

ForumIAS

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Prelims Marathon

1st week May, 2024

HISTORY
ECONOMICS
POLITY
SCIENCE AND TECHNOLOGY
GEOGRAPHY AND ENVIRONMENT

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Awareness in the field of Nano-technology, Biotechnology and related issues of IPR policies – 2024

Q.1) Consider the following statements:

1. Active Immunity is when Readymade or pre formed antibodies are directly injected into body to obtain temporary immunity
2. Passive Immunity is the one developed by person's own body either in form of antibodies or activated lymphocytes in response to exposure to living or dead microbes or other antigens.

Which of the above given statement is/are not correct?

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

ANS: C

Explanation: Passive Immunity is when readymade or pre formed antibodies are directly injected into body to obtain temporary immunity.

Active Immunity is the one developed by person's own body either in form of antibodies or activated lymphocytes in response to exposure to living or dead microbes or other antigens.

Source: ForumIAS

Q.2) Consider the following statements with respect to Institute for Stem Cell Science and Regenerative Medicine (inStem):

1. Research at inStem addresses the genetic mechanisms of potency, differentiation and proliferation in human pluripotent cells
2. inStem located at Hyderabad

Which of the above given statement is/are correct?

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

ANS: A

Explanation: Research at inStem addresses the genetic mechanisms of potency, differentiation and proliferation in human pluripotent cells, examines clinical manifestations of diseases that can potentially be treated by stem cells, models human diseases using stem cells, uses model organisms such as Planaria and Hydra to address fundamental questions in regenerative biology, develops platforms to interrogate signaling pathways with new chemical entities, and finally, develops tools that will help to better understand the biology driving stem cells and eventually treat disease states. At inStem, research is primarily carried out by groups who work on tightly-knit themes, crossing boundaries and developing new approaches to address questions larger than the expertise of individual researchers. inStem located at Bangalore.

Source: ForumIAS

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Q.3) Consider the following statements with respect to Nano Mission:

1. It was launched in 12th five year plan
2. The Department of Science and Technology is the nodal agency for implementing the Nano Mission.

Which of the above given statement is/are correct?

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

ANS: B

Explanation: Nano Technology is a knowledge-intensive and “enabling technology” which is expected to influence a wide range of products and processes with far-reaching implications for national economy and development. The Government of India, in May 2007, has approved the launch of a Mission on Nano Science and Technology (Nano Mission) with an allocation of Rs. 1000 crore for 5 years. The Department of Science and Technology is the nodal agency for implementing the Nano Mission. Capacity-building in this upcoming area of research will be of utmost importance for the Nano Mission so that India emerges as a global knowledge-hub in this field. For this, research on fundamental aspects of Nano Science and training of large number of manpower will receive prime attention. Equally importantly, the Nano Mission will strive for development of products and processes for national development, especially in areas of national relevance like safe drinking water, materials development, sensors development, drug delivery, etc. For this, it will forge linkages between educational and research institutions and industry and promote Public Private Partnerships. The Nano Mission has been structured in a fashion so as to achieve synergy between the national research efforts of various agencies in Nano Science and Technology and launch new programmes in a concerted fashion. International collaborative research efforts will also be made wherever required.

Source: FoumIAS

Q.4) Nice, Locarno and Vienna Agreement are related to which of the following field?

- a) Intellectual property rights
- b) World shipping rights
- c) Cross-border agreements
- d) International refugee agreements

ANS: A

Explanation: World Intellectual Property Organization (WIPO)-Administered Treaties for Classifications:

- The Nice Agreement (1957) establishes a classification of goods and services for the purposes of registering trademarks and service marks (the Nice Classification).
- The Locarno Agreement (1968) establishes a classification for industrial designs (the Locarno Classification).
- The Vienna Agreement (1973) establishes a classification (the Vienna Classification) for marks that consist of, or contain, figurative elements.
- The International Patent Classification (1971) is used to classify patents and utility models according to the different areas of technology to which they pertain. It was established by the Strasbourg Agreement.

Source: ForumIAS

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Q.5) Consider the following statements with respect to CRISPR-Cas9:

1. It is a new type of Gene Editing
2. It was adapted from a naturally occurring genome editing system in bacteria and virus

Which of the above given statement is/are correct?

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

ANS: A

Explanation: A recent approach to genome editing is known as CRISPR-Cas9, which is short for clustered regularly interspaced short palindromic repeats and CRISPR associated protein 9.

- It was adapted from a naturally occurring genome editing system in bacteria.
- It is faster, cheaper, more accurate, and more efficient than other existing genome editing methods
- CRISPR is the DNA-targeting part of the system which consists of an RNA molecule, or 'guide', designed to bind to specific DNA bases through complementary base-pairing.
- Cas9 is the nuclease part that cuts the DNA.

Source: ForumIAS

Q.6) Consider the following statements with respect to benefits of Gene Editing:

1. Treat many human diseases & genetic disorders like HIV/AIDS, hemophilia
2. It could form the basis of highly efficient & cost effective next generation antibiotics
3. Gene editing can be used to bring to life extinct species

Which of the above given statement is/are correct?

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

ANS: A

Explanation: It is a type of genetic engineering in which DNA is inserted, deleted or replaced in the genome of an organism using artificially engineered nucleases, or "molecular scissors". Human genome editing can be used to treat many human diseases & genetic disorders like HIV/AIDS, hemophilia etc.

- It could substantially bolster disease resistance in humans & increase life span.
- It could form the basis of highly efficient & cost effective next generation antibiotics (based on bacteriophage viruses).
- Gene editing can be used to protect endangered species or bring to life extinct species.
- It can be used to grow healthier food (via fortification) and increasing harvest.
- It has the potential to slow down the spread of diseases by eliminating its means of transmission.
E.g. Gene editing can be used to introduce sterile mosquitoes into the environment.

Source: ForumIAS

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Q.7) Consider the following statements with respect to Industrial Design (IPR):

1. "Industrial design" title granted by any official authority protects only the non-functional features of an industrial product
2. The period of protection granted to Industrial Design is from 10 to 25 years

Which of the following codes below given is/are NOT correct?

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

ANS: D

Explanation: An industrial design renders an object attractive or appealing, thus increasing its marketability and adding to its commercial value. The design may be three-dimensional based on the shape or surface of the object, or two-dimensional based on the object's patterns, lines or colours. Novelty, originality and visual appeal are essential if an industrial design is to be patented, although these criteria can differ from one country to another. Its aesthetic features should not be imposed by the technical functions of the product. Legally, "industrial design" is the title granted by an official authority, generally the Patent Office, to protect the aesthetic or ornamental aspect of an object. This protects solely the non-functional features of an industrial product and does not protect any technical features of the object to which it is applied. Industrial design rights are granted to the creator of designs to reward them for their effort and investment in manufacturing the product. These rights enable the owner to make articles to which the design is applied or in which the design is embodied. The holder of this legal title has the exclusive right to make, import or sell any objects to which the design is applied. They can authorise others to exploit the design and bring a legal action against anyone using the design without authorisation. In general the period of protection granted is from 10 to 25 years. This is often divided into terms and an extension of the term requires renewal of the registration.

