MISSION X

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Innovation in Learning

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HEALTH

Coronary Thrombosis: Clot in the Heart's Main Artery

NEWS IN BRIEF

- Autopsy findings reported on 13 October 2026 attributed a sudden death to a heart attack caused by a blood clot in the left main coronary artery, putting coronary thrombosis in focus.
- The underlying cause was recorded as atherosclerotic occlusive coronary artery disease, where fatty plaque narrows or blocks the arteries supplying the heart muscle.
- A plaque can rupture, a clot forms at the site, and blood flow stops within minutes, causing acute myocardial infarction (heart attack).
- Risk factors include high cholesterol, high blood pressure, diabetes, tobacco use, excess weight, poor diet and lack of exercise.

KEY CONCEPTS EXPLAINED

Coronary thrombosis: Formation of a blood clot inside a coronary artery, the vessels that supply oxygen-rich blood to the heart muscle; a leading cause of heart attack.

Atherosclerosis: Gradual buildup of fatty plaque in artery walls that narrows the vessel and can rupture, triggering clot formation at the site.

Left main coronary artery: A short, critical artery that supplies a large share of the heart; a blockage here threatens a very large portion of the heart muscle.

⚡ UNIQUE FACT

Most heart attacks are caused not by slow narrowing alone but by sudden plaque rupture followed by clotting, which is why a previously silent artery blockage can turn fatal within minutes.

⚠ EXAM TRAP

Do not confuse coronary thrombosis with a stroke or a cardiac arrest. Thrombosis is the clot in a heart artery that causes a heart attack; stroke involves brain blood vessels, and cardiac arrest is the heart's electrical failure.

📌 PRELIMS MEMORY BANK

- Clot inside a coronary artery
- Cause: ruptured atherosclerotic plaque
- Outcome: acute myocardial infarction
- Artery in news: left main coronary artery
- Risk: cholesterol, BP, diabetes, tobacco

PRELIMS PRACTICE MCQ

With reference to coronary thrombosis, consider the following statements:

1. It is the formation of a blood clot inside a coronary artery.
2. It is a condition that primarily affects the blood vessels of the brain.
3. Rupture of an atherosclerotic plaque can trigger the clot that causes it.

Which of the statements given above is/are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

✓ ANSWER: C

SOLUTION EXPLAINED

① THROUGH LOGICAL ANALYSIS

Statement 2 can be eliminated on logic alone: the word 'coronary' refers to the arteries of the heart, so a condition named coronary thrombosis cannot primarily affect the brain's blood vessels.

② THROUGH FACTUAL KNOWLEDGE

Coronary thrombosis is a clot in a coronary artery (statement 1) and is commonly triggered when an atherosclerotic plaque ruptures (statement 3), making C the correct combination.

HEALTH

Measles Resurgence: Cases Climb Through 2026

NEWS IN BRIEF

- US health data current to 15 October 2026 showed 4,410 confirmed measles cases this year, about 93% higher than the 2,289 cases recorded in all of 2025.
- Cases were reported across 47 jurisdictions with 42 outbreaks, and about 96% of cases were unvaccinated or of unknown vaccination status; 451 people were hospitalised.
- Health researchers also flagged subacute sclerosing panencephalitis (SSPE), a rare, almost always fatal brain complication that can appear years after measles infection.
- The surge underlines the need for sustained two-dose vaccination coverage and strong surveillance.

KEY CONCEPTS EXPLAINED

Measles: A highly contagious viral disease spread through respiratory droplets and airborne particles, causing fever, rash and, in some cases, pneumonia or brain inflammation.

Herd immunity: Indirect protection of a population when enough people are immune; for measles, very high vaccination coverage, around 95%, is needed to block spread.

SSPE: A delayed, progressive and almost always fatal brain disease caused by persistent measles virus infection, appearing years after the original illness.

⚡ UNIQUE FACT

Measles is among the most contagious human viruses, so it is often the first disease to return when vaccination coverage slips, making outbreaks a sensitive early signal of immunity gaps in a community.

⚠ EXAM TRAP

Do not assume one vaccine dose gives full protection. Measles vaccines are given as two doses for durable immunity, and the disease is caused by a virus, so antibiotics do not treat it.

