G. S. Mandal's

MARATHWADA INSTITUTE of TECHNOLOGY, AURANGABAD

DEPARTMENT of ELECTRONICS and TELECOMMUNICATION ENGINEERING

QUESTION BANK UNIT : I

Class: B. E. (A/B) **Course: Satellite communication**

Semester II -2017-18 **course co-ordinator: M. R. Vargantwar**

	1 Marks Questions
1.	Write the statement of Kepler's second law.
2.	Define apogee and perigee.
3.	Write the mathematical equation of power flux density of receiving antenna in terms of EIRP.
4.	Define argument of perigee.
5.	Write the statement of Kepler's first law.
6.	Define subsatellite path.
7.	What is sun transit outage?
8.	Define line of apsides.
9.	What are elevation and azimuth angles?
10.	What is sidereal time?
	Short Questions
1.	A satellite is moving in an elliptical orbit with a major axis equal to 42000 km. If the perigee distance is 8000 km., find the apogee distance.
2.	Draw and explain the block diagram of a satellite communication system.
3.	State and Explain the Kepler's third law of planetary motion.
4.	List different advantages and disadvantages of Satellite communication.
5.	What are prograde and retrograde orbits.
	Long Answer Questions
1.	A satellite is moving in a circular orbit at a height of 150Km above the surface of earth. If the radius of earth is 6360 Km, determine the orbital velocity and orbital period of the satellite. ($G=6.67\times10^{-11}$ Nm^2/kg, $M=5.98\times10^{24}$ kg)
2.	How the geostationary satellites are launched? Illustrate the launching process with the help of diagram.
3.	The different geostationary satellites in INSAT series are located 74^0 E and 94^0 E. Determine the line of sight between the two satellites orbiting the earth at height of about 36000 Km above the surface of the earth. Assume the radius of the earth to be 6370 Km.

4.	The LEO satellite is at 1000 Km from the subsatellite point on the earth. Determine the angular velocity and the time of orbit, considering ideal orbiting conditions. If this satellite has to scan from 20^{0} S-E to 40^{0} N-E . Estimate the number of satellites required for communication throughout 24 Hrs.
5.	Determine the average angular velocity of a satellite moving in an elliptical orbit. If the semimajor axis is 42164.8.km. and orbital eccentricity is 0.0011.

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QUESTION BANK UNIT : II

Class: B. E. (A/B) **Course: Satellite communication**

Semester II -2017-18 **course co-ordinator: M. R. Vargantwar**

	Short Answer Questions
1.	What is depolarization of radio wave propagation in satellite communication?
2.	List all the types of transmission losses in satellite space link.
3.	What is look angle?
4.	Define rain rate and rain attenuation.
5.	What is ionospheric scintillation?
6.	A satellite downlink at 12 GHz operates with a transmit power of 6 watt and an antenna gain of 48.2 dB. Calculate EIRP in dBW.
7.	If the amplifiers are connected in cascade, derive the equation for system temperature in terms of gain of the each stage.
8.	Explain the terms Noise Figure and Noise Temperature.
9.	What is satellite link power budget? Elaborate all terms is details
10.	Define EIRP, C/N ratio and G/T ratio.
	Long Answer Questions
1.	Determine the power received by satellite located at 40000 km from the surface of the earth. Satellite is operating at a frequency of 11 GHz and has EIRP of 21 dBW. The gain of receiving antenna is 50.5 dB.
2.	Name different types of losses in earth's atmosphere. Explain rain attenuation in detail. What are other impairments. Give details.
3.	Calculate, for a frequency of 12GHz and for horizontal polarization, the rain attenuation

	which is exceeded for 0.01 % of the time in any year, for a point rain rate of 10mm/hr. The earth station altitude is 600m and the antenna elevation angle is 50 degrees. The rain height is 3km. Given data a_h=0.0118. b_h=1.217.
4.	Discuss in details the factors that affect the link design of a satellite.
5.	A satellite at a distance of 36,000 Km from the surface of the earth receives the signal by an antenna of gain 15 dB. Find the flux density and power received by an antenna of effective area 12 m2. If the receiving antenna has a gain of 50 dB, then calculate the received power.
6.	Write short notes on a.) Orbital Perturbations b.) Link Power Budget c.) Ionospheric Effects
7.	The output from a satellite travelling wave tube amplifier is 10 W. This is fed to a 1.2 m parabolic antenna operating at 12 GHz, the feeder loss being 2 dB. Calculate EIRP.

