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DAY: 46

**QUESTIONS
with ANSWER HINTS**

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QUESTIONS

1. Consider the following statements regarding BRUIE robot:

1. It is an underwater exploration robot developed by NASA.
2. It is planned to be used to explore moons of the solar system like Europa of Jupiter.
3. It is being tested at Casey research station in Antarctica which is controlled by the USA.

Which of the above statements are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

2. Which of the following statements is/are correct regarding Aditya-L1?

1. The mission aims to put 1,500-kg heavy class Aditya-L1 satellite into halo orbit around Lagrangian point L1.
2. It is a flagship programme of NASA.

Select the correct answer using the code given below:

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

3. Consider the following statements regarding Avangard missile system:

1. It is Russia's new intercontinental subsonic missile system.
2. Its manoeuvring capability makes it difficult to predict its trajectory and gives it the ability to protect itself from the air and ballistic missile defences.

Which of the above statements is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

4. Consider the following statements:

1. Centralized Access Control System (CACS) project aims to share information in smart cities' complex ecosystem and combine it with contextual data that is analyzed in real-time.
2. e-BCAS project aims to achieve a paperless office under e-governance initiative of Indian government.
3. CACS and e-BCAS are projects launched by Ministry of Housing and Urban Affairs.

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

- (a) 1 and 3 only
- (b) 2 only
- (c) 3 only
- (d) 1 and 2 only

5. Which of the following are the advantages of Polycrack technology for waste-to-energy conversion?

1. It can be fed with all types of plastic
2. No need for pre-segregation of wastes
3. High moisture tolerance and no need to dry wastes
4. No affect on the air quality of surrounding area

Select the correct answer using the code given below:

- (a) 1, 2 and 3 only
- (b) 1, 3 and 4 only
- (c) 2 and 4 only
- (d) 1, 2, 3 and 4

6. With reference to Indian Science Congress (ISC), consider the following statements:

1. ISC is India's largest annual gathering of scientific luminaries from countries across the world.
2. A Farmers Science Congress was organized as part of ISC for the first time in 2020.

3. The theme for ISC-2020 was 'Future India – Science and Technology'.

Which of the above statements is/are correct?

- (a) 1 only
(b) 1 and 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

7. NASA recently discovered an Earth-sized planet orbiting a star in its 'Goldilocks Zone'. In this context, consider the following statements:

1. Goldilocks Zone refers to the habitable zone around a star where the temperature is just right for liquid water to exist.
2. Location of a planet in Goldilocks Zone is a guarantee of existence of life on that planet.

Which of the above statements is/are correct?

- (a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

8. Which of the following statements regarding Project NETRA are correct?

1. It is an early warning system to detect debris and other hazards to Indian satellites.
2. The project launched by ISRO will enhance India's capability in Space Situational Awareness (SSA).
3. The project will cover Low Earth Orbits (LEO) only.

Select the correct answer using the code given below:

- (a) 1 and 2 only
(b) 2 and 3 only

- (c) 1 and 3 only
(d) 1, 2 and 3

9. Match the following bilateral naval exercises in which India participates with their countries:

Naval Exercise	Country
A. SIMBEX	1. Oman
B. Varuna	2. Sri Lanka
C. Naseem-Al-Bahr	3. France
D. SLINEX	4. Singapore

Select the correct answer using the code given below:

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

10. The production of Geranium has got boost under the Aroma mission. In this regard, consider the following statements:

1. Geranium is a plant originally from South Africa that is used in manufacturing essential oils.
2. The plant is only cultivated in the North-Eastern regions of India.
3. The Aroma Mission was launched by Indian Council of Agricultural Research (ICAR).

Which of the above statements is/are correct?

- (a) 1 only
(b) 1 and 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

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ANSWER HINTS

Answer Key

Q. 1 (a)	Q. 3 (b)	Q. 5 (d)	Q. 7 (a)	Q. 9 (a)
Q. 2 (a)	Q. 4 (a)	Q. 6 (b)	Q. 8 (d)	Q. 10 (a)

1. Correct Option: (a)

Explanation:

- **Statement 3 is incorrect:** Casey is Australia's research centre in Antarctica.

