Basics of mobile and Satellite Communication(22ETOE03)

Question Bank on unit 4 & 5 for CIE II

UNIT4

1	With neat sketches state and explain Kepler's laws with respect to satellite orbiting the earth.
2	A satellite is in an elliptical orbit with a perigee height 1000kms and an apogee height of 4000kms using mean earth radius of 6378Kms. Find i) The eccentricity of the orbit. ii)Semimajor axis iii)period of the orbit in hours.
3	The orbit for an earth orbiting satellite orbit has an eccentricity of 0.15 and a semimajor axis 0f 9000km. Determine a)its periodic time b)the apogee height c)the perigee height. Assume a mean value of 6371Km for the earth's radius.
4	A satellite in geostationary orbit has an apogee height of 35,795Km and a perigee height of 35,779km. Assuming a value of 6378Km for the earth's equatorial radius, Calculate the semi major axis, eccentricity and period of the satellites orbit.
5	Explain the different satellite Orbits on basis of their distance from the surface of the earth and their applications.
6	Explain Power control subsystem in satellites.
7	Differentiate between Geosynchronous and geostationary orbit.
8	Explain in detail the equipment sections making up a transponder subsystem.
9	Define satellite attitude and briefly describe Attitude control subsystem.
10	Explain with typical block diagram Telemetry tracking and command system.
11	From the basics of transmission theory Illustrate with equations, the satellite link formula for power received. Express the formula in decibels and list all the losses with respect to the satellite link budget.
12	An antenna has a noise temperature of 35k and is matched into a receiver which has a noise temperature of 100k. Calculate i) the noise power density. ii) The noise power for a band width of 36MHz
13	Define EIRP and express the received power in terms of EIRP ant total losses. In a link Calculation at 12GHz, the free space loss is 206dB, the antenna pointing loss is 1db, and the atmospheric absorption is 2dB. The receiver G/T ratio is 19.5dB/K. The EIRP is 48dBW. Calculate the carrier- to-noise spectral density ratio.
14	The specified down link are satellite saturation value of EIRP 25dBW, output back-off 6dB, free space loss 196dB, allowance for down link losses 1.5dB and earth station G/T is 41dB/K. Calculate the carrier to noise density ratio at earth station in dB.

UNIT-V

1	Explain Direct broadcast satellite Services. Also explain the Indoor Unit of Direct broadcast satellite Services with a neat block diagram.

2 Explain GPS system and why a minimum of four satellites must be visible at an earth location utilizing the GPS system for position determination. What does the term "dilution of position "refer to?

3 Compare chandrayan1 and chandrayan2 missions launched by ISRO with details of payload and launching process.

4 Describe the main features of RADARSAT with its operation. Explain "dawn to dusk" orbit and why Radarsat follows such an orbit.

5 What was the main objective of Chandrayaan-2 .Describe the components of Chandrayaan-2: Orbiter, Lander, Rover.

6 Define trilateration in GPS. Describe the position determination process using GPS.

7

Given PDOP = 2.5 and range error = 3 m.

Calculate position error.

8

A GPS receiver calculates the following ranges:

Satellite	True Range (
S1	21,000
S2	20,900
S3	20,800
S4	21,200

But measured pseudoranges are **200 m larger** than expected.

Find the **receiver clock bias.**

9 Describe the operation of a typical VSAT system. Briefly mention the applications of VSAT systems.

10 Describe the MOM mission of ISRO in detail with the satellite payload, its launch process and objectives.

11 Explain the following satellite mobile services with its applications.
i) Asian Cellular Systems. ii) Thuraya.