PART – A

Answer ALL questions   5 x 2 = 10 M

1. What do you mean by visibility test of satellite, give the equation for maximum angular separation between earth station and subsatellite point (SSP).   (CO1)

2. If the altitude of a satellite is 10,255 km, then find its velocity (km/s) and its orbital period (H M S).   (CO1)

3. What is the importance of G/T ratio? The gain of a receiver is 60.6 dB and its system noise temperature is 19 dBk, then find its G/T ratio.   (CO2)

4. What is reliability of a satellite subsystem? Give the equation for the reliability of the device.   (CO2)

5. Why TWTAs give poor performance in FDMA transponders?   (CO3)

PART – B

Answer ALL questions   3 x 10 = 30 M

6. a) What are the Orbital effects in communication system Performance and describe them in Detail.   [5M] (CO1)

   b) An earth station situated in the Docklands of London, England, needs to calculate the look angle to a geostationary satellite in the Indian Ocean operated by Intelsat. The details of the earth station site and the satellite are as follows:
   Earth station latitude and longitude are 52.0^0 N and 0^0
   Satellite longitude (sub satellite point) is 66.0^0 E.   [5M] (CO1)

   (OR)

7. a) What are the methods used to place a satellite in to a geostationary orbit.[5M]   (CO1)

   b) What are the various applications of satellite communication systems?   [5M] (CO1)

8. a) Draw the Block diagram of simplified satellite earth station receiver and derive an equation for its system noise temperature.   [5M] (CO2)

   b) A 4GHz satellite Receiver has: T_{in} = 25 k, T_{RF} = 50 k, T_{IF} = 1000 k, T_m = 500 k, and G_{RF} = 23 dB, G_{IF} = 30 dB. Calculate the system noise temperature, assuming the mixer has a gain of G_M = 0 dB. Recalculate the system Noise temperature when the mixer has 10 dB loss.   [5M] (CO2)

   (OR)

9. a)What is the significance of bathtub curve and describe various redundancy connections

used in a satellites. [5M] (CO2)

b) Draw the block diagram of TTC&M and describe in detail. [5M] (CO2)

10. Prove that inter-modulation increases in proportion to the cubes of the signal power in a FDMA system. [10M] (CO3)

(OR)

11. What is the importance of back-off loss in FDMA system and give an equation for overall C/N ratio in the earth station receiver in terms of $(C/N)_{IM,}$ $(C/N)_{DN}$ and $(C/N)_{UP}$ and mention its significance. [10M] (CO3)

CVR COLLEGE OF ENGINEERING
An UGC Autonomous Institution - Affiliated to JNTUH
B.Tech. IV Year I Sem. I MID Examinations – August, 2018
Subject: Satellite Communications
(Professional Elective –III)

Date: 23/82018   Time: 2 hours   Max. Marks: 40

PART – A

Answer **ALL** questions   5 x 2 = 10 M

1. What are the advantages of C-band over k_a and k_u bands?   (CO1)
2. If the altitude of a satellite is 35,768.03 km, then find its velocity (km/s) and it's orbital period (H M S).   (CO1)
3. Differentiate single conversion and dual conversion transponders.   (CO2)
4. If the noise figure of a receiver is 0.56 dB then find out its noise temperature (K).   (CO2)
5. Compare TDMA, FDMA, CDMA.   (CO3)

PART – B

Answer **ALL** questions   3 x 10 = 30 M

6. a) Describe orbital perturbations in detail.   [5M]   (CO1)
    b) How do you calculate Look angle of a geostationary satellite?   [5M]   (CO1)

(OR)

7. a) What are the Kepler's laws and describe the orbit of a satellite using these Laws.   [5M]   (CO1)
    b) What is the difference between geostationary and geosynchronous orbits. Also mention the advantages of geostationary satellite?   [5M]   (CO1)

8. a) Derive the satellite Link equation and explain its significance.   [5M]   (CO2)

    b) A Satellite at a distance of 40,000 km from a point on the earth surface radiates a power of 10 W from an antenna with a gain of 17 dB in the direction of the observer. Find the Flux density and power received by an antenna at this point with an effective area of $10 \, m^2$.   [5M]   (CO2)

