

ForumIAS

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Prelims Marathon

4th week April, 2024

*HISTORY
ECONOMICS
POLITY
SCIENCE AND TECHNOLOGY
GEOGRAPHY AND ENVIRONMENT*

Prelims Marathon Compilation April [Fourth Week] 2024

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Science

Q.1) Consider the following statements regarding “Geostationary orbit”:

1. The satellite placed in geostationary orbit remains in the same position relative to the Earth.
2. It helps in direct broadcast as well as communications or relay systems.

Which of the statements given above is/are incorrect?

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

ANS: D

Explanation: Geostationary orbit is a type of geosynchronous orbit but satellite rotates in the same direction as the rotation of the Earth and has an approximate 24- hour period (lie on the same plane as the equator).

- The satellite placed in geostationary orbit remains in the same position relative to the Earth.
- Application: Direct broadcast as well as communications or relay systems.

Source: FORUMIAS

Q.2) Which of the following type of isotope of carbon found abundantly?

- a) Carbon 12
- b) Carbon 13
- c) Carbon 14
- d) Carbon 15

ANS: A

Explanation: Carbon dating is a widely-used method to establish the age of dead organic materials.

- Isotopes - Carbon occurs naturally in 3 isotopes: carbon 12, carbon 13 and carbon 14.
- The most abundant isotope of carbon in the atmosphere is C-12.

Source: FORUMIAS

Q.3) Consider the following statements regarding “carbon dating”:

1. Carbon 14 isotope is used in carbon dating.
2. It can be used to determine the age of non-living things like rocks.

Which of the statements given above is/are incorrect?

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

ANS: B

Explanation: Carbon dating - Living things have carbon in them in various forms. Plants and animals get their carbon from the atmosphere.

- When they die, C-14 decay and the ratio of C-12 and C-14 changes.
- The changing ratio of C-12 to C-14 in the remains of a plant or animal after it dies is measured to deduce its approximate age.
- Exceptions to carbon dating - It cannot be used to determine the age of non-living things like rocks, for example.

Source: FORUMIAS

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Q.4) Which of the following is/are dating method/s?

1. Radiometric
2. Potassium – argon
3. Cosmogenic nuclide

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: C

Explanation: Different types of dating methods:

- Radiometric dating methods which involve elements with half-lives of billions of years are used to determine age of very old objects.
- Potassium-argon dating - The radioactive isotope of potassium decays into argon, and their ratios can give a clue about the age of rocks.
- Uranium-thorium-lead dating - Uranium and thorium have several radioactive isotopes, and all of them decay into the stable lead atom.

Cosmogenic nuclide dating (CRN) - It is applied to study the age of ice cores in Polar Regions.

Source: FORUMIAS

Q.5) The term “vapes” is recently seen in news related to?

- a) Micro – organisms
- b) E – cigarettes
- c) Hydrogen fuel
- d) Organic farming

ANS: B

Explanation: Electronic Nicotine Delivery Systems-ENDS (e-cigarettes) are 95% less harmful than tobacco cigarettes claimed by a study is a myth.

- Vaping consists of inhaling the vapour of a heated liquid inside e-cigarettes.
- Since 2019, the production, manufacture, import and export, transport, sale, distribution, storage and advertisement of vapes have been banned in India.

Source: FORUMIAS

Q.6) The term “Clethodim” is often seen in news related to?

- a) Fungicide
- b) Herbicide
- c) Bio – fertilizer
- d) Weed

ANS: B

Explanation: New study raises concerns on use of common herbicide Clethodim, which is posing a silent threat to male reproductive health.

Clethodim is used as a selective post emergence herbicide for the control of annual and perennial grasses in numerous crops.

Source: FORUMIAS

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Q.7) The term “electroporation” is often seen in news related to?

- a) Cancer treatment
- b) Fuel cells
- c) Bio – fuels
- d) Solar equipment manufacturing

ANS: A

Explanation: Recently a patient suffering from non-alcoholic steatohepatitis associated with renal cancer has been treated with nanoknife technology.

Also known as electroporation, nanoknife is a surgical procedure developed to help treat certain cancerous tumors, including cancer of the prostate using pulses of electricity.

Source: FORUMIAS

Q.8) In which of the following city, recently inaugurated first 3D-printed post office?

- a) Hyderabad
- b) Delhi
- c) Mumbai
- d) Bangalore

ANS: D

Explanation: Recently India inaugurated its first 3D-printed post office in Bangalore.

- Additive Manufacturing (AM) – It is the industrial production name for 3D printing.
- It is an additive process, in which layers of a material like plastic, composites or bio-materials are built up to construct objects that range in shape, size, rigidity and colour.
- It differs from the traditional subtractive manufacturing techniques involving cutting large blocks of material to form the desired object.

Source: FORUMIAS

Q.9) The term “Namoh 108” is often seen in news related to?

- a) Rice variety
- b) Mustard variety
- c) Lotus variety
- d) Rose variety

ANS: C

Explanation: Science Minister unveiled a variety of lotus called “Namoh 108”.

- The lotus has 108 petals and was discovered several years ago in Manipur
- This is the only lotus variety in India to have had its genome sequenced.

Source: FORUMIAS

Q.10) The “Langlands program” is recently seen in news related to?

- a) Mathematics
- b) Physics
- c) Chemistry
- d) Biology

ANS: A

Explanation: Langlands program, the world’s biggest Math project provides a beautifully intricate set of connections between various areas of mathematics, pointing the way toward novel solutions for old problems.

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It is a mathematical exercise to find connections between two far-flung areas of mathematics - number theory and harmonic analysis, launched in 1967.

Source: FORUMIAS

Science - II

Q.1) Which of the following city is the India's first solar city?

- a) Sanchi
- b) Amaravathi
- c) Puri
- d) Hampi

ANS: A

Explanation: Sanchi, the historic home of the Stupa, has become India's first 'solar city'.

- Features - The 5,572 solar panels spread over an area of 4.98 hectares ensure supply from 9 am to 4 pm.
- It currently includes a 3 MW solar plant that caters to the city's energy needs.
- A 5 MW plant for agricultural requirements is also under construction.
- Another similar facility in Gulgaon village, which will house a 5 MW solar facility equipped with 11,722 solar panels is about to come up.
- Madhya Pradesh has also initiated the construction of a 600 MW electricity-producing solar plant on the dam water in Omkareshwar.
- Once completed, Sanchi will become energy surplus.

