SPACE TECHNOLOGY – MCQ BOOKLET

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1. Introduction to Space Science and Technology

Basic Concepts of Orbital Mechanics and Trajectories

1. Geo stationary satellite revolves at

A. Any height
B. At fixed height
C. Height above pole
D. Height which depends upon its mass

Ans: B

CGPSC Prelims Exam-2018

A geostationary orbit is a circular orbit directly above the Earth's equator, approximately 35,786 kilometers (22,236 miles) above mean sea level. At this specific altitude, the satellite's orbital period matches the Earth's rotational period (one sidereal day), making it appear stationary relative to a point on the ground. This fixed height is crucial for maintaining the synchronous orbit.

2. Which of the following statements is/are correct regarding satellites?

- **1. Geostationary satellites move from West to East**
- **2. Geostationary satellites' period of revolution is 24 hours**

A. Geostationary satellites move from West to East
B. Geostationary satellites' period of revolution is 24 hours
C. Both (A) and (B)
D. Neither (A) nor (B)

Ans: C

GPSC Prelims CSP-2-2021

- Geostationary satellites orbit Earth in the same direction as Earth's rotation (West to East). - Their orbital period is equal to Earth's rotation period (approx. 24 hours). - Geostationary satellites are positioned in an equatorial orbit. - They appear stationary relative to an observer on Earth.

3. Which of the following statements are correct regarding orbits?

- **1. In Intermediate Circular Orbit, the satellites move around Earth from pole to pole**
- **2. It takes approximately 99 minutes to complete an Orbit**
- **3. During one half of the Orbit, the satellite views the daytime and night time side of the Earth.**

A. 1, 2 and 3
B. 2 and 3 only
C. 1 and 3 only
D. 1 and 2 only

Ans: A

GPSC Prelims CSP-2-2021

- Intermediate Circular Orbit is not a standard orbital classification. - Polar orbits cover regions from pole to pole. - Orbital period in LEO is typically around 90-120 minutes. - Non-geostationary satellites orbit over both day and night sides of Earth.

4. A geostationary satellite is positioned at a distance of how many kilometres above mean sea level ?

A. 35,880
B. 37,800
C. 35,786
D. 32,000

Ans: C

HAS Prelims-2019

A geostationary orbit is located at an altitude of approximately 35,786 kilometers (22,236 miles) above the Earth's equator. At this altitude, a satellite orbiting in the same direction as the Earth's rotation with an orbital period equal to the Earth's rotational period appears stationary from the ground.

5. Which of the following describes the Geostationary Orbit (GEO) correctly ?

A. Altitude of 20,000 km above the sea level and the orbital period is 12 hours.
B. Altitude of 36,000 km above the sea level and the orbital period is 24 hours.
C. Altitude of 400 km above the sea level and the orbital period is 90 minutes.
D. None of the above

Ans: B

MPSC CS Prelims-2018

- A geostationary orbit (GEO) is a circular orbit located precisely above the Earth's equator. - A satellite in GEO moves in the same direction as the Earth's rotation and completes one orbit in the same time it takes the Earth to rotate once on its axis (approximately 23 hours, 56 minutes, 4 seconds, often rounded to 24 hours for practical purposes related to the apparent position from Earth). - Because of this matching orbital period and equatorial location, a satellite in GEO appears to remain fixed at a specific point in the sky relative to an observer on the Earth's surface. - The altitude required for a satellite to have an orbital period of approximately 24 hours is approximately 35,786 kilometers above the Earth's mean sea level (often rounded to 36,000 km).

6. Which one of the following statements about a satellite orbiting around the Earth is correct ?

A. Satellite is kept in orbit by remote control from ground station.
B. Satellite is kept in orbit by retro-rocket and solar energy keeps it moving around the Earth.
C. Satellite requires energy from solar panels and solid fuels for orbiting.
D. Satellite does not require any energy for orbiting.

Ans: D

UPSC NDA-2-2017

- Satellites orbit due to the balance between inertia and Earth's gravity. - Orbital motion itself is a form of freefall. - No continuous energy input is needed solely to stay in orbit.

