Graphic Era HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Even) Semester Examination May-June 2025

Roll no.....

Name of the Program and semester: BTech (ECE), Sem VIII
Name of the Course: Satellite Communications
Course Code: TEC 801

Time: 3 hour

Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1	(2x10=20 marks)	
(a)	Explain centripetal acceleration and centrifugal force with referenced to satellite orbit. Calculate the period of geostationary orbit if $\mu=3.986*10^5$ km^3/s^2 and a=42164.17 km.	**CO 1**
(b)	What are the main advantages of satellite communication technologies? What are the conditions required for an orbit to be Geostationary? Explain different satellite launching methods in details.	
(c)	Explain Geosynchronous Orbits in detail. What is the difference between Geosynchronous & Geostationary satellites? Discuss the figure of eight of Geosynchronous satellite.	
Q2	(2x10=20 marks)	
(a)	Explain Schematic block diagram of satellite system. How Telemetry and Tracking command & Monitoring System affects the satellite performance?	**CO 2**
(b)	What is Orbit perturbations? Explain the significance of G/T ratio of an earth station. Determine the angle of tilt required for a polar mount used with an earth station at latitude 49 degree north. Assume a spherical earth of mean radius 6371 Km and ignore earth station altitude.	
(c)	Discuss General Configuration of an Earth Station.	
Q3	(2x10=20 marks)	
(a)	Explain Uplink and downlink system between the Earth station and the satellite with help of figure. Explain EIRP and Power Flux Density.	**CO 3**
(b)	Derive the relation between Power flux density and EIRP.	
(c)	What are the different parameters in Design of Downlinks & Uplinks. Explain with help of example	

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Q4	(2x10=20 marks)	**CO 4**
(a)	Write a detailed note on: • FDMA • CDMA • TDMA	
(b)	Explain Satellite-switched TDMA with the help of diagram.	
(c)	Explain Spread spectrum transmission and reception with help of diagram.	
Q5	(2x10=20 marks)	**CO 5, 6**
(a)	Explain GPS position location principle with equations.	
(b)	What is the navigational trilateration principle? Describe the regional navigation satellite systems with examples.	
(c)	What is VSAT? Explain with help of Diagrams. Describe the distinguishing feature of VSAT?	