Source: ForumIAS

Q.8) Which of the following is/are functions of Genetic Engineering Appraisal Committee (GEAC)?

1. To appraise activities involving large scale use of hazardous microorganisms and recombinants in research and industrial production from the environmental angle.
2. To appraise proposals relating to release of genetically engineered organisms and products into the environment including experimental field trials.
3. It has no powers to take punitive action under the Environment Protection Act.

Which of the following codes below given is/are NOT correct?

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

ANS: D

Explanation: The Genetic Engineering Appraisal Committee (GEAC) functions in the Ministry of Environment, Forest and Climate Change (MoEF&CC). As per Rules, 1989, it is responsible for appraisal of activities involving large scale use of hazardous microorganisms and recombinants in research and industrial production from the environmental angle. The committee is also responsible for appraisal of proposals relating to release of genetically engineered (GE) organisms and products into the environment including experimental field trials. The committee or any persons authorized by it has powers to take punitive action under the Environment Protection Act.

Source: ForumIAS

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Q.9) Which of the following statements are true regarding challenges related to Nanoparticles?

1. Nanoparticles being small in size have tendency to clump up which make them inactive with prolonged use.
2. Due to their ability to long persistence, they may raise concerns such as bio-magnification.
3. In free form nanoparticles can accumulate in the soil, water or plant life.

Select the correct answer using the codes given below:

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

ANS: D

Explanation: Nanoparticles:

- Nanoparticles being small in size have tendency to clump up which make them inactive with prolonged use.
- Due to their ability to long persistence, they may raise concerns such as bio-magnification.
- Synthesising useful Nanoparticles is also challenging as production of a consistent size is tough.

Source: ForumIAS

Q.10) Gold Nano particles helps in:

1. Defecting Alzheimer's disease at an early stage.
2. Delivery drugs to specific site in the body, without harming healthy organs.

Which of the above given applications is/are correct?

- a) Only 1
- b) Only 2
- c) Both 1 and 2
- d) None

ANS: C

Explanation: Application of Gold nano-particles:

- Electronics - Gold nanoparticles are designed for use as conductors from printable inks to electronic chips. As the world of electronics become smaller, nanoparticles are important components in chip design. Nanoscale gold nanoparticles are being used to connect resistors, conductors, and other elements of an electronic chip.
- Photodynamic Therapy - Near-IR absorbing gold nanoparticles (including gold nanoshells and nanorods) produce heat when excited by light at wavelengths from 700 to 800 nm. This enables these nanoparticles to eradicate targeted tumors. When light is applied to a tumor containing gold nanoparticles, the particles rapidly heat up, killing tumor cells in a treatment also known as hyperthermia therapy.
- Therapeutic Agent Delivery - Therapeutic agents can also be coated onto the surface of gold nanoparticles. The large surface area-to-volume ratio of gold nanoparticles enables their surface to be coated with hundreds of molecules (including therapeutics, targeting agents, and anti-fouling polymers).
- Sensors - Gold nanoparticles are used in a variety of sensors. For example, a colorimetric sensor based on gold nanoparticles can identify if foods are suitable for consumption. Other methods, such as surface enhanced Raman spectroscopy, exploit gold nanoparticles as substrates to enable the

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measurement of vibrational energies of chemical bonds. This strategy could also be used for the detection of proteins, pollutants, and other molecules label-free.

- Probes - Gold nanoparticles also scatter light and can produce an array of interesting colors under dark-field microscopy. The scattered colors of gold nanoparticles are currently used for biological imaging applications. Also, gold nanoparticles are relatively dense, making them useful as probes for transmission electron microscopy.
- Diagnostics - Gold nanoparticles are also used to detect biomarkers in the diagnosis of heart diseases, cancers, and infectious agents. They are also common in lateral flow immunoassays, a common household example being the home pregnancy test.
- Catalysis - Gold nanoparticles are used as catalysts in a number of chemical reactions. The surface of a gold nanoparticle can be used for selective oxidation or in certain cases the surface can reduce a reaction (nitrogen oxides). Gold nanoparticles are being developed for fuel cell applications. These technologies would be useful in the automotive and display industry.

Source: ForumIAS

Other Technological developments in Science

Q.1) Which of the following are the advantages of bio-mining over traditional methods of mining?

1. It generates minimal amount of pollutants and reduces infrastructure cost.
2. It can be used for treating of Ores of lower metal concentration economically.
3. Bio-mining takes place at atmospheric pressure and lower temperatures than smelting thus the energy consumption at the mining site is less.

Select the correct answer using the codes given below:

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

ANS: D

Explanation: Bio-mining is the process of extracting valuable metals from ores and mine tailings with the assistance of microorganisms. It is a very low capital, low operational cost, and a low energy input process. This technology is also environmentally friendly as it generates minimal amount of pollutants. It has the added benefit of mining low grade ore and/or mine tailings.

The overall advantages of integrating bio-leaching into mining strategies, in addition to sustainability and maintenance are listed below.

- Ores of lower metal concentration can be treated economically; this is not feasible using traditional methods. Difficult refractory concentrates can also be processed. This method is emerging as an increasingly important way to extract valuable minerals when conventional methods such as smelting are too expensive.
- Concentrates with contaminants like arsenic, bismuth and magnesia are often expensive to treat in conventional metal-production. Mining companies often have to pay penalties for these hard to treat contaminants when they sell the concentrate to smelters. Using bioleaching microbes can help avoid these large penalties by removing arsenic and other hazardous materials from the concentrates in an environmentally stable form.
- Economic exploitation of smaller deposits, in remote locations, becomes viable because of reduced infrastructural costs.

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- Bio-mining allows for the rapid start-up of the mining site, is easy and reliable with regard to maintenance and infrastructural cost and is not labor intensive making it more profitable.
- The process takes place at atmospheric pressure and lower temperatures than smelting. Thus, the energy consumption at the mining site is less.

Source: ForumIAS

Q.2) Which of the following are the characteristic features of virus?

1. They are not affected by antibiotics.
2. They depend upon specific hosts for their reproduction and development.
3. Viruses are without protoplasm.
4. They contain only DNA and not RNA.

