**Duration: 3hrs** **[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.

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|---|---|---|---|
| **1** | | **Attempt any FOUR** | **[20]** |
| | **a** | Describe 3-axis stabilization. | **[5]** |
| | **b** | What do you mean by earth eclipse of satellite? | **[5]** |
| | **c** | What are losses involved in satellite communication and how they are minimized? | **[5]** |
| | **d** | Explain Telecommand format for nanosatellite. | **[5]** |
| | **e** | Compare LEO, MEO and GEO. | **[5]** |
| **2** | **a** | What do you understand by orbital perturbations? Give main causes of orbital perturbation. | **[10]** |
| | **b** | Derive an expression for overall uplink and downlink C/N ratio. For a satellite circuit the carrier-to-noise ratios are uplink 23dB, downlink 20dB, and intermodulation 24 dB. Calculate the overall carrier- to-noise ratio in decibels. | **[10]** |
| **3** | **a** | Why do you require deployment mechanisms in nanosatellite and which are the critical elements in deployment mechanisms? | **[10]** |
| | **b** | Discuss Limits of Visibility with its derivation. | **[10]** |
| **4** | **a** | Derive general link equation and also explain system noise temperature. | **[10]** |
| | **b** | List and describe the materials used for nanosatellite structure. | **[10]** |
| **5** | **a** | What do you mean by active thermal control and what are the different techniques used for it w.r.t. nanosatellite? | **[10]** |
| | **b** | Describe receive only earth station in detail. | **[10]** |
| **6** | **a** | Write short note on: i) input and output backoff<br>ii) Orbit Control System | **[10]** |
| | **b** | What are the different types of nano satellite structure design? | **[10]** |

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