

ForumIAS

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## Prelims Marathon

23<sup>rd</sup> to 28<sup>th</sup> October, 2023

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*HISTORY  
ECONOMICS  
POLITY  
SCIENCE AND TECHNOLOGY  
GEOGRAPHY AND ENVIRONMENT*

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FORUMIAS



## Science

**Q.1) Which of the following is/are part of “Panch Tatva”?**

1. Air
2. Fire
3. Earth

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** Since early times, human beings have been trying to understand their surroundings. Early Indian philosophers classified matter in the form of five basic elements – the “Panch Tatva”– air, earth, fire, sky and water.

**Source: NCERT**

**Q.2) Consider the following statements:**

1. The SI unit of mass is kilogram (kg).
2. The SI unit of volume is cubic metre (m<sup>3</sup>).

**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 SI unit of mass is kilogram (kg). The SI unit of volume is cubic metre (m<sup>3</sup>). The common unit of measuring volume is litre (L) such that 1L = 1dm<sup>3</sup>, 1L = 1000 mL, 1 mL = 1 cm<sup>3</sup>.

**Source: NCERT**

**Q.3) Consider the following statements:**

1. Particles of matter possess the kinetic energy.
2. As the temperature rises, particles move faster.

**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:** Particles of matter are continuously moving, that is, they possess what we call the kinetic energy.

As the temperature rises, particles move faster. So, we can say that with increase in temperature the kinetic energy of the particles also increases.

**Source:** NCERT

**Q.4) Which of the following is/are example/s of compressed form of gas?**

1. CNG
2. LPG
3. Oxygen supplied in hospitals

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** The liquefied petroleum gas (LPG) cylinder that we get in our home for cooking or the oxygen supplied to hospitals in cylinders is compressed gas.

Compressed natural gas (CNG) is used as fuel these days in vehicles. Due to its high compressibility, large volumes of a gas can be compressed into a small cylinder and transported easily.

**Source:** NCERT

**Q.5) Consider the following statements:**

1. The melting point of ice is 273.15 K.
2. The process of change of solid state into liquid state is also known as fusion.

**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 melting point of ice is 273.15 K\*. The process of melting, that is, change of solid state into liquid state is also known as fusion.

**Source:** NCERT

**Q.6) Consider the following statements:**

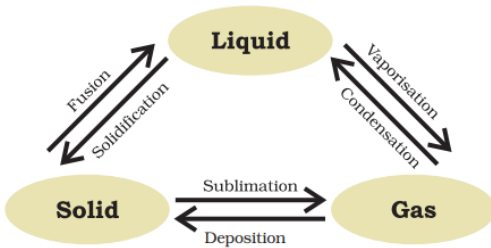
1. The change of form from liquid to gas is evaporation.
2. The change of form from solid to gas is deposition.

**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:**



**Fig. 1.9:** Interconversion of the three states of matter

**Source: NCERT**

**Q.7) Which of the following is/are state of matter?**

1. Gas
2. Plasma
3. Bose Einstein Condensate

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** Now scientists are talking of five states of matter: Solid, Liquid, Gas, Plasma and Bose Einstein Condensate.

**Source: NCERT**

**Q.8) Consider the following statements:**

1. Plasma state consists of super energetic and super excited particles.
2. The fluorescent tube and neon sign bulbs consist of plasma.

**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:** Plasma: The state consists of super energetic and super excited particles.

- These particles are in the form of ionized gases.
- The fluorescent tube and neon sign bulbs consist of plasma.

**Source: NCERT**

**Q.9) Consider the following statements:**

1. The states of matter are inter-convertible.
2. The state of matter can be changed by changing temperature or pressure.

**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 states of matter are inter-convertible. The state of matter can be changed by changing temperature or pressure.

**Source: NCERT**

**Q.10) Consider the following statements:**

1. Boiling is a bulk phenomenon.
2. Evaporation is a surface phenomenon.

**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:** Boiling is a bulk phenomenon. Particles from the bulk (whole) of the liquid change into vapor state.

Evaporation is a surface phenomenon. Particles from the surface gain enough energy to overcome the forces of attraction present in the liquid and change into the vapor state.

**Source: NCERT**

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## Science

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**Q.1) Consider the following statements:**

1. Alloys are mixtures of two or more metals.
2. Brass is a mixture of zinc and copper.

**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:** Alloys are mixtures of two or more metals or a metal and a non-metal and cannot be separated into their components by physical methods.

- But still, an alloy is considered as a mixture because it shows the properties of its constituents and can have variable composition.
- For example, brass is a mixture of approximately 30% zinc and 70% copper.

