19/05/2025 BE EXTC SEM-VIII C-SCHEME SNSC QP CODE: 10083207

**Duration: 3hours** **[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 | 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<br>ii) Limits of visibility and sun transit outage | **[10]** |
| | 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.<br>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. | **[10]** |
| | b | An uplink operates at 14 GHz, and the flux density required to saturate the transponder is 120 dB ($W/m^2$). 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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