Register Number:……..

KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Seventh Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U18ECE0002**:** Satellite Communication

COURSE OUTCOMES

CO1: Discuss orbital mechanics and Launch methodologies
CO2: Describe various space subsystems
CO3: Explain different subsystems of earth segment
CO4: Apply signal processing for satellite communication
CO5: Design and analyze link power budget for satellite
CO6: Describe various Satellite Applications

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	State Kepler's third law.	CO1	[K_2]
2.	Differentiate geostationary and geosynchronous satellite.	CO1	[K_2]
3.	Define sky noise.	CO2	[K_2]
4.	A satellite downlink at 12 GHz operates with a transmit power of 6W and an antenna gain of 48. 2dB.Calculate the EIRP in dBW.	CO3	[K_2]
5.	Formulate uplink and downlink equation of a satellite access.	CO3	[K_2]
6.	Enumerate guard time.	CO4	[K_2]
7.	Define noise factor.	CO4	[K_2]
8.	Explain saturation flux density.	CO5	[K_2]
9.	Give the frequency range of US DBS systems with high power satellites.	CO6	[K_2]
10.	List out the regions covered by INMARSAT.	CO6	[K_2]

Answer any FIVE Questions: -
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Describe in detail the launching procedure of a satellite.	8	CO1	[K_2]
	b)	Explain the features of typical satellite launch vehicles.	8	CO1	[K_2]

12.	a)	Determine the limits of visibility for an earth station situated at mean sea level, at a latitude48.42° north and longitude 89.26° west. Assume a minimum angle of elevation 5°.	8	CO2	[K4]
	b)	A satellite is orbiting in the equatorial plane with a period from perigee to perigee of 12 h. Given that the Eccentricity is 0.002. Calculate the semi major axis. The earth's equatorial radius is 6378.1414 km.	8	CO2	[K4]
13.	a)	Examine how the attitude and orbit control system (AOCS) is achieved through spin stabilization system? Give necessary diagrams.	8	CO3	[K2]
	b)	Define and explain the terms roll, pitch and yaw.	8	CO3	[K2]
14.	a)	Briefly explain in detail the effects of rain in uplink and downlink in satellite communication.	8	CO4	[K4]
	b)	What is spread spectrum (SS) technique? Explain any one type of SS techniques.	8	CO4	[K4]
15.		Derive the satellite power budget equation and examine the various interferences that may affect the satellite link performance.	16	CO5	[K4]
16.	a)	Describe the mobile services offered by Satellite Systems.	8	CO6	[K2]
	b)	Explain in details about INTELSAT satellites with respect to basic space craft characteristics and vehicle types.	8	CO6	[K2]

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