Supplementary notes:

BRUIE

- **Buyant Rover for Under-Ice Exploration (BRUIE) is a robot of NASA developed for underwater exploration in extra-terrestrial, icy waters.**
- It's a wheeled vehicle designed to drive upside down on ice sheets. BRUIE is buoyant, which keeps it pressed against the ice ceiling.
- Moons throughout the solar system believed to be covered in deep oceans hidden beneath thick, frozen surfaces.
- **It could be used to explore Jupiter's moon Europa or Saturn's moon Enceladus.**
- These can be the most promising locations in our solar system to search for evidence of extraterrestrial life.
- **It is being tested at Australia's Casey research station in Antarctica to perform driving upside down under sea ice.**
- NASA is already constructing the Europa Clipper orbiter, scheduled for launch in 2025 to study Jupiter's moon Europa, laying the groundwork for a future mission that could search for life beneath the ice.

2. Correct Option: (a)

Explanation:

- **Statement 2 is incorrect:** It is a flagship programme of ISRO

Supplementary notes:

Aditya-L1

- The India Indian Space Research Organisation (ISRO) is set to launch first solar mission Aditya-L1. It will be India's first dedicated scientific mission to study sun.
- **The mission aims to put 1,500-kg heavy class Aditya-L1 satellite into halo orbit around Lagrangian point L1,** a point between Sun and Earth. This point is at a distance of about 1.5 million km from earth.
- The mission is a joint venture between ISRO and physicists from various institutes including Indian Institute of Astrophysics (Bengaluru), Tata Institute of Fundamental Research (Mumbai) and Inter University Centre for Astronomy and Astrophysics (Pune). Aditya L1 satellite will be launched by using PSLV XL. The launch will take in early part of next solar cycle. The satellite will be programmed to orbit L1 point and image sun's magnetic field from space for very first time in world. Scientists hope to capture close-ups of sun from here, uninterrupted by eclipses for years.

Objectives of mission

- Study dynamic nature of sun's outer most layers, the corona and the chromosphere, and collect data about Coronal Mass Ejections (CME).
- Study on origin of solar storms and their path through the interplanetary space from the Sun to the Earth.
- The studies will also focus on collection of information for space weather prediction.

Lagrange point

- Lagrange point is position in space where combined gravitational forces of two large bodies, such as Earth and sun or Earth and moon, equal centrifugal force felt by a much smaller third body. The interaction of these forces creates point of equilibrium where spacecraft may be "parked" to make observation.

3. Correct Option: (b)

Explanation:

- **Statement 1 is incorrect:** It is Russia's new intercontinental hypersonic missile system that can fly 27 times the speed of sound.

Supplementary notes:

Avangard Missile System

- **Russia's military deployed a new intercontinental weapon, the Avangard hypersonic missile system that can fly 27 times the speed of sound.**
- This will be the Russian military's first Avangard hypersonic intercontinental ballistic missile (ICBM).
- This feat is highly significant and comparable to the 1957 Soviet launch of the first satellite.
- Previously referred to as Project 4202, the Avangard hypersonic missile system is a reentry body carried atop an existing ballistic missile, which has the capability to manoeuvre.
- The missiles have a range of over 6,000 km, weigh approximately 2,000 kg and can withstand temperatures of over 2000 degree celsius.
- **It's manoeuvring capability makes it difficult to predict its trajectory and gives it the ability to protect itself from the air and ballistic missile defences** by delivering nuclear warheads to targets, for instance, in Europe and the US.

4. Correct Option: (a)

Explanation:

- **Statement 1 is incorrect:** CACS project aims to enhance security and ease of doing business at airports.
- **Statement 3 is incorrect:** CACS and e-BCAS projects are launched by Ministry of Civil Aviation.

Supplementary notes:

Biometric enabled Centralized Access Control System (CACS) Project

- **Ministry of Civil Aviation launched CACS project to enhance security and ease of doing business at airports.**
- Covering 43 Airports of AAI and 5 Joint Venture airports at present, the CACS project is aimed to digitize the employee movement process at the airports.
- This multi-layered security system encompasses the uniqueness of the Airport Entry Permit (AEP) users, biometric authentication in

addition to PIN-based identity verification through contactless smart card technology, which manages access of personnel along with RFID based automated vehicle access control system according to the region, terminal, zone, and gate access privileges.

- The cost of the card is Rs. 225, which shall be valid for three years.
- Biometric ID (Biometric enabled Centralized Access Control System having chip embedded smart AEPs) thus issued, is non-duplicable.

e-BCAS Project

- Ministry of Civil Aviation launched e-BCAS project which aims to achieve a "paperless office" under e-Governance initiative of GoI.
- **The objective of the e-BCAS project is to make all the activities in the Bureau of Civil Aviation Security (BCAS) transparent, user-friendly, and efficient and above all, the project intends to provide an ease of doing business with the stakeholders.**
- The e-BCAS project included Training module, Quality Control and Operational module and Administration etc.
- e-BCAS Project: Training Module' aims at helping more than 1.5 lac employees of various stakeholders by migrating from manual process of training to digital platform.

