

B.E. (Part Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

ELECTRONICS AND COMMUNICATION ENGINEERING BRANCH

SEVENTH SEMESTER

PTEC 518/PTEC9031 – SATELLITE COMMUNICATION AND BROADCASTING

(REGULATION 2009/2005)

Time: 3 Hours

Max.marks: 100

Answer ALL Questions

PART-A (10x2=20 Marks)

1. State Newton's law of motion.
2. What is meant by azimuth angle and look angles?
3. A satellite downlink at 12 GHz operates with a transmit power of 10 W and an antenna gain of 45dB. Calculate the EIRP in dBW.
4. What is meant by noise figure and noise temperature?
5. Define power efficiency and spectrum efficiency.
6. List out the advantages of interleaving.
7. Why are random multiple access methods suitable for data oriented networks?
8. What are three factors that limit the number of channels that can be provided with in a satellite channel via FDMA?
9. Enumerate the distinguishing feature of MSAT.
10. What is differential GPS?

PART – B (5x16=80 Marks)

11. (i) State Kepler's laws as applied to satellite communications. Briefly describe the orbital parameters with the help of a diagram. **(10)**
- (ii) Compare the advantages and disadvantages of different types of orbits. **(6)**
12. (a) (i) Consider a satellite transmitting 25W at a frequency of 4GHz via an antenna of 18dB gain. An earth station in the network uses an antenna of 12m diameter with an efficiency of 60%. Determine the gain of the earth station antenna, path loss, flux density at the earth station and power received at the output of the earth station antenna assuming the satellite earth station range to be 40, 000 km. **(10)**
- (ii) Repeat the question 12. (a) (i) for a down frequency of 11.5 GHz. Compare the two sets of results and comment. **(6)**

(OR)

12.(b) (i) With neat block diagram, explain the telemetry, tracing command and monitoring sub system. (8)

(ii) With a neat sketch, explain the power budget for a satellite link considering rain fade margin (8)

13. (a) With the help of block schematics, illustrate the principles of the modulation and demodulation of QPSK and 16-QAM, and compare their spectral characteristics and performance in the presence of noise. What is the limitation in using higher –order modulation schemes for satellite communication. (16)

(OR)

13. (b) (i) With neat diagram, explain the turbo encoder and turbo decoder. (8)

(ii) Explain the various concatenated codes. (8)

14. (a) With neat block diagram, explain the CDMA transmitter and receiver with direct sequence spread spectrum. Derive the capacity equation of CDMA system and compare this with capacity of a TDMA system. (16)

(OR)

14. (b) (i) With the help of diagrams, discuss the principle of operation of the following multiple access schemes: Frequency division multiple access and Time division multiple access scheme. Mention the advantages and limitations of each. (8)

(ii) In a TDMA network the reference burst and the preamble each requires 560 bits and the nominal guard interval between bursts is equivalent to 120 bits. Given that there are eight traffic bursts and one reference burst per frame and the total frame length is equivalent to 40800 bits, Calculate the frame efficiency. (4)

(iii) Explain the Demand Assigned Multiple Access (DAMA) and compare its features with PRMA (4)

15. (a) Explain the GPS receiver operations and explain the code lock loop and navigation message recovery. (16)

(OR)

15. (b) (i) Describe the operations of typical VSAT system and explain the various types of Network configurations of VSAT systems. (10)

(ii) Explain the VSAT polling network configurations. (6)