C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 99416

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Professional Elective

Electronics and Communication Engineering

19UEC916 SATELLITE COMMUNICATION PRINCIPLES AND APPLICATIONS

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

PART A - (5 x 1 = 5Marks)

1. Name the first passive satellite transponder CO1- U

   (a) Sun (b) Early Bird (c) Score (d) Moon

2. Batteries are used to power all satellite subsystems CO1- U

   (a) at all times (b) only during emergencies

   (c) during eclipse periods (d) to give the solar arrays a rest

3. A TVRO installation for use with C-band satellite (download frequency at 4 GHz), has a diameter of about 3.5 meters and an efficiency of 60%. Calculate the gain. CO1- U

   (a) 41dB (b)19dB (c) 9dB (d) 21dB

4. The access scheme used by GPS CO1- U

   a) FDMA b) OFDMA c) CDMA d) TDMA

5. Which frequency band does the direct broadcast satellite system use? CO1- U

   (a) C band (b) X band (c) Ku band (d) MF band

PART – B (5 x 3= 15Marks)

6. Name the geostationary satellite launched in Jan2020 and brief about its launch vehicle. CO1-U

7. The noise factor of an amplifier is 7:1. Calculate the noise figure and equivalent noise temperature. Assume a room temperature of 290K. CO3 -App

8. Calculate power rating of ground transmitter operating at following conditions. Number of Carriers- 1, Power per carrier- 0.28 W, Amplifier back off-0 dB. CO4-App

9. Compare pre assigned and demand assigned FDMA satellite access CO3-U

10. How does the DBS service differ from the home reception of satellite TV signal in the C band? CO1 -U

PART – C (5 x 16= 80Marks)

11. (a) (i) What are the orbital Perturbation and explain them in detail. CO1- U (8)

(ii) Write a note on Limits of Visibility. CO1- U (8)

Or

(b) (i) State Kepler's three laws of planetary motion. Illustrate in each case their relevance to artificial satellites orbiting the Earth. CO1- U (8)

(ii) Write a note on atmospheric drag and station keeping. CO1- U (8)

12. (a) (i) With a neat diagram, Illustrate the importance of Telemetry, Tracking and Command subsystem. CO1-U (8)

(ii) Describe the need of communication subsystem and illustrate how the communication payload and supporting subsystems are used in space segment. CO1-U (8)

Or

(b) (i) How the inter modulation noise occurred in TWT and derive C/N ratio. CO1-U (8)

(ii) Explain how the carrier to noise ratio is used to measure the performance of satellite uplink.. CO1-U (8)

13. (a) Show how MATV is used to provide reception of DDS to a small group of users when this group is large what type of antenna should be used ? explain and analyze the result. CO1-U (16)

Or

(b) With the aid of a schematic diagram, describe the functioning of the Receive only home TV systems. CO1-U (16)

14. (a) Explain Spade systems with suitable diagram CO1-U (16)

Or

(b) Explain Bandwidth Limited and Power-Limited TWT Amplifier Operation. CO1-U (16)

15. (a) What is DTH? What are the design issues to be considered for launching DTH system? CO1-U (16)

Or

(b) Illustrate on the various mobile satellite services, its associated challenges and its impact on services when delivered by satellites.. CO1-U (16)