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Code No: **R18A0429** MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous Institution – UGC, Govt. of India)

IV B.Tech - II Semester Advance Supplementary Examinations, June 2023 Satellite Communications

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Roll No

Time: 3 hours

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Ouestion from each SECTION and each Question carries 14 marks.

SECTION-I Why is satellite transmission necessary? How a Satellite Operates? 1 A [7M] Compare the different satellites in earth orbit. B [7M] OR 2 Explain spacecraft in earth orbit. A [7M] What significance do coverage angle and tilt range have? B [7M] **SECTION-II** 3 Discuss satellite antenna equipment. A [7M] Describe how the link budget can be used as a tool for performance prediction and [**7M**] B determining whether the system delivers adequate performance. OR Describe the satellite's telemetry, tracking, and communication (TT&C) subsystem. 4 A [7M] utilising a block layout as guidance. Suppose we have a 4GHz receiver with the following gains and noise B [**7M**] temperatures, Tin=25K GRF =23 dB TIF=1000K TRF=50K GIF=30dB Tm=500K, Calculate the system noise temperature when the mixer has 10 dB loss. How can the noise temperature of the receiver be minimized when the mixer has a loss of 10 dB?

SECTION-III

- What satellite communication systems working in the W/V band consider cloud 5 A [7M] attenuation to be the most important propagation impairment?
 - Explain how the overall path attenuation in the W/V band is affected by gaseous B [7M] attenuation.

OR

- 6 Describe demand assignment multiple access and list the different kinds of demand A [7M] assignments (DAMA). [7M]
 - Explain about TDMA frame structure. B

SECTION-IV

- Describe the operation of the transmitter portion of a standard earth station using a 7 A [7M] block diagram. What is being done here with the HPAs?
 - Describe the role that GPS receivers play in satellite tracking. B [7M]

OR

- 8 A satellite in earth orbit passes through its perigee point at an altitude of 200 km [7M] A above the earth's surface and at a velocity of 7,850 m/s. Calculate the apogee altitude of the satellite.
 - Explain the tracking mechanism in the satellite communications earth station using B [7M]

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Max. Marks: 70

a block diagram.

SECTION-V

9	A	Briefly describe the M/G/I Queue-based FDMA message delivery.	[7M]
	B	Explain how satellite networks use packet reservation.	[7M]
		OR	
10	\boldsymbol{A}	Explanation of Random Access Control for Message Delivery.	[7M]
	B	Consider a (7,4) cyclic code with, i) let data word d =(1010) find the corresponding code word .ii) let the code word c = (1100101) find the corresponding data word. ***	[7M]