

Q.1) Recently, the maiden test of the Medium Range Surface to Air Missile (MRSAM) for the Indian Army was conducted. Consider the following statements with regard to it:

1. It is developed jointly by DRDO and Russia.
2. It is a high response, quick reaction, vertically launched supersonic missile with maximum speed of 5 mach.

Which of the above statements is/are correct?

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

Q.1) Solution (d)

Statement analysis

Statement 1	Statement 2
Incorrect	Incorrect
MRSAM is being developed by the DRDO (Defence Research and Development Organisation) in collaboration with Israel Aerospace Industries (IAI) for Army. (Hence, Statement 1 is incorrect)	MRSAM is a high response, quick reaction, vertically launched supersonic missile, designed to neutralize enemy aerial threats – missiles, aircraft, guided bombs, helicopters. The propulsion system assisted with Thrust vector control system result into maximum speed upto 2 mach. (Hence, Statement 2 is incorrect) Note: Supersonic missiles exceed the speed of sound (Mach 1) but they are not faster than Mach-3.

Basics about MRSAM Missile:

Barak 8, also known as MR-SAM is an Indo-Israeli surface-to-air missile (SAM), designed to defend against any type of airborne threat including aircraft, helicopters, anti-ship missiles, and UAVs as well as ballistic missiles, cruise missiles and combat jets. Both maritime and land-based variants of the system exist.

Barak 8 was jointly developed by Israel Aerospace Industries (IAI) and India's Defence Research & Development Organisation (DRDO)

MRSAM is the land based configuration of the missile. It consists of a command and control system, tracking radar, missile and mobile launcher systems. Each launcher will have eight such missiles in two stacks and are launched in a canister configuration. The system is also fitted with an advanced radio frequency (RF) seeker.

Q.2) Consider the following statements regarding recent systems developed by DRDO:

1. Varunastra is land-based heavy weight air to surface missile.
2. Rustom-1 is the first Indian Remotely Piloted Aircraft System to have conventional take-off and landing capability.

Which of the above statements is/are correct?

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

Q.2) Solution (b)

Explanation:

Varunastra is **ship launched**, heavy weight, electrically-propelled anti-submarine torpedo capable of targeting quiet submarines, both in deep and shallow waters in an intense countermeasures environment. Varunastra can be fired from all ASW ships capable of firing heavy weight torpedoes. VARUNASTRA has been inducted by Indian Navy in 2016. (So, statement 1 is incorrect)

RUSTOM-1 is an all composite, 800 kg class Short Range Remotely Piloted Aircraft System (SR-RPAS) having capabilities of Intelligence, Surveillance, Reconnaissance, Target Acquisition/Tracking and Image Exploitation. **Rustom-1 is the first Indian RPAS to have conventional take-off and landing capability.** It has autonomous flight mode and Get-To-Home features. (So, statement 2 is incorrect)

Q.3) Consider the following statements about artillery weapons of India:

1. Sharang Artillery gun with range of 36 km has been upgraded by DRDO.
2. K9 Vajra is the self-propelled artillery gun, indigenously produced in India.

Which of the following option is/are correct as per given statement?

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

Q.3) Solution (d)

Statement analysis

Statement 1	Statement 2
Incorrect	Incorrect
<p>Sharang Artillery gun with range of 36 km has been upgraded by the Ordnance Factory Board (OFB).</p> <p>The gun's range has now gone from 27km to over 36km with the upgrade.</p>	<p>K9 Vajra-T Gun is an artillery gun produced by South Korea. It will be the first induction of heavy artillery since the Swedish Bofors guns imported in the 1980s. It is a 155-mm, 52-calibre self-propelled artillery gun with a maximum range of 40 km, customized from the original K9 Thunder gun.</p> <p>Recently, government inaugurated India's first private sector small arms manufacturing plant - Armoured Systems Complex (ASC), developed by Larsen & Toubro (L&T) at Hazira (Gujrat). This ASC will manufacture K9 Vajra self-propelled Howitzer guns under Make in India initiatives.</p> <p>This is the India's first private facility where the K9 Vajra self-propelled Howitzer guns will be manufactured.</p>

Additional information:

Sharang Artillery Gun

- Sharang is the 130mm artillery gun 'up-gunned' to 155mm, 45 calibre up-gunning based on the Army's tender.
- The gun is upgraded by **The Ordnance Factory Board (OFB)**.
- The gun's range has now gone from 27km to over 36km with the upgrade.
- It also has the more explosive capability and hence and more damage potential.
- This step will reduce the logistic trail of the Army as it does away with the need to carry 130mm shells and support equipment as the mainstay of the Army's long-range artillery is 155mm guns.

K9 Vajra

- The K9 VAJRA-T is a tracked self-propelled howitzer, which has its roots in the K9 Thunder, the mainstay of the South Korean Army.
- The Vajra offers a high rate of fire at a long-range and is compatible with Indian and standard NATO ammunition.
- The K9 Thunder platform is made of all-welded steel armour protection material.
- The K9 gun has been developed under the 'Buy Global' programme of the Defence Procurement Procedure (DPP) where foreign companies are **allowed to participate —in this case Hanwha Techwin of South Korea is the technology partner of L&T**.
- The first 10 K9 Vajra guns have been imported from South Korea and have been assembled by L&T in India. The balance 90 guns will be largely manufactured in the country.