Select the correct answer using the codes given below:

- a) 1, 2 and 3 only
- b) 1, 3 and 4 only
- c) 2, 3 and 4 only
- d) All of the above

ANS: A

Explanation: Characteristics of virus:

- They are not affected by antibiotics.
- They depend upon specific hosts for their reproduction and development.
- Viruses are without protoplasm.
- They contain DNA or RNA.

Source: ForumIAS

Q.3) Which of the following statements is/are the correct with respect to the bio-prospecting?

1. It is the organization and analysis of biological data by computational techniques.
2. Bio-prospecting activities must comply with the definition of utilization of genetic resources of the Nagoya Protocol.
3. It promotes technology and knowledge transfer among countries along with foreign direct investment.

Select the correct answer using the codes given below:

- a) Only 1
- b) 1 and 2 only
- c) 2 and 3 only
- d) None

ANS: C

Explanation: Biodiversity prospecting or bio-prospecting is the systematic search for biochemical and genetic information in nature in order to develop commercially-valuable products for pharmaceutical, agricultural, cosmetic and other applications. Bio-prospecting activities must comply with the definition of utilization of genetic resources of the Nagoya Protocol or as stated in the national law or policy. The Nagoya Protocol applies to the utilization of genetic resources and their derivatives.

Advantages of Bio-prospecting

- It creates an incentive to monitor and preserve biodiversity in order to avoid the risk of losing economic opportunities from competitors or extinction;
- It promotes technology and knowledge transfer among countries (North-South and South-South) along with foreign direct investment;

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- Local populations will become increasingly aware of the potential economic value of natural habitats, providing incentives to the domestic population for biodiversity conservation;
- It promotes innovation, helping countries to develop new pharmaceutical products. It also favors employment opportunities related to natural products;
- It helps to preserve traditional culture and habits by rediscovering ancient native practices.

Source: ForumIAS

Q.4) Which of the following programmes initiated by the Ministry of Earth Sciences is/are correct?

1. National Monsoon Mission - to improve prediction of temperature, rainfall and extreme weather events on short to medium range time scale.
2. ORV Sagar Nidhi - to carry out monsoon experiments and know ocean processes in deep sea basins of Andamans.
3. SARAT - to carry out search and rescue to minimise loss of life, injury and property damage.

Select the correct answer using the codes given below:

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

ANS: C

Explanation: The vessel is capable of carrying out geo-scientific, meteorological and oceanographic research, and is designed with blue-water capability with ranges of up to 10,000 nautical miles (19,000 km) for voyages lasting up to 45 days. She is expected to support research in the Indian and Antarctic Oceans.

Sagar Nidhi will be utilized for deep sea mining, launching of ROV's, AUV's, manned/unmanned submersibles and exploration of gas hydrates.

RV Sindhu Sadhana will carry out monsoon experiments and know ocean processes in deep sea basins of Andamans.

Source: ForumIAS

Q.5) Which of the following statements is/are correct with respect to different types of nuclear reactors?

1. Sodium Cooled Fast Reactor: In this Sodium coolant is reactive with air and water thus, leaks in the pipes may result in sodium fires.
2. Pressurized Water Reactor: It uses regular old water as a coolant in which cooling water is kept at very high pressure so it does not boil.
3. Boiling Water Reactor: It can be refueled while operating, keeping capacity factors high.

Select the correct answer using the codes given below:

- a) Only 1
- b) 1 and 2
- c) 1 and 3
- d) None

ANS: B

Explanation: The CANDU, for Canada Deuterium Uranium, is a Canadian pressurized heavy water reactor design used to generate electric power. Pros:

- Require very little uranium enrichment.

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- Can be refueled while operating, keeping capacity factors high (as long as the fuel handling machines don't break).
- Are very flexible, and can use any type of fuel.

Sodium Cooled Fast Reactor is cooled by liquid sodium metal. Sodium is heavier than hydrogen, a fact that leads to the neutrons moving around at higher speeds (hence fast). These can use metal or oxide fuel, and burn a wide variety of fuels.

Sodium coolant is reactive with air and water. Thus, leaks in the pipes results in sodium fires. These can be engineered around but are a major setback for these reactors.

The PWR uses regular old water as a coolant. The primary cooling water is kept at very high pressure so it does not boil. It goes through a heat exchanger, transferring heat to a secondary coolant loop, which then spins the turbine. These use oxide fuel pellets stacked in zirconium tubes. They could possibly burn thorium or plutonium fuel as well.

Source: ForumIAS

Q.6) LCA Tejas is built from Carbon-Fiber Composite (CFC) materials. Which of the following is/are the characteristic feature of CFC materials?

1. High strength to weight ratio
2. Low thermal conductivity
3. Ablation resistance
4. Little sensitivity to thermal shock and mechanical shock

Select the correct answer using the codes given below:

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

ANS: C

Explanation: Carbon Fiber Properties:

- High Strength to weight ratio
- Rigidity
- Corrosion resistance
- Electrical Conductivity
- Fatigue Resistance
- Good tensile strength but Brittle
- Fire Resistance/Not flammable
- High Thermal Conductivity in some forms
- Low coefficient of thermal expansion
- Non poisonous
- Biologically inert
- X-Ray Permeable
- Relatively Expensive
- Requires specialized experience and equipment to use

Source: ForumIAS

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Q.7) Which of the statements given above is/are true regarding awards related to Science and Technology?

1. India Science Award is the highest and the most prestigious national recognition by the Government of India for outstanding contribution to science.
2. Contribution to Science and Technology field is honored by the Kalinga awards given by UNESCO.

Select the correct answer using the codes given below:

- a) Only 1
- b) Only 2
- c) Both 1 and 2
- d) None

ANS: C

Explanation: India Science Award is the highest and the most prestigious national recognition by the Government of India for outstanding contribution to science. The primary and essential criterion for the award is demonstrated and widely accepted excellence in science. The award covers all areas of research in science including engineering, medicine and agriculture.

The Kalinga Prize for the Popularization of Science is an award given by UNESCO for exceptional skill in presenting scientific ideas to lay people.

Source: ForumIAS

Q.8) Which of the following Radioisotopes and their Applications is incorrectly matched?

- a) Lead-210: Used to date layers of sand and soil.
- b) Chlorine-36: Used to measure sources of chloride and the age of water.
- c) Cobalt-60: Used to measure 'young' groundwater.
- d) Gold-198: Used to trace sand movement in river beds and ocean floors.