📌 PRELIMS MEMORY BANK

- Cause: measles virus, airborne spread
- Prevention: two-dose vaccine
- US 2026: 4,410 cases (to 15 Oct)
- About 96% unvaccinated or unknown status
- Late complication: SSPE, almost always fatal

PRELIMS PRACTICE MCQ

With reference to measles, consider the following statements:

1. It is a viral disease that can spread through respiratory droplets.
2. It is a bacterial infection that is treated effectively with antibiotics.
3. Two doses of the vaccine are used to provide durable protection.

Which of the statements given above is/are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

✓ ANSWER: C

SOLUTION EXPLAINED

① THROUGH LOGICAL ANALYSIS

Statement 2 can be eliminated on logic alone: a disease described as controlled by vaccination and linked to a virus cannot be a bacterial infection, and antibiotics act on bacteria, not viruses.

② THROUGH FACTUAL KNOWLEDGE

Measles is a viral disease spread by respiratory droplets (statement 1) and is prevented through a two-dose vaccine schedule (statement 3), confirming option C.

SPACE

TRISHNA: Indo-French Thermal Satellite Nears Launch

NEWS IN BRIEF

- The Indo-French TRISHNA satellite is set to launch within 12 to 16 months, according to reports dated 12 October 2026.
- TRISHNA stands for Thermal Infra-Red Imaging Satellite for High-resolution Natural Resource Assessment, and is a joint mission of ISRO and France's CNES.
- It will measure Earth's surface temperature and emissivity to track energy and water budgets, plant water stress and water use.
- It is the third India-France collaborative satellite after Megha-Tropiques (2011) and SARAL (2013).

KEY CONCEPTS EXPLAINED

Thermal infrared imaging: Sensing the heat radiated by Earth's surface to measure land and water temperature, useful for crop stress, evaporation and drought monitoring.

Emissivity: How efficiently a surface emits thermal radiation; it must be known to convert measured radiation into an accurate surface temperature.

Urban heat island: A city area that is warmer than its surroundings; thermal satellites help map such hotspots and support climate action.

⚡ UNIQUE FACT

TRISHNA also targets secondary uses such as detecting thermal anomalies and tracking snow-melt runoff and glacier dynamics, extending its value beyond agriculture to water security and climate monitoring.

⚠ EXAM TRAP

Do not confuse TRISHNA with Megha-Tropiques or SARAL. Megha-Tropiques studies the tropical water cycle, SARAL studies ocean surface height, while TRISHNA is a thermal infrared mission for land surface temperature and water use.

📌 PRELIMS MEMORY BANK

- ISRO and CNES joint mission
- Thermal infrared, land surface temperature
- Third India-France satellite
- Earlier: Megha-Tropiques, SARAL
- Launch expected in 12-16 months

PRELIMS PRACTICE MCQ

With reference to the TRISHNA satellite mission, consider the following statements:

1. It is a joint mission of ISRO and the French space agency CNES.
2. It is designed mainly to measure sea surface height.
3. It will use thermal infrared imaging to monitor land surface temperature.

Which of the statements given above is/are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

✓ ANSWER: C

SOLUTION EXPLAINED

① THROUGH LOGICAL ANALYSIS

Statement 2 can be eliminated on logic alone: the mission name stresses thermal infrared imaging and natural resource assessment, which points to land temperature and water use, not ocean height.

② THROUGH FACTUAL KNOWLEDGE

TRISHNA is an ISRO and CNES joint mission (statement 1) built around thermal infrared imaging of Earth's surface (statement 3); sea surface height is the focus of SARAL, confirming option C.

SPACE

JAXA's MMX Mission to Sample Mars's Moon Phobos

NEWS IN BRIEF

- Japan's Martian Moons eXploration (MMX) spacecraft is scheduled to launch on an H3 rocket from Tanegashima at 04:41 JST on 20 October 2026.
- MMX will be the first mission to collect a sample from Phobos, with JAXA working alongside NASA, CNES, DLR and ESA.
- The craft is due to enter Mars orbit in August 2027 and orbit Phobos in September 2027, deploying a rover named Idefix.
- At least 10 grams of material is to be collected in 2030 and returned to Earth in 2031, with the capsule landing in Australia.