Q.4) Which of the following statements with reference to Aircraft Carrier of Indian Navy is/are correct?

1. INS Vikrant is first aircraft carrier to be built in India.
2. INS Vikramaditya is only active aircraft carrier of India.

Select the correct code

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

Q.4) Solution (c)

INS Vikrant

- India's Cochin Shipyard Limited (CSL) has completed the basin trials of Indigenous Aircraft Carrier (IAC), INS Vikrant.
- **It is India's first domestically built aircraft carrier.** (So, Statement 1 is correct)
- It leads ship of the Indian Navy's Vikrant-class, to be designed and built in India under Indigenous Aircraft Carrier (IAC) program.
- The 40,000 Tons aircraft carrier is designated as IAC-1, operates a ski-jump assisted Short Take-Off But Arrested Recovery (STOBAR) launch systems for launching aircraft
- With speed of 52 kmph, it is capable of accommodating MiG 29K fighter jets, HAL Dhruv and helicopters.

INS Vikramaditya

- The operational INS Vikramaditya, former Kiev-class warship Admiral Gorshkov, was inducted into service in 2014.
- The 45,000-ton INS Vikramaditya could operate around twenty MiG-29K fighters, along with utility helicopters.
- It is only active operation aircraft carrier in India.
- It is equipped with Barak1 and Barak 8(LRSAM) missiles.

Q.5) Consider the following statements regarding INS Arihant:

1. It is nuclear powered submarine built under the Advanced Technology Vessel (ATV) project.
2. This submarine completes India's nuclear triad.
3. Challenge with INS Arihant is that it has to come on surface for regular supply of fuel.

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

Q.5) Solution (a)

Explanation:

INS Arihant

- INS Arihant (designated S2 Strategic Strike Nuclear Submarine) is the lead ship of India's Arihant class of **nuclear-powered ballistic missile submarines**.
- The 6,000 tonne vessel was built under the Advanced Technology Vessel (ATV) project at the Ship Building Centre in the port city of Visakhapatnam.
- With Arihant, India has now entered into a club of nations that have the technological capability to design, build and operate nuclear-powered ballistic missile submarines **or ship submersible ballistic nuclear (SSBNs)**.
- India's 'triad' is a mix of missiles fired from land — the Agni 2, the Agni 4 and the Agni 5. From the air, Sukhoi Su-30MKIs, Mirage 2000s and Jaguars are capable of launching nuclear missiles. The 6,000-tonne INS Arihant now adds a maritime strike capability.
- The SSBN is the most dependable platform for a second-strike. Because they are powered by nuclear reactors, these submarines can stay underwater indefinitely without the enemy detecting it. (So, statement 3 is incorrect)
- The submarines will be armed with up to 12 Sagarika (K-15) missiles armed with nuclear warheads. Sagarika is a submarine-launched ballistic missile with a range of 700 km.

Q.6) Consider the following Aircrafts of Indian Air force

1. Globemaster C17
2. Mirage -2000
3. MIG 29
4. SEPECAT Jaguars
5. Dassault Rafael

Which of the above aircraft are capable of nuclear payload launch?

- a) 1, 3 and 5 only
- b) 1, 2 and 5 only
- c) 3 and 5 only
- d) 2, 3, 4 and 5 only

Q.6) Solution (d)

Explanation:

Globemaster C17 - A high-wing, 4-engine, T-tailed military-transport aircraft, the multi-service C-17 can carry large equipment, supplies and troops directly to small airfields in harsh terrain anywhere in the world day or night. The massive, sturdy, long-haul aircraft tackles distance, destination and heavy, oversized payloads in unpredictable conditions. It has delivered cargo in every worldwide operation since the 1990s.

Other four i.e. Mirage-2000, Mig-29, SPECECAT Jaguars and Dassault Rafael were originally designed to perform air-to-air combat missions, though they could potentially be modified to deliver air-dropped nuclear weapons.

Q.7) Which of the following helicopters used by Indian Armed forces as attack helicopters?

1. CH-47 Chinook
2. AH-64 Apache
3. HAL Dhruv
4. Mi-26
5. Mi-24

Which of the above aircraft are capable of nuclear payload launch?

- a) 1, 3 and 5 only
- b) 1, 2 and 5 only
- c) 2 and 5 only
- d) 2, 3 and 5 only

Q.7) Solution (c)

Explanation:

Helicopter's name	Country of Origin	Type
HAL Light Combat Helicopter	India	Attack
Boeing AH-64 Apache	United States	Attack
Mil Mi-24	Russia	Attack

HAL Rudra	India	Armed
CH-47 Chinook	United States	Heavy transport
Mil Mi-26	Russia	Heavy transport
Mil Mi-17	Russia	Utility transport
HAL Dhruv	India	Utility
HAL Chetak	France / India	Light utility
HAL Cheetah	France / India	Light utility

Q.8) Mission Shakti is related to:

- a) Empowering rural women by nurturing for Entrepreneurship
- b) Transparent Allocation of Coal Blocks
- c) Development of Nuclear powered submarine
- d) Testing anti-satellite weapon

Q.8) Solution (d)

Statement analysis:

Statement (a): **Project Shakti** enables rural women in villages across India to nurture an entrepreneurial mind-set and become financially independent. In an attempt to provide regular income, these women entrepreneurs (called Shakti Ammas) are trained on basic principles of distribution management and familiarisation with the company's products. This is the project of Hindustan Uniliver Limited

Statement (b): **Scheme for Harnessing and Allocating Koyala Transparently in India or SHAKTI** is for power units with power purchase agreements (PPAs) but no long-term coal supply. Under the scheme, Coal India offers assured coal supply to units through bidding.