ANS: C

Explanation: Radioisotopes and Their Applications:

- Chlorine-36: Used to measure sources of chloride and the age of water (up to 2 million years).
- Carbon-14: Used to measure the age of water (up to 50,000 years).
- Tritium (H-3): Used to measure 'young' groundwater (up to 30 years).
- Lead-210: Used to date layers of sand and soil up to 80 years.
- Americium-241: Used in backscatter gauges, smoke detectors, fill height detectors and in measuring ash content of coal.
- Caesium-137: Used for radiotracer technique for identification of sources of soil erosion and deposition, in density and fill height level switches.
- Cobalt-60: Used for gamma sterilization, industrial radiography, density and fill height switches.
- Gold-198 and Technetium-99m: Used to study sewage and liquid waste movements, as well as tracing factory waste causing ocean pollution, and to trace sand movement in river beds and ocean floors.
- Strontium-90, Krypton-85, Thallium-204: Used for industrial gauging.
- Zinc-65 and Manganese-54: Used to predict the behavior of heavy metal components in effluents from mining waste water.
- Iridium-192, Gold-198 and Chromium-57: Used to label sand to study coastal erosion.
- Ytterbium-169, Iridium-192 and Selenium-75: Used in gamma radiography and non-destructive testing.

Source: ForumIAS

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Q.9) "Rapidly rotating stars would emit polarized light" this theory is given by:

- a) Satyendranath Bose
- b) Jayant Narlikar
- c) Sir C.V. Raman
- d) Subrahmanyam Chandrashekhar

ANS: D

Explanation: Over 70 years after Indian astrophysicist and Nobel laureate Subrahmanyam Chandrasekhar predicted that rapidly rotating stars would emit polarized light, scientists in Australia have observed the phenomenon for the first time. Researchers from the University of New South Wales (UNSW) in Australia and University College London in the UK used a highly sensitive piece of equipment to detect the polarized light from Regulus, one of the brightest stars in the night sky. The equipment provided unprecedented insights into the star, which is in the constellation Leo, allowing the scientists to determine its rate of spinning and the orientation in space of the star's spin axis.

In 1946, Chandrasekhar predicted the emission of polarized light from the edges of stars, prompting the development of sensitive instruments called stellar polar meters to try to detect this effect. In 1968, other researchers built on Chandrasekhar's work to predict that the distorted, or squashed, shape of a rapidly rotating star would lead to the emission of polarized light, but its detection has eluded astronomers until now

Source: ForumIAS

Q.10) Which of the following is not the fissile material?

- a) Plutonium-238
- b) Neptunium-237
- c) Curium-244
- d) Uranium - 238

ANS: D

Explanation: The known fissile materials are:

- Uranium-233
- Uranium-235
- Plutonium-238
- Plutonium-239
- Plutonium-241
- Neptunium-237
- Curium-244

Source: ForumIAS

Other Technological developments in Science

Q.1) Which of the followings are advantages of genetically modified crops over traditional selective breeding?

1. It allows a much wider selection of traits for improvement.
2. It reduces risk of random occurrence of undesirable traits.
3. It allows greater precision in selecting characteristics.

Which of the above given statement is/are correct?

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

ANS: D

Explanation: For the development of improved food materials, GM has the following advantages over traditional selective breeding:

- Allows a much wider selection of traits for improvement: e.g., not only pest, disease and herbicide resistance (as achieved to date in plants) but also potentially drought resistance, improved nutritional content and improved sensory properties.
- Desired change can be achieved in very few generations.
- Allows greater precision in selecting characteristics.
- Reduces risk of random occurrence of undesirable traits.

Source: ForumIAS

Q.2) Which of the following statements are true regarding Organic Light Emitting Diode (OLED)?

1. An OLED display works without backlight thus consumption of energy is less than LCD.
2. In low ambient light conditions an OLED screen has lower contrast ratio than LCD.
3. It produces brighter light and has wider viewing angle.

Select the correct answer using the codes given below:

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

ANS: C

Explanation: Organic Light Emitting Diode:

- An OLED is a light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compound that emits light in response to an electric current.
- This layer of organic semiconductor is situated between two electrodes; typically, at least one of these electrodes is transparent.
- OLEDs are used to create digital displays in devices such as television screens, computer monitors, and portable systems such as mobile phones, handheld game consoles and PDAs.
- An OLED display works without a backlight; thus, it can display deep black levels and can be thinner and lighter than a liquid crystal display (LCD) and consume less energy.
- In low ambient light conditions (such as a dark room), an OLED screen can achieve a higher contrast ratio than an LCD, regardless of whether the LCD uses cold cathode fluorescent lamps or an LED backlight.

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- It produces brighter light using less energy as compared to LEDs.

Source: ForumIAS

Q.3) Which of the following statements is/are true regarding PARAM-ISHAN?

1. It is the fastest and most powerful supercomputer in India.
2. It has been jointly developed by IIT Bombay and C-DAC (Centre for Development of Advance Computing).
3. It is solely for the weather and climate research.

Select the correct answer using the codes given below:

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

ANS: C

Explanation: Pratyush, an array of computers is the fastest supercomputer in India that can deliver a peak power of 6.8 petaflops. One petaflop is a million billion floating point operations per second and is a reflection of the computing capacity of a system.

Union Human Resource Development Minister Shri Praksh Javadekar launched PARAM-ISHAN supercomputing facility at IIT, Guwahati in 2016. It has a peak computing power of 250 Teraflops and three hundred tera bites capacity. It has been jointly developed by IIT Bombay and C-DAC (Centre for Development of Advance Computing). It will help to augment the research initiatives and also in creating an ecosystem for attracting right talents to the field of research.

Source: ForumIAS

Q.4) Which of the following is the application of Nano artificial nose?

- a) Provide easier delivery of drugs.
- b) Indicate pollution level in atmosphere air.
- c) Detect lung cancer.
- d) Provide cure against flu.

ANS: C

Explanation: NA-NOSE for short, as a means of detecting head, neck and lung cancers, which are incidentally some of the most common kinds. The method this device implements, with the help of its nanowire sensors, algorithms to differentiate healthy vs. unhealthy cells, and software, relates to its unique feature of sniffing out particles released by tumors, foreign bodies or antigens into the blood and then the breath of humans, also perceiving certain changes in biological chemicals, blood and metabolism.

Source: ForumIAS

Q.5) North-East India's largest IT hub has been opened in which of the following state?

- a) Assam
- b) Meghalaya
- c) Tripura
- d) Nagaland

ANS: C

Explanation: Tripura has got Northeast India's Largest It Hub. Its aim is to boost employment and e-governance and to increase the export of software technology. This is a great initiative and will help state to attract famous and reputed IT companies to set the business and services in this high facility set-up.

Source: ForumIAS

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Q.6) Which of the following is/are the application of radio-nuclides in environmental management?

1. To trace and analyze pollutants.
2. To study the movement of surface water.
3. To measure water runoffs from rain and snow.

Select the correct answer using the codes given below:

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

ANS: D

Explanation: Radio-nuclides are used in two major ways: either for their radiation alone (irradiation, nuclear batteries) or for the combination of chemical properties and their radiation (tracers, biopharmaceuticals). In ecology, radionuclides are used to trace and analyze pollutants, to study the movement of surface water, and to measure water runoffs from rain and snow, as well as the flow rates of streams and rivers.

