

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2024)**

**CLASS: BTECH
BRANCH: ECE**

**SEMESTER: VII
SESSION: MO/2024**

SUBJECT: EC417R1 SATELLITE COMMUNICATION

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
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		CO	BL
Q.1(a)	What is a Geostationary Orbit? Discuss the advantages of Satellites placed in this orbit.	[2] 1	1,2
Q.1(b)	A satellite orbiting in a geosynchronous orbit of radius 41500 km. Find the velocity and time of the orbit. What will be change in velocity if the radius reduces to 36000 km? Gravitational constant = $398600.5 \text{ km}^3\text{s}^{-2}$.	[3] 1	1,2,3
Q.2(a)	Describe the steps involved in launching a Satellite?	[2] 1	1,2
Q.2(b)	Determine the maximum shadow angle that occurs at equinoxes for a satellite orbiting in a circular equatorial orbit at a height of 13622 km. above the surface of the earth. Assume earth's radius to be 6378 kms. Also determine the maximum daily eclipse duration.	[3] 1	1,2,3
Q.3(a)	How can a Dish TV operator ensure the reception of the signal from a particular satellite?	[2] 2,3	2,3
Q.3(b)	An earth station transmits at 5.62 GHz from an antenna of 6 m. The satellite is 39920 from the earth station. The efficiency of the antenna is 70%. Calculate the path loss and the gain of the transmitting antenna in dB.	[3] 2,3	1,2,3,4,5
Q.4(a)	What are the losses that occur during propagation of EM wave from earth station to the satellite and vice versa?	[2] 2,3	1,2
Q.4(b)	A 12 GHz earth station receiving system has an antenna with a noise temperature of 50K, a LNA with a noise temperature of 100 K and a gain of 40 dB, and a mixer with a noise temperature of 1000 K. Find the system noise temperature.	[3] 2,3	1,2,3,4,5
Q.5(a)	List the various components of space platform and payload separately.	[2] 5	1,2
Q.5(b)	Compare a Transparent and Regenerative Repeater.	[3] 5	1,2

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