Statement (c): INS Arihant was developed under **Advanced Technology Vessel (ATV) project to**

design and build nuclear-powered submarines.

Statement (d): On 27 March 2019, **India tested an anti-satellite weapon during an operation code named Mission Shakti**. The target of the test was a satellite present in a low Earth orbit, which was hit with a kinetic kill vehicle.

The ASAT test utilized a modified anti-ballistic missile interceptor code-named Prithvi Defence Vehicle Mark-II which was developed under Project XSV-1. The test made India the fourth country after the United States, Russia and China to have tested an ASAT weapon.

Q.9) Consider the following missiles:

1. Akash
2. Trishul
3. Brahmos
4. Nag
5. Prithvi

Which of the above mentioned missiles were developed under the 'Integrated Guided Missile Development Programme' (IGMDP)?

- a) 1, 2, 4 and 5 only
- b) 2, 3 and 5 only
- c) 1, 3, 4 and 5 only
- d) All of the above

Q.9) Solution (a)

The Integrated Guided Missile Development Programme (IGMDP) was an Indian Ministry of Defence programme for the research and development of the comprehensive range of missiles.

The programme was managed by the Defence Research and Development Organisation (DRDO) and Ordnance Factories Board in partnership with other Indian government political organisations.

The project started in 1982–83 under the leadership of Dr. Abdul Kalam who oversaw its ending in 2008 after these strategic missiles were successfully developed.

The 5 missiles (P-A-T-N-A) developed under this program are:

1. Short range surface-to-surface missile (code-named **Prithvi**)↑↑
2. Short range low-level surface-to-air missile (code-named **Trishul**)

3. Medium range surface-to-air missile (code-named **Akash**)
4. Third-generation anti-tank missile (code-named **Nag**)
5. The **Agni missile** was initially conceived in the IGMDP as a technology demonstrator project in the form of a re-entry vehicle, and was later upgraded to a ballistic missile with different ranges.

Brahmos is not a part of IGMDP, but it has been developed as part of joint venture between India and Russia.

Q.10) Who among the following personalities, is generally referred to as the 'Missile woman of India'?

- a) Ritu Karidhal
- b) Tessy Thomas
- c) Minal Rohit
- d) Nandini Harinath

Q.10) Solution (b)

Tessy Thomas is an Indian scientist and Director General of Aeronautical Systems and the former Project Director for Agni-IV missile in Defence Research and Development Organisation. She is the first woman scientist to head a missile project in India and commonly referred to as the 'Missile woman of India'.

Q.11) Which of the following statements are not correct with reference to Chief of Defence Staff?

1. India was the only large democracy which did not have a single point military advisor.
2. Chief of Defence Staff is chief military advisor to government of India.
3. Chief of Defence Staff will head Defence Acquisition Council.

Select the correct option as per given statement:

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

Q.11) Solution (a)

Statement Analysis:

Statement 1: The Defence Secretary, a civil servant, remains as the main defence adviser, whilst the CDS has been sanctioned the role of being the main military adviser, acting as the single-point military adviser to the government and Defence Minister. **India was the only large democracy which did not have a single point military advisor;** with all P5 countries having one.

Statement 2: As the highest ranking officer of the armed forces, the CDS is the commanding officer and chairperson of the Joint Commanders and Staff Committee and here the CDS has an operational role where he is **responsible as the chief military adviser to the government of India** and the Ministry of Defence.

Statement 3: As the Permanent Chairman of Chiefs of Staff Committee, CDS will perform the following functions:

- Implementing weapons procurement procedures.
- Integrating operations of the Army, Air Force and Navy.
- Bring about jointness and ensure optimal utilisation of infrastructure in the three Services.
- Apart from being the military advisor for the government, the CDS also heads the Department of Military Affairs.
- Authority to create theatre commands as and when needed.
- Command tri-service agencies, organisations, and commands including those related to cyber and space.
- **CDS will be member of Defence Acquisition Council and Defence Planning Committee**
- Function as the Military Advisor to the Nuclear Command Authority.
- Bring about reforms in the functioning of three services aimed at augmenting combat capabilities of the Armed Forces by reducing wasteful expenditure.
- Assign inter-services prioritisation to capital acquisition proposals.

So, statement 3 is incorrect, as Defence Acquisition Council is headed by Minister of Defence.

Basics of Chief of Defence Staff

The CDS is a four-star officer selected from among the serving officers of the Indian Armed Forces. While being "first among equals" among the service chiefs, the CDS is a single-point military advisor to the defence minister. The holder of the post is also the head of all tri-service command structures to replace the post of Chief of Integrated Defence Staff. The CDS is assisted by a deputy, the Vice Chief of the Defence Staff. The CDS heads the Department of Military Affairs under the Ministry of Defence, as its secretary. Apart from heading the DMA, the CDS is the Permanent Chairperson of the Chiefs of Staff Committee (PC-CoSC).

