PAPER ID-410419

Subject Code: KEC062

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VI) THEORY EXAMINATION 2023-24
SATELLITE COMMUNICATION

TIME: 3 HRS **M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Q no.	Question	Marks	CO
a.	Write Advantages of satellite communication.	02	1
b.	Define space debris.	02	1
c.	Write down the Kepler's Three laws of Planetary Motion.	02	2
d.	Explain the concept of orbital perturbations.	02	2
e.	Write down the name of Seven segments of Satellite communication.	02	3
f.	Define G/T ratio for satellite communication.	02	3
g.	Explain the process of satellite signal acquisition in a GPS receiver.	02	4
h.	Describe the principle of direct broadcast satellite (DBS) for television.	02	4
i.	Define intelligent testing in satellite system.	02	5
j.	Define inter-satellite link (ISL) technology.	02	5

SECTION B

2. Attempt any *three* of the following: **3 x 10 = 30**

a.	Briefly discuss the historical milestones that led to the development of satellite communication technology.	10	1
b.	Explain the basic principles of orbital mechanics and the forces governing satellite motion.	10	2
c.	Explain the key considerations for designing the downlink (satellite to Earth) and uplink (Earth to satellite) segments of a satellite communication link.	10	3
d.	Describe the basic components of a VSAT system Also discuss the advantages and limitations of VSAT.	10	4
e.	Describe the different types of satellites launched by ISRO (communication, navigation, Earth observation) and their application.	10	5

SECTION C

3. Attempt any *one* part of the following: **1 x 10 = 10**

a.	Define the concept of a geosynchronous orbit. Also write down the basic differences between geosynchronous and geostationary orbits.	10	1
b.	Explain the different phases in the lifespan of a satellite, including launch, commissioning, operational phase, and decommissioning.	10	1

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4. Attempt any *one* part of the following: 1 x 10 = 10

a.	Define the concept of look angle in satellite communication and its importance for establishing communication links.	10	2
b.	Write the advantages and disadvantages of geostationary orbit. A satellite moving in a highly eccentric Molniya orbit having the farthest and the closest points as 35000km and 500km respectively from the surface of the earth. Determine the orbital period and the velocity at the apogee and perigee points.	10	2

5. Attempt any *one* part of the following: 1 x 10 = 10

a.	Explain the concept of carrier-to-noise ratio (C/N) and its role in determining the quality of a satellite communication link.	10	3
b.	Explain how solar energy is converted into electrical power using solar panels and the role of batteries for storing energy during eclipse periods.	10	3

6. Attempt any *one* part of the following: 1 x 10 = 10

a.	Discuss the basic principles of GPS operation, including the use of multiple satellites, trilateration, and pseudorandom noise (PRN) codes.	10	4
b.	Write a short note on (a) GPS Navigation Message (b) GPS Signal Levels.	10	4

7. Attempt any *one* part of the following: 1 x 10 = 10

a.	Describe the different stages of a typical launch vehicle and the role of each stage in achieving orbit.	10	5
b.	Write a short note on (a) GSLV (b) PSLV	10	5