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Question Paper Code: 49417

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

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)

- The equatorial plane is tilted at angle of _____ to the elliptical plane.
(a) 18° (b) 23.4° (c) 24.3° (d) 25.3°
- 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
- Transponders are
(a) Power systems used in satellites (b) Used to stabilize the satellite
(c) Launch vehicles for satellites (d) Receiver transmitter units
- Write the equations of losses for clear sky conditions.
(a) Losses=(FSL)+(RFL)+(AML)+(AA)+(PL)
(b) Losses=(FSL)+(RFL)
(c) Losses=(FSL)+(AML)+(AA)+(PL)
(d) None of these

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) $R_b/BH=m/(1+p)$ (b) $R_b/BH=m^2/(1+p)$
(c) $R_b/BH=m/(1+p)^2$ (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 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 conventional 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

PART - B (5 x 2 = 10 Marks)

11. State Kepler's first law.
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.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) What are the effects of a non spherical earth on the orbital mechanics of a Satellite. (8)

(ii) Discuss the orbital effects in communications system performance. (8)

Or

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

17. (a) Describe briefly the most common type of high power amplifying device (TWTA) used aboard a communication satellite. (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) (i) Explain the carrier to noise ratio of uplink and downlink frequency. (8)

(ii) Draw the block diagram and explain the receiver only home TV systems. (8)

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) (i) Explain in detail equipment for earth stations. (8)

(ii) Describe briefly about the configuration of front fed, cassegrain and Gregorian type of earth station antennas. (8)

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 in detail about the concept of Global Positioning Satellite (GPS). (16)