



### Daily Current Affairs Prelims Quiz 03-06-2024 & 02-05-2024 (Online Prelims Test)

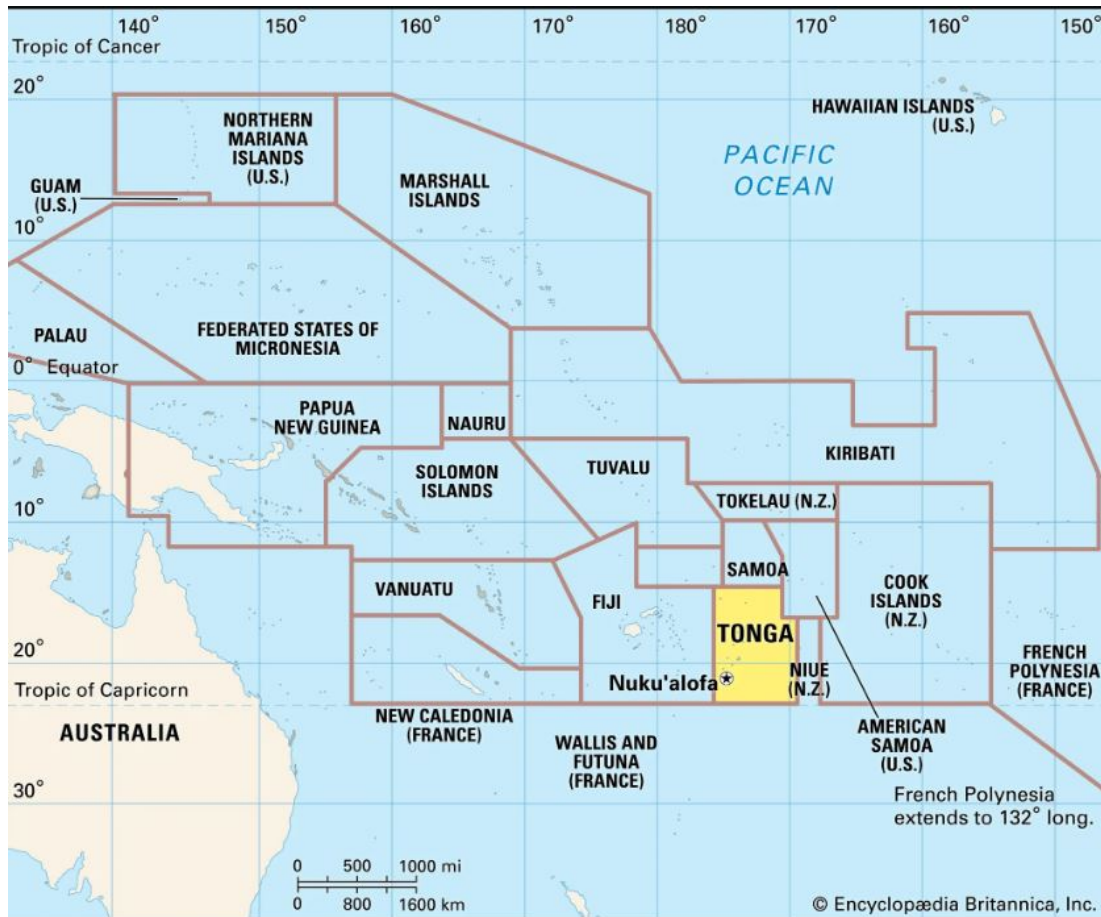
1) Hunga Tonga-Hunga Ha'apai, sometimes seen in the news recently, is related to?

- a. An island in Arctic region
- b. An underwater volcano in Pacific Ocean
- c. Earliest-known galaxy that was spotted recently
- d. A Himalayan species important for sustainable development

Answer : b

### Hunga Tonga-Hunga Ha'apai

- Hunga Tonga is the short form of Hunga Tonga-Hunga Ha'apai.
- It is an **underwater volcano** in Tonga Island which is located in **Pacific Ocean**.
- It erupted on January 2022, in the Pacific Kingdom of Tonga that created a tsunami.
- The tsunami triggered warnings across the entire Pacific basin, and sent sound waves around the globe multiple times.
- The eruption could have effects on the winter weather for years to come.
- **Role of sulphur dioxide** - Usually, the sulphur dioxide in the smoke of a volcano *cools the earth's surface for a short period*.
- This didn't happen for Hunga Tonga, because it was an underwater volcano.
- **Effects of the volcano** - Hunga Tonga produced *little smoke, but a lot of water vapour*.
- The enormous heat of the eruption transformed huge amounts of sea water into steam, which then shot high into the atmosphere with the force of the eruption.
- All that water ended up in the stratosphere layer of the earth.
- Water vapour in the stratosphere has 2 main effects:
  - 1. It helps in the chemical reactions which destroy the ozone layer
  - 2. It is a very potent greenhouse gas
- The large ozone hole from August to December 2023 was at least in part due to Hunga Tonga.



