

Code: 19EC4701A

IV B.Tech - I Semester – Regular Examinations - DECEMBER 2022

**SATELLITE COMMUNICATIONS
(ELECTRONICS & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

- Note: 1. This question paper contains two Parts A and B.
 2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
 3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
 4. All parts of Question paper must be answered in one place.

BL – Blooms Level

CO – Course Outcome

PART – A

		BL	CO
1. a)	Define the terms (i) Prograde orbit and (ii) Argument of perigee.	L1	CO1
1. b)	GSAT-30 satellite launched by India is used for which application.	L1	CO2
1. c)	Write the various types of transponders used with a satellite.	L1	CO1
1. d)	Why uplink and down link frequencies are different for a satellite system?	L1	CO3
1. e)	Define CDMA and mention the types.	L1	CO4

PART – B

		BL	CO	Max. Marks
UNIT-I				
2	Explain briefly various services provided by a satellite.	L2	CO1	12 M

OR					
3		Discuss frequency bands allocated to various satellite services.	L2	CO1	12 M
UNIT-II					
4	a)	State the Kepler's laws. Discuss its importance in satellite communications.	L2	CO1	8 M
	b)	Assume a satellite is rotating in an elliptical orbit with a perigee of 1000 km and an apogee of 4000 km. Calculate the period of orbit if the mean earth radius is 6000km.	L3	CO1	4 M
OR					
5	a)	Describe the orbital effects in communication system performance.	L2	CO2	6 M
	b)	Explain the look angles with respect to a satellite using relevant equations.	L2	CO2	6 M
UNIT-III					
6	a)	What are the various satellite subsystems? Explain the communication subsystem with a neat block diagram.	L2	CO1	8 M
	b)	Draw and explain the earth station technology diagram.	L2	CO2	4 M
OR					
7	a)	Explain telemetry, tracking, command and monitoring.	L2	CO2	8 M
	b)	Discuss briefly about satellite antennas.	L2	CO2	4 M
UNIT-IV					

8	a)	Derive the expression for the satellite link equation.	L3	CO3	6 M
	b)	Derive the expression for G/T ratio of a satellite link.	L3	CO3	6 M
OR					
9		Calculate the system noise temperature of a 4 GHz receiver having the following gains and noise temperatures. $T_{in} = 25K$, $T_{RF} = 50K$, $T_M = 500K$, $T_{IF} = 1000K$, $G_{RF} = 23dB$, $G_m = 0dB$ and $G_F = 30dB$. Derive the equation for system noise temperature.	L3	CO3	12 M
UNIT-V					
10	a)	Illustrate about Spread spectrum transmission and reception?	L2	CO4	6 M
	b)	Compare FDMA, TDMA and CDMA techniques.	L2	CO4	6 M
OR					
11	a)	With a neat block diagram explain frame and burst formats for a TDMA system.	L2	CO1	6 M
	b)	Assume that the TDMA system uses a $125\mu s$ frame failure. Calculate the number of channels/earth station when a $5\mu s$ preamble is added to the beginning of each earth station transmission.	L3	CO4	6 M