



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : EC801C SATELLITE COMMUNICATION & REMOTE SENSING

UPID : 008032

Time Allotted : 3 Hours

Full Marks : 70

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following :

[1 x 10 = 10]

- (I) _____ is a loss of power of a satellite downlink signal due to earth's atmosphere
- (II) The down link frequency in the C band transponder is _____
- (III) _____ technique uses spot beam antennas to divide the area covered by the satellite into smaller segments
- (IV) The most popular access method is _____, which allows the use of comparatively low-power VSAT terminals
- (V) In TV broadcast via satellite the TV signal from the main broadcast station is routed to the earth station via _____
- (VI) In satellite communication modulation is used _____
- (VII) DAMA stands for _____
- (VIII) What is meant by payload?
- (IX) Low-Earth-orbit (LEO) satellites have _____ orbits
- (X) Kepler's third law states?
 - a) $T^2 \propto a^3$ b) $T^3 \propto a^2$ c) $T^2 \propto a^{3/2}$ d) None of the above
- (XI) Geostationary satellite followpath
- (XII) Atmospheric drag has effect on
 - (a) geostationary satellites
 - (b) MEO
 - (c) LEO satellites below about 1000 km
 - (d) None of these

Group-B (Short Answer Type Question)

Answer any three of the following :

[5 x 3 = 15]

2. Explain GPS as an application of satellite . [5]
3. Explain the effect of rain on satellite communication. [5]
4. What is the importance of using 6/4 GHz as satellite carrier frequency? [5]
5. What is noise power spectral density? [5]
6. a) Mention the different frequency bands used for satellite communication. [5]
b) Calculate the radius of orbit for a earth satellite in a geosynchronous orbit, where the earth's rotational period is 86164.1 sec.

Group-C (Long Answer Type Question)

Answer any three of the following :

[15 x 3 = 45]

7. (a) Discuss any three-application satellite communication. [10]
(b) What are the advantages of satellite communication? [5]
8. (a) Discuss the effects of eclipse on a satellite? [4]
(b) What is system noise temperature? [3]
(c) Briefly discuss C/N and G/T ratio in connection with satellite communications? [5]
(d) Write a short note on VSAT. [3]
9. (a) Calculate the power gain of a horn antenna of a square aperture if the dimension of each side be 4. [5]
(b) Explain the transponder with a block diagram. [6]
(c) What is reliability? What is the importance of bath tub curve? [4]
Reliability technique is a mathematical technique which gives the idea about the probability of failure.
10. (a) What is guard time? Mention its role in TDMA efficiency? [5]

- (b) A TDMA frame with an efficiency of 95% having 14 numbers of traffic burst, 680 bits are therein the preamble. Calculate the number of voice channel available, when $T_f = 2$ ms, bit rate = 62 kbits/s and satellite transmission link = 120.832 mbits/s. [6]
- (c) What are the differences between TDM and TDMA? [4]
11. (a) What are look angles and why these are important? [3]
- (b) Explain the azimuth angle and Elevation Angle [7]
- (c) A satellite is moving in a circular orbit at a height of 150mkm above the surface of earth. If the radius of earth is 6360km, determine the orbital velocity and orbital period of the satellite. ($G=6.67 \times 10^{-11}$ Nm²/Kg, $M=5.98 \times 10^{24}$ Kg) [5]

*** END OF PAPER ***