2) Consider the following statements with respect to Mitral Valve Disease (MVD)

1. It is a common type of heart valve disease that occurs when the mitral valve doesn't open and close properly.
2. Transcatheter Edge-to-Edge Repair (TEER) is entirely an image guided procedure that treats valve leakage and mitral regurgitation.
3. It is confined only to the human species.

How many of the statements given above are correct?

- a. Only one
- b. Only two
- c. All Three
- d. None of the above

Answer : b

## Mitral Valve Disease

*In a first in Indian subcontinent, a dog with a complex heart condition successfully underwent a minimally invasive heart surgery at Delhi veterinary hospital.*

- Mitral valve disease (MVD) is a common type of heart valve disease that occurs when the mitral valve doesn't open and close properly.
- The mitral valve is made of two flaps of tissue, called leaflets or cusps that *control the flow of blood from the left atrium to the left ventricle*.
- MVD can be classified into 2 types:
  1. Mitral regurgitation (MR)
  2. Mitral stenosis (MS)

- Mitral valve disease can affect all ages of humans.
- Mitral valve regurgitation is a condition where the mitral valve in the heart does not close properly, allowing blood to flow backward from the left ventricle to the left atrium.
- **Mitral valve disease in dogs** - *It is the most common heart condition in dogs in India as well as in rest of the world.*
- It accounts for 80% of all heart diseases in dogs in India and worldwide.
- This disease is amongst one of the major causes of deaths in dogs.
- The only treatment majorly available so far includes medicinal treatment which delays the onset of clinical signs and gives symptomatic relief for some time.
- Open heart mitral valve repair surgery is not a very viable option owing to the highly invasive nature of the procedure and because it is done at very few centres in the world.
- **Transcatheter Edge-to-Edge Repair (TEER)** - Is entirely an image guided procedure and is done under trans oesophageal 4D echocardiography and fluoroscopy guidance in a beating heart.
- It treats valve leakage and mitral regurgitation.
- The procedure is similar in concept to Mitra clip procedure in humans which has benefitted and saved many human lives so far.

3) Consider the following statements with respect to Virus-like Particles (VLPs)

1. VLPs carry most of the characteristics of the virus and can cause infection.
2. Virus neutralisation assays of VLPs for Nipah virus (NiV) can be conducted only in the Biosafety level 4 (BSL-4) laboratories.
3. "HiBiT-tagged" Nipah virus-like particles (NiV-VLPs) are morphologically and functionally identical to the native virus.

How many of the statements given above are correct?

- a. Only one
- b. Only two
- c. All Three
- d. None of the above



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Answer : a

## Virus-like Particles (VLPs)

*Scientists at the Institute of Advanced Virology in Thiruvananthapuram, Kerala, have developed a novel method to generate non-infectious virus-like particles (VLPs) that mimic the Nipah virus (NiV).*

- Nipah virus (NiV) is a zoonotic disease that spreads primarily between animals and humans.
- Nipah is a highly pathogenic paramyxovirus, with a fatality rate of up to 80% in affected humans.
- The genome of the NiV encodes 6 major proteins:
  1. Glycoprotein (G)
  2. Fusion protein (F)
  3. Matrix (M)
  4. Nucleocapsid (N)
  5. Long polymerase (L)
  6. Phosphoprotein (P)
- **Virus-like Particles (VLPs)** - VLPs are molecules that closely resemble viruses, but are **non-infectious** because they contain no viral genetic material.
- VLPs carry most of the characteristics of the virus, except their ability to replicate (because it lacks the viral genome).

