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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Eighth Semester, B.E. - Electronics and Communication Engineering
Semester End Examination; July - 2023
Satellite Communication

Time: 3 hrs   Max. Marks: 100

Course Outcomes

The Students will be able to:
CO1: Recall the fundamentals of orbital mechanics, the characteristics of common orbits used by communications another satellite.
CO2: Understand the systems required by a communications satellite to function and the trade-offs and limitations encountered in the design of a communications satellite system.
CO3: Model the concepts of signal propagation affects, link design, rain fading and link availability and perform interference calculations.
CO4: Calculate an accurate link budget for a satellite or other wireless communication networks.
CO5: Understand the analog and digital technologies used for satellite communication networks.

<u>*Note*</u>*: I) PART - A is compulsory. Two marks for each question.*
II) PART - B: Answer any <u>Two</u> sub questions (from a, b, c) for a Maximum of 18 marks from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
1 a.	Calculate the time in days, hours, minutes and seconds for the epoch day 225.89854156.	2	L2	CO1	PO1
b.	In a travelling -wave tube amplifier, what are the different elements used to form an electron beam and how it is going to confine inside of a wire helix.	2	L1	CO2	PO1
c.	Write a diagram which shows acquisition of a carrier in a CDMA system.	2	L1	CO3	PO1
d.	Calculate the gain in decibels of a 3-m parabolaidal antenna operating at a frequency of 12 GHz. Assume an aperture efficiency of 0.55.	2	L2	CO4	PO1
e.	Why forward error correction is must in DBS TV and what are the different types of codes used to correct different errors?	2	L1	CO5	PO1
	II : PART - B	**90**			
	UNIT - I	**18**			
2 a.	Explain different causes of orbital perturbations.	9	L2	CO1	PO1
b.	State and explain Kepler's law of planetary motion with neat diagram and necessary equations.	9	L2	CO1	PO1
c.	Derive an expression for determining the azimuth and elevation angle of satellite antenna.	9	L3	CO1	PO2
	UNIT - II	**18**			
3 a.	Briefly illustrate the function of antenna subsystem.	9	L3	CO2	PO2

b.	With the aid of a block diagram, briefly describe the functioning of the satellite TV/FM receiving system intended for the home reception.	9	L2	CO2	PO2
c.	Describe different propagation effects that are not associated with hydrometeors.	9	L2	CO2	PO2

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UNIT - III **18**

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4 a.	With relevant sketches, explain the following:				
	i) Carrier recovery	9	L2	CO3	PO1
	ii) Network synchronization				
b.	Explain the frame and burst formats for a TDMA system.	9	L2	CO3	PO1
c.	Briefly explain frequency modulation technique for satellite link.	9	L2	CO3	PO1

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UNIT - IV **18**

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5 a.	Derive an expression for system noise temperature (T_s) when amplifiers are in cascaded form.	9	L3	CO4	PO2
b.	Explain the "Bent pipe" satellite relays system with its layer architecture.	9	L2	CO4	PO2
c.	With a neat diagram, explain the TCP/IP satellite link spoofing configuration.	9	L2	CO4	PO1

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UNIT - V **18**

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6 a.	Explain the following:				
	i) Transponder capacity	9	L2	CO5	PO1
	ii) Bit rates for digital television				
b.	Explain in detail the working of MPEG-2 encoder paths.	9	L2	CO5	PO1
c.	Describe the features and advantages of Iridium system.	9	L2	CO5	PO2

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