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QUESTION BANK UNIT : III

Class: B. E. (A/B) **Course: Satellite communication**

Semester II -2017-18 **course co-ordinator: M. R. Vargantwar**

	Short Answer Questions
1.	What is meant by thin route service?
2.	What is SPADE system?
3.	What is guard time?
4.	How frequency reuse concept is used in SDMA?
5.	What are different types of multiple access systems ? List them.
	Long Answer Questions
1.	Explain with the help of a figure how 3 earth station transmits and receives simultaneously through the same satellite transponder using fixed assigned SDMA.
2.	Write short notes on PN System b.) SDMA c.) SPADE System
3.	Explain preassigned and demand assigned TDMA.
4.	Explain how demand is assigned and carried out in FDMA network.
5.	Briefly describe the operational principle of FDMA system. What is the significance of

	a guard band?
6.	Explain the Direct Sequence CDMA system with the help of a block diagram.

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QUESTION BANK UNIT : IV

Class: B. E. (A/B) **Course: Satellite communication**

Semester II -2017-18 **course co-ordinator: M. R. Vargantwar**

	Short Answer Questions
1.	What is a transponder?
2.	Explain thermal control in satellite.
3.	List several subsystems of a satellite.
4.	What is the need of a attitude and orbit control of a satellite?
5.	What are the different types of sensors used for attitude control of a satellite.
6.	What are the different parameters of an antenna?
	Long Answer Questions
1.	What is meant by satellite attitude control? Briefly describe two forms of attitude control.
2.	Explain TT&C facility of satellite communication system with the help of a general block diagram.
3.	What is transponder? Draw and explain single conversion transponder for 6/4 GHz band.
4.	What is station keeping? Explain.
5.	What is a satellite stabilization? Write a comparative study between spin stabilization and three axes body stabilization.
6.	Write a short note on satellite antenna subsystem.

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QUESTION BANK UNIT : V

Class: B. E. (A/B) **Course: Satellite communication**

Semester II -2017-18 **course co-ordinator: M. R. Vargantwar**

	Short Answer Questions
1.	What is meant by a term redundant?
2.	What is meant by polarization interleaving ? Explain by giving one example.
3.	Give reasons why Ku band is used the DBS service?
4.	What is space qualification?
5.	Write the differences between small and large earth stations.
	Long Answer Questions
1.	Draw and explain the subsystem of earth station.
2.	Explain earth station antennas.
3.	Draw and explain a block schematic arrangement of a generalized earth station.
4.	What is DTH explain?
5.	Write a short note on types of earth stations.
6.	What is equipment reliability explain?
7.	What is HPBW of an antenna? Explain single conversion transponder for 6/4 GHz band.
8.	Draw and explain the block diagram of a home terminal DBS-TV receiving system.

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QUESTION BANK UNIT : VI

Class: B. E. (A/B) **Course: Satellite communication**

Semester II -2017-18 **course co-ordinator: M. R. Vargantwar**

	Long Answer Questions
1.	What is LEO and MEO satellite? State their applications.
2.	Explain remote sensing and mobile satellite services.
3.	Explain non-geostationary orbit satellite systems.
4.	Write short note on a.) Weather forecasting using Satellite b.) GPS and GSM c.) Scientific Satellite d.) GRAMSAT
5.	What is GPS? What information is carried by GPS signal carriers? State the three interacting components of GPS.
6.	Explain in details INMERSAT mobile satellite communication system.
7.	What are the different specifications of a satellite?