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**Question Paper Code: 59416**

B.E./B.Tech. DEGREE EXAMINATION, NOV 2018

Elective

Electronics and Communication Engineering

15UEC916-SATELLITE COMMUNICATION PRINCIPLES AND APPLICATIONS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Geo stationary satellites are generally placed in CO1- R  
(a) Equatorial orbit      (b) Polar orbit      (c) Inclined orbit      (d) Circular orbit
2. The downlink frequency in the C-band transponder is about CO2- R  
(a) 6 GHz      (b) 4 GHz      (c) 14 GHz      (d) 11 GHz
3. To avoid overlapping between traffic burst \_\_\_\_\_ is provided in CO3- R  
TDMA.  
(a) Reference station      (b) Guard time      (c) Unique word      (d) Clock recovery
4. The system which uses a satellite receiving antenna and the normal CO4- R  
MATV receiving aerials is known as  
(a) CCTV      (b) CATV      (c) SMATV      (d) None of these
5. The type of configuration used in VSAT system is CO5- R  
(a) Hybrid      (b) Data      (c) Mesh      (d) Star

PART – B (5 x 3= 15 Marks)

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|-----|---|--------|
| 6.  | State and explain the mechanism of launching a satellite.                       | CO1- U |
| 7.  | List out the requirements involved in the downlink design.                      | CO2- U |
| 8.  | Explain the power control mechanism of a CDMA system.                           | CO3- U |
| 9.  | Identify the parameters to be considered in the design of an antenna subsystem. | CO4- R |
| 10. | Outline the essential components comprised in INMARSAT satellites.              | CO5- R |

PART – C (5 x 16= 80 Marks)

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|-----|-----|---|----------|-----|
| 11. | (a) | (i) A satellite is moving in an elliptical transfer orbit with apogee and perigee at a distance of 35000 km and 500 km. If the radius of earth is 6360 km, determine the velocity of a satellite at any point in its orbit. | CO1- App | (8) |
|     |     | (ii) Illustrate the limits of visibility for a geostationary orbit.   | CO1- App | (8) |

Or

- |     |     |  |          |     |
|-----|-----|--|----------|-----|
|     | (b) | (i) Discuss in detail about orbital perturbations.                                     | CO1- U   | (8) |
|     |     | (ii) Explain briefly the orbital parameters required to determine a satellite's orbit. | CO1- U   | (8) |
| 12. | (a) | (i) Estimate the various parameters related to the reliability of a satellite system.  | CO2- App | (8) |
|     |     | (ii) Discuss the raindrop distribution in terms of attenuation and depolarization.     | CO2- App | (8) |

Or

- |     |     |  |        |      |
|-----|-----|--|--------|------|
|     | (b) | Analyze the expressions for the complete design of satellite link to obtain a carrier to noise ratio.              | CO2- U | (16) |
| 13. | (a) | (i) Distinguish between pre-assigned and demand-assigned traffic in relation to a satellite communication network. | CO3- U | (8)  |
|     |     | (ii) Explain what is meant by power-limited and bandwidth-limited operation as applied to a FDMA network.          | CO3- U | (8)  |

Or

- (b) (i) Illustrate the principle behind spectrum spreading and de-spreading and how this is used to minimize interference in a CDMA system. CO3- U (8)
- (ii) Discuss briefly how demand assignment may be implemented in a TDMA network. CO3- U (8)
14. (a) (i) Sketch the typical plan of a CATV system and explain its features. CO4- U (8)
- (ii) Identify the several methods available for tracking the satellite and explain them. CO4- U (8)
- Or
- (b) (i) Analyze an expression for carrier to noise ratio for a large earth station antenna. CO4- U (8)
- (ii) Deduce the design requirements of small earth station antennas. CO4- U (8)
15. (a) Draw the structure of GPS navigation data and explain. Also explain the major components if a GPS receiver with neat diagram. CO5- U (16)
- Or
- (b) (i) Illustrate the system configuration of a GRAMSAT satellite system and explain. CO5- U (8)
- (ii) Compare the technical parameters of LEO and MEO satellites. CO5- U (8)