Source: FORUMIAS

Q.2) Consider the following statements regarding "Solar City Programme":

1. It comes under the ministry of environment.
2. There is separate fund allocation to implement the programme.

Which of the statements given above is/are incorrect?

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

ANS: C

Explanation: Solar City Programme: A total of 24 states and union territories have identified cities to be developed as solar cities.

- It comes under the Ministry of New and Renewable Energy (MNRE). Each State /Union Territory shall select at-least one city under this.
- There is no separate fund allocation as funds available under the different existing schemes can be utilized for development of solar cities.

Source: FORUMIAS

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Q.3) Consider the following statements regarding “Tantalum”:

1. Recently researchers of from the Indian Institute of Technology (IIT), Ropar has detected the presence of tantalum in the Sutlej river sand in Punjab.
2. It is very hard, ductile, lustrous, bluish-grey transition metal that is highly corrosion resistant.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: Researchers from the Indian Institute of Technology (IIT), Ropar has detected the presence of tantalum, a rare metal, in the Sutlej river sand in Punjab.

- Tantalum – A chemical element with symbol Ta and atomic number 73 in the periodic table. It is very hard, ductile, lustrous, bluish-grey transition metal that is highly corrosion resistant.
- It has a melting point of 5,463 °F (2,996 °C), the 4th highest of all metals. It is one of the 12 critical and strategic minerals according to the annual report of the Union Ministry of Mines for 2020-21.

Source: FORUMIAS

Q.4) Recently South East Asia's first Night Sky Sanctuary will be setup in?

- a) Ladakh
- b) Tawang
- c) Namdapha
- d) Kalahasthi

ANS: A

Explanation: South East Asia's 1st Night Sky Sanctuary will be setup in Ladakh with the help of Indian Institute of Astrophysics, Bengaluru.

It will be located within the Changthang Wildlife Sanctuary and adjacent to the Indian Astronomical Observatory (2nd-highest optical telescope in the world).

Source: FORUMIAS

Q.5) The term “Sparsh Bharati” is often seen in news related to?

- a) Bharati script
- b) Indian Braille
- c) Vernacular books
- d) Single window kiosk

ANS: B

Explanation: After introducing the Bharati script V. Srinivasa Chakravarthy, a professor in IIT Madras has developed a script for persons with visual impairment named as Sparsh Bharati.

- This ‘Indian Braille’ can be used across Indian languages. Bharati is a simple and unified script which can be used to write most major Indian languages.
- It is designed using simple shapes, borrowing simple characters from various Indian languages and English.

Source: FORUMIAS

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Q.6) Which of the following is/are “Piezoelectric materials”?

1. Quartz
2. Ceramics
3. Tendons

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: C

Explanation: Piezoelectricity was discovered in 1880 by Pierre and Paul-Jacques Curie.

- It is a phenomenon in which certain materials generate an electric charge in response to mechanical stress.
- Piezoelectric materials include quartz, ceramics, lead, zirconate, titanate and biological substances like bone and tendons.

Source: FORUMIAS

Q.7) Which of the following state is proposed to launch India's first-ever gyrocopter safari?

- a) Himachal Pradesh
- b) Uttarakhand
- c) Sikkim
- d) Arunachal Pradesh

ANS: B

Explanation: Uttarakhand is all set to launch India's first-ever gyrocopter safari by the year's end to redefine the concept of adventure tourism in the state.

It is a type of rotorcraft, uses a rotor that is not powered to generate lift. The rotor looks similar to that of a helicopter, but it requires air flowing upwards across it to rotate.

Source: FORUMIAS

Q.8) The term “Ketamine” is often seen in news related to?

- a) Anesthetic drug
- b) Cancer drug
- c) Corona vaccine
- d) Arthritis drug

ANS: A

Explanation: Ketamine is an illegal recreational anaesthetic drug that has been listed as a hallucinogen by the US Drug Enforcement Administration.

- It is used to treat mental health treatments like depression and Post-Traumatic Stress Disorder (PTSD).
- India – It included the drug in the stringent Schedule X of the Drug and Cosmetics act, 1940.

Source: FORUMIAS

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Q.9) Consider the following statements regarding “Polar Science and Cryosphere Research (PACER)”:

1. It is a central sector umbrella scheme.
2. It is implemented by Ministry of Earth Sciences through National Centre for Polar and Ocean Research, Goa.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: PACER: It is a Central Sector umbrella scheme.

- It is implemented by – Ministry of Earth Sciences (MoES) through National Centre for Polar and Ocean Research (NCPOR), Goa.
- Its objective is to promote long-term scientific programmes in the polar region and the surrounding oceans.
- To implement annual expeditions and to maintain Indian research bases at Antarctica, Arctic and Himalaya.

Source: FORUMIAS

Q.10) Consider the following statements regarding “United Earth Amazonia prize”:

1. It is a "Green Nobel" prize that recognizes environmental work in the Amazon rainforest.
2. It was instituted by Marcus Nobel.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: The United Earth Amazonia prize is a "Green Nobel" prize that recognizes environmental work in the Amazon rainforest.

The prize was instituted by Marcus Nobel, a Swedish-American businessman based in Portland, Oregon.

Source: FORUMIAS

Science – III

Q.1) The term “Phage Therapy” is recently seen in news related to?

- a) Bacterial infections
- b) Cancer treatment
- c) Bio – fertilizers
- d) Fungicides

ANS: A

Explanation: Recently, study found that the public accepts use of bacteria-killing viruses (Phage Therapy) as an alternative to antibiotics.

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Phage Therapy involves using Bacteriophages to treat bacterial infections. Bacteriophages are viruses that infect and replicate only in bacterial cells.

Source: FORUMIAS

Q.2) Consider the following statements regarding “Net Energy Gain (NEG)”:

1. It implies nuclear fusion process generate more energy than the nuclear fusion process consumes.
2. India is a part of the International Thermonuclear Experimental Reactor (ITER) project to demonstrate NEG from the fusion reactors.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: NEG implies nuclear fusion process generate more energy than the nuclear fusion process consumes.

India is a part of the International Thermonuclear Experimental Reactor (ITER) project to demonstrate NEG from the fusion reactors.

Source: FORUMIAS

Q.3) Consider the following statements regarding “uranium enrichment”:

1. Weapon-grade uranium is commonly considered to have been enriched above 90 percent U-235.
2. Highly enriched uranium (HEU) is anything enriched above 20 percent U-235.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: Weapon-grade uranium is commonly considered to have been enriched above 90% U-235.