**Source: NCERT**

**Q.2) Which of the following is/are property/properties of a solution?**

1. It is a homogeneous mixture.
2. The particles of a solution are smaller than 1 nm
3. The solute particles cannot be separated from the mixture by the process of filtration.

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** Properties of a solution:

- A solution is a homogeneous mixture.
- The particles of a solution are smaller than 1 nm (10<sup>-9</sup> metre) in diameter. So, they cannot be seen by naked eyes.
- Because of very small particle size, they do not scatter a beam of light passing through the solution. So, the path of light is not visible in a solution.
- The solute particles cannot be separated from the mixture by the process of filtration.
- The solute particles do not settle down when left undisturbed, that is, a solution is stable.

**Source: NCERT**

**Q.3) Which of the following is/are property/properties of a suspension?**

1. Suspension is a heterogeneous mixture.
2. The particles of a suspension cannot be seen by the naked eye.
3. The particles of a suspension scatter a beam of light passing through it and make its path visible.

**How many of the statements given above are correct?**

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

**ANS: B**

**Explanation:** Properties of a Suspension:

- Suspension is a heterogeneous mixture.
- The particles of a suspension can be seen by the naked eye.
- The particles of a suspension scatter a beam of light passing through it and make its path visible.
- The solute particles settle down when a suspension is left undisturbed, that is, a suspension is unstable.
- They can be separated from the mixture by the process of filtration. When the particles settle down, the suspension breaks and it does not scatter light any more.

**Source:** NCERT

**Q.4) Which of the following is NOT a property of colloid?**

- a) A colloid is a homogenous mixture.
- b) The size of particles of a colloid is too small to be individually seen by naked eyes.
- c) Colloids are big enough to scatter a beam of light passing through it and make its path visible.
- d) They do not settle down when left undisturbed, that is, a colloid is quite stable.

**ANS: A**

**Explanation:** Properties of a colloid:

- A colloid is a heterogeneous mixture.
- The size of particles of a colloid is too small to be individually seen by naked eyes.
- Colloids are big enough to scatter a beam of light passing through it and make its path visible.
- They do not settle down when left undisturbed, that is, a colloid is quite stable.

**Source:** NCERT

**Q.5) In which of the following activity/activities the centrifugation is/are used?**

1. In diagnostic laboratories for blood and urine tests.
2. In dairies and home to separate butter from cream.
3. In washing machines to squeeze out water from wet clothes.

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** Sometimes the solid particles in a liquid are very small and pass through a filter paper. For such particles the filtration technique cannot be used for separation. Such mixtures are separated by centrifugation. The principle is that the denser particles are forced to the bottom and the lighter particles stay at the top when spun rapidly.

Applications:

- Used in diagnostic laboratories for blood and urine tests.
- Used in dairies and home to separate butter from cream.
- Used in washing machines to squeeze out water from wet clothes.

**Source: NCERT**

**Q.6) Which of the following is/are property/properties of metals?**

1. They have a luster.
2. They have silvery-grey or golden-yellow color.
3. They conduct heat and electricity.

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** Metals usually show some or all of the following properties:

- They have a lustre (shine).
- They have silvery-grey or golden-yellow colour.
- They conduct heat and electricity.
- They are ductile (can be drawn into wires).
- They are malleable (can be hammered into thin sheets).
- They are sonorous (make a ringing sound when hit).

**Source: NCERT**



**Q.7) Consider the following statements regarding elements:**

1. Majority of the elements are solid.
2. The numbers of elements known at present are more than 100.

**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 numbers of elements known at present are more than 100.

- Ninety-two elements are naturally occurring and the rest are manmade.
- Majority of the elements are solid. Eleven elements are in gaseous state at room temperature.
- Two elements are liquid at room temperature—mercury and bromine.
- Elements, gallium and cesium become liquid at a temperature slightly above room temperature (303 K).

**Source:** NCERT

**Q.8) Consider the following statements:**

1. Elements or compounds just mix together to form a mixture and no new compound is formed.
2. Elements react to form new compounds.

**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:**

**Table 2.2: Mixtures and Compounds**

Mixtures	Compounds
1. Elements or compounds just mix together to form a mixture and no new compound is formed.	1. Elements react to form new compounds.
2. A mixture has a variable composition.	2. The composition of each new substance is always fixed.
3. A mixture shows the properties of the constituent substances.	3. The new substance has totally different properties.
4. The constituents can be separated fairly easily by physical methods.	4. The constituents can be separated only by chemical or electrochemical reactions.

