

Reg. No.

Question Paper Code

11487

**B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022**

Eighth Semester

**Electronics and Communication Engineering**

**EC8094 - SATELLITE COMMUNICATION**

(Regulations 2017)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |  | <i>Marks,<br/>K-Level, CO</i> |
|--|-------------------------------|
| 1. State the purpose of Station keeping.   | 2,K1,CO1                      |
| 2. Differentiate Apogee and Perigee.   | 2,K1,CO1                      |
| 3. List the features of expendable launching vehicle.                            | 2,K1,CO2                      |
| 4. Define the range and elevation angle of a satellite.                          | 2,K1,CO2                      |
| 5. What is meant by momentum wheel stabilization?                                | 2,K1,CO3                      |
| 6. Explain the need of thermal control segment for a spacecraft.                 | 2,K2,CO3                      |
| 7. List the ionospheric effects on space link.                                   | 2,K1,CO4                      |
| 8. What are factors contributing to noise in an earth station receiving channel? | 2,K1,CO4                      |
| 9. What are the limitations of FDMA-satellite access?                            | 2,K1,CO5                      |
| 10. What is meant by Space Division Multiple Access?                             | 2,K1,CO5                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) (i) Discuss in detail about the orbital parameters like inclination, ascending node, semimajor axis and eccentricity. 8, K2,CO1  
(ii) Explain about sun transit outage. 5,K2,CO1
- OR**
- b) (i) State kepler's three laws planetary motion. Explain their relevance to artificial satellites orbiting the earth. 8, K1,CO1  
(ii) Calculate the apogee and perigee heights for the orbital parameters. Assume a mean earth radius of 6371 Km. 5,K1,CO1  
 $e = .0011501$   $a = 7192.3$  Km
12. a) (i) Determine the angles that are required to position the earth station directly pointing to the satellite. 8,K1,CO2

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*

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(ii) A geostationary satellite is located at  $90^\circ$  W. Calculate the azimuth angle for an earth station antenna at latitude  $35^\circ$  N and longitude  $10^\circ$  W. 5,K2,CO2

**OR**

b) Illustrate the features of launching vehicles and launching procedures in detail. 13,K2,CO2

13. a) (i) Explain the attitude control momentum wheel stabilization in the space segment with necessary diagrams and explain it. 8,K2,CO3  
(ii) Demonstrate the three-axis stabilized satellite system. 5,K2,CO3

**OR**

b) Describe the term antenna and discuss in detail about the various antenna used in the satellite. 13,K1,CO3

14. a) How to classify the system noise temperature and explain it in detail along with the relevant express for transmission loss. 13,K2,CO4

**OR**

b) Demonstrate the equation of noise figure and carrier to noise ratio. 13,K2,CO4

15. a) Discuss the techniques of compression and encryption used in satellite communication with general block diagram. 13,K2,CO5

**OR**

b) Write the design aspects and explain the technical features of TDMA frame structure. 13,K2,CO5

**PART - C (1 × 15 = 15 Marks)**

16. a) (i) Discuss the types of INSAT satellites still in operation. 6,K2,CO6  
(ii) Discuss the following INSAT satellites.  
(a) INSAT-3A, 3,K2,CO6  
(b) INSAT-3C, 3,K2,CO6  
(c) INSAT-4B. 3,K2,CO6

**OR**

b) List the functional units of GSM network and explain each in detail. 15,K2,CO6