- Uranium enrichment is a process to create an effective nuclear fuel out of mined uranium by increasing the percentage of uranium-235 (U-235).
- Uranium found in nature contains only 0.7% of the chain-reacting isotope U-235. Naturally, 99.27% of Uranium exists in form of U-238 while rest in other isotopes as: U-235 (0.72%), and U-234 (0.006%) etc.
- Most nuclear reactors that produce electricity only require fuel that is enriched to between 3-5% U-235. Highly enriched uranium (HEU) is anything enriched above 20% U-235.

Source: FORUMIAS

Q.4) The “Advanced Liquid Processing System” is recently seen in news related to?

- a) Purification of radionuclide’s
- b) Cryogenic technology
- c) Crude oil purification
- d) Ground water enrichment

ANS: A

Explanation: Contaminated Water stored at the Fukushima Daiichi Nuclear Power Station (FDNPS) has been released after treating through an Advanced Liquid Processing System (ALPS).

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- ALPS are a pumping and filtration system which uses a series of chemical reactions to remove radionuclides from the contaminated water.
- Prior to being treated by ALPS system, contaminated water had caesium and strontium (account for most of the radioactivity from the contaminated water), removed periodically.

Source: FORUMIAS

Q.5) Which of the following is/are advantage/s of "Direct Methanol Fuel Cells (DMFC's)"?

1. High energy density
2. High efficiency
3. High operating temperatures

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: B

Explanation: DMFC is an electrochemical energy conversion device that directly converts liquid methanol's chemical energy into electrical energy.

- DMFCs have a high energy density, high efficiency and low operating temperature and are safer to operate as they deal with liquid fuel (methanol).
- It generates cleaner energy and can utilize all by-products (except the CO₂) of the reaction.

Source: FORUMIAS

Q.6) Which of the following is/are lanthanide elements?

1. Neodymium
2. Promethium
3. Cadmium

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: B

Explanation: 15 lanthanide elements are: lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutetium.

Source: FORUMIAS

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Q.7) In which of the following application/s is/are rare earth elements used?

1. Computers
2. Cell phones
3. Electric vehicles

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: B

Explanation: Applications of Rare Earth Elements: High end technology, defense applications, electronic devices like cell-phones, computers, clean energy, electric vehicle etc. because of their luminescent and catalytic properties.

Source: FORUMIAS

Q.8) Which of the following country is the largest exporter of “vanadium”?

- a) Chile
- b) Argentina
- c) Brazil
- d) Congo

ANS: C

Explanation: Brazil is the world's largest exporter of vanadium (one-fourth of total exports), Followed by Russia and South Africa.

Source: FORUMIAS

Q.9) Which of the following is/are characteristic/s of lab grown diamonds?

1. No dirt or impurities ingrained in it.
2. Created with little to no environmental damage.
3. They mostly came from conflict areas.

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: B

Explanation: LGD's: Artificially manufactured diamonds through crystallization of pure carbon with the same physical and chemical properties as natural diamonds.

Natural diamonds can come from conflicted regions.

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Natural
DIAMONDS



Lab Grown
DIAMONDS

Mining has very high carbon emissions - about 57,000 grams of CO₂ per carat.



Lab grown diamonds have a zero to negligible carbon footprint. In some instances, carbon is captured and used in diamond production.

Diamond mining has approximately 2400kg of mineral waste per carat.



Lab grown diamonds have zero waste and do not displace land, disrupt wildlife or pollute ground water.

Water Usage:
557 litres per carat.



Water Usage:
82 litres per carat.

Mined diamonds are a rare and naturally beautiful stone. They are highly desirable and so can be incredibly expensive.



Typically the price of a like for like Lab Grown Diamond is upto 50% less.

With natural diamonds, assuming a budget, there's potentially a trade off between clarity and colour for carat.



The quality of a lab grown diamond is identical to a natural mined diamond, the only compromise is provenance.

Source: FORUMIAS

Q.10) The “BepiColombo spacecraft” is recently seen in news to study which of the following planet?

- a) Mercury
- b) Jupiter
- c) Mars
- d) Saturn

ANS: A

Explanation: BepiColombo spacecraft was launched in 2018 to study and understand the composition, geophysics, atmosphere, magnetosphere and history of Mercury, the least explored planet in the inner Solar System.

Source: FORUMIAS

Science – IV

Q.1) Which of the following is/are building blocks of Metaverse?

1. Infrastructure layer
2. Virtualization engine layer
3. Interface and Access layer

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: C

Explanation: Metaverse is a 3-D-enabled virtual reality space.

Building Blocks of Metaverse (4 layers):

- Infrastructure layer, enables devices, connects them to the network, and delivers content.
- Virtualization engine layer provides the computational and programming platform.
- Interface and Access layer help users in accessing the Metaverse.
- User experience and use cases layer, creation, sale, trading, storage, etc.

Source: FORUMIAS

Q.2) The term “bharos” is recently seen in news related to?

- a) Mobile operating system
- b) Bio – fertilizers
- c) Solar vents
- d) Pace makers

ANS: A

Explanation: The “bharos” is a made in India mobile operating system developed by IIT Madras.

- It is developed under project funded by the Department of Science and Technology (DST).
- It comes with No Default Apps (NDA).
- This means that users are not forced to use apps that they may not be familiar with or that they may not trust.

Source: FORUMIAS

Q.3) Which of the following tech company/companies is/are called as gatekeeper/s by European Union?

1. Apple
2. Meta
3. Infosys

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: B

Explanation: 6 Big Tech companies namely Apple, Amazon, Alphabet, ByteDance, Meta, and Microsoft were named as Gatekeepers by the EU.

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Gatekeepers are the companies to face the highest level of scrutiny under the Digital Markets Act (DMA) of the EU.

Source: FORUMIAS

Q.4) Consider the following statements regarding “Maya Operating System (OS)”:

1. Ministry of defense is replacing its windows system with Maya OS.
2. It is based on an open-source platform Ubuntu.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: Amid increasing cyber and malware attacks on defense as well as critical infrastructure, Ministry of Defense to replace Windows OS with Maya OS.

New OS is based on an open-source platform Ubuntu.

Source: FORUMIAS

Q.5) Which of the following space agency/agencies is/are developed the James Webb Space Telescope?

1. NASA
2. ISRO
3. JAXA

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: A

Explanation: James Webb Space Telescope launched in 2021 is a joint project of NASA, the European Space Agency (ESA) and the Canadian Space Agency.

Source: FORUMIAS

Q.6) The term “Hubble constant” is recently seen in news related to?

