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Question Paper Code: 49417

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

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. Low-Earth-orbit (LEO) satellites have _____ orbits.

    (a) equatorial   (b) polar   (c) inclined   (d) none of these

2. The carrier to noise ratio for a satellite depends upon

    (a) Effective Isotropic Radiated power   (b) Bandwidth   (c) Free space path losses   (d) All the above

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. Noise figure can be expressed as,

    (a) 10 log F   (b) F/ 10 log 10   (c) 20 log F   (d) 20 log F / 10

5. A satellite downlink at 12GHZ operates with a transmit power of 6w & an antenna gain of 48.2db. Calculate the EIRP in dBw.

    (a) 56dBw   (b) 16dBw   (c) 56dB   (d) None of these

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

9. 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

10. A major difference between DBS TV and conventional TV is that with DBS, _____ is used, whereas with con-ventional TV, _____in the form of vestigial single side-band (VSSB) is used.

    (a) Frequency modulation, amplitude modulation
    (b) Frequency modulation, digital modulation
    (c) Phase modulation, amplitude modulation
    (d) None of these

<div align="center">PART - B (5 x 2 = 10 Marks)</div>

11. What is meant by line of nodes for earth orbiting satellites?

12. Why do we need thermal control satellites?

13. What is meant by Time division Multiplexing?

14. What is an inter modulation noise?

15. Give the types of satellite services.

<div align="center">PART - C (5 x 16 = 80 Marks)</div>

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

<div align="center">Or</div>

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(b) Explain in detail the geocentric equatorial coordinate system which is based on the earth's equatorial plane. (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) Give a brief account of satellite TV network distribution and direct broadcasting. (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) Describe in detail about the concept of Global Positioning Satellite (GPS). (16)

Or

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

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