**Source:** NCERT

**Q.9) Consider the following statements:**

1. Pure substances can be elements or compounds.
2. An element is a form of matter that cannot be broken down by chemical reactions into simpler substances.

**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:** Pure substances can be elements or compounds. An element is a form of matter that cannot be broken down by chemical reactions into simpler substances.

A compound is a substance composed of two or more different types of elements, chemically combined in a fixed proportion.

**Source:** NCERT

**Q.10) The “Chandoli National Park” is recently seen in news located at?**

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

**ANS: D**

**Explanation:** Chandoli National Park is a national park established in Sangli district of Maharashtra on May 2004. Earlier it was a Wildlife Sanctuary declared in 1985.

Chandoli Park is notable as the southern portion of the Sahyadri Tiger Reserve, with Koyna Wildlife Sanctuary forming the northern part of the reserve.

**Source:** FORUMIAS

## Science

**Q.1) Consider the following statements:**

1. Harappans made faience, a sort of glass which was used in ornaments.
2. Copper metallurgy in India dates back to the beginning of chalcolithic cultures in the subcontinent.

**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:** Harappans made faience, a sort of glass which was used in ornaments.

- They melted and forged a variety of objects from metals, such as lead, silver, gold and copper.
- They improved the hardness of copper for making artefacts by using tin and arsenic.
- A number of glass objects were found in Maski in South India (1000–900 BCE), and Hastinapur and Taxila in North India (1000–200 BCE).
- Glass and glazes were coloured by addition of colouring agents like metal oxides.
- Copper metallurgy in India dates back to the beginning of chalcolithic cultures in the subcontinent.

**Source: NCERT**

**Q.2) Consider the following statements:**

1. Rasopanishada describes the preparation of gunpowder mixture.
2. Rasratnakar deals with the formulation of mercury compounds.

**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:** Rasopanishada describes the preparation of gunpowder mixture.

- Tamil texts also describe the preparation of fireworks using sulphur, charcoal, saltpetre (i.e., potassium nitrate), mercury, camphor, etc.
- Nagarjuna was a great Indian scientist. He was a reputed chemist, an alchemist and a metallurgist.
- His work Rasratnakar deals with the formulation of mercury compounds.

**Source: NCERT**

**Q.3) The famous “Brihat Samhita” was written by?**

- a) Nagarjuna
- b) Chakrapani
- c) Varahmihir
- d) Baskara

**ANS: C**

**Explanation:** Varāhmihir’s Brihat Samhita is a sort of encyclopaedia, which was composed in the sixth century CE.

It informs about the preparation of glutinous material to be applied on walls and roofs of houses and temples.

**Source: NCERT**

**Q.4) In which of the following place/s is/are principle/s of chemistry applied?**

- 1. Weather patterns
- 2. Functioning of brain
- 3. Operation of computer

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** Principles of chemistry are applicable in diverse areas, such as weather patterns, functioning of brain and operation of a computer, production in chemical industries, manufacturing fertilizers, alkalis, acids, salts, dyes, polymers, drugs, soaps, detergents, metals, alloys, etc., including new material.

**Source: NCERT**

**Q.5) Consider the following statements:**

- 1. Solids have definite volume and definite shape.
- 2. Liquids have definite volume but do not have definite shape.
- 3. Gases have neither definite volume nor definite shape.

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** Different states of matter exhibit the following characteristics:

- (i) Solids have definite volume and definite shape.
- (ii) Liquids have definite volume but do not have definite shape. They take the shape of the container in which they are placed.
- (iii) Gases have neither definite volume nor definite shape. They completely occupy the space in the container in which they are placed.

**Source: NCERT**

**Q.6) Which of the following is/are example/s of pure substance/s?**

1. Copper
2. Silver
3. Gold

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** Pure substances have characteristics different from mixtures.

- Constituent particles of pure substances have fixed composition.
- Copper, silver, gold, water and glucose are some examples of pure substances.

**Source: NCERT**

**Q.7) Consider the following statements:**

1. The metre is the SI unit of length.
2. The kilogram is the SI unit of mass.

**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 metre, symbol m is the SI unit of length.

The kilogram symbol kg. is the SI unit of mass.

**Source: NCERT**

**Q.8) Consider the following statements:**

1. The law of conservation of mass was put forth by Antoine Lavoisier.
2. The law of definite proportion was given by, a French chemist, Joseph Proust.

**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:** Law of Conservation of Mass: This law was put forth by Antoine Lavoisier in 1789. He performed careful experimental studies for combustion reactions and reached to the conclusion that in all physical and chemical changes, there is no net change in mass during the process.