- a) Nano technology
- b) Universe expansion
- c) Survival of fittest
- d) Genome project

ANS: B

Explanation: In 1929, Edwin Hubble provided first mathematical description of universe’s expansion. It is referred as the Hubble constant.

Source: FORUMIAS

Q.7) Which of the following is/are source/sources of Neutrinos?

1. Supernovas
2. Banana fruit
3. Exploding stars

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: C

Explanation: Sources of Neutrinos: When cosmic rays collide with interstellar matter.

- Produced by stars like the Sun, exploding stars, supernovas, etc.
- On Earth, neutrinos are produced when unstable atoms decay. Even a banana emits neutrinos—due to natural radioactivity of the potassium.

Source: FORUMIAS

Q.8) The “Iron Calorimeter (ICAL) detector” is recently seen in news related to?

- a) Neutrino
- b) Proton
- c) Electron
- d) Neutron

ANS: A

Explanation: ICAL should be able to study the spectra of muons from the atmospheric neutrinos and establish this "trough and peak" effect, thereby determining the oscillation parameters to good accuracy. Also, since ICAL can distinguish neutrino events from anti-neutrino events (by detecting muons of negative or positive sign in the detector, from a charge-current interaction), it can also study Earth-matter effects. This will enable it to study certain oscillation parameters which are not well-known.

Source: <https://www.imsc.res.in/~ino/Physics/physics.html#C3>

Q.9) Which of the following is/are Jovian planets?

1. Jupiter
2. Mars
3. Saturn

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: B

Explanation: Jupiter: Fifth from the Sun and largest planet in the solar system.

- One of the Jovian planets (others are Saturn, Uranus and Neptune).
- Jovian Planets do not have solid surfaces; instead, it is composed primarily of hydrogen and helium, with traces of methane, ammonia, water, and other gases in their atmospheres.

Source: FORUMIAS

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Q.10) The “OSIRIS-REx mission” is often seen in news launched by?

- a) NASA
- b) JAXA
- c) ISRO
- d) European Space Agency

ANS: A

Explanation: NASA’s OSIRIS-REx mission brought the sample from carbon-rich asteroid Bennu back to Earth. OSIRIS-REx is an acronym for: Origins, Spectral Interpretation, Resource Identification, and Security - Regolith Explorer.

Source: FORUMIAS

Awareness in Field of IT & Space - I

Q.1) Consider the following statements regarding “Polar Satellite Launch Vehicle (PSLV)”:

1. It is first Indian launch vehicle to be equipped with liquid stages.
2. It was successfully launched two spacecraft such as Chandrayaan-1 in 2008 and Mars Orbiter Spacecraft in 2013.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: Polar Satellite Launch Vehicle (PSLV): 3rd generation launch vehicle and first Indian launch vehicle to be equipped with liquid stages.

- PSLV emerged as the reliable and versatile workhorse launch vehicle of India.
- It successfully launched two spacecraft such as Chandrayaan-1 in 2008 and Mars Orbiter Spacecraft in 2013.
- 3 variations in PSLV - PSLV-G (General), PSLV-XL variants and PSLV-CA (Core Alone).
- It has 4 stages in its operation to provide thrust in launching spacecraft to different orbits.

Source: FORUMIAS

Q.2) Consider the following statements regarding “Geosynchronous Satellite Launch Vehicle (GSLV)”:

1. It is a four stage vehicle.
2. It can carry 5000kg load to Geosynchronous Transfer Orbit (GTO).

Which of the statements given above is/are correct?

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

ANS: D

Explanation: Geosynchronous Satellite Launch Vehicle (GSLV): 4th generation launch vehicle, a 3-stage vehicle with 4 liquid strap-on boosters.

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- Stage I: It uses solid rocket motor with 4 liquid strap-ons.
- Stage II: It uses liquid rocket engine (similar to vikas engine of PSLV stage II).
- Stage III: It uses India's first cryogenic engine (CE-7.5) in the upper stage. It enabled the launching of 2000 kg of communication satellites.

Capacity - 5000 kg of pay load to Low Earth Orbits (LEO) and 2500 kg of payload to Geosynchronous Transfer Orbit (GTO), primarily INSAT class communication satellites.

Source: FORUMIAS

Q.3) Consider the following statements regarding "Sounding Rockets":

1. They are one or two stage solid propellant rockets used for probing the upper atmospheric regions and for space research.
2. ISRO started launching indigenously made sounding rockets from 1992.

Which of the statements given above is/are correct?

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

ANS: A

Explanation: Sounding rockets are one or two stage solid propellant rockets used for probing the upper atmospheric regions and for space research.

- They serve as platforms to test or prove prototypes of new components or subsystems intended for use in launch vehicles and satellites.
- It is possible to conduct coordinated campaigns by simultaneously launching sounding rockets from different locations in a single day.
- ISRO started launching indigenously made sounding rockets from 1965.
- In 1975, ISRO consolidated all its sounding rocket activities under the Rohini Sounding Rocket (RSR) Programme.

Source: FORUMIAS

Q.4) Which of the following is/are navigation satellite system?

1. GAGAN
2. NAVIC
3. CARTOSAT

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: B

Explanation: Navigation Satellites are used to meet the emerging demand of positioning, navigation and timing and also civil aviation requirements.

Examples of navigation satellites are GAGAN and IRNSS (NAVIC).

Source: FORUMIAS

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Q.5) Consider the following statements regarding “propellants”:

1. Solid propellant consist of a casing filled with a mixture of solid compounds which burn at a rapid rate, expelling hot gases from a nozzle to produce thrust.
2. Liquid propellant consists of fuel and oxidizers are stored in separate tanks, and are fed to a combustion chamber where they are combined and burned to produce thrust.

Which of the statements given above is/are incorrect?

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

ANS: D

Explanation: Solid Propellant: They consist of a casing filled with a mixture of solid compounds (fuel and oxidizer) which burn at a rapid rate, expelling hot gases from a nozzle to produce thrust.

- Liquid Propellant: The fuel and oxidizer are stored in separate tanks (liquid form), and are fed to a combustion chamber where they are combined and burned to produce thrust.
- Cryogenic propellants are liquefied gases stored at very low temperatures. Examples are - Liquid hydrogen (LH₂) as fuel and liquid oxygen (LO₂ or LOX) as oxidizer.

Source: FORUMIAS

Q.6) The famous “Vikas engine” is used in which of the following launch vehicle/s?

1. PSLV
2. GSLV
3. GSLV Mk-III

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: C

Explanation: The Vikas is a liquid fueled rocket engine built by ISRO. The engine uses up about 40 metric tons of Unsymmetrical dimethylhydrazine (UDMH) as fuel and Nitrogen tetroxide (N₂O₄) as oxidizer with a maximum thrust of 725 kN.

