why do we need thermal control satellites?

13. What is an TDMA? What are the advantages?

14. What is an inter modulation noise?

15. Give the types of satellite services.

PART - C (5 x 16 = 80 Marks)

16. (a) Explain in detail the geocentric equatorial coordinate system which is based on the earth's equatorial plane. (16)

Or

(b) State Kepler's three laws for planetary motion. Illustrate in each case their relevance to artificial satellites orbiting the earth. (16)

17. (a) Discuss the satellite uplink and downlink analysis. (16)

Or

(b) (i) From first principles derive an expression for Power received P_r by an antenna in terms of L_a attenuation in atmosphere , L_{ta} losses associated with transmitting antenna, L_{ra} losses associated with receiving antenna and EIRP in communication system. (8)

(ii) Discuss in detail about the design of satellite links for specified carrier to Noise ratio.(C/N) (8)

18. (a) Draw a block diagram for digital transmission system and explain each blocks (16)

Or

(b) (i) Draw block diagram of a pulse amplitude modulation communication system and explain its operation with aid of its basic waveforms. (8)

(ii) Describe the important features of Frequency Division multiple access (FDMA) (8)

19. (a) Explain the principal behind spectrum spreading and dispreading and how this is used to minimize interference in a CDMA system. And also determine the throughput efficiency of the system. (16)

Or

(b) Describe the general operating principles of a TDMA network. Show how the transmission bit rate is related to the input bit rate. (16)

20. (a) Explain in detail satellite navigational system. (16)

Or

(b) Describe the operation of typical VSAT system. (16)