Reg. No.

B.E. / B.TECH. DEGREE

EXAMINATIONS, MAY 2024
Seventh Semester
EC18015 – SATELLITE COMMUNICATION
(Electronics and Communication Engineering)
(Regulation 2018 / 2018A)

TIME: 3 HOURS   **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Explain the various terms and parameters of satellites and develop equations of orbit to locate satellite in space.	2
CO 2	Categorise and recognise the significance of various satellite subsystems and ground segment.	3
CO 3	Identify the various aspects involved in satellite communication link and measure link budget.	4
CO 4	Classify and grade the varied multiple access techniques.	4
CO 5	Develop various satellite based applications.	3

PART- A (10 x 2 = 20 Marks)
(Answer all Questions)

		CO	RBT LEVEL
1.	Differentiate Apogee and Perigee.	1	4
2.	What is a transit outage and identify its effects?	1	3
3.	How can the bandwidth of a transponder be increased?	2	3
4.	List out the functions of TTC&M in Satellite Communication.	2	2
5.	Identify the parameters involved in determining quality and strength of received signal.	3	4
6.	Calculate the free space loss at a frequency of 6 GHz when the range between a ground station and a satellite is 36,000 Km.	3	3
7.	Mention the disadvantages of CDMA in satellite communication.	4	2
8.	Differentiate lossy compression and lossless compression.	4	4
9.	Differentiate DAB and DVB.	5	4

		Marks	CO	RBT LEVEL
10.	List out the various types of satellite services.	5	2	

PART- B (5 x 14 = 70 Marks)

			Marks	CO	RBT LEVEL
11. (a)	Analyze the various effects of eclipse over satellites and suggest suitable methodologies to mitigate the same.		(14)	1	3
	(OR)				
(b)	Perform a detailed analysis of orbital perturbations and the methodologies to mitigate the same.		(14)	1	3
12. (a)	With necessary block diagrams perform detailed analysis over the functioning of the receive only home TV system.		(14)	2	4
	(OR)				
(b)	Analyze how attitude and orbit control systems helps in controlling the satellite system with neat sketches.		(14)	2	4
13. (a)	Discuss the various types of system noise power present in satellite communication and suggest methodologies to mitigate the same.		(14)	3	3
	(OR)				
(b)	Satellite at 40000 km transmits 2W of power with an antenna gain of 17dB. Calculate flux density on earth surface, power received by antenna with effective aperture of 10m 2 , gain of receiving antenna and received C/N assuming T S = 152K and BW=500 MHz.		(14)	3	3
14. (a)	Analyze how spread spectrum communication technique is utilized in satellite communication and also discuss its merits and demerits.		(14)	4	4
	(OR)				
(b)	Perform a detailed analysis of the various channel allocation schemes applicable to satellite communication.		(14)	4	4
15. (a)	Describe how the specialized services like video conferencing, e-mail and internet have revolutionized the present day communication scenario along with their working principle respectively.		(14)	5	2
	(OR)				
(b)	Describe the application developed in satellite communication that had improved the transmission of video and audio signals benefiting the society with necessary sketches.		(14)	5	2

PART- C (1 x 10 = 10 Marks)
(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Evaluate the bit rate that can be accommodated by a satellite transponder operating with a bandwidth of 38MHz transmitting a QPSK signal	(10)	3	5

supported by a raised cosine filtering with roll off factor 0.1 which requires a BER of 10^{-5}. The link budget reveals the total loss of 250dB in the downlink with the receiving earth station G/T of 64 dB/K.

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