It was developed by Nambi Narayanan and his team during the 1970s. It is similar to Viking rocket engines.

The Vikas Engine is the workhorse liquid rocket engine powering:

- The second stage of India’s Polar Satellite Launch Vehicle (PSLV),
- The second stage and the four strap on stages of Geosynchronous Launch Vehicle (GSLV) and
- The twin engine core liquid stage (L110) of GSLV Mk-III.

Source: FORUMIAS

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Q.7) The term “INCOSPAR” is related to which of the following?

- a) ISRO
- b) NPCIL
- c) BARC
- d) NGT

ANS: A

Explanation: Indian Space Research Organisation (ISRO) is the space agency of India.

- Role- Involved in science and engineering to harvest the benefits of outer space for India and the mankind.
- Formation - On August 15, 1969 and superseded Indian National Committee for Space Research (INCOSPAR), set up in 1962 by Dr. Vikram Sarabhai with an expanded role to harness space technology.
- Department of Space (DoS) was set up and ISRO was brought under DoS in 1972.

Source: FORUMIAS

Q.8) Consider the following statements regarding “Open Network for Digital Commerce (ONDC)”:

1. It is a network based on open protocol and will enable local commerce across segments to be engaged by any network-enabled application.
2. It aims to increase e-commerce penetration in the country by enabling inclusion of all types and sizes of sellers.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: ONDC – It is a network based on open protocol and will enable local commerce across segments (mobility, grocery, food order, hotel booking, etc.) to be engaged by any network-enabled application.

- Its aim is to dramatically increase e-commerce penetration in the country by enabling inclusion of all types and sizes of sellers.
- ONDC goes beyond the current platform-centric digital commerce model where the buyer and seller have to use the same platform or application to be digitally visible and do a business transaction.
- Initiative of - It is an initiative of Department for Promotion of Industry and Internal Trade (DPIIT) under the Ministry of Commerce and Industry.

Source: FORUMIAS

Q.9) The term “Akira” is recently seen in news related to?

- a) Ransomware
- b) Sounding rocket
- c) Ballistic missile
- d) Radar system

ANS: A

Explanation: Recently the central government’s Computer Emergency Response Team (CERT-In) issued an advisory flagging the emergence of a new ransomware called Akira.

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- It is a kind of malware, software used to gain unauthorized access to systems to steal data.
- Akira targets computer systems that run on Windows and Linux operating systems and is known to spread laterally across networks.

Source: FORUMIAS

Q.10) Consider the following statements regarding WTO “Information Technology (IT) Agreement”:

1. It came into force from 1997.
2. India is not a signatory.

Which of the statements given above is/are correct?

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

ANS: A

Explanation: The WTO’s IT Agreement has done little for India’s IT services and India’s hardware sector was hit instead of benefitting from the pact.

- The ITA was concluded by 29 participants at the Singapore Ministerial Conference in December 1996. It entered into force on 1st July 1997.
- It seeks to accelerate and deepen the reduction of trade barriers for the critically important ICT industry.
- India is a signatory to the agreement. The participants are committed to completely eliminating tariffs on IT products covered by the Agreement.

Source: FORUMIAS

Awareness in Field of IT & Space – II

Q.1) The “Juice Mission” is often seen in news launched by?

- a) NASA
- b) JAXA
- c) ISRO
- d) European Space Agency

ANS: D

Explanation: European Space Agency (ESA) has launched JUICE from Europe's spaceport French Guiana on to Jupiter and its moons through Ariane-5.

Mission is to study Jupiter and its three large ocean-bearing moons – Ganymede, Callisto and Europa.

Source: FORUMIAS

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Q.2) Which of the following statements are correct about “Jupiter Planet”?

1. It is the largest planet in our solar system.
2. It has highest number of moons.
3. It has a faint ring system.

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: B

Explanation: Jupiter: Fifth from the Sun and largest planet in the solar system. One of the Jovian planets (others are Saturn, Uranus and Neptune).

- Jovian Planets do not have solid surfaces; instead, it is composed primarily of hydrogen and helium, with traces of methane, ammonia, water, and other gases in their atmospheres.
- 2nd highest number of moons (95) after Saturn (146 moons). Has a faint ring system.

Source: FORUMIAS

Q.3) Consider the following statements regarding “BL Lacertae (BL Lac)” blazer:

1. It is observed by the Indian Astronomical Observatory.
2. It is a type of galaxy that is powered by a humongous black hole.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: Indian Astronomical Observatory (located in Hanle of Ladakh) has observed the brightening of BL Lacertae (BL Lac), a blazar.

- A Blazar is a type of galaxy that is powered by a humongous black hole. It is among one of the brightest and most powerful objects in the universe.
- It is known for emitting highly energetic particles and radiation.

Source: FORUMIAS

Q.4) The term “Nabhmitra” device for the safety of fisherman is recently seen in news developed by?

- a) INCOIS
- b) DRDO
- c) ISRO
- d) NPCIL

ANS: C

Explanation: Nabhmitra', a device developed by ISRO-Space Applications Centre (Ahmedabad) for the safety of fishermen, was successfully tested at Neendakara.

- The satellite-based communication system enables two-way messaging services from and to the sea.
- While weather and cyclone warnings will be communicated in the local language, the boats can also send distress messages to the authorities.

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- In emergency situations like capsizing and fire, fishers can press a button on the device and get in touch with the control centre.
- While the control centre will receive the alert including the location of the boat, the crew on the boat will get a response message from the control centre.

Source: <https://www.thehindu.com/news/national/kerala/isro-developed-device-for-fishers-safety-successfully-tested-at-neendakara/article67241902.ece>

Q.5) The “Flamingo project” is recently seen in news related to?

- a) Cosmological supercomputer simulations
- b) Bird conservation
- c) Coastal area protection
- d) Sea lane communication

ANS: A

Explanation: FLAMINGO is a project of the Virgo consortium for cosmological supercomputer simulations. It stands for Full-hydro Large-scale structure simulations with All-sky Mapping for the Interpretation of Next Generation Observations.

Source: FORUMIAS

Q.6) The “FEAST, a Finite Element Analysis (FEA) software” is recently seen in news developed by?

- a) Vikram Sarabhai Space Centre
- b) DRDO
- c) BARC
- d) Nuclear Fuel Complex

ANS: A

Explanation: Vikram Sarabhai Space Centre (VSSC), the lead centre of ISRO has developed FEAST, a Finite Element Analysis (FEA) software.

