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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 / Aug. - 2022

Satellite Communication

Time: 3 hrs *Max. Marks: 100*

Course Outcome

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.

***Note**: I) **PART - A** is compulsory. **Two** marks for each question.*

*II) **PART - B**: Answer any **Two** 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**			
I a.	Calculate the time in days, hours, minutes and seconds for the epoch day 324.95616765.	2	L2	CO1	PO1
b.	Write the equation of Faraday rotation angle ϕ in the atmosphere.	2	L1	CO2	PO2
c.	Determine the miss probability for the following values: N: = 40 E: = 5 P: = 10^{-3}	2	L3	CO3	PO3
d.	Write the equation for the power output of the TWTA.	2	L3	CO4	PO4
e.	Write any two applications seen for Radar Sat.	2	L1	CO5	PO5
	II : PART - B	**90**			
	UNIT - I	**18**			
1 a.	Discuss the following: i) Universal Time ii) Julian Dates iii) Sidereal Time	9	L2	CO1	PO1
b.	A geostationary satellite is located at 90°W. Calculate the azimuth angle for an earth station antenna at latitude 35° N and longitude 100°W. Also find the range and antenna elevation angle.	9	L3	CO1	PO1
c.	State and explain Kepler's law of planetary motion with neat diagram and equations.	9	L2	CO1	PO1
	UNIT - II	**18**			
2 a.	With block diagram, explain satellite wide band receiver in detail.	9	L2	CO2	PO2
b.	Explain transmit-receive earth station with a more detailed block diagram.	9	L2	CO2	PO2
c.	Briefly explain the antenna subsystem.	9	L2	CO2	PO2

	UNIT - III	**18**			
3 a.	Discuss FDMA downlink analysis in detail.	9	L3	CO3	PO2
b.	Explain the following: i) S/N ratio for FM video transmission ii) SCPC FM links iii) FM threshold	9	L2	CO3	PO1
c.	Explain reference burst, preamble and post amble with respect to TDMA.	9	L2	CO3	PO1
	UNIT - IV	**18**			
4 a.	Describe transmission losses.	9	L2	CO4	PO2
b.	Explain the following: i) Output back off ii) Satellite TWTA output	9	L3	CO4	PO2
c.	Explain Enhancing TCP over satellite channels using standard mechanisms.	9	L2	CO4	PO1
	UNIT - V	**18**			
5 a.	With a block diagram, explain MPEG-2 Encoder paths.	9	L2	CO5	PO1
b.	Explain the following: i) Frequencies and polarization ii) Transponder capacity	9	L3	CO5	PO1
c.	Explain Radar sat objectives and applications in details.	9	L2	CO5	PO2

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