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Question Paper Code: 49417

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

1. Low-Earth-orbit (LEO) satellites have _____ orbits.
(a) equatorial (b) polar (c) inclined (d) none of these
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. ISI stands for
- (a) Ionosphere satellite interference (b) Inter modulation symbol interference
(c) Inter symbol interference (d) Inter satellite interference
7. G/T ratio is called as
- (a) Gain noise temperature ratio (b) Gain telemetry ratio
(c) Geostationary tracking ratio (d) Gain tracking ratio
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. Inmarsat provides satellite communications for
- (a) Internet connectivity (b) Direct to home television programs
(c) Satellite telephones (d) Ships and offshore oil platforms

PART - B (5 x 2 = 10 Marks)

11. Explain the various steps in launching communication satellite.
12. What are the several factors dominate the design of any system using Geostationary satellites?
13. What is meant by Time division Multiplexing?
14. What is an inter modulation noise?
15. List out the features of a low noise amplifier.

PART - C (5 x 16 = 80 Marks)

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

Or

- (b) (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)
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) (i) Explain how Television signals are transmitted using Analog FM transmission by satellite. (8)
- (ii) Explain with a block diagram Quadrature phase shift keying demodulator. (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) Give a brief account of satellite TV network distribution and direct broadcasting. (16)
20. (a) Explain in detail satellite navigational system. (16)
- Or
- (b) Describe the operation of typical VSAT system. (16)

