

# 50 IMPORTANT TOPICS FOR PRELIMS 2023

## SCHEDULE

27-03-2023	Monday	Polity	06-04-2023	Thursday	Geography
28-03-2023	Tuesday	Science	07-04-2023	Friday	Economy
29-03-2023	Wednesday	Environment	08-04-2023	Saturday	History
30-03-2023	Thursday	Geography	09-04-2023	Sunday	HOLIDAY
31-03-2023	Friday	Economy	10-04-2023	Monday	Polity
01-04-2023	Saturday	History	11-04-2023	Tuesday	Science
02-04-2023	Sunday	HOLIDAY	12-04-2023	Wednesday	Environment
03-04-2023	Monday	Polity	13-04-2023	Thursday	IR
04-04-2023	Tuesday	Science	14-04-2023	Friday	Economy
05-04-2023	Wednesday	Environment	15-04-2023	Saturday	Schemes

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## Pre-Mix - 5 MCQs for Prelims

### Subject - Science & Technology

Date - 01<sup>st</sup> April 2023

#### FROM OUR CRASH COURSE

1. What is a 'Dark sky reserve' recently seen in the news?

- A. Reserves of dark matter present in the solar system
- B. It is land with distinguished nocturnal environment and starry nights that has been developed responsibly to prevent light pollution.
- C. It is the phenomenon of dark skies during winter months in the Arctic region
- D. It is the constant present of cloudy atmosphere which makes solar power generation impossible

#### FROM OUR TEST SERIES

2. Consider the following with reference to satellite launch vehicles developed by Indian space research organization (ISRO)

- 1. The most commonly used launch vehicle is the polar satellite launch vehicle (PSLV).
- 2. GSLV Mk-II is the heaviest launch vehicle developed by ISRO.
- 3. Launch Vehicle Mark-3 (LVM3) is the new reusable launch vehicle being developed by ISRO.

Which of the statements given above is/are incorrect?

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

#### FROM OUR TEST SERIES

3. Consider the following statements:

- 1. CRISPR-Cas9 replicates natural defense mechanisms in bacteria to fight virus attacks using a special protein called Cas9.
- 2. CRISPR-Cas9 technology behaves like a cut-and-paste mechanism on DNA strands that contain genetic information.

Which of the statements given above is /are correct?

- A. 1 only
- B. 2 only
- C. 1 and 2 only
- D. Neither 1 nor 2

#### FROM OUR CURRENT AFFAIRS COURSE

4. Human settlement on Mars on a long-term basis poses several challenges . Which among the following is/are correct in this context.

- 1. Blood capillaries in the body would burst open causing internal bleeding
- 2. Microgravity on mars will increases red blood cell count.
- 3. Developing foetus is likely to sit low in the mother's womb

Select the correct answer using codes given below:

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

#### FROM OUR CRASH COURSE

5. In recent times, many companies are exploring Low earth orbit technology to provide satellite internet. Which among the following is/ are correct in this context:

- 1. Low earth orbit Provide stronger signals and faster speeds than traditional fixed-satellite systems
- 2. In low earth orbit companies need to launch less number of satellite as compare to high earth orbit

3. Satellite's footprint in low earth orbit is greater than high earth orbit

Select the correct answer code:

- A. 1 only
- B. 1 and 2 only
- C. 2 and 3 only
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## Answers with Explanations

Click [here](#) to watch the following topics on YouTube.

### FROM OUR CRASH COURSE

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Answer : B

Explanation

**Dark Sky Reserve**

- By the end of 2022, India will establish the country's first Dark Sky Reserve in the cold desert regions of Ladakh

**What is a Dark Sky Reserve?**

- A Dark Sky Reserve is public or private land with a distinguished nocturnal environment and starry nights that has been developed responsibly to prevent light pollution.
- According to the International Dark Sky Association (IDSA) website, these reserves "consist of a core area meeting minimum

criteria for sky quality and natural darkness, and a peripheral area that supports dark sky preservation in the core."