Q.12) Which state/Union Territory hosts the famous 'Dr. Abdul Kalam Island', which is very widely seen in the news?

- a) Andhra Pradesh
- b) Tamil Nadu
- c) Andaman and Nicobar
- d) Odisha

Q.12) Solution (d)

Dr. Abdul Kalam Island, formerly known as Wheeler Island, is an island off the coast of Odisha, India, approximately 150 kilometres east of the state capital Bhubaneswar. The Integrated Test Range missile testing facility is located on the island.



Q.13) consider the following statements:

1. "Secure Application for Internet" is a cyber-security framework for Ministry of Home Affairs.
2. Information Fusion Centre- Indian Ocean Region is jointly administered by Indian Navy and Indian Coast Guard.

Select the correct answer using the code given below

- a) 1 only
- b) 2 only

- c) Both 1 and 2
- d) Neither 1 nor 2

Q.13) Solution (b)

Explanation:

Statement 1: "Secure Application for Internet (SAI)"

- In the quest for 'Atmanirbhar Bharat', Indian Army has developed a simple and secure messaging application named the "Secure Application for Internet (SAI)".
- The application supports end to end secure voice, text and video calling services for Android platform over internet. **(Hence, Statement 1 is incorrect)**
- The model is similar to commercially available messaging applications like Whatsapp, Telegram, SAMVAD and GIMS and utilises end to end encryption messaging protocol.
- SAI scores over on security features with local in-house servers and coding which can be tweaked as per requirements.
- The application has been vetted by CERT-in empaneled auditor and Army Cyber Group.

Statement 2: Information Fusion Centre –Indian Ocean Region

- The IFC-IOR stems from the importance of the Indian Ocean to world trade and security, and the need for the various maritime nations and organisations to collaborate towards enhancing maritime safety and security on the seas of this region.
- In addition to utilising the collective wisdom and resources towards addressing myriad challenges in the region, IFC-IOR will help interface and integrate, wherein, all partners and stakeholders would benefit from each other's best practices and expertise.
- **The IFC has been established at Gurugram, India and is collocated with Information Management and Analysis Centre which is jointly administered by the Indian Navy and Indian Coast Guard. (Hence, Statement 2 is correct)**
- The setting up of IFC-IOR underscores the governmental approach and effort in line with the vision of our Indian government towards **Security and Growth of All in the Region (SAGAR)**.

Q.14) Consider the following statements about "National Critical Information Infrastructure Protection Centre":

1. It is a statutory body made for protection of Critical Information Infrastructure.
2. It was created under section 70 of Information Technology Act, 2000.
3. It is under administrative control of National Technical Research Organisation.

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

Q.14) Solution (c)

Explanation:

National Critical Information Infrastructure Protection Centre (NCIIPC) is an organisation of the Government of India created under Sec 70A of the Information Technology Act, 2000 (amended 2008), through a gazette notification on 16th Jan 2014 based in New Delhi, India. It is designated as the National Nodal Agency in respect of Critical Information Infrastructure Protection. **(So, Statement 1 is incorrect, while statement 2 is correct)**

Basics about NCIIPC

- **Aims to protect 12 such critical infrastructures** like nuclear, aviation, defense, energy etc.
- Under **NTRO** (National Technical Research organization) **(So, Statement 3 is correct)**
- **Nodal agency for cybersecurity**
- Main role as **advisor** of security issues & as a **feeder of intelligence to other agencies**
- Under **National Security Advisor, Prime Minister Office**
- To roll out counter-measures to protect the **Critical Information Infrastructure Protection**

Q.15) Consider the following pairs of Military exercise of Indian armed forces:

Military Exercise	:	Country
1. Desert Knight 21	:	United Arab Emirates
2. SIMBEX - 20	:	Singapore
3. SLINEX - 20	:	Sri Lanka

Which of the pairs given above is/are correctly matched?

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

Q.15) Solution (c)

Explanation:

Name of Exercise	Type of exercise	Country involved
Desert Knight 21	Air warfare Exercise	France
SIMBEX – 20	Maritime Exercise	Singapore
SLINEX – 20	Maritime Exercise	Sri Lanka

Q.16) Consider the following pairs of Military exercise of Indian armed forces:

Military Exercise	:	Armed Forces Involved
1. Exercise Kavach	:	Indian Navy and US Navy
2. Passage Exercise	:	Australian Navy and Indian Navy
3. Indra Navy	:	Indian Navy and Russian Navy

Which of the pairs given above is/are correctly matched?

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

Q.16) Solution (c)

Explanation:

Name of Exercise	Type of exercise	Country involved
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Exercise Kavach	Joint Military Exercise	Indian Navy, Indian Army , Indian Air Force and Indian Coast Guard
Passage Exercise	Maritime Exercise	Indian Navy and Australian Navy
Indra Navy	Maritime Exercise	Indian Navy and Russian Navy

Q.17) Consider the following statements about Air Breathing Engines:

1. Scramjet Engines designed by ISRO uses liquid fluorine as fuel.
2. Ramjet engine does not work efficiently when vehicle reaches hypersonic speeds.
3. With Scramjet technology, nearly 70% propellant will be reduced and hence will reduce the overall fuel need.