KEY CONCEPTS EXPLAINED

Phobos and Deimos: The two small moons of Mars; their origin is debated, as they may be captured asteroids or debris from a giant impact on Mars.

Sample return mission: A mission that collects material from a space body and brings it back to Earth for detailed laboratory analysis.

H3 rocket: Japan's flagship launch vehicle developed by JAXA and Mitsubishi Heavy Industries, used for this launch from Tanegashima Space Center.

⚡ UNIQUE FACT

MMX will also fly past Deimos on its way home and study it, so a single mission is set to examine both Martian moons while bringing samples back only from Phobos.

⚠ EXAM TRAP

Do not assume MMX will land on Mars itself. Its targets are Mars's moons, with sampling at Phobos and a flyby study of Deimos, and it only observes Mars from orbit.

📌 PRELIMS MEMORY BANK

- JAXA-led, with NASA, CNES, DLR, ESA
- Launch: 20 Oct 2026, H3 rocket
- Target: sample from Phobos
- Mars orbit Aug 2027, sample due 2031
- Rover: Idefix

PRELIMS PRACTICE MCQ

With reference to the Martian Moons eXploration (MMX) mission, consider the following statements:

1. It is led by the Japanese space agency JAXA.
2. It aims to land astronauts on the surface of Mars.
3. It aims to bring back a sample from the Martian moon Phobos.

Which of the statements given above is/are correct?

A. 1 and 2 only

B. 1 and 3 only

C. 2 and 3 only

D. 1, 2 and 3

✓ ANSWER: B

SOLUTION EXPLAINED

① THROUGH LOGICAL ANALYSIS

Statement 2 can be eliminated on logic alone: the mission name stresses Martian moons, and a robotic sample-return spacecraft carries no astronauts and does not target Mars's surface.

② THROUGH FACTUAL KNOWLEDGE

MMX is led by JAXA (statement 1) and is planned to return a Phobos sample to Earth (statement 3), confirming option B.

SPACE

NASA's PUFFINS to Study Interstellar Dust in Ultraviolet

NEWS IN BRIEF

- NASA's PUFFINS mission, led by Dr. Ramya Anche, who grew up near Bengaluru, is set to study interstellar dust using ultraviolet spectropolarimetry.
- The roughly $20 million mission is scheduled to launch in 2030 and carry a 10-inch telescope to observe about 70 distant stars in ultraviolet light.
- UV spectropolarimetry has not flown in space for about 30 years, so the mission aims to fill a long-standing gap in understanding cosmic dust.
- A team of about 40 from the University of Arizona, McDonald Observatory and Indian institutes including IUCAA and IIA is involved.

KEY CONCEPTS EXPLAINED

Interstellar dust: Tiny solid grains between stars that shape how stars and planets form and block or scatter starlight.

Spectropolarimetry: Measuring how the polarisation of light changes with wavelength, revealing the size, shape and composition of dust grains.

Ultraviolet astronomy: Observation of UV light, which Earth's atmosphere absorbs, so telescopes must fly in space.

⚡ UNIQUE FACT

Ultraviolet light is blocked by Earth's atmosphere, which is why mapping how dust grains polarise starlight in the UV requires a space telescope rather than a ground observatory.

⚠ EXAM TRAP

Do not mistake PUFFINS for a planet-finding or galaxy-imaging mission. Its purpose is to study interstellar dust grains between stars, using polarised ultraviolet light.

📌 PRELIMS MEMORY BANK

- NASA mission, led by Dr. Ramya Anche
- Studies interstellar dust
- Method: UV spectropolarimetry
- 10-inch telescope, about 70 stars
- Launch planned 2030, about $20 million

PRELIMS PRACTICE MCQ

With reference to the NASA PUFFINS mission, consider the following statements:

1. It is designed to study interstellar dust.
2. It uses ultraviolet spectropolarimetry for observations.
3. Indian institutes are among the partners in the team.

Which of the statements given above is/are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

✓ ANSWER: D

SOLUTION EXPLAINED

① THROUGH LOGICAL ANALYSIS

All three statements are consistent with one another: a dust-study mission naturally relies on polarised light measurements, and a team that includes Indian institutes does not conflict with either point.

