

**KAPIL SIKKA**

**CRACK UPSC  
CSE PRELIMS  
2022 THROUGH  
MCQS**

## **COURSE HIGHLIGHTS**

- This course will cover all the relevant current affairs according to the changing trend of UPSC Prelims.
- Special focus will be on the Environment and Science & Technology section which comprises 30 to 35 questions directly or indirectly.
- Mostly the topics will be from The Hindu, Indian Express, Yojana and Kurukshetra.
- Static syllabus will be covered on the basis of related current news.
- As in 2021 the questions based on sports were asked, this course will cover the sports section from the prelims perspective.

# ABOUT ME



- ✓ Mentoring, guiding and teaching UPSC students since 8 years
- ✓ Polity, Indian Economy, Essay, Internal Security & Post Independence India
- ✓ Teaching Political Science Optional



**GS by Kapil Sikka (<https://t.me/kapillive>)**



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**611.** Consider the following statements with regard to the Artificial Neural Networks(ANN)

1. It is a vital subset of machine learning that helps computer scientists in their work on complex tasks
2. It is a computational model that mimics the way nerve cells work in the human brain

Select the CORRECT statement(s) using the codes given below

- |                 |                    |
|-----------------|--------------------|
| a) 1 Only       | b) 2 Only          |
| c) Both 1 and 2 | d) Neither 1 nor 2 |

## C

- Recently, the global Artificial Neural Network (ANN) Market report was published. As per the current report, ANN Market is to set phenomenal growth from 2021 to 2028.
- It is an information bank that delivers comprehensive information about the market ranging from the establishment to the predictable growth trend.
- Artificial Neural Networks(ANN) also known as Neural Networks are a vital subset of machine learning and are at the heart of deep learning algorithms.

- The applications of Artificial Neural Network(ANN) are Image Preprocessing and Character Recognition, Forecasting, Credit rating, Fraud Detection, Portfolio Management among others.

**612.** Consider the following statements with regard to the Geomagnetic Storm

1. A geomagnetic storm is a disturbance in the Earth's stratosphere
2. It is caused by a solar wind shock wave or cloud of the magnetic field that interacts with the Earth's magnetic field

Select the CORRECT statement(s) using the codes given below

- |                 |                    |
|-----------------|--------------------|
| a) 1 Only       | b) 2 Only          |
| c) Both 1 and 2 | d) Neither 1 nor 2 |

## C

- Recently, Elon Musk's Starlink has lost dozens of satellites that were caught in a geomagnetic storm a day after they were launched.
- A geomagnetic storm is a disturbance in the Earth's magnetosphere. It is caused by a solar wind shock wave or cloud of the magnetic field that interacts with the Earth's magnetic field.
- The geomagnetic storm of 1859, also called the Carrington storm, was the largest geomagnetic storm ever recorded.



- A geomagnetic storm is a disturbance in the Earth's magnetosphere. It is caused by a solar wind shock wave or cloud of the magnetic field that interacts with the Earth's magnetic field. They are rated on a scale of 1 to 5, with 1 being the weakest and 5 being the strongest.

- 613.** Consider the following statements with regard to the Graphene
1. It is an allotrope of carbon
  2. It called as “wonder material”
  3. It is the thinnest, most electrically and thermally conductive material in the world

Select the CORRECT statements using the codes given below

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

## D

- The Kerala government announced the country's first Graphene Innovation Centre, a joint venture of Digital University of Kerala, Centre for Materials for Electronics Technology (C-MET) and Tata Steel Limited.
- An Innovation Center is a cross-functional plan that creates a safe haven for new ideas.
- Graphene is a one-atom-thick layer of carbon atoms arranged in a hexagonal lattice. It is the building-block of Graphite (which is used,

among others things, in pencil tips), but graphene is a remarkable substance on its own - with a multitude of astonishing properties which repeatedly earn it the title “wonder material”.

- Graphene is the thinnest material known to man at one atom thick, and also incredibly strong - about 200 times stronger than steel.
- On top of that, graphene is an excellent conductor of heat and electricity and has interesting light absorption abilities. It is truly a material that could change the world, with unlimited potential for integration in almost any industry.

