

**Pre-Mix – 5 MCQs for Prelims****Subject – Science & Tech****Date – 04<sup>th</sup> March 2023**

1. Recently National Centre for Polar and Ocean Research (NCPOR) and the Goa University (GU) have synthesized gold nanoparticles (GNPs). Consider the following statements in this context:

1. These GNPs were synthesized by using fungi through eco-friendly way.
2. These GNPs can be used as a composite therapeutic agent.
3. The GNPs displayed anti-bacterial properties.

Which of the statements given above /are correct?

- A. 1 and 2 only
- B. 2 and 3 only
- C. 3 only
- D. All of the above

2. Recently the body of Nobel Peace Prize winner Desmond Tutu underwent aquamation, a green alternative to traditional cremation methods. Which among the following statement/s is/are correct in this context.

1. It is an alkaline hydrolysis process in which body is immersed in a mixture of water and a strong alkali.
2. The process leaves behind DNA, bone fragments and a neutral liquid called effluent.

Which of the statements given above /are correct :

- A. 1 only
- B. 2 only
- C. Both 1 and 2
- D. None of the above.

3. With the current state of development, Synthetic biology can do which of the following?

1. Generation of polio virus from scratch

2. Microorganisms modification for bioremediation
3. Synthesis of bacterial genome
4. Rice modified to produce beta-carotene

Which of the statements given above /are correct:

- A. 1, 2 and 3 only
- B. 2 and 4 only
- C. 2, 3 and 4 only
- D. All of the above.

4. Which among the following is/are correct in context to the Hubble space and James web telescope:

1. The JWST will be able to see right through and into massive clouds of dust that are opaque to earlier generation visible-light observatories like the Hubble Telescope.
2. Webb is equipped with cameras and other instruments sensitive to infrared or “heat” radiation.
3. The James Webb Space Telescope will not be in orbit around the Earth, like the Hubble Space Telescope is.

Which of the statements given above /are correct :

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. All of the above.

5. Which one of the following statements is not correct?

(UPSC 2019)

- A. Hepatitis B virus is transmitted much like HIV.
- B. Hepatitis B, unlike Hepatitis C, does not have a vaccine.
- C. Globally, the number of people infected with Hepatitis B and C viruses are several times more than those infected with HIV.



2. Recently the body of Nobel Peace Prize winner Desmond Tutu underwent aquamation, a green alternative to traditional cremation methods. Which among the following statement/s is/are correct in this context.

1. It is an alkaline hydrolysis process in which body is immersed in a mixture of water and a strong alkali.
2. The process leaves behind DNA, bone fragments and a neutral liquid called effluent.

Which of the statements given above /are correct :

- A. 1 only
- B. 2 only
- C. Both 1 and 2
- D. None of the above.

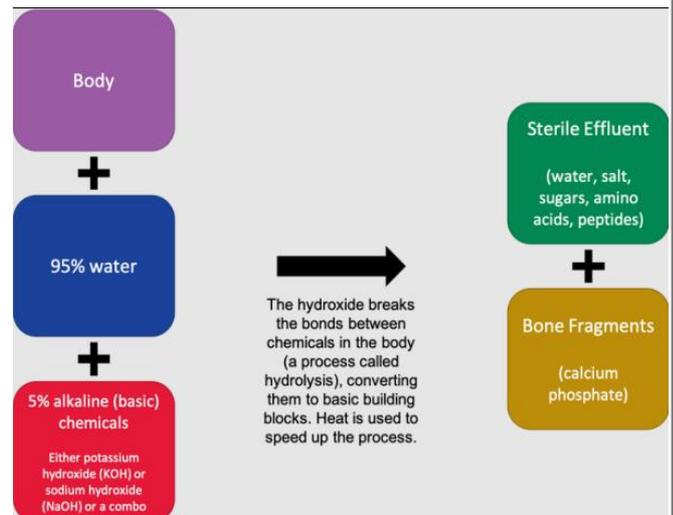
Answer : A

Explanation

What is aquamation?

- Aquamation, or alkaline hydrolysis, is a process in which the **body of the deceased is immersed for a few hours in a mixture of water and a strong alkali** in a pressurized metal cylinder and heated to around 150 degree centigrade.
- The process **leaves behind bone fragments** and a neutral liquid called effluent.
- The decomposition that occurs in alkaline hydrolysis is the **same as that which occurs during burial, just sped up dramatically by the chemicals.**
- The effluent is sterile, and contains salts, sugars, amino acids and peptides.

- There is **no tissue and no DNA left after** the process completes.



3. With the current state of development, Synthetic biology can do which of the following?

1. Generation of polio virus from scratch
2. Microorganisms modification for bioremediation
3. Synthesis of bacterial genome
4. Rice modified to produce beta-carotene

Which of the statements given above /are correct :

- A. 1, 2 and 3 only
- B. 2 and 4 only
- C. 2, 3 and 4 only
- D. All of the above.

Answer : D

Explanation

Synthetic biology

- Synthetic biology or synbio is a broad and dynamic field of innovation encompassing the **design and construction of new biological parts that redesign existing natural biological systems** to address real-time and real-world problems.
- In 2002, scientists in the United States synthesized a viral genome for the first time. Viral genomes are much smaller compared to the genomes of most bacteria and microorganisms. **Scientists** showed that it

was possible to create the polio virus from scratch and brought attention to the risk that synthetic biology could be used to develop biological weapons

- The first synthetic bacterial genome was completed in 2008 with the **synthesis of the genome of *Mycoplasma genitalium***, a bacterium that can cause urinary and genital tract infections in humans.

