Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 40931

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh Semester
Electronics and Communication Engineering
EC6004 – SATELLITE COMMUNICATION
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Name the Keplerian element set.
2. What do you mean by Sun transit outage ?
3. Give the formula for reliability of hardware.
4. What is the use of frequency reuse technique in communication subsystem and how it is employed ?
5. What is noise power spectral density ?
6. What is MATV and state its purpose ?
7. Differentiate multiple access from single access.
8. Define SCPC.
9. Mention the services of INSAT.
10. Write down the names of any four mobile satellite services.

PART – B **(5×16=80 Marks)**

11. a) i) State and explain the Kepler's three laws of motion with suitable diagram. **(9)**

ii) A satellite is orbiting in the equatorial plane with a period from perigee to perigee of 12h. Given that the eccentricity is 0.002. Calculate the semi major axis. The earth's equatorial radius is 6378.1414 km. **(4)**

iii) Write a brief note on atmospheric drag. **(3)**

(OR)

b) i) Draw and explain the geometry for determining the subsatellite point. (8)

ii) Explain and illustrate the limits of visibility in Satellite orbits. (8)

12. a) i) Describe the east-west and north-south station keeping maneuvers required in satellite station keeping. (8)

ii) Explain what is meant by satellite attitude, and briefly describe two forms of attitude control. (8)

(OR)

b) i) Explain the working of telemetry tracking and control with a suitable diagram. (10)

ii) Explain what is meant by thermal control and why this is necessary in a Satellite. (6)

13. a) i) Explain clearly the working of CATV with a diagram. (10)

ii) In a link-budget calculation at 12 GHz, the free-space loss is 206 dB, the antenna pointing loss is 1 dB and the atmospheric absorption is 2 dB. The receiver $[G/T]$ is 19.5 dB/K and receiver feeder losses are 1 dB. The EIRP is 48 dBW. Calculate the carrier-to-noise spectral density ratio. (6)

(OR)

b) Explain in detail the Free-space transmission losses, feeder losses and misalignment losses in space link. (16)

14. a) i) Explain with an example circuit, how carrier recovery is done in TDMA. (12)

ii) What is the advantage of TDMA over FDMA with respect to demand assignment ? (4)

(OR)

b) i) Draw the encoder diagram for the following digital signals – Unipolar NRZ, Polar NRZ, Manchester, Polar RZ for the digital data 1010111. (8)

ii) Explain the principle behind CDMA with a diagram and mention any two advantages of CDMA for satellite networking. (8)

15. a) i) Explain the concept behind DTH. (8)

ii) Write in detail about the features of GPS. (8)

(OR)

b) i) Briefly describe about satellite navigation system. (8)

ii) Describe in detail about videoconferencing and state its advantages and disadvantages. (8)