

Duration: 3 hours

[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 What is the effect of atmospheric drag? How to mitigate it? [5]
 b List various frequency bands used in satellite communication. Mention advantages and disadvantages of 14/12 GHz band used in satellite communication [5]
 c How to select Launching sites? Where is India's Launching pad? [5]
 d How the reliability analysis is done in case of Nano satellite? [5]
 e Explain power system used in Nano satellite. [5]

- 2 a Write short note on: i) Input back off and output back off [10]
 ii) Limits of visibility and sun transit outage

- b Explain three axis stabilization with suitable diagram. Mention its limitations. [10]

- 3 a Draw and explain Receive only type earth station. What do you mean by redundant earth station? [10]

- b Explain the propulsion system used in satellite. Specify which liquid and solid propulsion is used. [10]

- 4 a At room temperature the noise factor of a lossy network is equal to its power loss. YES/NO. Justify. [10]

LNA is connected to a receiver which has a noise figure of 12 dB. The gain of the LNA is 40 dB, and its noise temperature is 120 K. Calculate the overall noise temperature referred to the LNA input.

- b An uplink operates at 14 GHz, and the flux density required to saturate the transponder is 120 dB (W/m²). The free-space loss is 207 dB, and the other propagation losses amount to 2 dB. Calculate the earth-station [EIRP] required for saturation, assuming clear-sky conditions. Assume [RFL] is negligible. [10]

- 5 a Explain TT &C with suitable diagram. What is its significance? Explain this with example. [10]
- b Explain functions and design considerations of deployment mechanisms. List critical elements in deployment mechanism. [10]
- 6 a Explain scientific payload with suitable diagram. Which type of orbit you will use for this type of payload? Justify your answer [10]
- b List and explain various Active thermal control systems for Nano satellite. Which one you select for your satellite? Why? [10]
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