RollNo. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR / MAY 2025

ELECTRONICS AND COMUNICATION ENGINEERING

Semester VII

EC5007 SATELLITE COMMUNICATION

(Regulation2019)

Time:3hrs Max.Marks: 100

CO1	Ability to comprehend and appreciate the significance and role of this course in the present contemporary world
CO2	The student would be able to demonstrate an understanding of the basic principles of satellite orbits, placement and control, satellite link design and the communication system components
CO3	The student would be able to demonstrate an understanding of the different communication, sensing and navigational applications of satellite and their implementation

BL – Bloom's Taxonomy Levels

(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20Marks)

(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	State Kepler's second law of planetary motion.	2	1	1
2	Define apogee and perigee.	2	1	1
3	What is meant by transponder?	2	2	2
4	What is MTBF?	2	2	2
5	Write the equation of link budget.	2	3	2
6	What is ARQ and how does it work in satellite communication?	2	3	2
7	Differentiate DAMA AND PAMA.	2	4	2
8	What are the limitations of FDMA-satellite access?	2	4	2
9	How many satellites are required for GPS positioning? And name one application of GPS in daily life	2	5	2
10	Name components of a typical VSAT network architecture	2	5	1

PART- B(5x 13=65Marks)

(Restrict to a maximum of 2 subdivisions)

Q.No.	Questions	Marks	CO	BL
11 (a)	Derive the basic orbital equation of a satellite and explain each term involved. Discuss how the orbit is determined using this equation.	13	1	3
	OR			
11 (b)	Describe the steps involved in launching a satellite. And What are the different types of satellite orbits? Discuss their merits and demerits.	13	1	2
12 (a)	Describe the functions of AOCS and TTC&M subsystem and how do they interact with ground station	13	2	2
	OR			
12 (b)	From the calculation of system noise temperature prove that C/N ratio is directly proportional to G/T ratio	13	2	4

13 (a)	Explain in detail the link design process in satellite communication. Differentiate between single-link and double-link design with relevant block diagrams.	**13**	3	3
	OR			
13 (b)	Describe the various error control techniques used in satellite communication. Explain the working of ARQ.	**13**	3	2
14 (a)	With neat diagrams, explain the TDMA burst and frame structure of satellite system.	**13**	4	2
	OR			
14 (b)	Explain the principle behind spectrum spreading and dispreading and how this is used to minimize interference in a CDMA system.	**13**	4	4
15 (a)	Explain the characteristics of a typical VSAT system and Key Components for a VSAT network.	**13**	5	2
	OR			
15 (b)	Explain with neat diagram about DTH system.	**13**	5	2

PART- C(1x 15=15Marks)
(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	(i) In a link budget calculation at 12GHz the free space loss is 20dB, the antenna pointing loss is 1dB and atmospheric absorption is 2dB. The receiver [G/T] is 19.5dB/K and the receiver feeder loss is 1dB. The EIRP is 48dBw. Calculate the carrier to noise power spectral density ratio.	**5**	2	5
	(ii) Generalize the ECEF coordinate system, location determination and working of GPS.	**10**	5	2