② THROUGH FACTUAL KNOWLEDGE

PUFFINS targets interstellar dust (statement 1) through UV spectropolarimetry (statement 2), with IUCAA and IIA among the Indian institutes involved (statement 3), confirming option D.

DEFENCE

Indian Navy Ends First Command of Combined Task Force 154

NEWS IN BRIEF

- The Indian Navy is ending its first-ever command of Combined Task Force 154 (CTF 154), with a handover ceremony due in Manama, Bahrain.
- CTF 154 is the Combined Maritime Forces' maritime training task force, set up in May 2023, and India took command on 11 February 2026.
- India delivered over 7,800 training hours, 20 Staff Enhancement Training engagements, and exercises Operation Compass Rose 26-1 and Southern Readiness 26-2.
- Personnel from 39 countries took part, and the Combined Maritime Forces partnership includes 47 nations.

KEY CONCEPTS EXPLAINED

Combined Maritime Forces (CMF): A multinational naval partnership based in Bahrain that works on maritime security through task forces for training, counter-piracy and security.

Maritime domain awareness: Understanding activity at sea that could affect security, safety or the environment; a core training area for CTF 154.

Capacity building: Training and support that help partner navies improve skills and readiness, strengthening regional maritime security.

⚡ UNIQUE FACT

CTF 154 is a training-focused task force rather than an operational patrol force, so India's command was measured in training hours and exercises delivered rather than ships deployed on patrol.

⚠ EXAM TRAP

Do not confuse CTF 154 with an anti-piracy patrol task force. It is dedicated to training and capacity building, and it operates under the Combined Maritime Forces, not under the Indian Navy alone.

📌 PRELIMS MEMORY BANK

- Part of Combined Maritime Forces
- Training task force, set up May 2023
- India's first command, from 11 Feb 2026
- 7,800+ training hours delivered
- Handover in Manama, Bahrain

PRELIMS PRACTICE MCQ

With reference to Combined Task Force 154 (CTF 154), consider the following statements:

1. It is a dedicated maritime training task force under the Combined Maritime Forces.
2. The Indian Navy took command of it for the first time in 2026.
3. It is an anti-piracy patrol force run solely by the Indian Navy.

Which of the statements given above is/are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

✓ ANSWER: A

SOLUTION EXPLAINED

① THROUGH LOGICAL ANALYSIS

Statement 3 can be eliminated on logic alone: a force with participation from 39 countries under a multinational partnership cannot be run solely by one navy.

② THROUGH FACTUAL KNOWLEDGE

CTF 154 is a Combined Maritime Forces training task force (statement 1) and India assumed command for the first time on 11 February 2026 (statement 2), confirming option A.

DEFENCE

Varunastra Torpedo: Rs 1,543 Crore Navy Contract Signed

NEWS IN BRIEF

- The Defence Ministry signed contracts worth about Rs 4,106 crore on 15 October 2026, including Rs 1,543 crore for Varunastra torpedoes for the Indian Navy.
- Varunastra is a ship-launched, heavyweight anti-submarine torpedo built by Bharat Dynamics Limited and developed by the Naval Science and Technological Laboratory (NSTL).
- The second contract is Rs 2,563 crore with NewSpace India Limited for the GSAT-7C communication satellite for the Indian Air Force.
- Both systems are described as indigenously designed and developed, supporting self-reliance in defence.

KEY CONCEPTS EXPLAINED

Heavyweight torpedo: A large underwater guided weapon, launched from ships or submarines, used to hunt and destroy submarines at long ranges.

Anti-submarine warfare (ASW): Detecting, tracking and neutralising hostile submarines using sonar, aircraft, ships and weapons such as torpedoes.

NSTL and BDL: NSTL is a DRDO laboratory that develops underwater weapons; Bharat Dynamics Limited is the public sector company that manufactures them.

⚡ UNIQUE FACT

The same day's package paired an underwater weapon with a military communication satellite, showing how a navy's anti-submarine reach and an air force's secure communications are being bought together under indigenous supply.

⚠ EXAM TRAP

Do not confuse the developer with the manufacturer of Varunastra. NSTL, a DRDO laboratory, developed it, while Bharat Dynamics Limited is the contractor producing it for the Navy.

