Reg. No:

SRM Institute of Science and Technology

Tiruchirappalli Campus, Trichy – 621 105

Faculty of Engineering and Technology

Continuous Learning Assessment- I, Sixth Semester, March-2025

Department of ECE

21ECE223T Satellite Communication and Broadcasting

(B. Tech - Regulations 2021)

Date: 03.03.2025 FN

Time: 90 Minutes **Max. Marks**: 50

	Answer ALL Questions.		
	PART A – (10 x 1 = 10 marks)		
1.	The isotropic power gain for a paraboloid antenna in antenna subsystem is (A) G=πD2 (B) G=nπλ2 (C) G=TD (D) G=nπD	CO 1	K 1
2.	In a spin stabilized GEO satellite, the spin axis is (A) Perpendicular to the orbital (B) In the plane of the orbit plane (C) Inclined at 45° at the orbital (D) Inclined at 6° to the orbit plane plane	CO 1	K 1
3.	The line joining the ascending and descending nodes through the center of the earth is called (A) Line of aries (B) Point of node (C) Line of nodes (D) Line of earth	CO 1	K 1
4.	The perigee and apogee of an elliptical satellite orbits are 600 km and 3000 km the value of semi major axis is (A) 180 km (B) 2000 km (C) 1800 km (D) 1200km	CO 1	K 3
5.	The minimum and maximum orbital spacing for satellite is (A) 2° and 10° (B) 10° and 18° (C) 2° and 9° (D) 12° and 19°	CO 1	K 1
6.	The overall noise temperature Te, absolute temperature T and noise figure. F are related as (A) T=T(F-1) (B) T = F(T-1) (C) T=T(F-1) (D) T, =(T)(F)	CO 2	K 1
7.	A satellite link is operating at 14 GHz has receiver feeder loss of 1.5 dB and free space loss 207 dB. The atmospheric absorption loss in 0.5 dB, antenna pointing loss is 0.5 dB depolarization loss is neglected. What is the total line loss	CO 2	K 3

	for clear sky condition? (A) 209.5 dB (B) 215.3 dB (C) 210 dB (D) 203.5 dB		
8.	An average value of the angular position of the satellite with reference to the perigee is called (A) True anomaly (B) Average abnormality (C) Mean anomaly (D) Average apogee	CO 2	K 1
9.	Unit of carrier-to-noise spectral density ratio is (A) Db (B) DHz (C) dW (D) dBHz	CO 2	K 1
10.	Frequency bands used by satellite mobile services are (A) L and S band (B) Ku band (C) K2 and C band (D) X and Y band	CO 2	K 1

	Answer All Questions.		
	PART B – (4× 4 = 16 Marks)		
11.	Apply the principles of spherical geometry to find Look Angle Determination. *For derivation steps and answers – 4 marks*	CO 1	K 2
12.	Write a short note on Frequency allocation of satellite subsystems. *For explanation – 4 marks*	CO 1	K 2
13.	State and explain in detail downlink design in satellite communication. *For explanation – 4 marks*	CO 2	K 2
14.	Differentiate Carrier to Nosie ratio and Gain to Temperature ratio. *For Description – each 2 marks*	CO 2	K 2

Answer ALL Questions.				
PART C – (2 x 12 = 24 marks)				
15.		Explain in detail about Geostationary Earth Orbit and TTC operations of subsystems with neat diagrams. *For explanation – 12 marks*	CO 1	K 2
OR				
16.	i	A satellite orbit in equatorial plane with a period from perigee to perigee of 6 hours. Assume earth as perfect spherical and $\mu = 3.986 \times 10^{14} m^3/S^2$ *For steps and answers – 6 marks*	CO 1	K 3
	ii	Analyze in detail, different satellite launching vehicles. *For explanation – 6 marks*	CO 1	K 2

17.	Analyse an equation to calculate power budget for satellite link. Discuss various types of transmission losses. *For explanation – 12 marks*	CO 2	K 3
	OR		
18.	Express the first and second Kepler laws that governs satellite motion. 22. A satellite is operated at EIRP of 60dBW with an output backoff of 5dB. The transmitter feeder lower amount to 1dB, and the antenna gain in 50dB. Calculate the power output of the TWTA required for full saturated EIRP. *For steps and answers – 12 marks*	CO 2	K 3

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