LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME)
Approved by AICTE, New Delhi and Affiliated to JNTUK, Kakinada
L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

OBJECTIVE QUESTIONS

Name of Course Instructor(s) : Mr. V V Rama Krishna Reg : R20
Course Name & Code : Satellite Technology – 20EC80 Unit : II
Program/Sem/Sec : B.Tech., IT, V-Sem., Section – A, B, andC A.Y : 2023-24
L-T-P Structure : 3-0-0 Credits: 3

S.No	Question Description	Answer
1.	What does the term "apogee" refer to in orbital mechanics? A. The highest point in an object's elliptical orbit around Earth. B. The point where an object re-enters Earth's atmosphere. C. The lowest point in an object's elliptical orbit around Earth. D. The point where an object exits Earth's gravitational influence	A
2.	Which law states that a planet orbits the sun in an ellipse with the sun at one of the two foci? A. Newton's first law B. Kepler's third law C. Kepler's first law D. Newton's third law	C
3.	Which parameter defines the shape of an orbit and indicates how "stretched out" it is? A. Inclination B. Eccentricity C. Apogee D. Altitude	B
4.	The point in a satellite's orbit where it is closest to the Earth is called? A. Perihelion B. Apogee C. Perigee D. Aphelion	C
5.	Which of Kepler's laws states that the square of the period of any planet is proportional to the cube of the semi-major axis of its orbit? A. First law B. Second law C. Third law D. None of the above	C
6.	Which of the following can cause perturbations in a satellite's orbit? A. The uneven distribution of Earth's mass. B. Strong solar flares. C. Nearby celestial bodies, such as the Moon. D. Both A and C.	D

7.	The slight change in an object's orbit due to the pressure exerted by sunlight is known as: A. Atmospheric drag B. Tidal forces C. Solar radiation pressureD. Oblateness effect	C
8.	The effect of the Earth's atmosphere slowing down a satellite, especially in low Earth orbits, is termed: A. Solar wind deceleration B. Atmospheric drag C. Tidal deceleration D. Oblateness drag	B
9.	. The Global Positioning System (GPS) primarily consists of which three main segments? A. Space segment, User segment, and Control segment B. Satellite segment, Monitoring segment, and Navigation segment C. Orbital segment, Ground segment, and Mobile segment D. Tracking segment, Operational segment, and Receiver segment	A
10.	How many GPS satellites are typically needed to obtain an accurate 3D position (latitude, longitude, altitude) and time solution? A. 2 B. 3 C. 4 D. 5	C
11.	The Master Control Station (MCS) responsible for the operation of the GPS constellation is located in: A. California, USA B. Colorado, USA C. Florida, USA D. Washington, USA	B
12.	Station keeping is primarily performed to: A. Boost a satellite's speed. B. Change a satellite's mission. C. Correct and maintain a satellite's designated orbital position. D. Increase the lifespan of a satellite.	C
13.	North-South station keeping is primarily concerned with correcting: A. Altitude changes B. Speed discrepancies C. Inclination drifts D. Longitude variations	C

Course Instructor **Course Coordinator** **Module Coordinator** **HOD**

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CRIPTIVE QUESTIONS

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Course Name & Code : Satellite Technology – 20EC80 Unit : II
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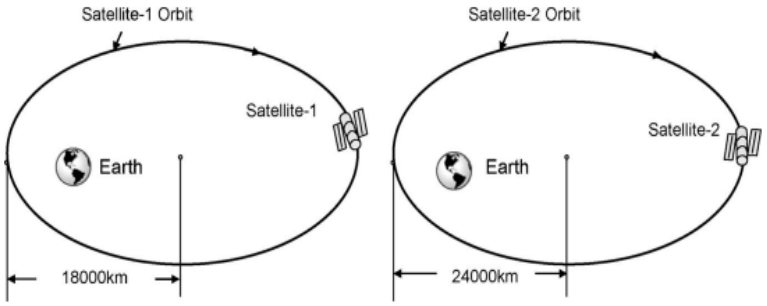
L-T-P Structure : 3-0-0 Credits: 3

