Exam Seat No:_____ Enrollment No:_____

C.U.SHAH UNIVERSITY
WADHWAN CITY
University (Winter) Examination -2013

Course Name :M.Tech(EC)Sem-I **Subject Name: -Satellite Communication** **Duration :- 2:30 Hours**
Date : 15/1/2014 **Marks : 70**

Instructions:-
(1) Attempt all Questions of both sections in same answer book / Supplementary.
(2) Use of Programmable calculator & any other electronic instrument is prohibited.
(3) Instructions written on main answer Book are strictly to be obeyed.
(4) Draw neat diagrams & figures (If necessary) at right places.
(5) Assume suitable & Perfect data if needed.

SECTION – I

Q.1	(a)	Explain (1) Subsatellite path (2) Apogee.	02
	(b)	Explain (1) Perigee (2) Line of apsides.	02
	(c)	Explain (1) Ascending node (2) Descending node	02
	(d)	What is Line of nodes?	01
Q.2	(a)	Determine the angle of tilt required for a polar mount used with an earth station at latitude 49° north. Assume a spherical earth of mean radius 6371 km, and ignore earth-station altitude.	05
	(b)	Determine the limits of visibility for an earth station situated at mean sea level, at latitude 48.42° north, and longitude 89.26 degrees west. Assume a minimum angle of elevation of 5°.	05
	(c)	An earth station is located at latitude 35°N and longitude 100°W. Calculate the antenna-look angles for a satellite at 67°W	04
		OR	
Q.2	(a)	An earth station is located at latitude 12°S and longitude 52°W. Calculate the antenna-look angles for a satellite at 70°W.	05
	(b)	Explain the advantages and disadvantages of satellite communication.	05
	(c)	An earth station is located at latitude 35°N. Assuming a polar mount antenna is used, calculate the angle of tilt.	04
Q.3	(a)	State and explain Kepler's law in relation to artificial satellites orbiting the earth.	07
	(b)	Explain detailed block diagram of a transmit -receive earth station.	07
		OR	
Q.3	(a)	Explain Receive-Only Home TV Systems with diagram.	07
	(b)	Write a short note on MATV.	07

SECTION – II

Q.4	(a)	Explain (1) Inclination (2) Argument of perigee	02
	(b)	Explain Side Real Day.	02
	(c)	Enlist Losses that can occur in uplink and downlink.	02
	(d)	Explain Mean anomaly.	01

Q.5	(a)	Prove mathematically that is only one geostationary orbit is possible.	05
	(b)	In a link-budget calculation at 12 GHz, the free-space loss is 206 dB, the antenna pointing loss is 1 dB, and the atmospheric absorption is 2 dB. The receiver [G/T] is 19.5 dB/K, and receiver feeder losses are 1 dB. The EIRP is 48 dBW. Calculate the carrier-to-noise spectral density ratio.	05
	(c)	An uplink at 14 GHz requires a saturation flux density of -91.4 dBW/m^2 and an input BO of 11 dB. The satellite [G/T] is -6.7 dB/K and receiver feeder losses amount to 0.6 dB. Calculate the carrier-to-noise density ratio.	04

OR

Q.5	(a)	The EIRP from a satellite is 49.4 dBW. Calculate (a) the power density at a ground station for which the range is 40,000 km and (b) the power delivered to a matched load at the ground station receiver if the antenna gain is 50 dB. The downlink frequency is 4 GHz.	05
	(b)	An earth station radiates an [EIRP] of 54 dBW at 14 GHz from a 10-m parabolic antenna. The transmit feeder losses between the HPA and the antenna are 2.5 dB. Calculate the output of the HPA.	05
	(c)	Write a short note on Radarsat.	04
Q.6	(a)	Explain what is meant by satellite attitude, and briefly describe two forms of attitude control.	07
	(b)	Explain TT&C subsystem in detail.	07

OR

Q.6	(a)	Explain wide band receiver of the transponder in detail.	07
	(b)	Draw Block schematic for the indoor unit (IDU) of DBS and explain.	07

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