5. Correct Option: (d)

Explanation:

- **All statements are correct**

Supplementary notes:

Polycrack Technology

- By January 2020, pretty much all kind of waste generated at Bhubaneswar's railway station, carriage and coaching depot will be converted into light diesel oil that can be used in furnaces and gas that can be used to keep the waste-to-energy plant running.
- This will be done using a patented technology developed by Indian Railways' Bhubaneswar-located Carriage Repair Workshop, called Polycrack.
- The world's first such process, Polycrack converts multiple feedstock into hydrocarbon liquid fuels, gas, carbon and water.
- This will be the third such facility in India. The same technology is being used for waste-to-energy plants at New Delhi and Infosys, Bengaluru.



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- **Polycrack can be fed with all types of plastic;** petroleum sludge; un-segregated municipal solid waste with moisture up to 50 per cent; electronic waste, automobile fluff, organic waste including bamboo, garden waste; jatropa fruit and palm bunch.
- **Polycrack's strength includes not requiring pre-segregation of waste, allowing waste as collected to be directly used. With a high moisture tolerance, drying of waste is not required.**
- Waste is processed within 24 hours. **The working environment is dust free as the unit is enclosed and the air quality of the surrounding area is not hit.** Also, the area required for installing the plant is less when compared with the conventional method of processing, and all constituents are converted into energy.

6. Correct Option: (b)

Explanation:

- **Statement 3 is incorrect:** The theme for ISC-2020 was 'Science & Technology: Rural Development'.

Supplementary notes:

Indian Science Congress (ISC)

- **India's largest annual gathering of scientific luminaries from countries across the world, the 107th session of Indian Science Congress, was held from January 3 to 7, 2020 at University of Agricultural Sciences, GKVK Campus, Bangalore, Karnataka focusing on 'Science & Technology: Rural Development'.**
- It is a major focal point for scientists, researchers and academicians interested in various aspects of science discoveries and technologies.
- The five-day long event aims to bring together science fraternity across the world to discuss scientific innovation and research.
- **With focus on Rural Development through Science and Technology, for the first time in the history of Indian Science Congress, a Farmers Science Congress was held.** It covered themes ranging from farmers innovation on integrated agriculture and entrepreneurship for doubling farmers income, climate change, bio-diversity, conservation, ecosystem services & farmers empowerment to agrarian distress, rural bio-entrepreneurship, policy issues.
- The Indian Science Congress Association (ISCA) owes its origin to the foresight and initiative

of two British Chemists, namely, Professor J. L. Simonsen and Professor P.S. MacMahon.

- The first meeting of the Congress was held from January 15-17, 1914 at the premises of the Asiatic Society, Calcutta.
- The Association was formed with the following objectives:
 - To advance and promote the cause of science in India
 - To hold an annual congress at a suitable place in India
 - To publish such proceedings, journals, transactions and other publications as may be considered desirable
 - To secure and manage funds and endowments for the promotion of Science including the rights of disposing of or selling all or any portion of the properties of the Association
 - To do and perform any or all other acts, matters and things as are conducive to, or incidental to, or necessary for, the above objects

7. Correct Option: (a)

Explanation:

- **Statement 2 is incorrect:** Just because a planet or moon is in the Goldilocks Zone of a star, doesn't mean it's going to have life or even liquid water.

Supplementary notes:

Goldilocks Zone

- **NASA recently reported the discovery of an Earth-size planet, named TOI 700 d, orbiting its star in the "habitable zone".**
- TOI 700 d measures 20% larger than Earth. It orbits its star once every 37 days and receives an amount of energy that is equivalent to 86% of the energy that the Sun provides to Earth.
- The star, TOI 700, is an "M dwarf" located just over 100 light-years away in the southern constellation Dorado, is roughly 40% of our Sun's mass and size, and has about half its surface temperature.
- **The Goldilocks Zone refers to the habitable zone around a star where the temperature is just right - not too hot and not too cold - for liquid water to exist on a planet.**
- Looking for planets in the Goldilocks Zone is a way that allows scientists to hone in their search for Earth-like planets that could contain life. Basically, the assumption is that if it's possible there may be liquid water on

the planet, and then it's also possible that the planet may be habitable.