Select the correct answer using the code given below:

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

Q.17) Solution (c)

Statement 1: The Scramjet engine designed by ISRO uses Hydrogen as fuel and the Oxygen from the atmospheric air as the oxidiser.

Statement 2: Ramjets work most efficiently at supersonic speeds around Mach 3. However, the ramjet efficiency starts to drop when the vehicle reaches hypersonic speeds.

Statement 3: Nearly 70% of the propellant (fuel-oxidiser combination) carried by today's launch vehicles consists of oxidiser. Therefore, using atmospheric oxygen would considerably reduce the overall propellant required to place the satellite in the orbit.

Basics about Air Breathing engines

- The basic difference between air-breathing systems and others is the material that plays the role of oxidiser.
- Generally, launch vehicles use combustion of propellants consisting of oxidiser and fuel for deriving the energy. Air breathing propulsion systems use atmospheric oxygen, which is available up to about 50 km of earth's surface to burn the fuel stored on-board thereby making the system much lighter, more efficient and cost effective.

Types of air-breathing systems:

- **Ramjet Engine:** A ramjet is a form of air-breathing jet engine that uses the vehicle's forward motion to compress incoming air for combustion without a rotating compressor. Fuel is injected in the combustion chamber where it mixes with the hot compressed air and ignites. It works most efficiently at supersonic speeds around mach 3.
- **Scramjet Engine:** A scramjet engine is an improvement over the ramjet engine as it efficiently operates at hypersonic speeds and allows supersonic combustion. Thus it is known as Supersonic Combustion Ramjet, or Scramjet.
- **Dual mode ramjet (DMRJ):** It is a type of jet engine where a ramjet transforms into scramjet over Mach 4-8 range, which means it can efficiently operate both in subsonic and supersonic combustor modes.

Q.18) Consider the following statements

1. India has signed Nuclear Non-Proliferation Treaty, but hasn't ratified it.
2. India has signed and ratified Comprehensive Test Ban Treaty (CTBT).
3. India, China and Pakistan, all three follow policy of no-first-use of nuclear weapon.

Which of the above statements are *incorrect*?

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

Q.18) Solution (d)

Statement Analysis

Statement 1 & 2: India is not a member of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) or the Comprehensive Nuclear Test Ban Treaty (CTBT), but is a state party to the Partial Test Ban Treaty (PTBT). The dominant Indian narrative has been to project the

'discriminatory' nature of the Non-Proliferation Treaty (NPT) as the reason for India's perennial opposition and that the treaty, as drafted by the then superpowers, cannot facilitate disarmament and, instead, could only sustain a world of nuclear 'haves' and 'have-nots'. **(So, both statement 1 and 2 are incorrect)**

Statement 3: While both India and China follow No-First use policy, Pakistan do not follow such policy. **(So, Statement 3 is incorrect)**

Since the adoption of nuclear doctrine, India has said consistently that its nuclear weapons were based on staggering and punitive retaliation, in case the deterrence has failed.

Pakistan, by contrast, has openly threatened India with the use of nuclear weapons on multiple occasions beginning from the time the two nations were not even acknowledged nuclear powers

Basics – India's Nuclear Profile

India is not a member of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) or the Comprehensive Nuclear Test Ban Treaty (CTBT), but is a state party to the Partial Test Ban Treaty (PTBT). India embarked on a nuclear energy program in 1948 and a nuclear explosives program in 1964. The latter culminated in India's May 1974 test of a "peaceful nuclear explosion," which provoked global condemnation and proliferation concerns. Following five nuclear weapons tests in May 1998, India formally declared itself a nuclear weapons state.

According to 2020 estimates, the Indian arsenal comprises approximately 150 nuclear warheads. India has one operational Arihant-class nuclear-powered ballistic missile submarine (SSBN), which completed its first deterrence patrol in November 2018, and has one more submarine currently undergoing sea trials. Although India is increasingly concentrating on developing missiles for nuclear delivery roles, aircraft such as the Mirage 2000 and the Jaguar remain integral parts of its nuclear delivery force. In addition to the Mirage 2000 and the Jaguar, addition of 36 nuclear-capable Rafale fighter jets to India's delivery arsenal will increase its nuclear deterrence.

India and the United States announced a nuclear cooperation initiative in July 2005 that would permit India to participate in international nuclear trade, under certain conditions. In 2008, India negotiated a limited safeguards agreement with the International Atomic Energy Agency (IAEA). Subsequently, in October 2008, India and the United States signed a bilateral 123 nuclear cooperation agreement. In June of 2014, India ratified a version of the IAEA Additional Protocol after a 5-year delay. India also seeks to join the NSG, but China has continually blocked India's membership bid.

Q.19) Consider the following statements about Biological Weapon Convention (BWC):

1. BWC was the first multilateral disarmament treaty to ban the production of an entire category of weapons of mass destruction.
2. Treaty allows the stockpiling of biological agents and toxins for "prophylactic, protective or other peaceful purposes.

Which of the above statements is/are correct?

- a) 1 only
- b) 2 only
- c) Both
- d) None of these

Q.19) Solution (c)

Explanation:

Statement 1: Having entered into force on 26 March 1975, the BWC was the first multilateral disarmament treaty to ban the production of an entire category of weapons of mass destruction. The Convention is of unlimited duration. As of February 2021, 183 states have become party to the treaty. Four additional states have signed but not ratified the treaty, and another ten states have neither signed nor acceded to the treaty. The Biological Weapons Convention (BWC) is a disarmament treaty that effectively bans biological and toxin weapons by prohibiting their development, production, acquisition, transfer, stockpiling and use.

