PVP 20

Code: 20EC2702B

IV B.Tech - I Semester – Regular / Supplementary Examinations
OCTOBER 2024

SATELLITE COMMUNICATIONS
(Common for ALL BRANCHES)

Duration: 3 hours Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	Discuss the future trends and advanced concepts relating to the satellite communication.	L2	CO1	7 M
	b)	What is Satellite? Define Satellite Communication. Describe briefly the main advantages offered by satellite communication.	L2	CO1	7 M
OR					
2	a)	Outline the history of satellite communication.	L2	CO1	7 M
	b)	List and explain the frequency band allocations used for satellite services.	L2	CO1	7 M

UNIT-II					
3	a)	Identify and explain different launchers and launch vehicles.	L4	CO2	7 M
	b)	What are look angles? Develop the expressions for elevation angle.	L3	CO2	7 M
OR					
4	a)	A satellite in an elliptical orbit around the earth has an apogee of 39,152km and a perigee of 500 km. What is the orbital period of this satellite? Assume radius of earth is 6378.137 km and Kepler's constant has the value $3.98*10^5$ km^3/s^2.	L3	CO2	7 M
	b)	Explain in detail about of Orbital perturbations.	L2	CO2	7 M
UNIT-III					
5	a)	Write notes on: (i) Space qualification (ii) Satellite antenna equipment reliability.	L2	CO3	8 M
	b)	What are the various subsystems in the satellite? Explain the power system.	L2	CO3	6 M
OR					
6	a)	Explain how altitude control is established through various satellite stabilization techniques.	L2	CO3	7 M
	b)	Mention the different antennas used on satellites. Explain with the help of typical satellite antenna patterns and coverage zones.	L2	CO3	7 M

UNIT-IV					
7	a)	Consider the receiver side of an earth station. The antenna gain is 65 dB and it noise contribution in 60 K. The wave guide Ions is 0.5 dB. Find the equivalent noise temperature of LNA assuming that the noise contribution by the down converter is negligible and earth station G/T is 40 dBK. (T_o=300K).	L4	CO2	7 M
	b)	From system noise temperature calculation, prove that C/N ratio is directly proportional to G/T ratio.	L4	CO2	7 M
OR					
8	a)	A multiple carrier satellite circuit operate in the 6/4GHz band with the following characteristic. Uplink: saturation flux density -67.5dBW/m^2, input backoff 11dB; satellite G/T -11.6dB/K. Downlink: satellite saturation EIRP 26.6dB/K; output backoff 6dB; free-space loss 196.7dB; earth station G/T 40.7dB/K. For this example, the other losses may be ignored. Calculate the carrier-to-noise density ratios for both links and the combined value.	L4	CO2	7 M
	b)	Explain the design procedure of satellite communication link.	L2	CO2	7 M

UNIT-V					
9	a)	Explain Satellite switched TDMA with onboard processing. Brief about DAMA.	L2	CO4	8 M
	b)	Detail the acquisition and tracking mechanism for CDMA techniques.	L3	CO4	6 M
OR					
10	a)	Describe the ways in which demand assignment may be carried out in an FDMA network.	L2	CO4	8 M
	b)	In a TDMA network the reference burst and the preamble each require 560 bits, and the nominal guard interval between bursts is equivalent to 120 bits. Given that there are eight traffic bursts and one reference burst per frame and the total frame length is equivalent to 40,800 bits, calculate the frame efficiency.	L3	CO4	6 M