S.No	Question Description	CO	BL
1.	Describe the architecture of GPS with a neat sketch and explain its applications.	CO3	L2
2.	State Kepler's laws of planetary motion with suitable diagrams and derive the relation between orbital period and semi-major axis.	CO3	L3
3.	Refer to Figure, the semi-major axes of the two satellites shown in the figure are 18000 km (satellite 1) and 24000 km (satellite 2). Determine the relationship between their orbital periods. 	CO3	L3
4.	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.	CO3	L3
5.	State Kepler's first law of planetary motion and derive the expression for velocity of a satellite in a circular orbit	CO3	L2
6.	Discuss about the orbital perturbations.	CO3	L2
7.	List out the merits and demerits of GPS.	CO3	L2
8.	Evaluate the orbital parameters used to determine the satellite position.	CO3	L2
9.	The difference between the furthest and the closest points in a satellite's elliptical orbit from the surface of the Earth is 30000 km and the sum of the distances is 50000 km. If the mean radius of the Earth is considered to be 6400 km, determine orbit eccentricity.	CO3	L3

10.	Summarize the following terms: (i) Apogee (ii) Perigee (iii) line of nodes (iv) Station keeping	CO3	L2
11.	Compare Geodetic coordinate system with Geocentric coordinate system.	CO3	L2
12.	The apogee and perigee distances of a satellite orbiting in an elliptical orbit are respectively 45000 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	CO3	L3

Course Instructor	Course Coordinator	Module Coordinator	HOD
Mr. V V Rama Krishna	Mr. V V Rama Krishna	Dr.M.V.Sudhakar	Dr. Y. Amar Babu

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ICT Tools

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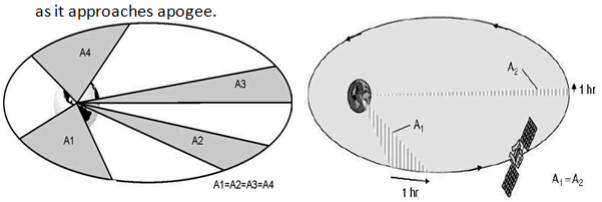
L-T-P Structure : 3-0-0 — Credits: 3

Kepler's Laws...

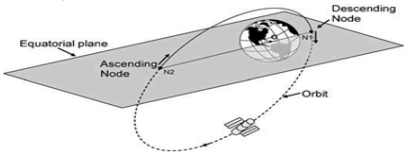
Kepler's second Law:

- The line joining the satellite and the centre of the Earth sweeps out equal areas in the plane of the orbit in equal time intervals
- This result also shows that the satellite orbital velocity is not constant; the satellite is moving much faster at locations near the earth, and slows down as it approaches apogee.



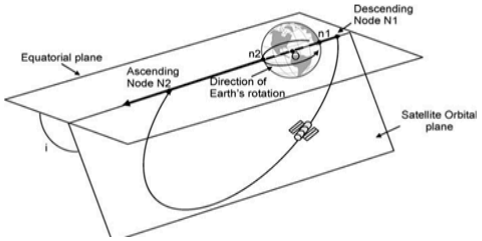
1. Ascending and descending nodes

- The satellite orbit cuts the equatorial plane at two points:
- the first, called the descending node (N1), where the satellite passes from the northern hemisphere to the southern hemisphere, and
- the second, called the ascending node (N2), where the satellite passes from the southern hemisphere to the northern hemisphere



7. Inclination

- Inclination is the angle that the orbital plane of the satellite makes with the Earths's equatorial plane. Its measured at the ascending node from the equator to the orbit, going from East to North. Also, this angle is commonly denoted as **i.**



Ground/Earth station network requirements

- Earth stations provide access to the space segment, interconnecting users with one another and with terrestrial networks such as the Internet and the public telephone network.
- **Performance Requirements**
- That is to ensure that there is a satisfactory RF link between the ground and the space segments under all expected conditions and for the range of required services.
- In addition, the Earth station determines the baseband quality and much of the end-to-end communication performance of the services being provided.
- **Frequency criteria**
- **Transmit EIRP**
- **Receive G/T**
- **Location and Platform Requirements**

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