B.E. Eighth Semester (Electronics & Communication /
Electronics & Telecommunication Engineering) (C.B.S.)
Elective - III : Satellite Communication

P. Pages : 2

Time : Three Hours

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Notes :   1.   All questions carry marks as indicated.
          2.   Solve Question 1 OR Questions No. 2.
          3.   Solve Question 3 OR Questions No. 4.
          4.   Solve Question 5 OR Questions No. 6.
          5.   Solve Question 7 OR Questions No. 8.
          6.   Solve Question 9 OR Questions No. 10.
          7.   Solve Question 11 OR Questions No. 12.
          8.   Due credit will be given to neatness and adequate dimensions.
          9.   Assume suitable data whenever necessary.

1.   a)   What are the advantages and disadvantages of Geostationary orbit ?   **3**

     b)   State & explain Kepler's laws of planetary motion.   **6**

     c)   Explain briefly how will you locate a satellite in the orbit.   **5**

OR

2.   a)   Draw the block diagram of Attitude & orbit control system & explain it in detail.   **7**

     b)   Write a short note on orbital perturbations.   **7**

3.   a)   Explain the design of the downlink of satellite communication system. Also derive the expression for the power received at the earth station.   **7**

     b)   An earth station antenna has a diameter of 30 m, has an overall efficiency of 68% and is used to receive a signal of 4150 MHz. At this frequency, the system noise temperature is 79 K when the antenna points at the satellite at an elevation angle of 28°. What is the earth station G/T ratio under these conditions ? If heavy rain causes the sky temperature to increase so that the system noise temperature rises to 88 K, what is the new G/T value ?   **6**

OR

4.   a)   A satellite at a distance of 40,000 km from a point on the earth's surface radiates a power of 10 W from an antenna with a gain of 17 dB in the direction of the observer. Find the flux density at the receiving point & the power received by an antenna at this point with an effective area of 10 m^2.   **7**

     b)   Explain various design issues related with uplink design & give the expression of C/N for the same.   **6**

5.   a)   What is meant by intermodulation products ? How are they produced ? Explain with mathematical expression.   **7**

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	b)	Write a short note on DAMA.	**6**

OR

6.	a)	What are the techniques used for spread spectrum transmission ? Explain SS-CDMA transmission & reception using direct sequence psedonoise technique.	**7**
	b)	Write a short note on TDMA.	**6**
7.	a)	What do you mean by propogation effects ? Explain briefly.	**6**
	b)	Explain the effect of atmospheric absorption on satellite communication.	**7**

OR

8.	a)	Explain rain & ice effect on satellite communication.	**6**
	b)	Write a short note on effect of rain on antenna noise temperature.	**7**
9.	a)	Explain the channel capacity. State & explain Hartley Shannon law with power limited & B.W. limited link.	**7**
	b)	Construct a decoding table for a single error correcting (7, 4) cyclic code if the generator polynomial g(x) is $x^3 + x^2 + 1$. If the received code ward is 1101010, find whether it is in error. If yes, what is the correct codeward which was transmitted.	**7**

OR

10.	a)	The purity check matrix of a particular (7, 4) linear block code is expressed as $$H = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$ Obtain the generator matrix (G) & List of all code vectors.	**7**
	b)	What are convolutional codes ? Explain how they are generated ? State is advantages over linear block code.	**7**
11.		Write short notes on **any three.**	**13**
		i) LNA & HPA.	
		ii) Tracking	
		iii) RF multiplexer.	
		iv) Factors affecting orbit utilization.	

OR

12.	a)	Explain the factors affecting the orbit utilization.	**6**
	b)	What are the requirements of earth station antenna for satellite communication.	**7**

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