



**Module 1 :Question Bank**

Q no	Question
1	Define the following terms a) satellite                      b) orbit                      c) trajectory
2	Explain the orbital mechanics related to satellites
3	Illustrate with some example effect of orbital height with respect to orbital velocity and orbital period of a satellite.
4	Explain the basic principle of satellite communication with neat diagram.
5	Explain the basic principle of satellite communication with neat diagram.
6	State and explain Kepler's laws of planetary motion with neat diagrams and necessary equations.
7	With neat sketches, define the following terms related to satellites. a) apogee, perigee and line of apsides b) Ascending node, descending node and line of nodes c) Inclination , prograde and retrograde orbit



Q no	Question
8	With neat sketches, define the following terms related to satellites. a) Argument of perigee and Right ascension of ascending nodes b) True anomaly, Mean anomaly and Eccentric anomaly
9	Give the Classification of satellites
10	Discuss the effect of injection velocity on satellite trajectory with expressions and neat sketches.
11	Discuss orbital perturbations in satellites.
12	With neat sketches, explain Earth Eclipse of Satellite
13	With neat sketches, explain sun transit outage
14	With neat diagrams , discuss the stabilization in satellites.
15	Compare different stabilization used in satellites.
16	Define Look angle, elevation and Azimuth as related to satellites.
17	A satellite is orbiting Earth in a uniform circular orbit at a height of 630 km from the surface of Earth. Determine the velocity of the satellite (Assuming the radius of Earth to be 6370 km)



Q no	Question
18	The apogee and perigee distances of a satellite orbiting in an elliptical orbit are respectively 45 000 km and 7000 km. Determine the following: 1. Semi-major axis of the elliptical orbit 2. Orbit eccentricity 3. Distance between the centre of the Earth and the centre of the elliptical orbit
19	A satellite is moving in an elliptical orbit with the major axis equal to 42 000 km. If the perigee distance is 8000 km, find the apogee and the orbit eccentricity.
20	The elliptical eccentric orbit of a satellite has its semi-major and semi-minor axes as 25 000 km and 18 330 km respectively. Determine the apogee and perigee distances.
21	Satellite A is orbiting Earth in a near-Earth circular orbit of radius 7000 km. Satellite B is orbiting Earth in an elliptical orbit with apogee and perigee distances of 47 000 km and 7000 km respectively. Determine the velocities of the two satellites at point X. (Take $= 3.98604 \times 10^{13} \text{ m}^3/\text{s}^2$ .)
22	Satellite A is orbiting Earth in an equatorial circular orbit of radius 42 000 km. Satellite B is orbiting Earth in an elliptical orbit with apogee and perigee distances of 42 000 km and 7000 km respectively. Determine the velocities of the two satellites at point X



### Module 2 a :Question Bank

Q no	Question
1	Discuss the functions of various subsystems of a typical satellite
2	With neat block diagram , explain basic block schematic arrangement of a regulated bus power supply system in satellite.
3	Compare the types of sources of energies available to generate power in satellite.
4	With neat diagram, explain Principle of Operation of a Solar Cell
5	Compare commonly used batteries in satellites
6	With neat block diagram explain Telemetry, tracking and command (TT&C) subsystem
7	Explain Attitude and orbit control subsystem in satellites
8	Discuss Payload subsystem in used in satellites.
9	Explain typical payload of a Communication satellite with neat diagram.

### Module 2 b :Question Bank

Q no	Question
1	Give the classification of Earth station based on service and usage.
2	Explain typical architecture of an Earth station.
3	Compare different Earth stations.
4	Mention important Earth Station Design Considerations
5	Discuss the important Key Performance Parameters related to Earth station.
6	Explain any TWO mandatory test to be conducted at Earth station.
7	Explain Any TWO hardware components of an Earth Station
8	Explain satellite tracking techniques.



### Module 3 a :Question Bank

Q no	Question
1	Explain TDMA frame structure.
2	Compare various multiple access technologies.
3	Clearly state definitions of multiple access technologies with neat diagrams.
4	Explain SCPC/PSK/FDMA system
5	Explain MCPC/FDM/FM/FDMA systems.
6	Compare various CDMA technologies with neat diagrams.
7	Explain DS-CDMA, FH-CDMA and TH-CDMA transmitter and receiver with neat block diagrams.
8	How frequency re-use concept utilized in SDMA/FDMA System and SDMA/TDMA System

### Module 3 b :Question Bank

Q no	Question
1	Derive satellite transmission equation.
2	Explain briefly satellite link parameters.
3	List all the frequency bands used in satellite communication.
4	Discuss propagation consideration in satellite communication.
5	Discuss noise and interference related problems in satellite communication.



## Module 4: Question Bank

Q.no	Question
1	Explain with neat diagram satellite point to point telephone network.
2	Explain the advantages and disadvantages of satellite over terrestrial networks.
3	What is transponder? Explain various types of transponder.
4	Describe the various methods of reception of satellite TV programs.
5	Explain with neat diagram the Satellite Telephony network.
6	Explain briefly: Satellite radio, Regional satellite Systems, National Satellite Systems.
7	Explain the related applications of communication satellites.
8	Explain the different frequency bands of communication Satellites.
9	Explain with a neat block diagram basic elements of satellite communication system.



## Module 5:Question Bank

Q.no	Question
1	What is remote sensing satellite systems? What are its applications?
2	Explain optical,thermal,microwave remote sensing systems.
3	Explain the supervised and unsupervised image classification of a satellite processed images.
4	Explain satellite remote sensing system on the basis of radiation and spectral region used for data acquisition.
5	Explain Weather Forecasting Satellites applications.
6	What are the military and civilian applications of satellite navigation system.
7	Explain the applications of Navigation Satellites systems.
8	Explain the working principle of global positioning satellite GPS system.
9	Explain GPS satellite signal structure.