Source: ForumIAS

Q.7) Consider the following statements related to the missiles developed under Integrated guided Missile Development Programme:

1. Prithvi - Surface to Surface short range cruise missile
2. Dhanush - Naval variant of Prithvi Missile
3. Akash - Short range Surface to Air Missile
4. Shaurya - Short range Surface to Surface ballistic missile.

Which of the above pair is/are correct?

- a) 1 and 2
- b) 2, 3 and 4
- c) 2 and 4
- d) None

ANS: C

Explanation:

- Prithvi - Surface to surface short range ballistic missile,
- Trishul - Short range surface to air missile.
- Akash - medium range mobile surface to air defence system.
- Dhanush - Naval variant of Prithvi Missile.
- Shaurya - Short range surface to surface ballistic missile.

Source: ForumIAS

Q.8) Which of the following are the advantages of Fiber optics?

1. Fiber optic cables are thinner and have a much greater bandwidth.
2. Fiber optic cables do not radiate electromagnetic energy thus data cannot be intercepted.
3. Data can be transmitted digitally rather than analogically.

Select the correct answer using the codes given below:

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

ANS: D

Explanation: Fibre optics is a technology that uses glass (or plastic) threads (fibers) to transmit data. A fiber optic cable consists of a bundle of glass threads, each of which is capable of transmitting messages modulated onto light waves.

Fiber optics has several advantages over traditional metal communications lines:

- Fiber optic cables have a much greater bandwidth than metal cables. This means that they can carry more data.
- Fiber optic cables are less susceptible than metal cables to interference.
- Fiber optic cables are much thinner and lighter than metal wires.
- Data can be transmitted digitally (the natural form for computer data) rather than analogically.
- There are no radiated magnetic fields around optical fibers; the electromagnetic fields are confined within the fiber. That makes it impossible to tap the signal being transmitted through a fiber without cutting into the fiber. Since fiber optics do not radiate electromagnetic energy, emissions cannot be intercepted and physically tapping the fiber takes great skill to do undetected. Thus, the fiber is the most secure medium available for carrying sensitive data. It works under DRDO.

Source: ForumIAS

Q.9) Which of the following statement is incorrect related to Orthogonal Frequency Division Multiplexing?

- a) It is a method of encoding digital data on multiple carrier frequencies.
- b) It is resilient to inter-symbol and inter-frame interference.
- c) It is used in Digital Audio Broadcasting (DAB) and Digital Video Broadcasting over the terrestrial network.
- d) It is immune to Sensitive to Doppler shift also.

ANS: D

Explanation: Orthogonal frequency-division multi-plexing (OFDM) is a method of encoding digital data on multiple carrier frequencies. OFDM has developed into a popular scheme for wideband digital communication, used in applications such as digital television and audio broadcasting, DSL internet access, wireless networks, power line networks, and 4G mobile communications.

Advantages:

- High spectral efficiency as compared to other double sideband modulation schemes, spread spectrum, etc.
- Can easily adapt to severe channel conditions without complex time-domain equalization.
- Robust against narrow-band co-channel interference
- Robust against intersymbol interference (ISI) and fading caused by multipath propagation
- Efficient implementation using fast Fourier transform

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- Low sensitivity to time synchronization errors
- Tuned sub-channel receiver filters are not required (unlike conventional FDM)
- Facilitates single frequency networks (SFNs) (i.e. transmitter macrodiversity)

Disadvantages

- Sensitive to Doppler shift
- Sensitive to frequency synchronization problems
- High peak-to-average-power ratio (PAPR), requiring linear transmitter circuitry, which suffers from poor power efficiency
- Loss of efficiency caused by cyclic prefix/guard interval.

Source: ForumIAS

Q.10) Which of the following semiconductors are used for LED manufacture?

1. Gallium Arsenide
2. Gallium Phosphide
3. Gallium Arsenide Phosphide
4. Indium Gallium Nitride

Select the correct answer using the codes given below:

- a) Only 1
- b) 2, 3 and 4
- c) 1, 3 and 4
- d) All

ANS: D

Explanation: Materials commonly used to make LEDs are gallium arsenide (GaAs) and gallium phosphide (GaP). The main semiconductor materials used to manufacture LEDs are:

- Indium gallium nitride (InGaN): blue, green and ultraviolet high-brightness LEDs
- Aluminum gallium indium phosphide (AlGaInP): yellow, orange and red high-brightness LEDs
- Aluminum gallium arsenide (AlGaAs): red and infrared LEDs
- Gallium phosphide (GaP): yellow and green LEDs

Source: ForumIAS

Other technological developments in Science

Q.1) The “One Future Alliance (OFA)” is recently seen in news related to?

- a) Solar energy
- b) Natural farming
- c) Nuclear energy
- d) Digital public infrastructure

ANS: D

Explanation: One Future Alliance (OFA), a voluntary initiative aimed to build capacity, and provide technical assistance and funding support for implementing DPI in low and middle income countries.

Source: FORUMIAS

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Q.2) Consider the following statements regarding “UPI LITE X”:

1. It was launched by National Payments Corporation of India for offline payments.
2. It will be accessible to anyone with a compatible device that supports Near Field Communication (NFC).

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: UPI LITE X was launched for offline payments. It was build based on the UPI Lite feature, which was launched in 2022.

UPI LITE X will be accessible to anyone with a compatible device that supports Near Field Communication (NFC), offering payments faster than other payment methods.

Source: FORUMIAS

Q.3) The “Universal Service Obligation Fund (USOF)” is often seen in news related to?

- a) Food grains distribution
- b) Primary health care
- c) Mobile and digital services
- d) Vaccine distribution

ANS: C

Explanation: Universal Service Obligation Fund (USOF) aims to provide for quality and affordable mobile and digital services across the rural and remote areas of the country.

Source: FORUMIAS

Q.4) Which of the following is/are advantage/s of multimodal AI?

1. Versatility
2. Natural interaction
3. Improved accuracy

How many of the statements given above are correct?

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

ANS: C

Explanation: Multimodal AI - It is artificial intelligence that combines multiple types or modes of data to create more accurate determinations, draw insightful conclusions or make more precise predictions about real-world problems.

Multiple modalities include video, audio, speech, images, text and a range of traditional numerical data sets.

Advantages of multimodal AI over the current AI:

- Versatility- It can handle multiple types of data, making it more adaptable to different situations and use cases.
- Natural interaction- By integrating multiple modalities, multimodal AI can interact with users in a more natural and intuitive way, similar to how humans communicate.