- It is a computerized method for predicting how a product reacts to real-world forces.
- It will be used to perform FEA of various types of structures including rockets, aircraft, satellites, buildings, etc.

Source: FORUMIAS

Q.7) The term “Betelgeuse” is often seen in news related to?

- a) Brightest star
- b) Bacteria found in deep sea
- c) Ancient bacteria
- d) Extinct mammal species

ANS: A

Explanation: Betelgeuse, seventh brightest star in sky (discounting the Sun), is spotted in constellation Orion. It is also called as ‘Thiruvathirai’ or ‘Ardra’ in Indian astronomy.

Source: FORUMIAS

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Q.8) The terms “GAPAR, AWaRe and GLASS” is often seen in news associated with?

- a) Microbial resistance
- b) Bio – fertilizers
- c) Hybrid variety of maize
- d) Exoplanets

ANS: A

Explanation: WHO in partnership with the Global AMR R&D Hub has released ‘Incentivizing the development of New Antibacterial Treatments 2023’ Report.

- Global Steps to handle AMR:
- Global Action Plan on Antimicrobial Resistance (GAPAR) by WHO
- AWaRe (Access, Watch, Reserve) Tool by WHO.
- Global Antimicrobial Resistance and Use Surveillance System (GLASS) by WHO
- Global Antibiotic Research and Development Partnership (GARDP)

Source: FORUMIAS

Q.9) The terms “Casgevy and Lyfgenia” is recently seen in news related to?

- a) Gene therapies
- b) Bio – pesticides
- c) Rice varieties
- d) Vaccines

ANS: A

Explanation: Casgevy and Lyfgenia, first cell-based gene therapies, is approved for treatment of SCD in patients 12 years of age and older.

India has also launched the National Sickle Cell Anaemia Elimination Mission to tackle SCD.

Source: FORUMIAS

Q.10) The “Preparedness and Resilience For Emerging Threats (PRET)” initiative is recently seen in news launched by?

- a) WHO
- b) WTO
- c) UNEP
- d) UNDP

ANS: A

Explanation: World Health Organisation (WHO) launched Preparedness and Resilience For Emerging Threats (PRET) Initiative.

- It is an innovative approach to improve disease pandemic preparedness.
- Recognizes that the same systems, capacities, knowledge, and tools can be leveraged and applied for groups of pathogens based on their mode of transmission (respiratory, vector-borne, foodborne etc.).
- Provides a platform for national, regional and global stakeholders to collaborate to strengthen preparedness.

Source: FORUMIAS

Revision

Q.1) Consider the following statements regarding “Chandrayaan-3”:

1. It is the world’s 1st mission to soft-land near the lunar South Pole.
2. India is the sixth country to soft-land on the moon.

Which of the statements given above is/are correct?

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

ANS: A

Explanation: The Indian Space Research Organization (ISRO) has launched the Chandrayaan-3.

- Chandrayaan-3 is India’s 3rd lunar mission and follow-on to the unsuccessful Chandrayaan-2.
- Chandrayaan-3 is the world’s 1st mission to soft-land near the lunar South Pole and India 4th country to soft-land on the moon.

Source: FORUMIAS

Q.2) The “Artemis Accords” is often seen in news related to?

- a) Outer Space
- b) Nuclear reactors
- c) Arab peace zone
- d) Export control regimes

ANS: A

Explanation: The US established the Artemis Accords together with 7 other founding member nations in 2020.

- The Artemis Accords reinforce and implement key obligations in the 1967 Outer Space Treaty.
- These Accords are a non-binding set of principles designed to guide civil space exploration cooperation among nations participating in the agency’s 21st century lunar exploration plans.
- It currently has 27 signatories including India.

Source: FORUMIAS

Q.3) The term “Lagrange points” is often seen in news related to?

- a) Criticality of nuclear reactors
- b) Positions in space
- c) Genome combinations
- d) Vaccine manufacturing

ANS: B

Explanation: Lagrange points - Lagrange points are positions in space where objects sent there tend to stay put.

- At Lagrange points, the gravitational pull of two large masses precisely equals the centripetal force required for a small object to move with them.
- These points in space can be used by spacecraft to reduce fuel consumption needed to remain in position.
- Of the five Lagrange points, three are unstable (L1, L2 and L3) and two are stable (L4 and L5).

Source: FORUMIAS

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Q.4) Consider the following statements regarding “NavIC system”:

1. It is a regional navigation satellite system of India.
2. It is designed with a constellation of 9 satellites.

Which of the statements given above is/are incorrect?

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

ANS: B

Explanation: NavIC (Navigation with Indian Constellation) is a regional navigation satellite system of India.

- It is erstwhile known as the Indian Regional Navigation Satellite System (IRNSS).
- NavIC is designed with a constellation of 7 satellites, all launched by PSLV rockets - 3 satellites of the constellation are placed in geostationary orbit and the other 4 are placed in inclined geosynchronous orbit.

Source: FORUMIAS

Q.5) Which of the following state has signed the MOU with OneWeb to set up India’s first ‘satellite network portal site’?

- a) Maharashtra
- b) Gujarat
- c) Madhya Pradesh
- d) Tamil Nadu

ANS: B

Explanation: OneWeb is to set up India’s first ‘satellite network portal site’ through a MoU signed with Gujarat government in Gujarat.

Source: FORUMIAS

Q.6) Consider the following statements regarding “XPoSat mission”:

1. It is built by Space application centre, Ahmadabad.
2. It is to study various dynamics of bright astronomical X-ray sources in extreme conditions.

Which of the statements given above is/are incorrect?

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

ANS: A

Explanation: The X-Ray Polarimeter Satellite (XPoSat) is being built in collaboration with the Raman Research Institute (RRI), Bengaluru.

India’s first, and only the world’s second polarimetry mission. It is meant to study various dynamics of bright astronomical X-ray sources in extreme conditions.

Source: FORUMIAS

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Q.7) Which of the following country/countries is/are participating in “LUPEX mission”?

1. Japan
2. France
3. India

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: B

Explanation: With Chandrayaan-3 successfully landing on the Moon’s South Pole, ISRO is planning for its next lunar mission LUPEX.

- LUPEX - Lunar Polar Exploration will be accomplished in partnership with Japan’s space agency, Japan Aerospace Exploration Agency (JAXA).
- The mission is slated to be launched in 2025. The launch vehicle and rover for this programme are supposed to be contributed by the Japanese agency, while the lander will be contributed by ISRO.

