Paper id: 251022

Subject Code: BEC061

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

BTECH

(SEM VI) THEORY EXAMINATION 2024-25

SATELLITE COMMUNICATION

TIME: 3 HRS **M.MARKS: 70**

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt *all* questions in brief. **02 x 7 = 14**

Q no.	Question	CO	Level
a.	Explain the sun synchronous orbit.	1	K2
b.	State Kepler's second law of planetary motion.	2	K2
c.	Elucidate the term Sun Transit Outage with a neat diagram.	2	K2
d.	Elaborate the earth station parameters affecting the C/N ratio	3	K2
e.	The noise figure of an amplifier is 4dB. Calculate its equivalent noise temperature. Assume the room temperature to be 290K.	3	K3
f.	Draw the block diagram of GPS functioning.	4	K2
g.	Discuss about space X launch system.	5	K2

SECTION B

2. Attempt any *three* of the following: **07 x 3 = 21**

Q no.	Question	CO	Level
a.	Explain the terms Space qualification and Space debris.	1	K2
b.	Discuss argument of perigee, mean anomaly and true anomaly.	2	K2
c.	Explain TT and C system briefly.	3	K2
d.	Discuss briefly about VSAT? Describe the distinguishing feature of VSAT?	4	K2
e.	Briefly describe the satellite launch sequence.	5	K2

SECTION C

3. Attempt any *one* part of the following: **07 x 1 = 07**

Q no.	Question	CO	Level
a.	Enlist the elements of satellite communication. Elaborate each element with befitting block diagram.	1	K2
b.	Elaborate the term LEO, MEO and GEO. Also write their advantages and disadvantages.	1	K2

4. Attempt any *one* part of the following: **07 x 1 = 07**

Q no.	Question	CO	Level
a.	Elaborate the terms perigee and apogee in the context of satellite motion. A satellite is in an elliptical orbit with a perigee at 1000 km and apogee of 4000 km. Using mean radius of earth to be 6378.14 Km. Find the period of orbit in hours, minutes and seconds and also calculate eccentricity of the orbit.	2	K3

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b.	An earth station is located at a longitude of 76° east and latitude of 13° north while the satellite is at 83° east. Calculate the elevation and azimuth requirement of transmitting antenna. Assume the radius of satellite orbit R_{sa} 42164.17 Km and radius of the earth R_{ea}=6378.137Km.	2	K3

5. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Explain the system noise temperature. Derive its relation for equivalent system noise temperature.	3	K2
b.	A satellite TV signals occupies the full transponder bandwidth of 36 MHz, and it desire to provide a C/N ratio of 22 dB tat earth station. If a downlink frequency of 4GHz is employed and other losses amount to 3.4 dB, what must be the G/T ratio of the earth if EIRP is 37dBW? The path length may be assumed to be 40000Km.	3	K3

6. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Explain the basic principle of a GPS system. Explain why a minimum of four satellites must be visible at an earth location utilizing the GPS system for position determination.	4	K3
b.	Delineate the DBS home receiver with help of neat block diagram.	4	K2

7. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Differentiate between PSLV and GSLV and also write their vehicle and technical specifications clearly.	5	K2
b.	Explain the term intelligence testing, control and decision making for space. Also discuss intersatellite link in short.	5	K2