Statement 2: However, Treaty allows the stockpiling of biological agents and toxins for "prophylactic, protective or other peaceful purposes.

Q.20) Consider the following pairs:

1. The Wassenaar Arrangement (WA) : : control of chemical and biological
2. The Nuclear Suppliers Group (NSG) : : nuclear and nuclear-related technology
3. The Australia Group (AG) : : Conventional Arms and Dual-Use Goods and Technologies
4. The Missile Technology Control Regime (MTCR) : : weapons of mass destruction

Which of the above pairs are correctly matched?

- a) 2 and 3 only
- b) 2 and 4 only

- c) 1, 2 and 3 only
- d) 1, 2 and 4 only

Q.20) Solution (b)

Statement analysis:

A multilateral export control regime is an informal group of like-minded supplier countries that seek to contribute to the non-proliferation of weapons of mass destruction, delivery systems, and advanced conventional weapons through national implementation of guidelines and control lists for exports.

There are currently four such regimes:

1. The **Wassenaar Arrangement (WA)** on Export Controls for Conventional Arms and Dual-Use Goods and Technologies.
2. The **Nuclear Suppliers Group (NSG)**, for the control of nuclear and nuclear-related technology.
3. The **Australia Group (AG)** for the control of chemical and biological technology that could be weaponised.
4. The **Missile Technology Control Regime (MTCR)** for the control of rockets and other aerial vehicles capable of delivering weapons of mass destruction.

India is member of all three multilateral export control regime except NSG, where its inclusion has been protested by China.

While not formally an export control regime, the Zangger Committee has developed guidance on nuclear export restrictions required by the Non-Proliferation Treaty (NPT).

Q.21) Consider the following statements:

1. Sandalwood Spike Disease is an infectious disease caused by phytoplasma.
2. The only option to prevent the spread of this disease is to cut down the infected tree.

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

Q.21) Solution (c)

Statement 1	Statement 2
Correct	Correct
Sandalwood Spike Disease is an infectious disease which is caused by phytoplasma. Phytoplasmas are bacterial parasites of plant tissues - which are transmitted by insect vectors and involved in plant-to-plant transmission.	There is no cure as of now for the infection. Presently, there is no option but to cut down and remove the infected tree to prevent the spread of the disease.

Q.22) Consider the following pairs:

<i>GI Tagged Handlooms</i>	<i>State</i>
1. Uppada Jamdani Sarees	Andhra Pradesh
2. Maheshwar Sarees & Fabrics	Karnataka
3. Chendamangalam Dhoties & Set Mundu	Tamil Nadu

Which of the pairs given above is/are correctly matched?

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

Q.22) Solution (a)

- Uppada Jamdani Sarees – Andhra Pradesh.
- Chendamangalam Dhoties & Set Mundu – Kerala.
- Maheshwar Sarees & Fabrics – Madhya Pradesh.

Q.23) With reference to 'Madrid Principles' sometimes seen in news, consider the following statements:

1. These are series of pragmatic suggestions for settling the conflict in the Syria peacefully.
2. Principles are proposed by the UNSC.

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

Q.23) Solution (d)

Statement 1	Statement 2
Incorrect	Incorrect
Madrid principles are series of pragmatic suggestions for settling the conflict in the Nagorno-Karabakh peacefully. It calls for Armenia to withdraw its military from Nagorno-Karabakh in exchange for Azerbaijan granting de-facto autonomy to Nagorno-Karabakh.	The Madrid principles were proposed by the Minsk Group in 2007. Minsk Group is the only internationally agreed body to mediate the negotiations for the peaceful resolution of the Nagorno-Karabakh conflict. It is chaired by France, Russia and the US.

Q.24) With reference to Nagar Van scheme, consider the following statements:

1. The scheme aims to develop 100 Urban Forests across the country in the next five years.
2. Warje Urban Forest in Chandigarh will be considered as a role model for the Scheme.
3. The scheme will be funded by the CAMPA (Compensatory Afforestation Fund Management and Planning Authority).

Which of the statements given above is/are correct?

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

Q.24) Solution (c)

Statement 1	Statement 2	Statement 3
Incorrect	Incorrect	Correct
The Nagar Van (Urban Forests) aims to develop 200 Urban Forests across the country in the next five years. The Scheme enforces people's participation and collaboration between the Forest Department, Municipal bodies, NGOs, Corporates and local citizens.	Warje Urban Forest in Pune (Maharashtra) will be considered as a role model for the Scheme. Recently, Ministry of Environment, Forest and Climate Change (MoEF&CC) selected Arunachal Pradesh capital (Itanagar) for implementation of the 'Nagar Van' or Urban Forest scheme.	CAMPA (Compensatory Afforestation Fund Management and Planning Authority) will fund the Nagar Van scheme or the Urban Forests scheme. CAMPA is the Management and Planning Authority for Compensatory Afforestation Fund.

Q.25) Recently held VAIBHAV Summit 2020 is associated with which of the following?

