DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Semester Examination – Summer 2022

Course: B. Tech.   Branch : Electronics and Telecommunication   Semester : VIII

Subject Code & Name: BTETPE702C Satellite Communication

Max Marks: 60   Date: 18/08/2022   Duration: 3.45 Hrs.

Instructions to the Students:
1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q. 1	Solve Any Two of the following.		
A)	3 Axis Stabilization	Remember	6
B)	FRIIS transmission Equation	Remember	6
C)	Figure of merit	Remember	6
Q.2	Solve Any One of the following.		
A)	Derive the equation $r_o = \frac{p}{1+e\cos(\phi_o - \theta_o)}$ where e is eccentricity and p is semilatus rectum.	Understand	12
B)	Semi major axis: 42,167.911km, eccentricity: 0.00033, mean anomaly: 28.3866°. Determine a. The orbital period b. The mean orbital angular velocity in radians per second c. The maximum and minimum distance of the spacecraft from the center of the earth during each orbital revolution.	Analysis	12
Q. 3	Solve Any Two of the following.		
A)	Explain the digital satellite communication.	Remember	6
B)	Uplink Budget	Remember	6
C)	Downlink Budget	Remember	6
Q.4	Solve Any Two of the following.		
A)	What is transponder? Explain transponder and frequency arrangement in details.	Remember	6
B)	Explain single conversion and double conversion transponder.	Remember	6
C)	Derive and explain $(C/N)_i = \frac{1}{\frac{1}{\left(\frac{C}{N}\right)_U} + \frac{1}{\left(\frac{C}{N}\right)_D} + \frac{1}{\left(\frac{C}{N}\right)_I}}$	Understand	6
Q. 5	Solve Any One of the following.		
A)	Illustrate the variation of frequency of slow FH/MFSK signal with time for one complete period of PN sequence. The FH/MFSK signal has following	Analysis	12

parameters:
    a. No. Of bits per MFSK symbol = 2
    b. Number of MFSK tones = 4
    c. Length of PN segment per hop = 3
    d. Total No. Of frequency hops = 8
    Input binary data: 010011100110011010101010011110
    PN Sequence: 110 101 011 001 110 111 101

B) Explain System Noise Temperature and derive the Equation for C/N ratio.　　Understand　　12

Define the Figure of Merit.

<p align="center">*** End ***</p>