Source: FORUMIAS

Q.8) Which of the following space agency recently launched the TROPICS mission?

- a) ISRO
- b) NASA
- c) European Space Agency
- d) ROSCOSMOS

ANS: B

Explanation: NASA launches 'TROPICS' mission to improve understanding about hurricanes, cyclones.

- TROPICS is a constellation of 4 Cubesats in three low earth orbital planes that will measure temperature, humidity and precipitation with spatial resolution on hourly basis.
- It will provide microwave measurements over the tropics to observe the thermodynamics of the troposphere.

Source: FORUMIAS

Q.9) The term “Enceladus” is recently seen in news related to?

- a) Saturn moon
- b) Asteroid
- c) Meteorite
- d) Neptune moon

ANS: A

Explanation: High concentrations of phosphorus have been detected by NASA’s Cassini spacecraft in ice crystals spewed from the interior ocean of Saturn’s moon Enceladus.

Enceladus is a small moon of Saturn with an ocean of liquid water beneath its icy crust. It’s the first time phosphorous has been discovered in an ocean beyond Earth.

Source: FORUMIAS

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Q.10) CALIPSO satellite which monitors climate, weather and air quality using LIDAR has ended its science mission after 17 years was launched by which of the following space agency?

- a) NASA
- b) JAXA
- c) ISRO
- d) ROSCOSMOS

ANS: A

Explanation: CALIPSO satellite which monitors climate, weather and air quality using LIDAR has ended its science mission after 17 years.

- CALIPSO - Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation (CALIPSO) Mission.
- Launched in - 2006 by the NASA and France's CNES (Centre National d'Etudes Spatiales).

Source: FORUMIAS

Awareness in the field of Defense technology

Q.1) Consider the following statements regarding "Status of India's Defense Production":

1. India is the world's biggest arms importer.
2. India is the largest military spender in the world.

Which of the statements given above is/are correct?

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

ANS: A

Explanation: India is the world's biggest arms importer but the major weapons purchases include provisions for joint manufacture or technology transfer.

- Of India's total volume of procurement in 2016– 20, 84% was of foreign origin.
- As per Stockholm International Peace Research Institute (SIPRI), India bought weapons worth over \$60 billion in the last 20 years, of which 65% were from Russia.
- India is the third largest military spender after the United States and China.

Source: FORUMIAS

Q.2) The army exercise "INDRA" is between India and which of the following country?

- a) France
- b) Russia
- c) Japan
- d) Australia

ANS: B

Explanation: USSR was India's strategic partner during the Cold War and also its primary military equipment supplier.

- Moscow loaned the 1st nuclear submarine to India in 1988, which was commissioned as INS Chakra.
- Joint exercises- "INDRA" are held between the three-Armed Forces. Indian contingent participated in International Army Games, Ex Vostok in Russia.

Source: FORUMIAS

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Q.3) The term “IDEX-Prime” is often seen in news related to?

- a) Defense start ups
- b) Gene projects
- c) Hybrid solar projects
- d) Farming start ups

ANS: A

Explanation: IDEX-Prime - To encourage projects that may necessitate support beyond Rs. 1.5crore and up to Rs. 10crore, to help developing start-ups in the defense sector.

Source: FORUMIAS

Q.4) The “Project Swavlamban” is often seen in news related to?

- a) Indigenization of defense equipment
- b) Women empowerment
- c) Financial inclusion
- d) Satellite manufacturing

ANS: A

Explanation: Project Swavlamban- It is an initiative to promote Atmanirbhar (self-reliance) in the defense sector by encouraging indigenization of defense equipment and technology.

Source: FORUMIAS

Q.5) The term “WARDEC” is often seen in news related to?

- a) Satellite development
- b) Radar development
- c) Research centre for war game
- d) Coastal security system

ANS: C

Explanation: WARDEC - The Army Training Command has signed a MoU with Rashtriya Raksha University (RRU) to develop a Wargame Research and Development Centre (WARDEC) in New Delhi. It will be India's first simulation-based training centre.

Source: FORUMIAS

Q.6) The term “Agni-D” is recently seen in news related to which of the following?

- a) Ballistic missile
- b) Cruise missile
- c) Surveillance software
- d) Stealth missile

ANS: C

Explanation: Agni-D- it is an “AI-based surveillance software” developed by the Indian military for border security and threat detection which was unveiled at Aero India, one of Asia’s largest air shows, in 2023. It was deployed in eastern Ladakh sector, a region of strategic importance due to its closeness to China.

Source: FORUMIAS

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Q.7) Which of the following missile is NOT part of Integrated Guided Missile Development Programme (IGMDP)?

- a) S - 400
- b) AGNI
- c) AKASH
- d) NAG

ANS: A

Explanation: Integrated Guided Missile Development Programme (IGMDP): It is a Ministry of Defence programme to research and develop missiles.

- The project was started in 1982–1983 under the leadership of Dr APJ Abdul Kalam. It accomplished its design objectives by 2012.
- The DRDO and erstwhile Ordnance Factories Board (OFB) managed the programme with other Indian government political organizations.
- Missiles developed under IGMDP are 1. PRITHVI 2. AGNI 3. TRISHUL 4. AKASH 5. NAG.

Source: FORUMIAS

Q.8) The term “Agni – P” is often seen in news related to which of the following?

- a) Ballistic missile
- b) Cruise missile
- c) Surveillance software
- d) Stealth missile

ANS: A

Explanation: New Generation Ballistic Missile ‘Agni Prime’ or Agni – P was successfully flight-tested by Defense Research and Development Organization (DRDO).

It is a nuclear-capable new-gen advanced variant of the Agni class of missiles.

Source: FORUMIAS

Q.9) Consider the following statements regarding “ASTRA missile”:

1. It is a Beyond Visual Range class of Air-to-Air Missile system.
2. It was designed to be mounted on fighter aircraft to destroy highly manoeuvring supersonic aerial targets.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: ASTRA – It is a Beyond Visual Range (BVR) class of Air-to-Air Missile (AAM) system.

- It was designed and developed by the Defense Research and Development Laboratory (DRDL), Research Centre Imarat (RCI) and other laboratories of the DRDO.
- Targets - It was designed to be mounted on fighter aircraft to destroy highly manoeuvring supersonic aerial targets.

Source: FORUMIAS

Q.10) The “Project Mausam” is often seen in news associated with which of the following?

- a) Atlantic Ocean
- b) Indian Ocean
- c) Pacific Ocean
- d) Antarctica Ocean

ANS: B

Explanation: Project Mausam - To re-establish communication between countries of the Indian Ocean, to create an understanding of cultural values & concerns.

