B. E-(Sem-VIII)/EXTC/Aug-2025/22/08/25

**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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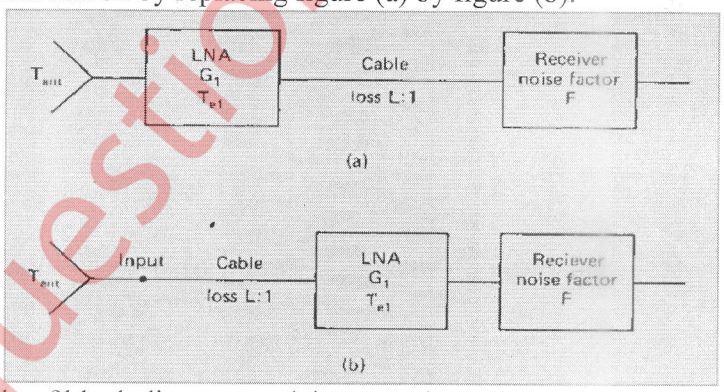
| 1 | | **Attempt any FOUR** | [20] |
| | a | State and explain Kepler's laws. | [5] |
| | b | Write a short note on bath tub curve. | [5] |
| | c | What is the system noise temperature? How does it affect the C/N and G/T ratio? | [5] |
| | d | Differentiate between "geostationary" and "low altitude" satellites. Which one is suitable for communication and why? | [5] |
| | e | Briefly explain power system design in nanosatellite. | [5] |
| 2 | a | Explain launching of synchronous satellite using ELV launch. Briefly list some launch vehicles with features. | [10] |
| | b | What do you mean by active thermal control and what are the different techniques used for it w.r.t. nanosatellite? | [10] |
| 3 | a | What are the orbital parameters required to determine a satellite orbit? Explain them in detail. | [10] |
| | b | For the system shown in figure (a), the receiver noise figure is 12 dB, the cable loss is dB , the LNA gain is 50 dB and its noise temperature is 150 K. The antenna noise temperature is 35K. Calculate the noise temperature referred to the input. Repeat the calculation by replacing figure (a) by figure (b). | [10] |

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| 4 | a | With the help of block diagram explain transmit receive type of earth station. | [10] |
| | b | With neat diagram explain an Optical camera for earth observation. | [10] |
| 5 | a | Write short note on: i) Double conversion Ku band<br>ii) AM/PM conversion factor | [10] |
| | b | Briefly describe OBC Software and hardware. | [10] |
| 6 | a | What are the different types of Nano satellite structure design? | [10] |
| | b | Describe the significance of carrier to noise ratio and carrier to noise density ratio. | [10] |