- The location of a Goldilocks Zone around another star depends on the type of star. Bigger hotter stars have their Goldilocks Zones further out, while smaller cooler stars such as M-type red dwarf stars have habitable zones much closer in.
- **Just because a planet or moon is in the Goldilocks Zone of a star, doesn't mean it's going to have life or even liquid water.**
- **After all, Earth isn't the only planet in the Sun's Goldilocks Zone - Venus and Mars are also in this habitable zone, but aren't currently habitable.**

8. Correct Option: (d)

Explanation:

- **All statements are correct**

Supplementary notes:

Project NETRA

- **It is an early warning system in space to detect debris and other hazards to Indian satellites launched by ISRO.**
- Under NETRA, or Network for space object Tracking and Analysis, the ISRO plans to put up many observational facilities: connected radars, telescopes; data processing units and a control centre. They can, among others, spot, track and catalogue objects as small as 10 cm, up to a range of 3,400 km and equal to a space orbit of around 2,000 km.
- **The project, when in place, will give India its own capability in space situational awareness (SSA) like the other space powers — which is used to 'predict' threats from debris to Indian satellites.**
- **Our SSA will first be for low-earth orbits or LEO which have remote-sensing spacecraft with an eventual goal to capture the GEO, or geostationary orbit, scene at 36,000 km where communication satellites operate.**
- The NETRA effort would make India a part of international efforts towards tracking, warning about and mitigating space debris.

9. Correct Option: (a)

Explanation:

- **Option (a) is correct:**

<i>Naval Exercise</i>	<i>Country</i>
A. SIMBEX	4. Singapore

B. Varuna	3. France
C. Naseem-Al-Bahr	1. Oman
D. SLINEX	2. Sri Lanka

Supplementary notes:

Exercises with Foreign Navies

- **Varuna:** The **Indian Navy and the French Navy** have conducted bilateral maritime exercises since May 1993. Since 2001, the exercises have been named VARUNA and there have been fifteen editions of the same till date.
- **Naseem-Al- Bahr (or Sea Breeze):** It is a biennial naval exercise between the **Indian Navy and the Royal Navy of Oman (RNO)**, being conducted since 1993.
- **SLINEX:** The bilateral exercises between the **Indian and Sri Lankan navies** commenced in 2005 and have steadily grown in scope and complexity with each edition.
- **SIMBEX:** Since its inception in 1993, SIMBEX has grown in tactical and operational complexity. The annual bilateral exercise between **Indian and Singapore navies** saw its progression from traditional anti-submarine exercises to more complex maritime exercises such as advanced air defense operations, anti-air/ surface practice firings, tactical exercises, etc. Over the years SIMBEX has stood the test of time in demonstrating the nation's commitment to enhance maritime cooperation between the two navies and bolster bonds of friendship between the two countries.

10. Correct Option: (a)

Explanation:

- **Statement 2 is incorrect:** In India, the plant is cultivated in Himachal Pradesh, Punjab, Haryana, Uttar Pradesh and North Eastern Regions.
- **Statement 3 is incorrect:** The Aroma Mission was launched by Council of Scientific and Industrial Research (CSIR).

Supplementary notes:

New Technology to Boost Production of Geranium

- **Scientists from Council of Scientific and Industrial Research – Central Institute of Medicinal and Aromatic Plants (CSIR-CIMAP), Lucknow have developed a new low-cost technology to prepare Geranium saplings and make this available for the farmers too.**

- Till now the plant of Geranium was saved in aerated glass house, but now with the development of the protective shed technology of the polyhouse, it is prepared at a much cheaper cost on the farmer's farm itself.
- Till now the plant was prepared from the saplings of Geranium, but these used to be ruined in the rainy season. This made the plant material very expensive to the farmer.
- **The production of Geranium has got boost under the Aroma mission.**
- **Geranium plant is originally from South Africa and is predominantly used in manufacturing essential oils.**
- It acts as an anti-inflammatory and antiseptic agent. It also has several medicinal values.
- **In India, the plant is cultivated in Himachal Pradesh, Punjab, Haryana, Uttar Pradesh and North Eastern Regions.**

Aroma and Phyto-Pharmaceutical Mission

- **The CSIR Aroma Mission is envisaged to bring transformative change in the aroma sector through desired interventions in the**

areas of agriculture, processing and product development for fuelling the growth of aroma industry and rural employment.