Law of Definite Proportions: This law was given by, a French chemist, Joseph Proust. He stated that a given compound always contains exactly the same proportion of elements by weight.

**Source: NCERT**

**Q.9) “Equal volumes of all gases at the same temperature and pressure should contain equal number of molecules” – related to?**

- a) Law of multiple proportions
- b) Gay Lussac’s Law of Gaseous Volumes
- c) Avogadro’s Law
- d) Law of Definite Composition.

**ANS: C**

**Explanation:** In 1811, Avogadro proposed that equal volumes of all gases at the same temperature and pressure should contain equal number of molecules.

Avogadro made a distinction between atoms and molecules which is quite understandable in present times.

**Source:** NCERT

**Q.10) Consider the following statements:**

1. The molecular mass of a molecule is obtained by taking sum of the atomic masses of different atoms present in a molecule.
2. The molecular formula can be calculated by determining the mass per cent of different elements present in a compound and its molecular mass.

**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 molecular mass of a molecule is obtained by taking sum of the atomic masses of different atoms present in a molecule. The molecular formula can be calculated by determining the mass per cent of different elements present in a compound and its molecular mass.

**Source:** NCERT

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## Science

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**Q.1) In which of the following year “family planning” was initiated in India?**

- a) 1921
- b) 1948
- c) 1951
- d) 1972

**ANS: C**

**Explanation:** India was amongst the first countries in the world to initiate action plans and programmes at a national level to attain total reproductive health as a social goal. These programmes called ‘family planning’ were initiated in 1951 and were periodically assessed over the past decades.

**Source: NCERT**

**Q.2) The term “amniocentesis” is often seen in news related to?**

- a) Prenatal test
- b) Thyroid test
- c) Blood infusion test
- d) Lungs capacity test

**ANS: A**

**Explanation:** Amniocentesis (also called amnio) is a prenatal test that takes amniotic fluid from around your baby in the uterus (also called womb). The fluid is tested to see if your baby has certain health conditions. A prenatal test is a medical test you get during pregnancy.

**Source: NCERT**

**Q.3) Which of the following is/are characteristic/s of law of dominance of Mendel?**

1. Characters are controlled by discrete units called factors.
2. Factors occur in pairs.
3. In a dissimilar pair of factors one member of the pair dominates the other.

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** Law of Dominance: (i) Characters are controlled by discrete units called factors. (ii) Factors occur in pairs. (iii) In a dissimilar pair of factors one member of the pair dominates (dominant) the other (recessive).

**Source: NCERT**

**Q.4) Consider the following statements:**

1. Mutation is a phenomenon which results in alteration of DNA sequences.
2. Mutation results in changes in the genotype and the phenotype of an organism.

**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:** Mutation is a phenomenon which results in alteration of DNA sequences and consequently results in changes in the genotype and the phenotype of an organism. In addition to recombination, mutation is another phenomenon that leads to variation in DNA.

**Source:** NCERT

**Q.5) “The inheritance of a particular trait is represented in the family tree over generations” – related to?**

- a) Mutation
- b) Recombination
- c) Pedigree analysis
- d) Co-twin method

**ANS: C**

**Explanation:** The idea that disorders are inherited has been prevailing in the human society since long. This was based on the heritability of certain characteristic features in families.

- After the rediscovery of Mendel’s work the practice of analyzing inheritance pattern of traits in human beings began.
- Since it is evident that control crosses that can be performed in pea plant or some other organisms, are not possible in case of human beings, study of the family history about inheritance of a particular trait provides an alternative.
- Such an analysis of traits in several of generations of a family is called the pedigree analysis.
- In the pedigree analysis the inheritance of a particular trait is represented in the family tree over generations.

**Source:** NCERT

**Q.6) Consider the following statements regarding sickle cell anaemia:**

1. It is an autosome linked recessive trait.
2. It can be transmitted from parents to the offspring when both the partners are carrier for the gene.

**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:** Sickle-cell anaemia: This is an autosome linked recessive trait that can be transmitted from parents to the offspring when both the partners are carrier for the gene (or heterozygous).

**Source:** NCERT



**Q.7) Consider the following statements regarding Down's syndrome:**

1. The cause of this genetic disorder is the presence of an additional copy of the chromosome number 18.
2. It was first described by Langdon Down.

**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:** Down's syndrome: The cause of this genetic disorder is the presence of an additional copy of the chromosome number 21 (trisomy of 21).

