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

Question Paper Code: 99416

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

Professional Elective

Electronics and Communication Engineering

19UEC916 SATELLITE COMMUNICATION PRINCIPLES AND APPLICATIONS

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

Answer All Questions

PART A - (5 x 1 = 5 Marks)

1. In a communication satellite, the equipment which provides the connecting link between the satellite's transmit & receive antennas CO1- U

   (a) Repeater (b) Transponder (c) Transmitter (d) None of the above

2. The carrier to noise ratio for a satellite depends upon CO1- U

   (a) Effective Isotropic Radiated power (b) Bandwidth

   (c) Free space path losses (d) All of the above

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. Classify satellite launch vehicles. Also mention which type of fuel is used by GSLV in its operations. CO1-U
7. Describe in brief about SCPC? CO1-U
8. The range between ground station and satellite is 42,000 Km. Calculate the free space loss at the frequency of 6 GHz. CO4-App
9. Define CDMA throughput efficiency. CO1-U

10. Inscribe the function of GRAMSAT. CO1 -U

PART – C (5 x 16= 80Marks)

11.	(a)	(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) Describe satellite launching procedure.	CO1- U	(8)
		Or		
	(b)	(i) What are the orbital elements and explain them.	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)	Explain the terrestrial interface, transmitter and receiver of earth station technology.	CO1-U	(16)
		Or		
	(b)	With the aid of a schematic diagram, describe the functioning of the DBS	CO1-U	(16)
14.	(a)	Describe the general operating principles of a TDMA network. Show how the transmission bit rate is related to the input bit rate	CO1-U	(16)
		Or		
	(b)	With a neat diagram, explain in detail about the function Code-Division Multiple Access	CO1-U	(16)
15.	(a)	Explain GRAMSAT satellites with respect to basic space craft characteristics and the vehicle type	CO1-U	(16)
		Or		
	(b)	Write short notes on mobile satellite services GPS, Iridium mobile satellite system	CO5-U	(16)