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- Improved accuracy- Multimodal AI can also improve the accuracy of its predictions and classifications.
- Enhanced user experience- It can enhance the user experience by providing multiple ways for users to interact with the system.

Source: FORUMIAS

Q.5) The “Global Partnership on AI Summit (GPAI)” took place in which of the following place?

- a) New Delhi
- b) Paris
- c) London
- d) Washington

ANS: A

Explanation: The 2023 summit of the Global Partnership on Artificial Intelligence (GPAI) held on 12–14 December 2023, in New Delhi, India.

Source: FORUMIAS

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

1. China and Brazil are global leaders in the commercial production of grapheme.
2. Graphene oxide membranes are used for water purification and desalination.

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: China & Brazil - Global leaders in the commercial production of grapheme.

- Graphene-based sensors are used for environmental monitoring, healthcare and wearable devices.
- Graphene oxide membranes are used for water purification and desalination.

Source: FORUMIAS

Q.7) The term “Krutrim” is often seen n news related to?

- a) Artificial intelligence
- b) Humanoid robot
- c) 3D printing
- d) Space robot

ANS: A

Explanation: Krutrim - India’s own AI model.

- According to Ola, Krutrim AI is an assistant “envisioned to be your own personalized assistant, who can simplify your personal and professional life by getting a variety of tasks done for you, while keeping the aesthetic sense and sensibilities of the Indian ethos.”
- The company aims to develop a unique form of AI designed to cater to the diverse needs and nuances of the Indian consumer.
- Ola claims Krutrim is built on its own foundation model and that it is “Indian at heart.”

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- The company said the AI assistant is its first step towards its product journey and building the nation's own AI.

Source: <https://indianexpress.com/article/explained/explained-sci-tech/ola-krutrim-ai-9230622/>

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

- a) Frigate
- b) Unmanned aerial vehicle
- c) Surface to air missile
- d) Submarine

ANS: B

Explanation: TAPAS-BH is a Medium Altitude Long Endurance (MALE) UAV with an operating altitude of 30000 ft, and an endurance of 24 hours.

- TAPAS-BH also projects a range of 250 km which can carry a variety of payloads up to a maximum of 350 kg with a wing span of 20.6 meters.
- It is based on the Rustom-2 platform which has been originally conceptualized and designed to perform Intelligence, Surveillance, and Reconnaissance missions for the Indian armed forces.

Source: FORUMIAS

Q.9) Which of the following is not part of project 17A?

- a) INS Nilgiri
- b) INS Himgiri
- c) INS Vela
- d) INS Dunagiri

ANS: C

Explanation: Under Project 17A, a total of 7 ships were constructed, 4 at Mazagon Dock Shipbuilders, Mumbai and 3 at Garden Reach Ship Builders Limited (GRSE), Kolkata.

7 Ships - INS Nilgiri, INS Himgiri, INS Udaygiri, INS Dunagiri, INS Taragiri, INS Vindhyagiri and INS Mahendragiri. The ships are named after hill ranges in India.

Source: FORUMIAS

Q.10) The term “Varunastra” is recently seen in news related to?

- a) Torpedo
- b) Anti tank missile
- c) Surface to air missile
- d) Hypersonic missile

ANS: A

Explanation: Indigenously made Varunastra was successfully test-fired with a live warhead by the Indian Navy.

Varunastra is a ship launched, heavy weight, electrically-propelled anti-submarine torpedo.

Source: FORUMIAS

Revision

Q.1) Which of the following country has the highest space debris?

- a) USA
- b) Russia
- c) Canada
- d) India

ANS: B

Explanation: Space Debris is any piece of machinery or debris left by humans in space.

- It can be dead satellites, bits of debris or paint flecks that have fallen off a rocket.
- Russia has the most space debris with over 7000 rocket bodies floating in space.

Source: FORUMIAS

Q.2) The “Smart Lander for Investigating Moon (SLIM)” is recently seen in news launched by?

- a) USA
- b) Japan
- c) Russia
- d) India

ANS: B

Explanation: Japan’s space Agency JAXA has recently launched the SLIM moon lander.

- SLIM – A small-scale exploration lander designed for pinpoint landings on the Moon’s surface and investigates into the Moon’s origins. The mission was dubbed as the Moon Sniper.
- It will also test technology fundamental to exploration in low-gravity environments, an important requirement for future scientific investigation of the solar system.

Source: FORUMIAS

Q.3) The “Hitomi” was a high energy astrophysics space observatory, developed by?

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

ANS: A

Explanation: Hitomi was a highenergy astrophysics space observatory, developed by JAXA.

Source: FORUMIAS

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Q.4) Consider the following statements:

1. FDI in space sector is allowed up to 100 percent in the area of Satellites establishment and operations through government route.
2. Indian Space Association was launched in 2021, to help private players carry out independent space activities.

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 Space Association- It was launched in 2021 to help private players carry out independent space activities facilitate services and technology developed by ISRO to be utilized in the private sector.

- Revised FDI guidelines- This would open up huge investment opportunities for the foreign companies.
- FDI in space sector is allowed up to 100% in the area of Satellites Establishment and Operations through Government route.

Source: FORUMIAS

Q.5) Which of the following treaty/treaties is/are ratified by India?

1. The Outer Space Treaty
2. The Liability Convention
3. The Moon Agreement

How many of the statements given above are correct?

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

ANS: C

Explanation: 5 United Nations treaties are generally thought to form the bedrock of international space law.

- The Outer Space Treaty
- The Rescue Agreement
- The Liability Convention
- The Registration Convention
- The Moon Agreement

Of the 5 UN Treaties on Space Venture, India has ratified 1st four and signed Moon Agreement without ratifying it.

Source: FORUMIAS

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Q.6) Which of the following statements is/are correct about “Outer Space Treaty –1967”?

1. It governs the exploration and use of Outer Space only for peaceful purpose.
2. Liability on countries for damage caused by any objects launched into space from their territory.
3. Binding on its signatories.

How many of the statements given above are correct?

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

ANS: C

Explanation: The Outer Space Treaty –1967:

- It is often called the magna carta of space law. It governs the exploration and use of Outer Space only for peaceful purpose.
- It prohibits the weaponisation of space. No claim of sovereignty over any bodies in space.
- Liability on countries for damage caused by any objects launched into space from their territory.
- Countries must help astronauts who are in distress. Space installations and vehicles of one nation are to be open to other nations on a reciprocal basis.
- It binding on its signatories.

Source: FORUMIAS

Q.7) Consider the following statements regarding the “Karman line”:

1. It is the boundary between the Earth’s atmosphere and outer space.
2. It is an internationally recognized boundary of space.

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: Karman line - The Karman line is the boundary between the Earth’s atmosphere and outer space at an altitude of 100km (62 miles) above sea level.