- This disorder was first described by Langdon Down (1866).
- The affected individual is short statured with small round head, furrowed tongue and partially open mouth.
- Palm is broad with characteristic palm crease. Physical, psychomotor and mental development is retarded.

**Source: NCERT**

**Q.8) Consider the following statements:**

1. Detritivores break down detritus into smaller particles.
2. By the process of leaching, watersoluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts.

**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:** Detritivores (e.g., earthworm) break down detritus into smaller particles. This process is called fragmentation.

- By the process of leaching, water soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts.
- Bacterial and fungal enzymes degrade detritus into simpler inorganic substances. This process is called as catabolism.

**Source: NCERT**

**Q.9) Consider the following statements:**

1. Humification leads to accumulation of a dark colored amorphous substance called humus.
2. The humus is degraded by some microbes and release of inorganic nutrients occurs by the process known as mineralization.

**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:** Humification leads to accumulation of a dark colored amorphous substance called humus that is highly resistant to microbial action and undergoes decomposition at an extremely slow rate.

Being colloidal in nature it serves as a reservoir of nutrients. The humus is further degraded by some microbes and release of inorganic nutrients occurs by the process known as mineralization.

**Source: NCERT**

**Q.10) Consider the following statements:**

1. The gradual and fairly predictable change in the species composition of a given area is called ecological succession.
2. The entire sequence of communities that successively change in a given area are called sere(s).

**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 gradual and fairly predictable change in the species composition of a given area is called ecological succession.

- During succession some species colonise an area and their population become more numerous whereas populations of other species decline and even disappear.
- The entire sequence of communities that successively change in a given area are called sere(s).

**Source: NCERT**

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## Science

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**Q.1) Consider the following statements regarding acharya Jagadish Chandra Bose:**

1. He was the first Asian to be awarded a US patent in 1904.
2. He invented Crescograph.

**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:** Ministry of Culture organized an international conference on the occasion of 164th birth anniversary of the Indian scientist Acharya Jagadish Chandra Bose (J.C. Bose)

- He was the first Asian to be awarded a US patent in 1904 and first Asian along with Srinivasa Ramanujan FRS, to become the fellows of the Royal Society (FRS) in 1920.
- Bose invented the instrument Crescograph which demonstrated the minute movements of plants subjected to external stimuli and measure their rate of growth.

**Source:** FORUMIAS

**Q.2) Consider the following statements:**

1. Nuclear fusion is the process by which two light atomic nuclei combine to form a single heavier.
2. Fusion reactions take place in a state of matter called plasma.

**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:** Nuclear fusion is the process by which two light atomic nuclei (for example tritium and deuterium) combine to form a single heavier (Helium) one while releasing massive amounts of energy.

Fusion reactions take place in a state of matter called plasma a hot, charged gas made of positive ions and free-moving electrons with unique properties distinct from solids, liquids, or gases.

**Source:** FORUMIAS

**Q.3) Consider the following statements:**

1. India has three stage nuclear energy generation programme.
2. In 2<sup>nd</sup> stage Thorium is used as fuel.

**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's 3-stage nuclear energy program, envisioned by Homi Bhabha, is based on a closed nuclear fuel cycle.

- Stage-I: PHWRs fuelled by Natural uranium would produce plutonium-239. Heavy water (D<sub>2</sub>O) is used as moderator and coolant in PHWR.
- Stage-II: Fast Breeder Reactors utilizing plutonium-239 fuel from first stage and formed uranium-238.
- Stage-III: Advanced nuclear power systems for utilization of thorium.

**Source:** FORUMIAS

**Q.4) The "aditya L1" mission is often seen in news related to?**

- a) Sun
- b) Mars
- c) Moon
- d) Venus

**ANS: A**

**Explanation:** ISRO successfully launched India's first space-based observatory-class solar mission to study the Sun on September 2, to study the Sun.

**Source:** FORUMIAS

**Q.5) Consider the following statements regarding vanadium:**

1. It is an abundant element in the earth's crust.
2. It is listed as one of the critical mineral identified by the Government of India.

**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:** Vanadium is a chemical element with the symbol "V" and the atomic number 23 and is classified as a transition metal.

- It is an abundant element in the earth's crust, ranking 22<sup>nd</sup> in position in the upper continental crust.
- It is listed as one of the 30 critical minerals identified by the Government of India.

**Source:** FORUMIAS

**Q.6) Consider the following statements:**

1. Human genome has 22 pairs of autosomes and one pair of sex chromosomes.
2. Y chromosome is male-determining.

**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:** Y-chromosome is one of the two human sex chromosomes (X being the other).