- These reserves, it said, are formed through a "partnership of multiple land managers who have recognized the value of the natural nighttime environment through regulations and long-term planning".

**How does a site become a 'Dark Sky Reserve'?**

- Individuals or groups can nominate a site for certification to the International Dark Sky Association (IDSA). There are five designated categories, namely International Dark Sky parks, communities, reserves, sanctuaries and Urban Night Sky Places.
- The certification process is similar to that of a site being awarded the UNESCO World Heritage Site tag or getting recognised as a Biosphere Reserve.
- Between 2001 and January 2022, there have been 195 sites recognised as International Dark Sky Places globally, the IDSA said.

**Criteria**

- The IDSA considers a piece of land suitable for dark sky place only if it is either publicly or privately owned; is accessible to the public partially or entirely during the year; the land is legally protected for scientific, natural, educational, cultural, heritage and/or public enjoyment purposes; the core area of the land provides an exceptional dark sky resource relative to the communities and cities that surround it and the land offers prescribed night sky brightness either for a reserve, park or sanctuary.
- India is still in the process of filing its nomination to IDSA.

**Who is developing India's first Dark Sky Reserve?**

- The Ladakh Union Territory administration is leading the efforts in establishing the country's first Dark Sky Reserve.

- To be situated at a height of 4,500 metres above sea level, the Hanle Dark Sky Reserve (HDSR) will come up within the Changthang Wildlife Sanctuary.

**FROM OUR TEST SERIES**

**2. Consider the following with reference to satellite launch vehicles developed by Indian space research organization (ISRO)**

1. The most commonly used launch vehicle is the polar satellite launch vehicle (PSLV).
2. GSLV Mk-II is the heaviest launch vehicle developed by ISRO.
3. Launch Vehicle Mark-3 (LVM3) is the new reusable launch vehicle being developed by ISRO.

**Which of the statements given above is/are incorrect?**

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

**Answer : B**

**Explanation**

**Explanation:**

- India currently has three operational launch vehicles – the Polar Satellite Launch Vehicle or PSLV, of which there are multiple versions; the Geosynchronous Satellite Launch Vehicle or GSLV Mk-II; and the Launch Vehicle Mark-3 or LVM3. The PSLV has been the most commonly used, having carried as many as 53 successful missions since 1993. Only two flights of PSLV have failed. Hence, statement **1 is correct**.
- The GSLV-MkII rocket has been used in 14 missions, of which four have ended in failures, most recently in August last year. The LVM3 has flown five times, including the Chandrayaan 2 mission, and has never disappointed. In addition, ISRO has been working on a reusable launch vehicle (RLV).

Unlike other rockets, the RLV would not end up in space as waste. Instead, it can be brought back and refurbished for use multiple times. Hence, statement **3 is incorrect**.

- The heaviest rocket of the Indian Space Research Organisation - LVM3-M2/OneWeb India-1 blasted off from this spaceport to place 36 broadband communication satellites into the Low Earth Orbit (LEO) for a UK-based customer. Hence, statement **2 is incorrect**.
- New Space India Limited (NSIL), a central public sector enterprise under the Department of Space, had earlier signed two launch service contracts with the London-headquartered Network Access Associated Limited (OneWeb) for launching OneWeb LEO satellites on board ISRO's LVM3.

**FROM OUR TEST SERIES**

**3. Consider the following statements:**

1. CRISPR-Cas9 replicates natural defense mechanisms in bacteria to fight virus attacks using a special protein called Cas9.
2. CRISPR-Cas9 technology behaves like a cut-and-paste mechanism on DNA strands that contain genetic information.