📌 PRELIMS MEMORY BANK

- Ship-launched heavyweight ASW torpedo
- Contract: Rs 1,543 crore, 15 Oct 2026
- Developer: NSTL (DRDO)
- Maker: Bharat Dynamics Limited
- Package also: GSAT-7C, Rs 2,563 crore

PRELIMS PRACTICE MCQ

With reference to the Varunastra torpedo, consider the following statements:

1. It is a ship-launched anti-submarine heavyweight torpedo.
2. It is manufactured by Bharat Dynamics Limited for the Indian Navy.
3. It is an air-launched weapon meant to target aircraft.

Which of the statements given above is/are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

✓ ANSWER: A

SOLUTION EXPLAINED

① THROUGH LOGICAL ANALYSIS

Statement 3 can be eliminated on logic alone: a torpedo is an underwater weapon, so it cannot be a weapon meant to target aircraft.

② THROUGH FACTUAL KNOWLEDGE

Varunastra is a ship-launched anti-submarine heavyweight torpedo (statement 1) produced by Bharat Dynamics Limited for the Navy (statement 2), confirming option A.

DEFENCE

China Releases First Air-Launch Footage of YJ-21 Missile

NEWS IN BRIEF

- Chinese state media released footage on about 16 October 2026 described as the first visuals of the YJ-21 being launched from an aircraft, eight years after it was first shown.
- The YJ-21 is an air-launched hypersonic anti-ship ballistic missile carried by the H-6K bomber, which can carry up to four.
- Reported speeds reach up to Mach 10, and reported range is about 1,500 to 2,000 km, with sources differing on the exact figure.
- It was first displayed at the 2018 Zhuhai airshow and is designed to complicate interception by air and missile defence systems.

KEY CONCEPTS EXPLAINED

Hypersonic missile: A missile flying at more than five times the speed of sound (Mach 5), which leaves little time for air defences to react.

Anti-ship ballistic missile: A missile that follows a high, steep path and dives onto a moving ship, designed to counter naval vessels.

Mach number: The ratio of an object's speed to the local speed of sound; Mach 1 is the speed of sound.

⚡ UNIQUE FACT

Air launch extends a missile's reach because the bomber carries it toward the target before release, which is why an aircraft-carried hypersonic weapon can threaten ships far beyond coastal range.

⚠ EXAM TRAP

Do not confuse hypersonic with supersonic. Supersonic means faster than sound (above Mach 1), while hypersonic means above Mach 5, and published figures for the YJ-21 are reported, not independently verified.

📌 PRELIMS MEMORY BANK

- Air-launched hypersonic anti-ship missile
- Carried by H-6K bomber, up to four
- Reported speed: up to Mach 10
- First shown at Zhuhai airshow, 2018
- First air-launch footage: Oct 2026

PRELIMS PRACTICE MCQ

With reference to the YJ-21 missile, consider the following statements:

1. It is an air-launched anti-ship missile.
2. It is reported to fly at hypersonic speeds.
3. It is a submarine-launched cruise missile.

Which of the statements given above is/are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

✓ ANSWER: A

SOLUTION EXPLAINED

① THROUGH LOGICAL ANALYSIS

Statement 3 can be eliminated on logic alone: footage described as a launch from an aircraft, with a bomber carrying the missile, rules out a submarine-launched weapon.

② THROUGH FACTUAL KNOWLEDGE

The YJ-21 is an air-launched anti-ship missile (statement 1) reported to reach hypersonic speeds, up to Mach 10 (statement 2), confirming option A.

DEFENCE

JWALA-MK1: Indian Private-Sector Micro-Missile Advances

NEWS IN BRIEF

- IG Defence's JWALA-MK1, described as India's first private-sector micro-missile, is set for trials after successful solid rocket motor tests, reported on 16 October 2026.
- It is a short-range surface-to-air, hard-kill interceptor meant to physically destroy hostile drones and UAVs as a cheaper alternative to costly missiles.
- It has a dual-pulse solid rocket motor, a 2 to 5 km engagement range, and an altitude band of 50 m to 5,000 m.
- It works as the effector in IG Defence's GRID Defend AI-enabled battle-management system and is built to cope with electronic warfare.

KEY CONCEPTS EXPLAINED

Hard-kill interceptor: A weapon that destroys a threat by physical impact or fragmentation, unlike soft-kill methods such as jamming or spoofing.

