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Question Paper Code	12192
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**B.E. / B.Tech - DEGREE EXAMINATIONS, NOV / DEC 2023**

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.                          | <i>2,K1,CO1</i>               |
| 2. List the orbital parameters used for positioning a satellite.  | <i>2,K1,CO1</i>               |
| 3. Identify the major design types of satellite.                  | <i>2,K2,CO2</i>               |
| 4. Illustrate the materials used for making the satellites.       | <i>2,K2,CO2</i>               |
| 5. State the importance of AOCS.                                  | <i>2,K1,CO3</i>               |
| 6. Illustrate how do you achieve stabilization by momentum wheel. | <i>2,K2,CO3</i>               |
| 7. State the equation of link budget.                             | <i>2,K1,CO4</i>               |
| 8. State the basic requirements of an earth station antenna.      | <i>2,K2,CO4</i>               |
| 9. Define SCPC system.  | <i>2,K1,CO5</i>               |
| 10. Mention the services of INSAT.                                | <i>2,K2,CO6</i>               |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

- |  |                 |
|--|-----------------|
| 11. a) (i) Express the first two Kepler's laws of planetary motion with suitable diagrams.     | <i>8,K2,CO1</i> |
| (ii) Estimate the suitable equations for azimuth angle and location of geostationary satellite | <i>5,K2,CO1</i> |

**OR**

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|---|------------------|
| b) Identify the orbital elements used in satellite.   | <i>13,K2,CO1</i> |
| 12. a) Describe the term antenna and discuss in detail about the various antenna used in the satellite. | <i>13,K2,CO2</i> |

**OR**

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|--|------------------|
| b) Explain the various elements used in the space segments of a satellite system and also the need and function of each element in the satellite system. | <i>13,K2,CO2</i> |
|--|------------------|

13. a) (i) Trace the attitude control momentum wheel stabilization in the space segment with necessary diagrams and explain it. *8,K3,CO3*  
(ii) Demonstrate the three-axis stabilized satellite system. *5,K2,CO3*

**OR**

- b) (i) Describe briefly the typical antenna patterns and coverage zones of satellites. *7,K2,CO3*  
(ii) List out the methods of estimating the fuel in the satellite. *6,K1,CO3*

14. a) Explain about free space transmission losses and express the received power in unit of dBW. *13,K2,CO4*

**OR**

- b) (i) Compose the uplink equation with respect to saturation flux density. *8,K2,CO4*  
(ii) An uplink operates at 14 GHz, and the flux density required to saturate the transponder is 120 dB (W/m<sup>2</sup>). The free-space loss is 207 dB, and the other propagation losses amount to 2 dB. Calculate the earth-station [EIRP] required for saturation, assuming clear-sky conditions. *5,K2,CO4*

15. a) Explain the concept of direct sequence spread spectrum communication with necessary diagrams. *13,K2,CO5*

**OR**

- b) Discuss the following with neat diagram. *7,K2,CO5*  
(i) Analog voice transmission systems. *6,K2,CO5*  
(ii) PCM coder/decoder (CODEC).

**PART - C (1 × 15 = 15 Marks)**

16. a) Explain the basic techniques and network configurations of VSAT. State briefly where VSAT system find widest application. *15,K2,CO6*

**OR**

- b) Evaluate the features and Architecture of GSM. *15,K2,CO6*