- Potential applications:
- batteries
- transistors
- computer chips
- energy generation
- supercapacitors
- DNA sequencing
- water filters
- antennas
- touchscreens (for LCD or OLED displays)
- solar cells
- Spintronics-related products

**614.** Consider the following statements with regard to the series of Chandrayaan Missions

1. Both the Chandrayaan Missions 1 and 2 were successful missions
2. Chandrayaan-2 was ISRO's first attempt to land on any extraterrestrial surface
3. Chandrayaan-3 Its job will only be confined to carry the lander to the moon, oversee the landing from its orbit and communicate between the lander and the earth station

Select the CORRECT statement(s) using the codes given below

- a) 1 Only
- b) 2 and 3
- c) 1 and 3
- d) 1, 2 and 3

**Answer: b**

**Explanation:**

- Chandrayaan-1, India's first mission to Moon, was launched successfully on October 22, 2008 from SDSC SHAR, Sriharikota. The spacecraft was orbiting around the Moon at a height of 100 km from the lunar surface for chemical, mineralogical and photo-geologic mapping of the Moon.
- The Chandrayaan-3 mission is a follow-up of Chandrayaan-2 of July 2019, which aimed to land a rover on the lunar South Pole.



- The **subsequent failure of the Vikram lander** of Chandrayaan-2 led to the pursuit of another mission to demonstrate the landing capabilities needed for the Lunar Polar Exploration Mission proposed in partnership with Japan for 2024.
- Thus Chandrayaan-1 was a successful mission and Chandrayaan-2 was unsuccessful.

**615.** With regard to the Earth Observation Satellite (EOS), consider the following statements

1. Earth observation satellites are the satellites equipped with remote sensing technology
2. Recently EOS-4 is launched by the GSLV Mk-III
3. EOS-04 with a mission life of ten years designed to provide high quality images under all weather conditions for applications such as agriculture

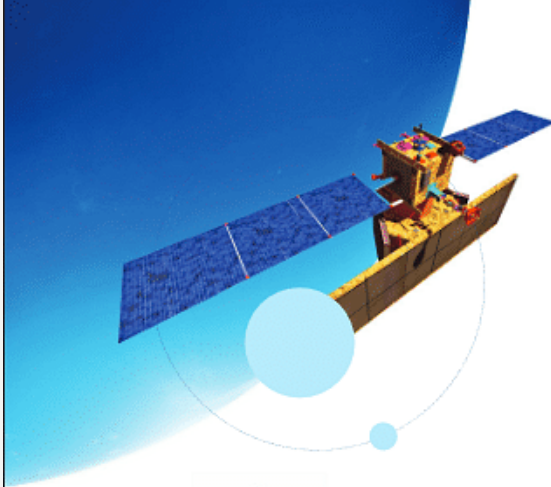
Select the CORRECT statements using the codes given below

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

## B

- Marking the first launch mission of the year 2022, Indian Space Research Organisation's earth observation satellite EOS-04 and two small satellites were successfully placed into the intended orbit by the PSLV-C52 rocket recently.
- This launch was the 54th flight of the Polar Satellite Launch Vehicle (PSLV) rocket, and the 23rd of its most powerful XL-version that has six strap-on boosters.

- Earth observation satellites are the satellites equipped with remote sensing technology. Earth observation is the gathering of information about Earth's physical chemical and biological systems.
- EOS-04 weighing 1,710 kg and with a mission life of ten years designed to provide high quality images under all weather conditions for applications such as Agriculture, Forestry and Plantations, Soil Moisture and Hydrology and Flood mapping.



# PSLV C52/ EOS-04

## MISSION DESCRIPTION

PSLV-C52 launches EOS-04 (Earth Observation Satellite - 04) to a Sun Synchronous orbit. It carries two satellites as co-passengers.

This is the 54th flight of PSLV and 23rd mission using PSLV-XL configuration with 6 PSOM-XLs.

PSLV-C52 lifts off from First Launch Pad (FLP), SDSC, SHAR.



## Vehicle Characteristics

Vehicle Height	44.4 m
Lift off Mass	321 t
Propulsion Stages	
First Stage	6PSOM-XL+ S139
Second Stage	PL40
Third Stage	HPS3
Fourth Stage	L2.5 (Ti)

## Mission Specifications

Semi-Major Axis (km)	6907.159
Altitude (km) (wrt. equatorial Earth radius)	529.022
Inclination (deg)	97.514
Launch Azimuth (deg)	140

## PSLV-C52 Stages at a Glance

	Stage 1		Stage 2 (PS2)	Stage 3 (HPS3)	Stage 4 (PS4)
	PS1	PSOM-XL			
Length (m)	20	12	12.8	3.6	3.0
Diameter (m)	2.8	1	2.8	2	1.34
Propellant	Solid (HTPB based)	Solid (HTPB based)	Liquid (UH25 + N <sub>2</sub> O <sub>4</sub> )	Solid (HTPB based)	Liquid (MMH+ MON3)
Propellant Mass (t)	139	12.2 (each)	41	7.65	2.5

- 616.** HANSA-New Generation (HANSA-NG) is India's first indigenous
- a) Sub-Marine
  - b) Anti-Ballistic Missile
  - c) Aircraft Trainer
  - d) Semi-automatic pistol

## C

- HANSA-New Generation (HANSA-NG) is India's first indigenous aircraft trainer.
- HANSA-NG is indigenously designed and developed by Council of Scientific and Industrial Research -National Aerospace Laboratories (CSIR-NAL).
- It is a two-seater aircraft and a revamped version of the HANSA, which was developed 30 years ago.