Source: FORUMIAS

Awareness in the field of Nano-technology, Biotechnology and related issues of IPR policies

Q.1) Consider the following statements regarding “Mitochondria”:

- 1. It is the power house of cells.
- 2. The chemical energy produced by the mitochondria is stored in a small molecule called adenosine triphosphate (ATP).

Which of the statements given above is/are correct?

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

ANS: C

Explanation: Mitochondria - They are membrane-bound cell organelles that are the powerhouses of the cells as they generate the energy needed to power the cell's biochemical reactions.

- Chemical energy produced by the mitochondria is stored in a small molecule called adenosine triphosphate (ATP).
- Mitochondria contain their own small chromosomes.
- Generally, mitochondria, and mitochondrial DNA, are inherited only from the mother.

Source: FORUMIAS

Q.2) Consider the following statements regarding “Genome”:

- 1. It contains all the information needed for an individual to develop and function.
- 2. In humans, the genome consists of 23 pairs of chromosomes located in the cell's nucleus, as well as in the mitochondria.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: Genome - It is the entire set of DNA instructions found in a cell.

- It contains all the information needed for an individual to develop and function.

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- In humans, the genome consists of 23 pairs of chromosomes located in the cell's nucleus, as well as in the mitochondria.
- Each chromosome is a contiguous stretch of DNA string which in turn is composed of millions of individual building blocks called nucleotides or bases.

Source: FORUMIAS

Q.3) Which of the following is/are genome sequencing method/s?

1. Clone-by-Clone method
2. Whole genome shotgun sequencing
3. Next-Generation Sequencing

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: C

Explanation: Methods deployed for Genome sequencing: Clone-by-Clone method- It is a traditional method that requires high density genome map and works well for larger genomes like eukaryotic genomes.

- Whole genome shotgun sequencing- It is the improved version of Clone-by-Clone method that doesn't require a genome map. It is the faster method of sequencing but not suitable for larger genomes as they have a number of repetitive DNA sequences.
- Next-Generation Sequencing- It is the most advanced, robust, accurate, faster, cheaper and high throughput genome sequencing technique.

It relies on the chemistry of bridge amplification and can sequence more than 5 separate human genomes simultaneously. It is the most trusted Genome Sequencing method so far.

Source: FORUMIAS

Q.4) The Genetically Engineered (GE) organisms or cells and hazardous microorganisms and products thereof are regulated as per?

- a) Wildlife Protection Act
- b) Environment (Protection) Act
- c) Biodiversity Act
- d) Biotechnology regulatory Act

ANS: B

Explanation: GE organisms or cells and hazardous microorganisms and products thereof are regulated as per 'Rules 1989' under the Environment (Protection) Act of 1986.

Source: FORUMIAS

Q.5) The "Nasha Roko Committee" is recently seen in news formed by?

- a) Punjab
- b) Maharashtra
- c) Tamil Nadu
- d) Uttar Pradesh

ANS: A

Explanation: A vigilant wave is sweeping through villages in Punjab to tackle the decade-old drug problem. It is an informal committee to stop the use and sale of drugs. It act against the drugs Chitta and the prescription-only pharma drug, pregabalin.

Source: FORUMIAS

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Q.6) Which of the following company gets the U.S. Food and Drug Administration's (FDA) approval for study of brain implants in humans?

- a) Neuralink
- b) Meta
- c) IBM
- d) Apple

ANS: A

Explanation: Elon Musk's company Neuralink gets the U.S. Food and Drug Administration's (FDA) approval for study of brain implants in humans.

- Neuralink is brain-implant Company, co-founded by Elon Musk.
- Neuralink is making a Class III medical device known as a brain-computer interface (BCI).
- The device connects the brain to an external computer via a Bluetooth signal, enabling continuous communication back and forth.

Source: FORUMIAS

Q.7) Consider the following statements regarding "Advanced Driver Assistance Systems (ADAS)":

1. It is an electronic system of automated vehicle safety features.
2. It uses innovative sensor technology to provide information, warnings, and assistance to the driver while they are driving.

Which of the statements given above is/are correct?

3. 1 only
4. 2 only
5. Both 1 and 2
6. Neither 1 nor 2

ANS: C

Explanation: Car manufactures have started providing ADAS which could create a safe traffic environment resulting in reduced accidental death.

- Electronic system - Advanced Driver Assistance Systems (ADAS) is an electronic system of automated vehicle safety features.
- The System uses innovative sensor technology to provide information, warnings, and assistance to the driver while they are driving.

Source: FORUMIAS

Q.8) Which of the following is/are advantage/s of "super capacitors"?

1. Quick charging and discharging
2. Exhibit long life
3. Bigger in size

How many of the statements given above are correct?

- a) Only one
- b) Only two
- c) Only three
- d) None

ANS: B

Explanation: Supercapacitors are a type of electrochemical energy storage systems which have great power density and specific capacitance.

Advantages of Super capacitors: Quick charging and discharging

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- Exhibit long life since they are not subject to chemical degradation as in conventional batteries
- Greater power density (can release energy more quickly)
- Smaller in size
- Provides back-up power during power outages in space applications

Source: FORUMIAS

Q.9) Consider the following statements regarding “Lithium titanate battery”:

1. It utilizes lithium-titanate nanocrystals instead of carbon on the surface of the anode.
2. It has lower inherent charge.

Which of the statements given above is/are correct?

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

ANS: C

Explanation: A lithium-titanate or lithium titanate oxide (LTO) battery is an improved version of Lithium ion batteries (LiB).

- Lithium titanate battery utilises lithium-titanate nanocrystals instead of carbon on the surface of the anode.
- Lithium-titanate nanocrystals allow the anode to gain more surface area than carbon which permits the electrons to enter and exit the anode quickly.
- The ability to donate or accept electrons in the electrolytic solutions of lithium ions with titanium oxides is more likely than the same reaction with graphite.
- This allows for fast charging capacity in the case of lithium titanate than in the case of carbon. Unlike conventional LiB, it has lower inherent charge.

Source: FORUMIAS

Q.10) Consider the following statements regarding “Helium”:

1. It is abundantly found on earth.
2. It is extracted from natural gas reserves.

Which of the statements given above is/are correct?

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

ANS: B

Explanation: Helium, despite being the 2nd most abundant element in the universe, is a rare commodity on earth.

The only way to source helium is to extract it from natural gas reserves.

Source: FORUMIAS