(OR)

9. a) What do you mean by space qualification and derive an equation for reliability of a device?   [5M]   (CO2)
    b) Describe satellite orbital control system.   [5M]   (CO2)

10. What is inter-modulation? Derive an equation for the power of inter-modulation products at the output of a High Power Amplifier (HPA) in the FDMA System. [10M] (CO3)

(OR)

11. What is the importance of back-off loss in the satellite Communications? Write an equation for calculation of C/N with inter-modulation and mention its significance. [10M] (CO3)

CVR COLLEGE OF ENGINEERING

An UGC Autonomous Institution - Affiliated to JNTUH

B.Tech. IV Year I Sem. **II MID Examinations** – October, 2018

Subject: **Satellite Communications**

(Professional Elective –III)

Date: 23/8/2018   Time: 2 hours   Max. Marks: **40**

PART – A

Answer **ALL** questions   **5 x 2 = 10 M**

1. What are the properties of DSSS codes?   (CO3)
2. Why L-band is preferred for LEO satellites?   (CO4)
3. Explain off-Axis scanning.   (CO4)
4. What is the effect of clock offset/bias in GPS?   (CO5)
5. What are the differences among SPS and PPS in GPS?   (CO5)

PART – B

Answer **ALL** questions   **3 x 10 = 30 M**

6. a) Explain principle of TDMA with its frame structure.   [5M] (CO3)
   b) Describe advantages of TDMA over FDMA.   [5M] (CO3)

(OR)

7. a) Explain synchronization in TDMA Networks.   [5M] (CO3)
   b) Explain the concept of CDMA with an example.   [5M] (CO3)

8. a) Draw the block diagram of an Earth Station transmitter and explain each block in detail.   [5M] (CO4)

   b) How the delay and throughput will be affected in satellite communications?   [5M] (CO4)

(OR)

9. Describe various satellite tracking systems used in earth stations.   [10M] (CO4)

10. a) Draw the block diagram of GPS signal generation in a GPS satellite.   [5M] (CO5)
    b) What are the segments used in GPS? Describe each in detail.   [5M] (CO5)

(OR)

11. a) Describe the principle of a GPS Receiver.   [5M] (CO5)
    b) What are the advantages of Differential GPS? Describe its principle.   [5M] (CO5)

CVR COLLEGE OF ENGINEERING
An UGC Autonomous Institution - Affiliated to JNTUH
B.Tech. IV Year I Sem. II MID Examinations – October, 2018
Subject: Satellite Communications
(Professional Elective –III)

Date: 23/82018   Time: 2 hours   Max. Marks: 40

PART – A

Answer **ALL** questions   **5 x 2 = 10 M**

1. Draw the TDMA frame structure   (CO3)
2. What is sun synchronous orbit and give its advantages?   (CO4)
3. How delay and throughput can be affected in satellite communications?   (CO4)
4. What is selective availability in GPS?   (CO5)
5. What are the types of DOPs in GPS measurements?   (CO5)

PART – B

Answer **ALL** questions   **3 x 10 = 30 M**

6. a) What is the principle of CDMA? Explain in detail with an example.   [5M]   (CO3)
   b) Compare and contrast TDMA and FDMA.   [5M]   (CO3)

(OR)

7. a) Explain onboard processing in satellite communications.   [5M]   (CO3)
   b) Discuss the features of DAMA.   [5M]   (CO3)

8. a) What are the HPA configurations used in Earth stations? Explain in detail. [5M]   (CO4)
   b) Explain the factors involved while considering coverage frequency of a satellite.   [5M]   (CO4)

(OR)

9. a) Describe the features of Molniya orbits.   [5M]   (CO4)
   b) Draw the block diagram of an Earth station and explain each block.   [5M]   (CO4)

10. a) Describe the GPS location principle with necessary diagrams and equations. [5M]   (CO5)
    b) Draw the block diagram of a generic GPS Receiver.   [5M]   (CO5)

(OR)

11. a) Describe the principle of Differential GPS.   [5M]   (CO5)
    b) How C/A code is generated in GPS? Describe it with a block diagram.   [5M]   (CO5)