It is an internationally recognized boundary of space. The Karman line is near the transition between the upper mesosphere and lower thermosphere.

Source: FORUMIAS

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Q.8) Consider the following statements regarding “Starship”:

1. The Starship spacecraft and Super Heavy rocket is collectively referred to as Starship.
2. It represents a fully reusable transportation system designed to carry both crew and cargo to Earth orbit, the Moon, Mars and beyond.

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: Starship spacecraft and Super Heavy rocket is collectively referred to as Starship.

- It represents a fully reusable transportation system designed to carry both crew and cargo to Earth orbit, the Moon, Mars and beyond.
- Starship will be the world’s most powerful launch vehicle ever developed, capable of carrying up to 150 metric tonnes fully reusable and 250 metric tonnes expendable.

Source: FORUMIAS

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

1. Leptons
2. Quarks
3. Neutrons

How many of the statements given above are correct?

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

ANS: C

Explanation: Fermions - Any member of a group of subatomic particles having odd half-integral angular momentum (spin $1/2, 3/2$).

Fermions mainly include quarks and leptons along with electrons, protons, and neutrons.

Source: FORUMIAS

Q.10) The term “Scary Barbie” is often seen in news related to?

- a) Ancient bacteria
- b) Black hole
- c) Deep sea organisms
- d) Invasive species

ANS: B

Explanation: Scientists discovered a super massive black hole and have named it ‘Scary Barbie,’ after a beloved children’s character.

- Scary Barbie is a super massive black hole that is devouring a star with a thousand times the brightness of a supernova.
- It is one of the most luminous, energetic, long-lasting transient objects in the sky.

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- The researchers discovered it using an AI engine called REFITT (Recommender Engine For Intelligent Transient Tracking).

Source: FORUMIAS

Bilateral Relations

Q.1) The “Ratle Hydroelectric Project” is often seen in news on which of the following river?

- a) Ganga
- b) Chenab
- c) Jhelum
- d) Ravi

ANS: B

Explanation: The Permanent Court of Arbitration rejected India’s objections and determined it is competent to consider matters under Kishenganga and Ratle hydroelectric projects.

- Kishanganga Hydroelectric Project is a run-of-the-river hydroelectric project diverts water from the Kishanganga River to a power plant in the Jhelum River basin.
- Ratle Hydroelectric Project (Chenab River) is a hydroelectric power plant being built by India with a capacity of 850 MW.
- India has opposed it and contends that it is in contravention of the provisions of the Indus Waters Treaty (IWT).

Source: FORUMIAS

Q.2) Which of the following institution is funding the “Turkmenistan-Afghanistan-Pakistan-India (TAPI) Project”?

- a) World Bank
- b) Asian Development Bank
- c) Asian Infrastructure Investment Bank
- d) New Development Bank

ANS: B

Explanation: TAPI project aims to export natural gas annually through pipeline from Turkmenistan (Galkynysh gas field) to Afghanistan, Pakistan and India (Fazilka).

The funding of the project is done by the Asian Development Bank (ADB).

Source: FORUMIAS

Q.3) The boundary dispute over “Limpiyadhura, Kalapani and Lipulekh” between India and?

- a) Bangladesh
- b) Sikkim
- c) Nepal
- d) Bhutan

ANS: C

Explanation: Recently, Nepal has released a new political map that claims Kalapani, Limpiyadhura and Lipulekh of Uttarakhand as part of Nepal’s territory.

- The area of Susta (West Champaran district, Bihar) can also be noted in the new map.

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- India rejected the new map of Nepal saying that Nepal's new map involves artificial enlargement of territories, which is not based on historical facts and evidence.
- Nepal's act is a unilateral act and is contrary to the bilateral understanding to resolve the outstanding boundary issues through diplomatic dialogue.
- Currently, India and Nepal have border disputes over Kalapani - Limpiyadhura - Lipulekh trijunction between India-Nepal and China and Susta area (West Champaran district, Bihar).

Source: FORUMIAS

Q.4) The "Pacheshwar multipurpose project" is often seen in news related to?

- a) Nepal
- b) Bhutan
- c) Sikkim
- d) Bangladesh

ANS: A

Explanation: More than a month after India and Nepal signed the agreement on long-term power sharing; the two sides have not managed to make any forward movement on the stalled negotiations over the landmark Pancheshwar Multipurpose Project (PMP).

The Pancheshwar Multipurpose Project is aimed at generating around 6,480 MW energy (to be divided equally between two sides), along with water for irrigation of 130,000 hectares of land in Nepal and 240,000 hectares of Indian territory, respectively.

Source: FORUMIAS

Q.5) Consider the following statements regarding the sixth "Indian Ocean Conference":

1. It was jointly organized by the Sri Lanka and India.
2. Peace Prosperity and Partnership for a Resilient Future was the theme of conference.

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: Indian Ocean Conference (IOC): 6th IOC was jointly organized by the Bangladesh and India.

- Theme: Peace Prosperity and Partnership for a Resilient Future. IOC is a forum to discuss how the countries of the Indian Ocean region (IOR) can promote economic development while maintaining peace and stability.
- First IOC was held in 2016 (Singapore). It provides a common platform to deliberate upon the prospects of regional cooperation for Security and Growth for All in the Region (SAGAR).

Source: FORUMIAS

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Q.6) Which of the following country's political party made the pre poll promise of "India Out campaign"?

- a) Nepal
- b) Sri Lanka
- c) Maldives
- d) Bhutan

ANS: C

Explanation: Maldives' President has pitched to end the presence of Indian troops in the islands in accordance with his pre-poll promise made under "India Out" campaign.

- The "India Out" campaign was led by the Progressive Party of Maldives (PPM).
- The campaign strongly opposed the Indian military's presence in the Maldives, on the grounds of sovereignty of the Maldives.

Source: FORUMIAS

Q.7) The "Ekuverin" military exercise between India and which of the following country?

- a) Sri Lanka
- b) Malaysia
- c) Maldives
- d) Myanmar

ANS: C

Explanation: The 12th edition of joint military exercise "Ex Ekuverin" between the Indian Army & the Maldives National Defence Force has commenced at Chaubatia, Uttarakhand.

Ekuverin meaning 'Friends' is a bilateral annual exercise conducted alternatively in India and Maldives.

Source: FORUMIAS

Q.8) Which of the following country is divided into three island groups Luzon, Visayas, and Mindanao?

- a) Thailand
- b) Singapore
- c) Philippines
- d) New Zealand

ANS: C

Explanation: Philippines is an archipelago (of over 7,000 islands) in south-eastern Asia between the South China Sea and the Pacific Ocean.