Counter-drone systems: Sensors and weapons that detect, track and neutralise hostile drones, a fast-growing need as drone use spreads.

Solid rocket motor: A rocket engine using solid propellant that is simple, storable and ready to fire quickly.

⚡ UNIQUE FACT

JWALA-MK1 has a reported circular error probable below 2 m at maximum range and a small 0.5 to 1.5 kg pre-fragmented warhead with a proximity fuze, tuned for destroying small drones rather than large aircraft.

⚠ EXAM TRAP

Do not treat JWALA-MK1 as a long-range air-defence missile or a satellite. It is a short-range, ground-launched counter-drone missile developed by a private company, with a range of only 2 to 5 km.

📌 PRELIMS MEMORY BANK

- Developer: IG Defence, private sector
- Short-range surface-to-air, counter-drone
- Range: 2 to 5 km
- Part of GRID Defend network
- Status: trials after motor tests

PRELIMS PRACTICE MCQ

With reference to the JWALA-MK1 micro-missile, consider the following statements:

1. It is a short-range missile designed to counter hostile drones.
2. It has been developed by a private-sector company.
3. It is a long-range missile for striking enemy aircraft carriers.

Which of the statements given above is/are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

✓ ANSWER: A

SOLUTION EXPLAINED

① THROUGH LOGICAL ANALYSIS

Statement 3 can be eliminated on logic alone: a 'micro-missile' with a 2 to 5 km engagement range cannot be a long-range weapon for striking aircraft carriers.

② THROUGH FACTUAL KNOWLEDGE

JWALA-MK1 is a short-range counter-drone missile (statement 1) developed by the private company IG Defence (statement 2), confirming option A.

MISCELLANEOUS

IISER Team Develops Hydrogen-Methane Releasing Compound

NEWS IN BRIEF

- Researchers at IISER Thiruvananthapuram developed magnesium hydridomethylzincate, a solid crystalline organometallic compound rich in hydride, reported on 15 October 2026.
- Without solvent or oxygen, it releases hydrogen and methane at temperatures as low as 80 degrees Celsius, leaving magnesium and zinc behind.
- Heated in solution to 100 degrees Celsius, it releases only hydrogen; methane comes off first, suggesting successive reactions.
- It could act as a molecular platform to store and release fuel gases in a controlled way, offering an alternative to compressed gas transport.

KEY CONCEPTS EXPLAINED

Organometallic compound: A compound containing a bond between a metal and a carbon atom, widely used in chemistry and catalysis.

Hydride: A compound or ion in which hydrogen carries a negative charge; hydride-rich materials can store hydrogen chemically.

Hydrogen storage: Methods to hold hydrogen safely and densely, such as in solid materials, instead of bulky high-pressure gas tanks.

⚡ UNIQUE FACT

The compound releases methane before hydrogen, and each paired unit could yield two molecules of each gas, which points to a stepwise reaction rather than a single burst of gas release.

⚠ EXAM TRAP

Do not assume this compound is a fuel cell or a new fuel itself. It is a solid material that stores and releases hydrogen and methane gases on heating, a storage-and-release platform.

📌 PRELIMS MEMORY BANK

- Made by IISER Thiruvananthapuram
- Solid, crystalline organometallic compound
- Releases H2 and CH4 from 80 degrees C
- Methane released before hydrogen
- Use: controlled fuel gas storage

PRELIMS PRACTICE MCQ

With reference to magnesium hydridomethylzincate, consider the following statements:

1. It was developed by researchers at IISER Thiruvananthapuram.
2. It can release hydrogen and methane gases on heating.
3. It is a liquid fuel used directly in rocket engines.

Which of the statements given above is/are correct?

A. 1 and 2 only

B. 2 and 3 only

C. 1 and 3 only

D. 1, 2 and 3

✓ ANSWER: A

SOLUTION EXPLAINED

① THROUGH LOGICAL ANALYSIS

Statement 3 can be eliminated on logic alone: the compound is described as a solid crystalline material, so it cannot be a liquid fuel, and nothing suggests direct use in rocket engines.

② THROUGH FACTUAL KNOWLEDGE

The compound was developed at IISER Thiruvananthapuram (statement 1) and releases hydrogen and methane when heated (statement 2), confirming option A.