7. The time period of revolution of a geostationary satellite is

A. 12 hrs.
B. 24 hrs.
C. 48 hrs.
D. 6 hrs.

Ans: B

UKPSC CS Prelims-2016

- Geostationary satellites orbit at a specific altitude above the Earth's equator. - Their orbital period matches the Earth's rotation period. - This period is approximately 24 hours.

8. Geostationary satellite completes its one revolution around the earth in

A. 90 minutes
B. 24 hours
C. 30 days
D. 365 days

Ans: B

UPSC CAPF-2013

A geostationary satellite orbits the Earth at a specific altitude (approximately 35,786 kilometers above the equator) and follows the Earth's rotation. For a satellite to appear stationary from a point on the Earth's surface, its orbital period must be exactly equal to the Earth's sidereal rotation period, which is about 23 hours, 56 minutes, and 4 seconds. For practical purposes and standard options, this is typically rounded to 24 hours. This synchronization allows the satellite to remain over the same geographic location on the equator.

9. A geostationary satellite has a period of

A. 6 hours
B. 12 hours
C. 18 hours
D. 24 hours

Ans: D

UPPSC Upper Mains-2010

A geostationary satellite is placed in a geosynchronous orbit directly above the Earth's equator. Its defining characteristic is that it orbits the Earth at the same rate as the Earth rotates on its axis.

10. Geostationary satellite

A. orbits at any height
B. orbits at constant height
C. does not orbit, remains stationary
D. Height depends on mass of satellite

Ans: B

BJS -2023

Geostationary satellites have a specific orbital characteristic related to their position relative to the Earth.

11. Match list – I with list – II and choose the correct answer using the code given below – List – I (Orbit) (A) Polar Earth Orbit (B) Parking Orbit (C) Sun Synchronous Orbit (D) Geo Synchronous Orbit List – II (Distance above the Equator) (1) 700 – 800 km (2) 35,800 km (3) 500 – 2000 km (4) 35,785 km Code – (a) (A)-3, (B)-4, (C)-1, (D)-2 (b) (A)-2, (B)-3, (C)-4, (D)-1 (c) (A)-4, (B)-1, (C)-3, (D)-2 (d) (A)-3, (B)-4, (C)-2, (D)-1

A. (A)-3, (B)-4, (C)-1, (D)-2
B. (A)-2, (B)-3, (C)-4, (D)-1
C. (A)-4, (B)-1, (C)-3, (D)-2
D. (A)-3, (B)-4, (C)-2, (D)-1

Ans: A

Civil Judge -2022

This question tests knowledge of different types of Earth orbits and their typical altitudes. The most well-defined are Geo Synchronous Orbit and Sun Synchronous Orbit. The distinction between "Polar Earth Orbit" and "Sun Synchronous Orbit" in terms of altitude ranges and the assignment of a high altitude to "Parking Orbit" are points of confusion.

12. As the height of satellite above earth surface increases, the time taken to complete the orbit -

A. Remains same
B. Decreases
C. Increases
D. May increase or decrease

Ans: C

Civil Judge -2022

The time period of a satellite orbiting a celestial body (like Earth) is related to the radius of its orbit. According to Kepler's Third Law and Newtonian gravitation, a larger orbital radius implies a longer orbital period (time to complete one orbit). This is because the satellite has to travel a greater distance, and the gravitational force pulling it towards the

Earth is weaker at higher altitudes, resulting in a slower orbital speed.

Definition and Scope of Space Science and Technology

13. With respect to India's nuclear programme, consider the following statements :

- **(i) ADITYA is the name of India's indigenously developed tokamak.**
- **(ii) ADITYA is a breeder reactor.**
- **(iii) ADITYA is a fusion reactor.**
- **(iv) ADITYA is a fission reactor.**

Select the correct statement(s) using the codes given below.

A. Only (i)
B. Only (i) and (ii)
C. Only (i) and (iii)
D. Only (i) and (iv)

Ans: C

APSC CCE Prelims Exam-2022

ADITYA is indeed the name of India's first indigenously developed tokamak, located at the Institute for Plasma Research (IPR) in Gandhinagar. A tokamak is a machine designed to harness the energy of nuclear fusion. Thus, ADITYA is a device used for fusion research.