- Human genome has 22 pairs of autosomes and one pair of sex chromosomes (XX in female and XY in male)
- Y chromosome is male-determining because it bears SRY genes which are responsible for certain sex characteristics, such as testes.

**Source:** FORUMIAS

**Q.7) The Kakrapar Nuclear Power Plant is recently seen in news located at?**

- a) Karnataka
- b) Maharashtra
- c) Gujarat
- d) Tamil Nadu

**ANS: C**

**Explanation:** First largest indigenous 700 MWe Kakrapar Nuclear Power Plant (KAPP 3) started working in Gujarat.

KAPP-3 is also the biggest indigenously developed variant of the Pressurised Heavy Water Reactor (PHWR).

**Source:** FORUMIAS

**Q.8) The “Gujarat declaration of 2023” is recently seen in news related to?**

- a) Cyber security
- b) Health
- c) Agriculture
- d) Intellectual property

**ANS: B**

**Explanation:** WHO has released the outcome document of first WHO Traditional Medicine Global Summit 2023 in form of Gujarat Declaration.

- It reaffirmed global commitments towards indigenous knowledge, biodiversity and Traditional, Complementary and Integrative Medicine.
- It serves as a catalyst to harness the potential of traditional medicine and focus on their integration in national health systems.

**Source:** FORUMIAS

**Q.9) The famous “Juno Mission” is often seen in news related to?**

- a) Jupiter
- b) Mars
- c) Moon
- d) Venus

**ANS: A**

**Explanation:** NASA’s Juno mission completed its 53rd close flyby of Jupiter.

Juno missions aim is to probe beneath Jupiter’s dense clouds and the origin and evolution of Jupiter, solar system, and giant planets in general across the cosmos.

**Source: FORUMIAS**

**Q.10) The “Simlipal Tiger Reserve” is recently seen in news located at?**

- a) Odisha
- b) Tamil Nadu
- c) Andhra Pradesh
- d) Kerala

**ANS: A**

**Explanation:** Simlipal is a tiger reserve in the Mayurbhanj district in the Indian state of Odisha covering 2,750 km.

It is part of the Mayurbhanj Elephant Reserve, which includes three protected areas—Similipal Tiger Reserve, Hadgarh Wildlife Sanctuary with 191.06 km and Kuldiha Wildlife Sanctuary with 272.75 km.

**Source: FORUMIAS**

## Science

**Q.1) Which of the following is/are objective/s of Indian Space Policy, 2023?**

1. To augment India's space capabilities.
2. To enable and encourage the development of a commercial space sector in India.
3. To use space as a driver of technology development and derive benefits in allied areas.

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** The objectives of India's space program are as follows:

- To augment India's space capabilities.
- To enable and encourage the development of a commercial space sector in India.
- To use space as a driver of technology development and derive benefits in allied areas.
- To pursue international relations in the space sector.

**Source: FORUMIAS**

**Q.2) Consider the following statements regarding "NavIC":**

1. It is known as Indian Regional Navigation Satellite System (IRNSS).
2. It is designed with a constellation of 10 satellites and a network of ground stations operating 24 x 7.

**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:** NavIC was erstwhile known as Indian Regional Navigation Satellite System (IRNSS).

- NavIC is designed with a constellation of 7 satellites and a network of ground stations operating 24 x 7.
- Three satellites of the constellation are placed in geostationary orbit, and four satellites are placed in inclined geosynchronous orbit.

**Source: FORUMIAS**

**Q.3) Which of the following nation/s is/are to achieve successful mars orbit/mission?**

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: B**

**Explanation:** The Mars Orbiter Mission (MOM), also known as Mangalyaan, was a space probe orbiting Mars since 24 September 2014.

- It was India's first interplanetary mission and it made ISRO the fourth space agency to achieve Mars orbit, after Roscosmos, NASA, and the European Space Agency.
- It made India the first Asian nation to reach the Martian orbit and the first nation in the world to do so on its maiden attempt.

**Source: FORUMIAS**

**Q.4) The “Perseverance mission” is often seen in news related to?**

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

**ANS: A**

**Explanation:** The Perseverance Rover is a robotic space rover that was launched by NASA on July 30, 2020. It landed on Mars on February 18, 2021.

The rover is part of NASA's Mars 2020 mission, which is designed to search for signs of ancient microbial life on Mars.

**Source: FORUMIAS**

**Q.5) Consider the following statements:**

1. Gaganyaan is a human spaceflight mission being undertaken by the Indian Space Research Organisation (ISRO).
2. Gaganyaan mission aims to send three Indian astronauts to orbit the Earth for up to seven days.

