R22 Regulation *Subject code:4P7DF*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VII Semester Regular/Supplementary Examinations, October 2026

SATELLITE COMMUNICATIONS

(ECE)

Maximum Marks: 60 Date:30.10.2026 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	BTL
1.a)	Mention the future trends in satellite communication system.	1M	1	1
b)	Define the terms Apogee and perigee.	1M	1	1
c)	Write about antenna look angles.	1M	2	2
d)	State the purpose of a satellite antenna.	1M	2	1
e)	Compare TDMA and FDMA.	1M	3	2
f)	What is mean by multiple access	1M	3	1
g)	What are the various types of power amplifiers used at satellite earth station?	1M	4	1
h)	What is the primary function of an earth station in satellite communication?	1M	4	1
i)	What are the features of GPS?	1M	5	1
j)	What is code accuracy?	1M	5	1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	a) A low earth orbit satellite is at an altitude of 250km above the earth's surface. Assuming earth's diameter is approximately 12,756.28km, calculate the period of when the orbit is circular. Also find the linear velocity of the satellite along its orbit. b) Describe the orbit and explain how the satellite is located with respect to the earth.	5M 5M	1	1
	OR			
3	a) Illustrate geostationary transfer orbit and AKM approach to geostationary orbit using a neat diagram. b) A geostationary satellite moving in an equatorial orbit is at a height of 35786Km from the earth's surface. If the earth radius is taken as 6378 Km, determine the theoretical maximum coverage angle and maximum slant range.	5M 5M	1	3

4	Analyze the role of sensors, actuators, and control techniques in the Attitude and Orbit Control System for maintaining satellite attitude and orbit.	10M	2	4
	OR			
5	a) Discuss about Telemetry and Tracking in detail. b) Explain the redundancy type of approach used for improving reliability in satellite.	5M 5M	2	2
6	Explain the principle of CDMA and spread spectrum transmission and reception.	10M	3	2
	OR			
7	Explain system noise temperature and G/T ratio in detail. Analyze their significance in determining the performance of a satellite communication link.	10M	3	4
8	a) Draw the block diagram of a typical earth station transmitter and explain. b) Explain in detail about tracking system in earth station.	5M 5M	4	2
	OR			
9	Draw the block diagram of earth station neatly and explain each block in detail.	10M	4	2
10	a) Explain the GPS position location principles. b) Explain the orbit characteristics of LEO and GEO satellites and compare their orbital parameters.	5M 5M	5	2
	OR			
11	a) Discuss about Delay and Throughput considerations for a geo stationary satellite. b) Explain the major system considerations and operational aspects of NGSO satellite constellations.	5M 5M	5	4