Hall Ticket Number:

Code No. : 17455 (A) N/O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (E.C.E.) VII-Semester Main & Backlog Examinations, Dec.-23/Jan.-24

Satellite Communication (PE-IV)

Time: **3 hours** Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	State the Laws of planetary motion to describe the motion of satellite in space?	2	1	1	1,PSO2
2.	List out the allotted frequency bands for satellite communications?	2	1	1	1,PSO2
3.	What is space segment and list out the subsystems of space segment?	2	1	2	1,PSO2
4.	Calculate the number of transponders, if the satellite uses 12 channels of frequency and frequency reuse is implemented.	2	3	2	2,PSO2
5.	Relate the G/T and C/N of an earth station?	2	2	3	1,PSO2
6.	Find the received power , if the satellite operated at a frequency of 11GHz, EIRP of 20dBW and with a path loss of 25.3dB. The receiving antenna has a gain of 52.3dB.	2	3	3	2,PSO2
7.	Draw the TDMA frame structure with the inputs from various Earth Stations	2	2	4	1,PSO2
8.	What is the need for multiple access techniques?	2	1	4	1,PSO2
9.	What is ECHO and list out the various types of ECHOs	2	1	5	1,PSO2
10.	What are the recent milestones of ISRO's 2023 launches and list out the key features of these launches?	2	1	5	1,PSO2
	Part-B (5 × 8 = 40 Marks)				
11. a)	INSAT at sub satellite point (SSP) with ls=83East, Ls=0North and the Earth station (ES) is at Hyderabad (le=78E, Le=22N). Find earth station elevation angle (EL) to INSAT.where: ls-Longitude of SSP, Ls- Latitude of SSP, le- Longitude of ES, Le- Latitude of ES.	4	3	1	2,PSO2
b)	Discuss about azimuth angle and derive the azimuth angle cases for GEO satellite?	4	2	1	1,PSO2
12. a)	Explain how satellite attitude control works, with suitable diagrams.	4	2	2	1,PSO2
b)	List out the antennas used at earth station and explain the structural functioning of cassegrain antenna?	4	2	2	1,PSO2

Contd... 2

13. a)	Derive the expression for overall system noise temperature at the receiving earth station.	4	4	3	1,PSO2
b)	Discuss about design of satellite links for specified C/N in detail.	4	2	3	1,PSO2
14. a)	Compare FDMA, TDMA and CDMA techniques	4	2	4	6,PSO2
b)	Explain the analyze the Channeling scheme for the Spade system	4	4	4	7,PSO2
15. a)	Discuss about the special purpose communication satellites?	4	2	5	6,PSO2
b)	List out the series of India **NavIC** System and its standard?	4	3	5	1,PSO2
16. a)	A satellite is moving in an elliptical orbit with the major axis equal to 42,000km, if the perigee distance is 8000km. find the apogee and the orbit eccentricity?	4	3	1	2,PSO2
b)	Explain the functioning of Telemetry Tracking and Command (TT&C) and the give the significance of each sub system.	4	4	2	1,PSO2
17.	Answer any ***two*** of the following:				
a)	What is path loss? Calculate the EIRP in dBW for satellite with downlink at 12 GHz operates, transmit power of 6W and an antenna gain of 48. 2dB.	4	3	3	7,PSO2
b)	Draw the TDMA frame structure and explain the same.	4	1	4	1,PSO2
c)	Discuss about INTELSAT in brief.	4	2	5	1,PSO2

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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