**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:** Gaganyaan is a human spaceflight mission being undertaken by the Indian Space Research Organisation (ISRO).

The mission aims to send three Indian astronauts to orbit the Earth for up to seven days. The mission is scheduled to take place in 2023.

**Source: FORUMIAS**



**Q.6) Which of the following is/are part of Chandrayaan 3?**

1. Lander
2. Rover
3. Orbiter

**How many of the statements given above are correct?**

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

**ANS: B**

**Explanation:** Chandrayaan 3 is the planned third lunar exploration mission by the Indian Space Research Organisation (ISRO).

- The mission will comprise a lander and a rover, similar to Chandrayaan-2, but will not include an orbiter.
- The propulsion module of Chandrayaan 3 will serve as a communications relay satellite.

**Source: FORUMIAS**

**Q.7) Which of the following complex problem/s is/are solved by using quantum principles?**

1. Computing
2. Communications
3. Chemistry

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** National Mission on Quantum Technology and Applications (NMQTA):

- In the Union Budget of 2020-2021, the Central Government has allocated Rs. 8000 crore for the National Mission on Quantum Technology and Applications (NMQTA).
- The mission seeks to develop quantum computing linked technologies amidst the second quantum revolution and make India the world's third-biggest nation in the sector after the US and China.
- The areas of focus of the NM-QTA Mission will be fundamental science, translation, technology developed and towards fulfilling natural properties
- Quantum principles will be used for engineering solutions to extreme complex problems in computing, communications, sensing, chemistry, cryptography, imaging and mechanics.

**Source: FORUMIAS**

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

- a) Quantum mechanics
- b) Cyber security
- c) Geospatial technology
- d) Nano technology

**ANS: A**

**Explanation:** Just like bits (1 and 0) are the basic units by which computers process information, ‘qubits’ or ‘quantum bits’ are the units of process by quantum computers.

A quantum computer stores information in the form of quantum bits (qubits) that can take on various combinations of zero and one.

**Source: FORUMIAS**

**Q.9) The “Orion Space Capsule” is recently seen in news related to?**

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

**ANS: A**

**Explanation:** NASA's Orion Space Capsule is a spacecraft designed to take astronauts to destinations beyond low Earth orbit, including the Moon, Mars, and potentially other celestial bodies.

**Source: FORUMIAS**

**Q.10) The “Bhitarkanika National Park” is recently seen in news located at?**

- a) Odisha
- b) Andhra Pradesh
- c) Tamil Nadu
- d) Karnataka

**ANS: A**

**Explanation:** Bhitarkanika National Park is a 145 km<sup>2</sup> large national park in northeast Kendrapara district in Odisha in eastern India.

- It was designated on 16 September 1998 and obtained the status of a Ramsar site on 19 August 2002.
- The area is also been designated as the second Ramsar site of the State after the Chilika Lake.

**Source: FORUMIAS**

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## Science

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**Q.1) The “Jezero Crater” is recently seen in news related to?**

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

**ANS: A**

**Explanation:** The Perseverance Rover is about the size of a car and weighs about 2,268 pounds.

- It has a variety of scientific instruments, including a drill, a camera, and a spectrometer.
- The rover is also equipped with a helicopter named Ingenuity.
- The Perseverance rover is currently exploring the Jezero Crater on Mars.

**Source: FORUMIAS**

**Q.2) The “LIGO–India” is often seen in news is going to be located at?**

- a) Kashmir
- b) Himachal Pradesh
- c) Maharashtra
- d) Tamil Nadu

**ANS: C**

**Explanation:** LIGO–India will be located in the Hingoli district of Maharashtra, India, due to its low seismic activity and close proximity to the Inter-University Centre for Astronomy and Astrophysics (IUCAA), a major research institute.

**Source: FORUMIAS**

**Q.3) The “Starlink” is often seen in news related to?**

- a) Internet
- b) Cyber fraud
- c) Space exploration
- d) Solar energy

**ANS: A**

**Explanation:** Starlink is a satellite-based internet service provider owned and operated by SpaceX.

Starlink is currently in beta testing and is available in select areas of the United States, Canada, and Europe.

**Source: FORUMIAS**

**Q.4) The famous “CRISPR-Cas9” is often seen in news related to?**

- a) Gene editing tool
- b) Hydrogen fuel
- c) Catalytic convertors
- d) Organic medicine

**ANS: A**

**Explanation:** CRISPR-Cas9 is a gene-editing tool that has revolutionized the way scientists can make precise changes to DNA.