**4. Which among the following is/are correct in context to the Hubble space and James web telescope:**

1. The JWST will be able to see right through and into massive clouds of dust that are opaque to earlier generation visible-light observatories like the Hubble Telescope.
2. Webb is equipped with cameras and other instruments sensitive to infrared or "heat" radiation.
3. The James Webb Space Telescope will not be in orbit around the Earth, like the Hubble Space Telescope is.

**Which of the statements given above /are correct :**

- A. 1 and 2 only
- B. 2 and 3 only
- C. 1 and 3 only
- D. All of the above.

**Answer : D**

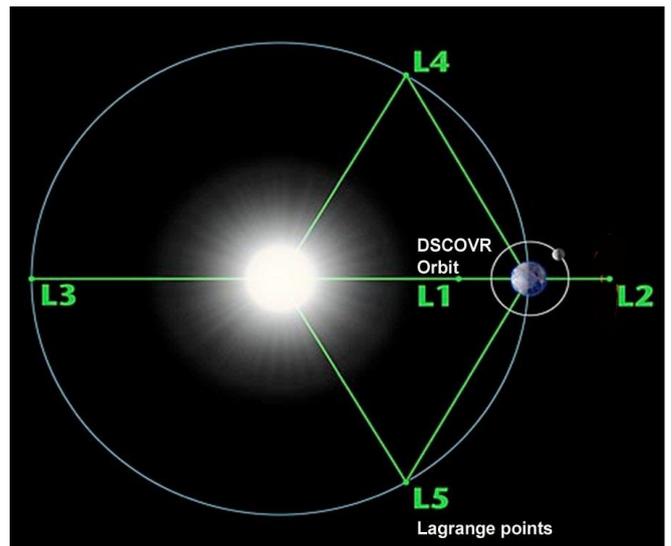
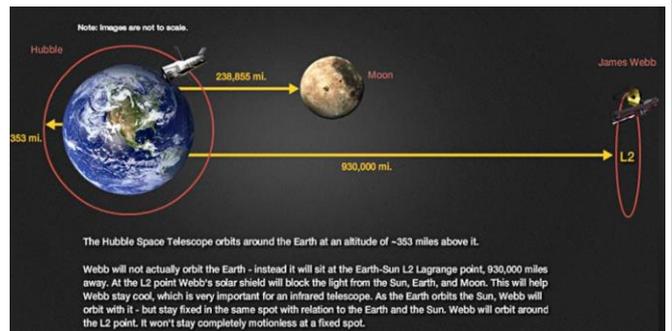
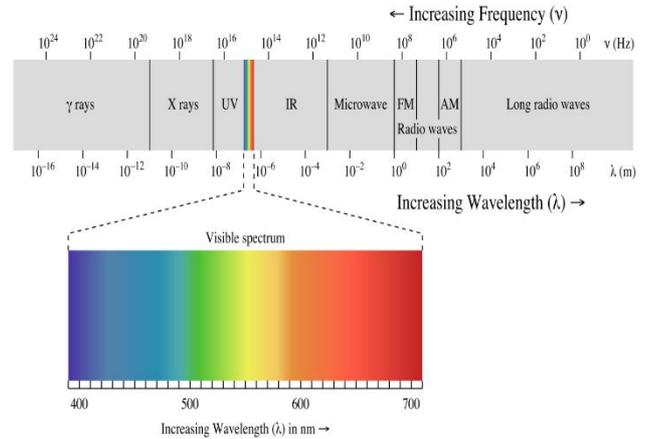
**Explanation**

**James Webb Space Telescope (JWST)**

**Hubble Vs James web telescope**

- The JWST will be able to see right through and into massive clouds of dust that are opaque to earlier generation visible-light observatories like the Hubble Telescope.
- Another difference is that the Webb is equipped with cameras and other instruments sensitive to infrared or "heat" radiation, and the Hubble is not.

- The expansion of the universe causes the light that would normally be in wavelengths that are visible to be shifted to longer infrared wavelengths, normally invisible to human eyes.



5. Which one of the following statements is not correct?

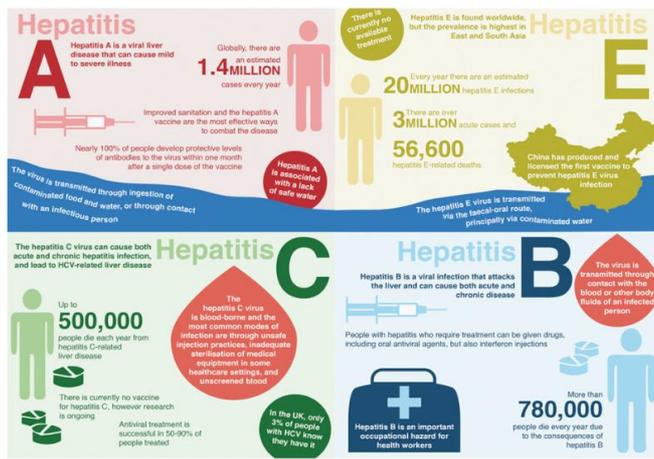
(UPSC 2019)

- A. Hepatitis B virus is transmitted much like HIV.
- B. Hepatitis B, unlike Hepatitis C, does not have a vaccine.
- C. Globally, the number of people infected with Hepatitis B and C viruses are several times more than those infected with HIV.
- D. Some of those infected with Hepatitis B and C viruses do not show the symptoms for many years.

**Answer : B**

**Explanation**

- Hepatitis B is a viral infection that attacks the liver and can cause both acute and chronic disease. The virus is transmitted through contact with the blood or other body fluids of an infected person. (HIV also gets transmitted via the exchange of a variety of body fluids from infected individuals, such as blood, breast milk, semen and vaginal secretions)



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