14. Which one of the following statements is correct regarding LOFAR (Low Frequency Array) ?

A. It is the world's most powerful radio antenna.
B. It is a space technology launched by NASA to discover exoplanets.
C. It is an arrangement of satellites in space for the purpose of creating Satellite Navigation System.
D. It is a wireless communication technology for 5G services.

Ans: A

UPSC CDS-1-2022

It is not a single antenna but an array of antennas that work together using advanced data processing to synthesize a large effective aperture, giving it high sensitivity and resolution.

15. The word "Roc" is often seen in news is related to which of the following?

A. Satellite to study stratosphere
B. Largest aircraft
C. Helium balloon to study stratosphere
D. Drone to study upper atmosphere

Ans: B

GPSC Prelims CSP-2-2023

The Stratolaunch Roc is a twin-fuselage aircraft designed primarily to serve as a carrier aircraft for launching air-breathing hypersonic vehicles or rockets from high altitudes.

16. Find out the Indian scientist Dr. Vikram Sarabhai's contributions from the options listed below:

- **1. Founded the Physical Research Laboratory in Ahmedabad.**
- **2. Chairman, Atomic Energy Commission of India.**
- **3. Won Nobel Prize in physiology and medicine.**
- **4. Won Nobel Prize in physics.**

Select the correct answer using the code given below:

A. 1 and 2
B. 1 and 3
C. 1, 2 and 4
D. 1 and 4

Ans: A

GPSC Prelims CSP-2-2023

Vikram Sarabhai is widely regarded as the father of India's space program and was a key figure in establishing several scientific institutions in India.

17. Where is Vikram Sarabhai Space Centre?

A. Bengaluru
B. Sriharikota
C. Baleswar
D. Thiruvananthapuram

Ans: D

WBCS_Main-Paper-4-2019

VSSC is a major space research centre of the Indian Space Research Organisation (ISRO).

18. Which of the following is India's first Nuclear Reactor ? - Jarlina - Bhaskar - Kalpana - Apsara

A. (1) Jarlina
B. (2) Bhaskar
C. (3) Kalpana
D. (4) Apsara

Ans: D

Asst. Engineer Comb. Comp. Exam (Pre) -2024

Apsara is recognized as India's first nuclear reactor, marking a significant milestone in the country's atomic energy program.

19. Which Nuclear Power Plant has maximum gross power (MWe) in India ?

A. Tarapur Atomic Power Plant – 4
B. Rajasthan Atomic Power Plant – 6
C. Kudankulam Nuclear Power Station – 2
D. Kaiga Generating Station – 4

Ans: C

Assistant Conservator of Forest -2025

Kudankulam Nuclear Power Station Unit 2 has the maximum gross power capacity (MWe) among the listed nuclear power plants in India.

20. India's third research station in Antarctica is

A. Gangotri
B. Maitry
C. Shaurya
D. Bharti

Ans: D

Assistant Engineer (AE) Exam -2012

Bharti is the third Indian research station in Antarctica, commissioned after Gangotri (first) and Maitry (second).

21. India's first indigenously developed Remote Sensing Satellite was launched through -

A. Cape Kennedy
B. Baikonur
C. French Guiana
D. Sriharikota

Ans: D

Civil Judge -2022

Sriharikota is a crucial spaceport for India, enabling the country to launch its satellites independently into orbit.

22. Match the following nuclear plants with their location and give correct answer from the code given below –

(A) Kalapakka (1) Gujarat
(B) Narora (2) Maharashtra
(C) Tarapur (3) U.P.
(D) Kakrapara (4) Tamil Nadu

Code - (a) (A)-1, (B)-2, (C)-3, (D)-4 (b) (A)-2, (B)-3, (C)-1, (D)-4 (c) (A)-4, (B)-3, (C)-2, (D)-1 (d) (A)-3, (B)-2, (C)-4, (D)-1

A. (A)-1, (B)-2, (C)-3, (D)-4
B. (A)-2, (B)-3, (C)-1, (D)-4
C. (A)-4, (B)-3, (C)-2, (D)-1
D. (A)-3, (B)-2, (C)-4, (D)-1

Ans: C

Civil Judge -2022

Nuclear power plants in India are located in specific states. Knowing the location of these major plants is important for geography and general knowledge questions.