This relatively new technology has already been used to make a variety of modifications to the DNA of plants, animals, and even humans.

**Source: FORUMIAS**

**Q.5) Consider the following statements regarding Recombinant DNA technology:**

- 1. It is the process of combining DNA from different organisms.
- 2. It is done by cutting DNA from two different sources with restriction enzymes and then ligating DNA fragments together.

**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:** Recombinant DNA technology is the process of combining DNA from different organisms.

- This is done by cutting DNA from two different sources with restriction enzymes and then ligating the DNA fragments together.
- Recombinant DNA technology is used in a variety of applications, including the production of vaccines, hormones, and other biological products.

**Source: FORUMIAS**

**Q.6) Which of the following disease/s is/are treated through stem cell therapy?**

- 1. Leukemia
- 2. Lymphoma
- 3. Myeloma

**How many of the statements given above are correct?**

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

**ANS: C**

**Explanation:** Stem Cell Transplants are used to treat a Variety of Diseases:

- Leukemia: Leukemia is a cancer of the blood cells. Stem cell transplants can be used to treat leukemia that does not respond to other treatments, such as chemotherapy and radiation therapy.

**PRELIMS MARATHON COMPILATION FOR THE MONTH OF OCTOBER, [Fourth WEEK] 2023**

- Lymphoma: Lymphoma is a cancer of the lymph nodes. Stem cell transplants can be used to treat lymphoma that does not respond to other treatments, Like Chemotherapy and Radiation Therapy.
- Myeloma: Myeloma is a cancer of the plasma cells. Stem cell transplants can be used to treat myeloma that does not respond to other treatments, Like Chemotherapy and Radiation Therapy.
- Aplastic anemia: Aplastic anemia is a condition in which the body does not produce enough new blood cells. Stem cell transplants can be used to treat aplastic anemia that does not respond to other treatments, Like Chemotherapy and Radiation Therapy.

**Source: FORUMIAS**

**Q.7) The terms “Heera and Donskaja” is often seen in news related to?**

- a) Maize
- b) Mustard
- c) Cotton
- d) Paddy

**ANS: B**

**Explanation:** Genetically modified mustard is a type of mustard that has been genetically engineered to have certain desired traits.

These traits can include resistance to herbicides, pests, or diseases, or improved nutritional value.

The use of the barnase-barstar system in breeding allows for the development of hybrids using a wider range of mustard varieties, including those of East European origin such as 'Heera' and 'Donskaja.'

**Source: FORUMIAS**

**Q.8) Which of the following is/are benefit/s of 5G technology?**

1. Increased latency
2. Faster speed
3. Increased connectivity

**How many of the statements given above are correct?**

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

**ANS: B**

**Explanation:** Benefits of 5G:

- **Faster Speeds:** 5G offers significantly faster data speeds compared to previous generations, enabling quicker downloads, smoother streaming, and improved real-time communication.
- **Reduced Latency:** 5G networks have lower latency, reducing the time it takes for devices to communicate with each other. This is crucial for applications like autonomous vehicles, remote surgery, and real-time gaming.

**PRELIMS MARATHON COMPILATION FOR THE MONTH OF OCTOBER, [Fourth WEEK] 2023**

- Increased Capacity: 5G can support a massive number of connected devices simultaneously, enabling the Internet of Things (IoT) to flourish and powering smart cities, smart homes, and interconnected devices.
- Enhanced Connectivity: 5G provides more reliable and stable connections, ensuring seamless connectivity even in densely populated areas or high-traffic environments.

**Source: FORUMIAS**

**Q.9) Consider the following statements:**

1. A Non-Fungible Token (NFT) is a unique digital asset that is stored on a blockchain.
2. NFTs can represent anything from art to collectibles to in-game items.

**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 Non-Fungible Token (NFT) is a unique digital asset that is stored on a blockchain.

- NFTs can represent anything from art to collectibles to in-game items.
- They are often bought and sold with cryptocurrency, and their value can fluctuate wildly.

**Source: FORUMIAS**

**Q.10) The “Mudumalai National Park” is recently seen in news located at?**

- a) Tamil Nadu
- b) Andhra Pradesh
- c) Karnataka
- d) Kerala

**ANS: A**

**Explanation:** Mudumalai National Park is a national park in the Nilgiri Mountains in Tamil Nadu in southern India.

It covers 321 km<sup>2</sup> at an elevation range of 850–1,250 m in the Nilgiri District and shares boundaries with the states of Karnataka and Kerala. A part of this area has been protected since 1940.

**Source: FORUMIAS**