VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A++ Grade
B.E. (E.C.E.) VII-Semester Supplementary Examinations, July-2022
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.	How the satellites are broadly classified?	2	1	1	1
2.	Determine the semi major axis when the orbital period of a satellite is 650min.	2	2	1	2
3.	What are the different techniques used to stabilize the satellites?	2	1	2	1
4.	What is role of TTM block in satellite communication system?	2	2	2	1
5.	Express overall $(C/N)_o$ in terms of uplink $(C/N)_u$ and downlink $(C/N)_d$	2	3	3	2
6.	A satellite downlink at 11 GHz operates with a transmit power of 6 W and an antenna gain of 100 dB. Calculate the EIRP in dBW	2	3	3	2
7.	How space division multiple accessing technique used to double the transponder capacity?	2	2	4	1
8.	Why uplink frequency is higher than the down link frequency?	2	2	4	2
9.	List different protocols used in satellite communication.	2	1	5	1
10.	How to eliminate the echo present in the satellite telephone calls?	2	1	5	1

Part-B (5 × 8 = 40 Marks)

Q. No.	Stem of the question	M	L	CO	PO
11. a)	Explain how Keplers laws are used to describe the satellite orbit?	4	2	1	1
b)	Obtain the orbit equation for an elliptical orbit and prove that the orbital time period T, is given by $T^2=4\pi^2a^3/\mu$, where a = Semi major axis.	4	4	1	2
12. a)	Explain how altitude and orbit control is achieved from an earth station.	4	3	2	1
b)	Calculate the elevation and azimuthal look angles of Geo stationary satellite with (i) Earth station latitude Le=52⁰ North and longitude le = 0⁰ (ii) Satellite latitude Ls=0⁰ and longitude(sub satellite point) ls=66⁰ East	4	4	2	2

13. a)	Discuss about design of satellite links for specified C/N in detail.	4	3	3	2
b)	Illustrate the procedure of calculating the system noise temperature.	4	2	3	2
14. a)	The standard power output of the transponder after the back-off is 50 W. Find the input power from each earth station to keep the transponder in linear mode when the bandwidth allotted to each earth station is as given below Earth Station #1: 2.5 MHz Earth Station #2: 2.5 MHz Earth Station #3: 5.0 MHz Earth Station #4: 15 MHz Earth Station #4: 5.0 MHz Earth Station #6: 2.5 MHz Earth Station #7: 2.5 MHz	4	4	4	3
b)	Draw the TDMA frame structure and explain.	4	4	4	2
15. a)	Write the applications of satellites.	4	1	5	1
b)	Explain GPS constellation structure and segments.	4	1	5	1
16. a)	List different satellite orbits and with their specifications.	4	2	1	1
b)	Explain the role of a transponder in satellite communication. Also draw the simplified diagram of double conversion transponder for 14/11 GHz band.	4	3	2	2
17.	Answer any *two* of the following:				
a)	Draw the block diagram of Earth station receiver.	4	2	3	1
b)	Compare FDMA, TDMA and CDMA multiple accessing techniques.	4	2	4	1
c)	Write Short notes on Indian scientific satellite Chandrayan-2.	4	2	5	1

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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