- The advent of NanoBiT technology and “HiBiT-tagged” VLP (HiBiT is an 11 amino acid peptide) makes it far more sophisticated.
- Scientists at the Institute of Advanced Virology (IAV) have generated “HiBiT-tagged” Nipah virus-like particles (NiV-VLPs).
- Highly sensitive and quantitative HiBiT-tagged Nipah virus-like particles is a platform for rapid antibody neutralisation studies.
- It was generated using plasmid-based expression systems, encoding the NiV structural proteins G, F, and M.
- **The VLPs produced are morphologically and functionally identical to the native virus.**
- The inclusion of a highly sensitive HiBiT tag on these VLPs accelerates their potential in antiviral drug screening and vaccine development.
- **Virus neutralisation assays** – Are critical for the development and evaluation of vaccines and immune-therapeutics,
- They are also used for conducting basic research into the immune response and pathogenesis of NiV.
- These tests, which traditionally require to be done in high security labs (BSL-4) with the infectious organism, **can now be done safely in BSL-2 labs** in the country using the NiV-VLPs.
- **Biosafety level 4 (BSL-4) laboratories** are designed to handle pathogens that are highly contagious and can cause fatal diseases.
- These pathogens are known as Risk Group 4 pathogens and include viruses like Ebola, Lassa, Nipah, Marburg and Crimean-Congo hemorrhagic fever.

4) Chollima-1, sometimes seen in the news recently, is a carrier rocket of?

- India
- Japan
- North Korea
- European Union



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Answer : c

## Chollima-1

*Recently a North Korea's military satellite launch has failed and rocket exploded in Yellow Sea.*

- In this mission the North Korea have tried a new "liquid oxygen and petroleum engine" with the rocket which failed during its first stage.
- This rocket is different from the Chollima-1, which is used in previous successful launches by the **North Korea**.
- The Chollima-1 uses hypergolic fuels that ignite on contact and are typically used in North Korea's nuclear missiles, which *do not use liquid oxygen* due to storage temperature challenges.
- The new engine type may indicate Russian assistance, as Russia has previously vowed to help North Korea's satellite programme.
- Liquid oxygen engines, like those developed by Russia, require specialised storage and handling due to extremely low boiling points.

5) Consider the following statements with respect to Mullaperiyar Dam

1. It was constructed during the Pre-Independence era of India.
2. It is located in the Idukki district of Kerala and owned and operated by the State of Tamil Nadu.

Which of the above statement(s) is/are correct?

- a. 1 only

- b. 2 only
- c. Both 1 and 2
- d. Neither 1 nor 2

Answer : c

## Mullaperiyar Dam

*Kerala has been seeking a new Terms of Reference from the Ministry of Environment, Forest and Climate Change to conduct an Environment Impact Assessment for constructing a new dam at Mullaperiyar.*

- The Mullaperiyar Dam was constructed between 1887-1895 under a 999-year lease agreement between the Maharaja of Travancore and the Secretary of State for India for Periyar irrigation works.
- British raj was the period of direct British rule over the Indian subcontinent from 1858 until the independence of India and Pakistan in 1947.
- In 1979, reports emerged about damage to the Periyar Dam, leading to measures for strengthening the dam and limiting the water level.
- It became a legal dispute, with Kerala passing an act in 2006 prohibiting raising the water level beyond 136 ft, while Tamil Nadu wanted to raise it to 142 ft after strengthening measures.
- The Supreme Court intervened and constituted an Empowered Committee in 2010 to study the dam's safety.
- The Committee concluded in 2012 that the dam is **hydrologically safe**.
- In 2014, the Supreme Court declared Kerala's 2006 act unconstitutional and directed setting up a Supervisory Committee to monitor the dam's safety after restoring the full reservoir level (FRL) to 142 ft.
- **Recent issues** - Kerala has been seeking a new Terms of Reference (ToR) from the Expert Appraisal Committee (EAC) of the Ministry of Environment, Forest and Climate Change (MoEF).
- The ToR deals with conducting an Environment Impact Assessment (EIA) for constructing a new dam at Mullaperiyar.
- The earlier ToR issued in 2018 for the same purpose had expired, prompting Kerala to seek a fresh one.
- However, the EAC meeting scheduled for May 28 to consider Kerala's request was cancelled abruptly.
- Tamil Nadu objected to Kerala's move, arguing that it violates the Supreme Court's order which stated that the court's permission is required for any such studies related to a new dam.
- Tamil Nadu maintains that the existing 128-year-old dam has been repeatedly found safe by expert committees and the Supreme Court.