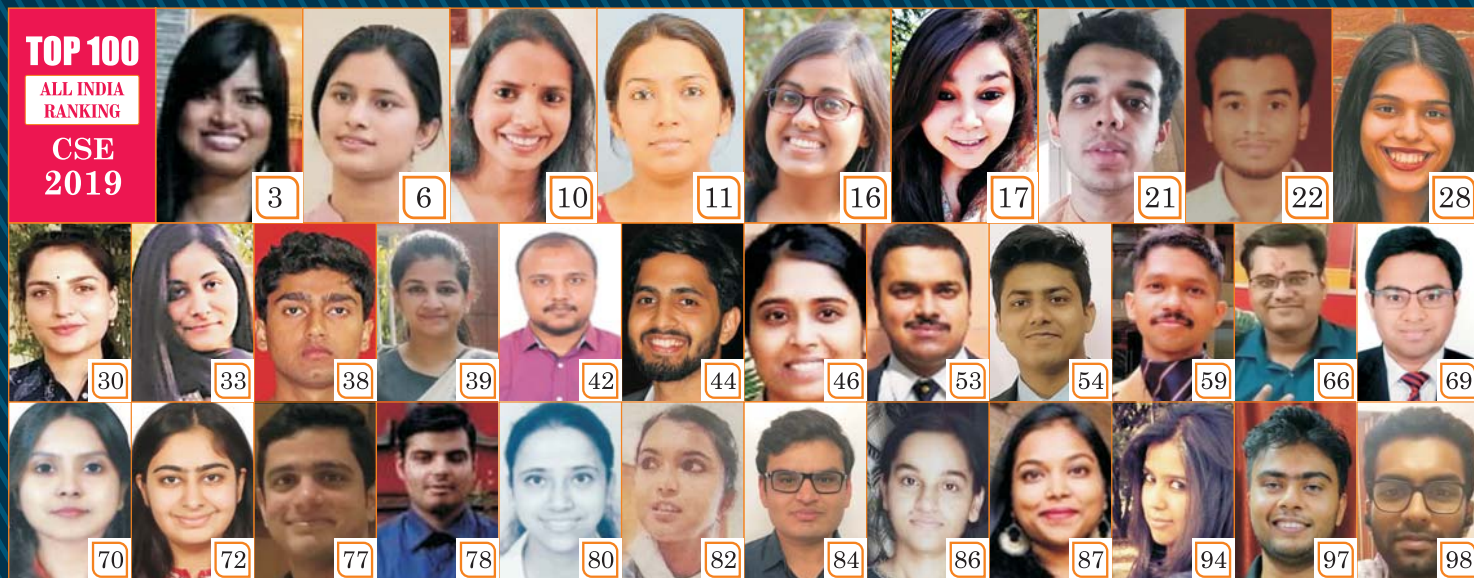
- The mission will promote the cultivation of aromatic crops for essential oils that are in great demand by aroma industry. It is expected to enable Indian farmers and aroma industry to become global leaders in the production and export of some other essential oils on the pattern of menthol mint. This is expected to provide substantial benefits to the farmers in achieving higher profits, utilization of waste lands and protection of their crops from wild and grazing animals.
- Under the Aroma Mission various economically important aromatic crops including mint, vetiver, lemon grass, palmarosa, ocimum, patchouli, lavender, rosemary, tagetes, Jammu monarda and valerian will be taken up.
- Similarly, Phyto-Pharmaceutical Mission will target several economically important medicinal plants including kalmegh, ashwagandha, satavar, senna, silybum, curcuma and swertia, he said.



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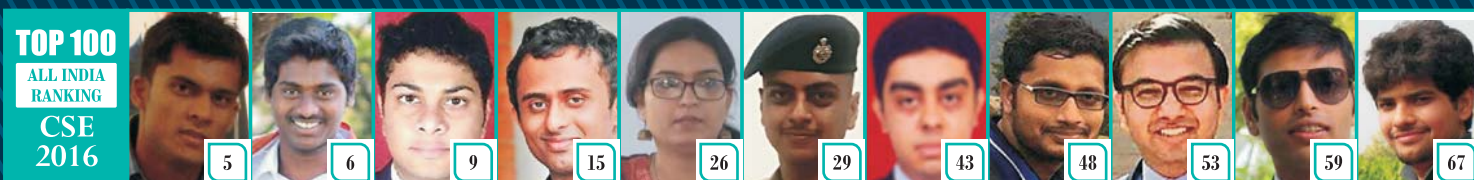
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