- Showcasing the rich Indian Culture and Heritage
- Conference on geopolitics and geo-economics of Indo-Pacific region
- Sustainable solutions to environmental problems
- Enhancing the knowledge-base of Indian Research and Academic Institutions

Q.25) Solution (d)

Global Summit of NRI Researchers called Vaishvik Bhartiya Vaigyanik (VAIBHAV) Summit is being organised aimed at developing mechanisms for involving Indian Diaspora working in top universities and R&D organisations across the world, to further enhance the knowledge-base of Indian Research and Academic Institutions.

- It is a global summit of Overseas and Resident Indian scientists and academicians.
- Key areas of discussion: Quantum technologies, artificial intelligence and machine learning, communications technologies, computational and data sciences and aerospace technologies, etc.

Q.26) With reference to Commission on Status of Women (CSW), consider the following statements:

1. It is the principal global intergovernmental body exclusively dedicated to the promotion of gender equality.
2. It is a functional commission of the United Nations General Assembly (UNGA).

Which of the statements given above is/are *NOT* correct?

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

Q.26) Solution (b)

Statement 1	Statement 2
Correct	Incorrect
Commission on Status of Women (CSW) is the principal global intergovernmental body exclusively dedicated to the promotion of gender equality and the empowerment of women.	It is a functional commission of the ECOSOC. It was established by ECOSOC resolution 11(II) of 21 June 1946. 45 member states of the United Nations serve as members of the Commission at any one time. India has been elected as the member of the CSW for four years (2021 to 2025).

Q.27) With reference to Question Hour, which of the following statements is correct?

- a) Question Hour is not mentioned in the Rules of Procedure.
- b) In an unstarred question, a member seeks an oral answer.
- c) Short notice question is one that is asked by giving a notice of less than ten days.
- d) Question Hour in both Houses is held on all days of the session without any exception.

Q.27) Solution (c)

- The first hour of every parliamentary sitting is slotted for the Question Hour where Members of Parliament raise questions about any aspect of administrative activity.
- **In a starred question, a member seeks an oral answer** from the concerned minister and this can be followed by supplementary questions, whereas in the case of unstarred questions, a written answer is provided, and no supplementary question can be asked.
- **Short notice question is one that is asked by giving a notice of less than ten days.** It is answered orally. Ministries receive the questions 15 days in advance so that they can prepare their ministers for Question Hour.
- The presiding officers of the both Houses (Rajya Sabha and Lok Sabha) are the final authority with respect to the conduct of Question Hour.
- Question Hour is regulated according to parliamentary rules. **It is mentioned in the Rules of Procedure.**
- **Question Hour in both Houses is held on all days of the session. But there are two days when an exception is made (Day of President's address & During Budget presentation).**

Q.28) Recently launched 'Krishi Megh' is related to which of the following?

- a) Cloud seeding project in drought prone area
- b) Data recovery centre
- c) Cold chain infrastructure facility
- d) E-commerce platform for horticultural products

Q.28) Solution (b)

- **Krishi Megh is the National Agricultural Research & Education System -Cloud Infrastructure and Services.**
- It aims to protect the precious data of the government's premier research body Indian Council of Agricultural Research.
- It has been set up at National Academy of Agricultural Research Management (NAARM) in Hyderabad.
- The data recovery centre at NAARM is synchronized with the data centre at the main data centre of the ICAR is at Indian Agricultural Statistics Research Institute (IASRI) Delhi.
- Krishi Megh has been set up under the National Agricultural Higher Education Project (NAHEP), funded by both the government and World Bank.

Q.29) Consider the following statements regarding The Essential Commodities (Amendment) Act, 2020:

1. The Amendment Act adds cereal, pulses, oilseed, edible oil, onion and potatoes to the list of essential commodities.
2. Central Government may impose a stock limit only if there is a 100 percent increase in retail price of non-perishable agricultural food 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

Q.29) Solution (d)

Statement 1	Statement 2
Incorrect	Incorrect
Under the Essential Commodities Act, 1955, the Government regulates the production, supply and distribution of certain commodities it declares 'essential' in order to make them available to consumers at fair prices. Essential Commodities (Amendment) Act, 2020 amends the Essential Commodities Act, 1955. The Amendment Act removes cereal, pulses, oilseed, edible oil, onion and potatoes from the list of essential commodities.	Amendment Act requires that imposition of any stock limit on agricultural produce must be based on price rise. A stock limit may be imposed only if there is: (i) a 100% increase in retail price of horticultural produce; and (ii) a 50% increase in the retail price of non-perishable agricultural food items.

Q.30) With reference to Beach Environment and Aesthetics Management Services (BEAMS) program which of the following statements is/are *NOT* correct?

1. It is an eco-label under ICZM (Integrated Coastal Zone Management) project.

2. It is prepared by the Society of Integrated Coastal Management (SICOM)

Select the correct answer using the code given below:

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

Q.30) Solution (d)

Statement 1	Statement 2
Correct	Correct
Beach Environment and Aesthetics Management Services (BEAMS) program is India's own eco-label under ICZM (Integrated Coastal Zone Management) project.	BEAMS has been prepared by the Society of Integrated Coastal Management (SICOM) under the Union Ministry of Environment, Forest and Climate Change (MoEFCC).

The objectives of BEAMS program is to Abate pollution in coastal waters, Promote sustainable development of beach facilities, Protect & conserve coastal ecosystems & natural resources, Strive and maintain high standards of cleanliness, Hygiene & safety for beachgoers in accordance with coastal environment & regulations.