- It is divided into three island groups: Luzon (largest island of country), Visayas, and Mindanao.
- It is bounded by Philippine Sea, Celebes Sea, Sulu Sea and South China Sea.

Source: FORUMIAS

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Q.9) Consider the following statements regarding “India-Saudi Arabia Strategic Partnership Council”:

1. It was set up in 2019.
2. India is the fourth country with which Riyadh formed such a partnership, after the UK, France, and China.

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: India-Saudi Arabia Strategic Partnership Council was set up in 2019.

- India is the fourth country with which Riyadh formed such a partnership, after the UK, France, and China.
- Its aim is to establish a high-level council to steer the Indo-Saudi relationship.

Source: FORUMIAS

Q.10) Recently India has signed the memorandum of understanding for “Local Currency Settlement System (LCSS)” with which of the following country?

- a) Russia
- b) Saudi Arabia
- c) Iraq
- d) UAE

ANS: D

Explanation: Recently, a MoU has been signed between India and UAE on Local Currency Settlement System.

- Local Currency Settlement (LCS) means settlement of a bilateral transaction between two countries is conducted in the respective currency of each country where the settlement is conducted within their jurisdiction.
- The pact signed between UAE and India is to promote the use of the rupee and UAE Dirham (AED) for cross-border transactions.

Source: FORUMIAS

Bilateral Relations - II

Q.1) The “Comprehensive Economic Partnership Agreement (CEPA)” signed by India with which of the following country/countries?

1. Japan
2. South Korea
3. Australia

How many of the statements given above are correct?

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

ANS: B

Explanation: While a traditional Free Trade Agreement (FTA) focuses mainly on goods; a CEPA is more comprehensive and ambitious in terms of a holistic coverage of many areas like services, investment, IPR, government procurement, disputes etc.

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India-UAE Comprehensive Economic Partnership Agreement (CEPA) completed one year. India has also signed CEPA with Japan and South Korea.

Source: FORUMIAS

Q.2) Which of the following provision/s is/are covered under the “Comprehensive Economic Partnership Agreement (CEPA)”?

1. Services
2. Investments
3. Intellectual Property Rights

How many of the statements given above are correct?

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

ANS: C

Explanation: While a traditional Free Trade Agreement (FTA) focuses mainly on goods; a CEPA is more comprehensive and ambitious in terms of a holistic coverage of many areas like services, investment, IPR, government procurement, disputes etc.

Source: FORUMIAS

Q.3) Consider the following statements regarding “bilateral relations with UAE by India”:

1. UAE is India’s third-largest trading partner.
2. India has a trade surplus with UAE.

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: UAE is India’s third-largest trading partner and India’s second-largest export destination. India has a trade deficit with UAE.

Source: FORUMIAS

Q.4) The “Innovation Handshake” initiative is launched by India and which of the following country?

- a) France
- b) Canada
- c) Japan
- d) USA

ANS: D

Explanation: A Memorandum of Understanding (MoU) on “Enhancing Innovation Ecosystems through an Innovation Handshake” under the framework of India – U.S. Commercial Dialogue was signed between the two countries on the 14th of November 2023 in San Francisco.

The leaders’ Joint Statement during the historic official State Visit of Prime Minister in June 2023 announced the establishment of the “Innovation Handshake”.

Source: FORUMIAS

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Q.5) The “INDUS-X” defense cooperation between India and which of the following country?

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

ANS: A

Explanation: The U.S.-India Defense Acceleration Ecosystem (INDUS-X) was launched to expand the strategic technology partnership and to advance cutting-edge technology cooperation between governments, businesses, and academic institutions.

Source: FORUMIAS

Q.6) Which of the following is/are cover/s under the “Artemis Accord”?

- 1. Mars
- 2. Moon
- 3. Comets

How many of the statements given above are correct?

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

ANS: C

Explanation: Artemis Accord was established by the U.S. State Department and NASA In 2020.

It sets common principles to govern civil exploration and use of outer space, the moon, Mars, comets, and asteroids, for peaceful purposes.

Source: FORUMIAS

Q.7) Which of the following country is NOT part of “Five Eyes Intelligence Alliance (FVEY)”?

- a) USA
- b) Canada
- c) Australia
- d) Japan

ANS: D

Explanation: Five Eyes Intelligence Alliance (FVEY) is an intelligence alliance comprising the US, UK, Australia, Canada, and New Zealand.

- It originated from the 1946 UK-USA Agreement for sharing signals intelligence (SIGINT).
- Five Eyes Intelligence Oversight and Review Council include the non-political intelligence oversight, review, and security entities of member.

Source: FORUMIAS

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Q.8) Consider the following statements regarding “IBSA forum”:

1. It does not have a headquarters.
2. Brazil assumed presidency in 2023.

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: IBSA forum: The grouping was formalized and named the IBSA Dialogue Forum 2003 and Brasilia Declaration was issued.

- It is a trilateral forum which brings together India, Brazil and South Africa, three large democracies and major economies from three different continents, facing similar challenges.
- IBSA does not have a headquarters or a permanent executive secretariat. Brazil assumed presidency in 2023.

Source: FORUMIAS

Q.9) The “SAFE framework” is often seen in news related to?

- a) World Customs Organization
- b) World Trade Organization
- c) World Bank
- d) UNCTAD

ANS: A

Explanation: In June 2005 the WCO Council adopted the SAFE Framework of Standards to Secure and Facilitate Global Trade (SAFE Framework) that would act as a deterrent to international terrorism, to secure revenue collections and to promote trade facilitation worldwide.

- In 2007, the WCO’s flagship Customs-Business partnership programme - the Authorized Economic Operators (AEO) Programme - was introduced.
- The SAFE Framework has emerged as the global Customs community’s concerted response to threats to supply chain security, equally supporting facilitation of legitimate and secure businesses.
- It prescribes baseline standards that have been tested and are working well around the globe.
- This unique international instrument endeavors to usher in a safer world trade regime and also heralds a new approach to working methods and partnership for both Customs and business towards a common goal based on trust.

Source: https://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/frameworks-of-standards/safe_package.aspx

Q.10) The “Exercise Pitch Black” is often seen in news conducted/hosted by?

- a) USA
- b) Japan
- c) Australia
- d) Canada

ANS: C

Explanation: Exercise Pitch Black is a biennial warfare exercise hosted by the Royal Australian Air Force (RAAF).

- Exercise Pitch Black 22 was hosted by the Royal Australian Air Force at its Darwin Air Base.

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- Spanning over duration of three weeks, the exercise saw the participation of 17 Air Forces and over 2500 military personnel.
- The IAF contingent included four Su-30 MKI & two C-17 aircraft. The participating forces took part in various multi-aircraft combat drills by day & night, simulating complex aerial scenarios, involving large formations.

Source: FORUMIAS

