Duration: 3 hrs   **[Max Marks: 80]**

N.B. : (1) Question No 1 is Compulsory.
       (2) Attempt any three questions out of the remaining five.
       (3) All questions carry equal marks.
       (4) Assume suitable data, if required and state it clearly.

1		**Attempt any FOUR**	**[20]**
	a	Explain briefly sun transit outage	**[5]**
	b	Write a short note on bath tub curve.	**[5]**
	c	Compare FH-CDMA and DS- CDMA	**[5]**
	d	Explain different types of tracking system used in satellite earth stations	**[5]**
	e	State and explain Kepler's laws.	**[5]**
2	a	Explain the Spin Stabilization and 3-axis stabilization methods. Mention their merits and demerits.	**[10]**
	b	Derive general link equation. Find expression for C/N and G/T ratio. Explain importance of these ratios in satellite link design.	**[10]**
3	a	Write in brief on inclination correction and circularization procedure.	**[10]**
	b	Draw and explain the block diagram of: (i) Outdoor unit for DBS home receiver. (ii) Indoor unit for DBS home receiver	**[10]**

4   a   Explain TDMA frame structure and Unique word detection in detail.   **[10]**

     b   A multiple carrier satellite circuit operates in the 6/4 GHz band with the following characteristics. Uplink: Saturation flux density -67.5 dBW/m^2; input BO 11 dB; satellite G/T -11.6 dB/K. Downlink: Satellite saturation EIRP 26.6 dBW; output BO 6 dB; free-space loss 196.7 dB; earth station G/T 40.7 dB/K. For this example, the other losses may be ignored. Calculate the carrier-to-noise density ratios for both links and the combined value.   **[10]**

5   a   Describe window and frame organization in details.   **[10]**

     b   Derive an expression for combined uplink and downlink C/N ratio. For a satellite circuit the individual link carrier-to-noise spectral density (C/N_0) ratios are: uplink 100 dBHz; downlink 87 dBHz. Calculate the combined C/N_0 ratio.   **[10]**

6   a   Explain INMARSAT mobile satellite services in detail   **[10]**

     b   Explain Limits of Visibility with its derivation.   **[10]**

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