Directions for the following 2 (two) items:

Read the following two passages and answer the items that follow. Your answers to these items should be based in the passage only.

Passage 1

Nationalism, of course is a curious phenomenon which at a certain stage in a country's history gives life, growth and unity. But at the same time, it has a tendency to limit one because one thinks of one's country as something different from the rest of world. One's perceptive changes and one is continuously thinking of one's own struggles and virtues and failing to the exclusion of other thoughts. The result is that the same nationalism which is the symbol of growth for a people becomes a symbol of the cessation of that growth in mind. Nationalism, when it

becomes successful sometimes goes on spreading in an aggressive way and becomes a danger internationally. Whatever line of thought you follow, you arrive at the conclusion that some kind of balance must be found. Otherwise something that was good can turn into evil. Culture which is essentially good becomes not only static but aggressive. It is something that breeds conflict and hatred when looked at from a wrong point of view. Apart from the political and economic problems of the age, perhaps, that is the greatest problem today because behind it there is tremendous search for something which it cannot find. We turn to economic theories because they have an undoubted importance. It is folly to talk of culture or even of god. When human beings starve and die. Before one can talk about anything else one must provide the normal essentials of life to human beings. That is where economies come in. Human beings today are not in mood to tolerate this suffering and starvation and inequality when they see that the burden is not equally shared. Others profit while they only bear the burden.

Q.31) The greatest problem in the middle of the passage refers to the question

- a) how to mitigate hardship to human beings
- b) how to contain the dangers of aggressive nationalism
- c) how to share the economic burden equally
- d) how to curb international hatred

Q.31) Solution (b)

Nationalism, when it becomes successful sometimes goes on spreading in an aggressive way and becomes a danger internationally. Whatever line of thought you follow, you arrive at the conclusion that some kind of balance must be found.....Hence option b is the correct answer.

Passage 2

In the United States between 2001 and 2014, higher income was associated with greater longevity and differences in life expectancy across income groups increased over time. However, the association between life expectancy and income varied substantially across areas; differences in longevity across income groups decreased in some areas and increased in others. The differences in life expectancy were correlated with health behaviors and local area characteristics.

Q.32) Apart from income, which of the following factors too contribute towards greater longevity and difference in life expectancy?

- 1. Health behavior
- 2. Local area characteristics
- 3. Education qualification

Which of the following options are correct?

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

Q.32) Solution (a)

There is no discussion about the role of education in the life span.

Q.33) On a straight road, car X and car Y are traveling at different constant rates. If car X is now 2 km ahead of car Y, how much time from now will car X be 4km ahead of car Y?

Statement I: Car X is traveling at 45 km/hr and car Y is traveling at 30 km/hr.

Statement II: 6 minutes ago, car X was 1/2 km ahead of car Y

- a) Statement I alone is sufficient, but statement II alone is not sufficient.
- b) Statement II alone is sufficient, but statement I alone is not sufficient
- c) Both statements together are sufficient, but neither statement alone is sufficient
- d) Each statement alone is sufficient

Q.33) Solution (d)

The car X is 2 km ahead of car Y. To make this difference 4km, car X has to travel 2km more than car Y.

From statement I, the relative speed of car X is $45 - 30 = 15$ km/hr

So, the time required is $(2/15) * 60 = 8$ min

Hence, statement I alone is sufficient.

From statement II, if 6 minutes ago, car X was 1/2 km ahead of car Y and now it is 2 km ahead of Y, it means X gained 1.5 km in 6 minutes.

Since the cars are moving at constant speeds, so car X will gain 2 km in 8 minutes.

Hence, statement II is also sufficient.

Therefore, both the statements are individually sufficient.

Q.34) The ratio of metal 1 and metal 2 in Alloy A is 3:4. In Alloy B same metals are mixed in the ratio 5:8. If 26 kg of Alloy B and 14 kg of Alloy A are mixed then find out the ratio of metal 1 and metal 2 in the new Alloy.

- a) 3:2
- b) 2:5
- c) 2:3
- d) 5:3

Q.34) Solution (c)

Alloy A contains Metal 1 and Metal 2 in the ratio 3:4

Likewise, Alloy B contains Metal 1 and Metal 2 in the ratio 5:8

Therefore, Metal 1 in Alloy A will be $(3/7)*14 = 6\text{kg}$ and Metal 2 in Alloy A will be $(4/7)*14 = 8\text{ kg}$

Similarly, Metal 1 in Alloy B will be $(5/13)*26 = 10\text{ kg}$ and Metal 2 in Alloy B will be $(8/13)*26 = 16\text{ kg}$

Required ratio = $(6+10):(8+16) = 16:24 = 2:3$

Q.35) In a 500 m race, the ratio of the speeds of two contestants A and B is 3:4. A has a start of 140 m. Then, A wins by:

- a) 60m
- b) 40m
- c) 20m
- d) 10m

Q.35) Solution (c)

To reach the winning post, A will have to cover a distance of $(500 - 140)\text{m}$, i.e., 360 m.

While A covers 3 m, B covers 4 m. While A covers 360 m, B covers $(4/3)*360 = 480\text{ m}$.

Thus, when A reaches the winning post, B covers 480 m and therefore remains 20 m behind.