- HANSA-NG is an advanced flying trainer. It is powered by Rotax Digital Control Engine. It has other special features like composite lightweight airframe, glass cockpit, bubble canopy with wide panoramic view, electrically operated flaps, etc.
- Its advantages include low cost and low consumption of fuel.
- Thus it is most suitable for Commercial Pilot Licensing (CPL) purposes and meets the needs of Indian flying clubs.



**617.** Consider the following statements with regard to the Solid State Batteries

1. Unlike lithium-ion, solid-state batteries use a solid electrolyte to regulate the flow of current
2. It doesn't have a risk of explosion or fire, so there is no need to have components for safety

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

- |                 |                    |
|-----------------|--------------------|
| a) 1 Only       | b) 2 Only          |
| c) Both 1 and 2 | d) Neither 1 nor 2 |

## C

- Volkswagen to Produce Solid-State Batteries with Quantum-Scape by 2025.
- A solid-state battery has higher energy density than a Lithium-ion battery that uses liquid electrolyte solution. **It doesn't have a risk of explosion or fire, so there is no need to have components for safety, thus saving more space.**
- Then we have more space to put more active materials which increase battery capacity in the battery.

- A solid-state battery can increase energy density per unit area since only a small number of batteries are needed. For that reason, a solid-state battery is perfect to make an Electric Vehicle (EV) battery system of module and pack, which needs high capacity.

**618.** Which of the following statements is INCORRECT with regard to the Millimetre Wave-Band?

- a) It's a radio frequency ranges from 50 GHz and 100 GHz
- b) It has a short wavelength
- c) It makes data transfer efficient and seamless
- d) It delivers greater speeds and lower latencies



**A**

- In India, Satcom Industry Association-India (SIA) has voiced concerns over the Government's plan to include the **Millimetre Wave (mm Wave) bands in the 5G spectrum auction.**
- It is a segment of the radio frequency spectrum that ranges from **24 GHz to 100 GHz.**
- This spectrum, as the name implies, has a short wavelength and is suitable for delivering higher speeds and lower latencies. As a result, data transfer becomes **more efficient and seamless, as current networks operate best only on lower frequency bandwidths.**

**619.** Which of the following are the advantages of Open Source Technology?

1. It allowing everyone to copy, re-distribute and modify the code
2. It evolve through a great community cooperation
3. It allow the users to make any changes to the software

Select the CORRECT statements using the codes given below

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



**Answer: a**

**Explanation:**

- Github, an open-source software repository service, was recently used to create and share an offensively named app that sexually harassed a woman in India. The app stole images of the women from their social media accounts and invited "users" to bid on them.
- GitHub is the world's largest open-source developer community platform where users upload their projects and code for others to view, edit, and tweak.

- Open source products evolve through a great community cooperation that includes individual developers and programmers as well as large companies. The license allows everybody in the community to study thoroughly, change the codes and use it for any purpose.
- Open source software includes operating systems, programs and applications that have its source code published for the public use, allowing everyone to copy, re-distribute and modify the code without paying any royalties.

- But this term is often misunderstood as the users often think that the word is synonymous with free. But this is not so with all the software versions.
- **Statement 3 :**A big challenge with the closed-source proprietary solutions is that it does not allow the users to make any changes to the software. In simple words you are not allowed to see how the software works or even customize it accordingly to fit the unique needs of your business or even optimize the performance.

- 620.** Consider the following statements with regard to the Kavach
1. It is the automatic train anti-collision system developed by the Indian Railways
  2. Kavach will help India in cutting import costs and saving forex reserves

Select the CORRECT the statement(s) using the codes given below

- |                 |                    |
|-----------------|--------------------|
| a) 1 Only       | b) 2 Only          |
| c) Both 1 and 2 | d) Neither 1 nor 2 |

C

- 'Kavach' is the automatic train anti-collision system developed by the Indian Railways.
- Kavach or "armor" is the indigenously-developed system that prevents collisions between trains.
- It is also known as **Train Collision Avoidance System (TCAS)**.
- It is being developed since 2012 and in 2016 first field trials were conducted.
- At present, it is operational in the Lingampalli & Vikarabad section of the South Central Railway (SCR) zone.

- It will be soon operational all over India in a gradual manner, as proposed in the Budget.
- Kavach will cost around Rs 30 lakh to 50 lakh per kilometer, while the imported system will cost around Rs 2.5 crores a kilometer.

**Thus, Kavach will help India in cutting import costs and saving forex reserves.**

Thank you 😊

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