**Which of the statements given above is /are correct?**

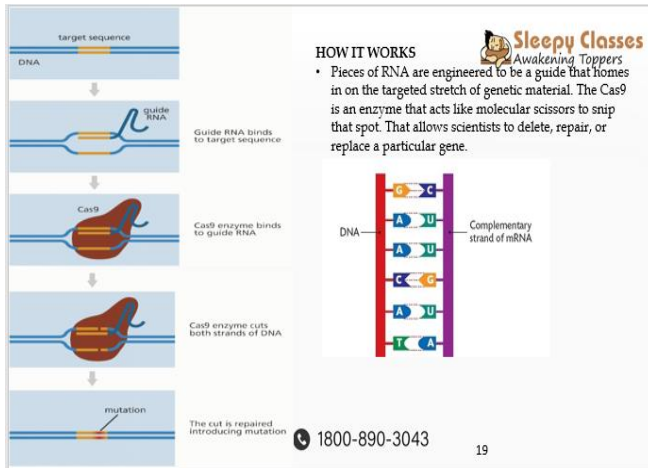
- A. 1 only
- B. 2 only
- C. 1 and 2 only
- D. Neither 1 nor 2

**Answer : C**

**Explanation**

In the 10 years since the CRISPR technology has been developed, it has begun to deliver on its unlimited potential which will help in improving the quality of human life. CRISPR is short for Clustered Regularly Interspaced Short Palindromic Repeats.

- Statement 1 is correct: It is a powerful gene editing technology that replicates natural defence mechanisms in bacteria to fight virus attacks using a special protein called Cas9.
- Statement 2 is correct: CRISPR-Cas9 technology behaves like a cut-and-paste mechanism on DNA strands that contain genetic information.



### FROM OUR CURRENT AFFAIRS COURSE

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- D. 1 and 3 only

Answer : A

Explanation

Sustaining Life on Mars

Lack of oxygen

- Since the atmosphere does not contain oxygen, **breathing becomes impossible**, without the aid of oxygen cylinders
- Due to the low atmospheric pressure, **blood capillaries in the body would burst** open causing internal bleeding

### Absence of magnetic field

- In the **absence of a magnetic field**, humans on Mars would be exposed to high levels of **harmful ionizing radiations**.
- Continuous exposure to high levels of radiation leads to many health problems like **cataract, cancer, gene mutations, and more**.

### Gravity

- **Microgravity** of space leads to **loss of bone density and muscle mass** resulting in osteopenia and fractures.
- Another problem is that while on Earth the human heart has to pump against gravity, in space, it does not have to do that. So it **weakens with time leading to cardiac problems, low red blood cells, immunodeficiency, etc**.
- Microgravity in space also **affects eyeball movement** and brain affecting a person's sense of balance and body orientation.
- The severity of these problems at the reduced gravity of Mars is not known.
- On Earth, the **entire developing foetus - its bone, muscle, circulation system** - all work against gravity. In the low gravity of Mars, the developing **foetus is likely to sit high up in the mother's womb**, pressing on the lungs and making it difficult for her to breathe.

### Soil

- Martian soil, called regolith, is known to contain high levels of chemicals such as **sulphates and perchlorates**. Plants incorporating these chemicals are known to be **harmful to humans if consumed**.

**FROM OUR CRASH COURSE**

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- C. 2 and 3 only
- D. 1 and 3 only

**Answer : A**

**Explanation**

**Satellite Internet**

- Following the successful launch of 36 satellites on May 28, OneWeb’s Low Earth Orbit (LEO) constellation reached 218 in-orbit satellites
- The company only has one more launch to complete before it obtains the capacity to enable its ‘**Five to 50’ service** of offering internet connectivity to all regions north of 50 degrees latitude.

**What is OneWeb?**

- OneWeb is a global communications company that aims to deliver **broadband satellite Internet** around the world through its fleet of LEO satellites

Low Earth Orbit technology	
<b>Distance</b>	Around 500km-2000km from earth
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Provide <b>stronger signals and faster speeds</b> than traditional fixed-satellite systems</li> <li>• <b>Signals travel faster through space than through fibre-optic cables</b></li> </ul>
<b>Issues</b>	<ul style="list-style-type: none"> <li>• Satellites travel at a speed of 27,000 kph and complete a full circuit of the planet in <b>90-120 minutes</b></li> <li>• Individual satellites can only make direct contact with a land transmitter for a <b>short period of time</b> thus requiring massive LEO satellite fleets</li> <li>• Huge <b>capital investment</b></li> </ul>