

B.E. Eighth Semester (Electronics Engineering) (C.B.S.)
Elective - II : Satellite Communication

P. Pages : 2

Time : Three Hours



KNT/KW/16/7554

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Assume suitable data whenever necessary.
 9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) State and prove Kepler's first law of planetary motion. **8**
- b) A satellite is in an orbit with a perigee of 1000 km and an apogee of 4000 km. Using a mean earth radius of 6378.14 km, find the period of the orbit in hours, minutes, and seconds. **6**

OR

2. a) Explain telemetry tracking and command system. **6**
- b) What is attitude & orbit control system. Explain in detail. **8**
3. a) Derive the link equation and explain each term used in link equation. **7**
- b) An earth station antenna has a diameter of 30m, has an overall efficiency of 68%, and is used to receive a signal at 4150 MHz. At this frequency, the system noise temperature is 79k when the antenna points at the satellite at an elevation angle of 28° what is the earth station G/T ratio under these conditions? If heavy rain causes the sky temperature to increase so that the system noise temperature rises to 88k, what is the new G/T value? **6**

OR

4. a) Write the steps to design a satellite link designed C/N. **8**
- b) Determine the total noise power for a receiver with an input bandwidth of 40 MHz and equivalent noise temperature of 800 K. **5**
5. a) Explain the FDMA technique used in satellite communication with advantages and disadvantages. **7**
- b) Draw and explain the TDMA frame structure. **6**

OR

6. a) What do you mean by spread spectrum techniques? Explain in detail. **7**

- b) Write short notes on DAMA 6
7. a) Explain propagation effect and their impact on satellite. 7
- b) Write short notes on Tropospheric multipath and scintillation effect. 6

OR

8. a) Explain the process of attenuation calculation. 7
- b) Write short notes on effect of rain on antenna noise temperature. 6
9. a) Explain the term channel capacity with suitable expression. 7
- b) The generator matrix for a (6,3) block code is shown below. obtain all code words. 7

$$G = \begin{bmatrix} 1 & 0 & 0 & : & 0 & 1 & 1 \\ 0 & 1 & 0 & : & 1 & 0 & 1 \\ 0 & 0 & 1 & : & 1 & 1 & 0 \end{bmatrix}$$

OR

10. a) Differentiate between block code and convolution code. Explain the error detecting and correcting capability of linear block code. 8
- b) Explain in brief implementation of error detection on satellite links. 6
11. a) Write short notes on 13
- 1) HPA
 - 2) LNA
 - 3) Factors affecting orbit utilization.
 - 4) RF Multiplexing.

OR

12. a) Explain Earth station design requirement in detail. 6
- b) What is tracking, why tracking is required. Explain all the techniques with neat sketch. 7
