Q.1) With reference to National Disaster Management Authority consider the following statements?

1. It is an autonomous body under Ministry of Home Affairs
2. It is headed by Prime Minister.
3. NDMA is mandated to lay down the policies, plans and guidelines for Disaster Management.

Which of the above statements are correct?

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

Q.1) Solution (b)

Statement analysis

Statement 1: NDMA is an apex Body of Government of India under Ministry of Home Affairs. NDMA was established through the Disaster Management Act enacted by the Government of India on 23 December 2005. **It is a statutory body not autonomous body (bodies which are established independently and functions by its own law. Example - CSIR, AIIMS etc.). Hence statement is incorrect**

Statement 2: It **is headed by the Prime Minister of India** and can have up to nine other members. Since 2020, there have been five other members. NDMA has a vision to "build a safer and disaster resilient India by a holistic, pro-active, technology-driven and sustainable development strategy that involves all stakeholders and fosters a culture of prevention, preparedness and mitigation."

Statement 3: **NDMA is mandated to lay down the policies, plans and guidelines for Disaster Management. India envisions the development of an ethos of Prevention, Mitigation, Preparedness and Response.**

The Indian government strives to promote a national resolve to mitigate the damage and destruction caused by natural and man-made disasters, through sustained and collective efforts of all Government agencies, Non-Governmental Organizations and People's participation. This is planned to be accomplished by adopting a Technology-Driven, Pro-Active, Multi-Hazard and Multi-Sectoral strategy for building a Safer, Disaster Resilient and Dynamic India.

Q.2) Which of the following disaster is not monitored by Ministry of Home Affairs?

1. Cyclone
2. Hailstorm
3. Flood
4. Landslide

Q.2) Solution (b)

Explanation:

Department of Agriculture and Cooperation under Ministry of Agriculture (MoA) monitors relief activities for calamities associated with **drought, hailstorms, pest attacks and cold wave frost** while rest of the natural calamities are monitored by Ministry of Home Affairs.

Q.3) Which of the following agency is involved in preparation of Climate Vulnerability Assessment Map of India?

a) NITI Aayog
b) Department of Biotechnology
c) National Disaster Management Authority
d) Department of Science and Technology

Q.3) Solution (d)

Explanation:

Rising sea levels, increasing number of extreme weather events, urban floods, changing temperature and rainfall patterns are the impacts of climate change being felt in many parts of the country and not just coastal areas or hilly regions.

For preparing communities and people to meet the challenge arising out of such changes, information specific to a state or even district is needed because such impacts of climate change are not uniform. In order to meet this need, a pan India **climate vulnerability assessment map** is being developed.

The map is being developed under a joint project of the Department of Science and Technology (DST) under the Union Ministry of Science and Technology and Swiss Agency for Development and Cooperation (SDC).

Such climate vulnerability atlas has already been developed for 12 states in the Indian

Himalayan Region, using a common framework.

Q.4) Recently, a term called 'Dooms day Clock' was in news, it is associated with –

1. A countdown clock to warn people from upcoming world war.
2. An ecofriendly clock which uses solar power.
3. A hypothetical clock to measure the effect of greenhouse gases on environment.
4. Visual depiction of how vulnerable the world is to a climate or nuclear catastrophe.

Q.4) Solution (d)

Explanation:.

The hands of the 'Doomsday Clock', a visual depiction of how vulnerable the world is to a climate or nuclear catastrophe, remained at '100 seconds to midnight' for the second consecutive year — the closest it has been to the symbolic annihilation of humanity.

- The Bulletin of the Atomic Scientists, founded by Albert Einstein and students from the University of Chicago in 1945, created the 'Doomsday Clock' as a symbol to represent how close the world is to a possible apocalypse.
- It is set annually by a panel of scientists, including 13 Nobel laureates, based on the threats — old and new — that the world faced in that year.
- When it was first created in 1947, the hands of the clock were placed based on the threat posed by nuclear weapons, which the scientists then perceived to be the greatest threat to humanity.
- Over the years, they have included other existential threats, such as climate change and disruptive technologies like artificial intelligence.

Q.5) Consider the following statements in context of Sustainable Agriculture:

1. Sustainable agriculture is aimed at meeting the needs of the present generation without endangering the resource base of the future generations.
2. Degradation of natural resources is the main issue threatening sustainable development of agriculture.

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.5) Solution (c)

Explanation:

Sustainable agriculture is a form of agriculture aimed at meeting the needs of the present generation without endangering the resource base of the future generations. It is considered as a system of cultivation with the use of manure, crop rotation and minimal tillage and with minimum dependence on synthetic fertilizers, pesticides and antibiotics.

- Agriculture has an enormous environmental footprint, playing a significant role in causing climate change, water scarcity, land degradation, deforestation and other processes. it is simultaneously causing environmental changes and being impacted by these changes.
- A sustainable agriculture approach seeks to utilize natural resources in such a way that they can regenerate their productive capacity, and also minimize harmful impacts on ecosystems beyond a field's edge.
- It is a balanced management system of renewable resources including soil, wildlife, forests, crops, fish, livestock, plant genetic resources and ecosystems without degradation and to provide food, livelihood for current and future generations maintaining or improving productivity and ecosystem services of these resources.
- Sustainable agriculture has to prevent land degradation and soil erosion. It has to replenish nutrients and control weeds, pests and diseases through biological and cultural methods.
- **Degradation of natural resources is the main issue threatening sustainable development of agriculture.**

Q.6) Who among the following is the head of Crisis Management Committee?

a) Prime Minister
b) Chairman of NITI Aayog
c) Cabinet Secretary
d) Home Minister

Q.6) Solution (c)

Explanation:

At the national level, Cabinet Committee on Security (CCS) and **National Crisis Management Committee (NCMC)** are the key committees involved in the top-level decision-making with regard to Disaster Management (DM).

NCMC deals with major crisis which have serious or national ramifications. It is headed by Cabinet secretary who functions directly under the Prime Minister and is the administrative head of the cabinet Secretariat.

Cabinet Secretary is also the ex-officio Chairman of the Civil Services Board.

Q.7) Which of the following are classified as Terrestrial disaster?

1. Floods
2. Blizzard
3. Drought
4. Landslides
5. Earthquake

Choose appropriate answer:

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

Q.7) Solution (d)

Statement Analysis:

Classification of Natural Disasters

Atmospheric	Terrestrial	Aquatic	Biological
1. Blizzards 2. Thunder-storms 3. Lightening	**1. Earthquakes** 2. Volcanic eruptions	1. Floods 2. Tidal waves 3. Ocean currents	Plants and Animals as colonisers (Locusts, etc.).

4. Tornadoes 5. Tropical cyclone 6. Drought 7. Hailstorm 8. Frost, Heat wave 9. Cold Wave etc.	**3. Landslides** 4. Avalanches 5. Subsidence 6. Soil Erosion	4. Storm surge 5. Tsunami	Insects infestation—fungal, bacterial and viral diseases such as bird flu, dengue, etc.

Hence, Option (d) is correct.

Q.8) Consider the following statements:

1. Geological Survey of India is the nodal agency for the Indian government for landslide data repository and landslide studies.
2. UN Office for Disaster Risk Reduction (UNISDR) has been tasked to support the implementation, follow-up and review of the Sendai Framework.

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.8) Solution (c)

Explanation:

Statement 1: Geological Survey of India as a Nodal Agency is responsible for:

- Coordinating and undertaking geological studies for landslide hazard mitigation
- Carrying out landslide hazard zonation
- **Monitoring landslide**s and avalanches
- Studying the factors responsible for sliding and suggesting precautionary as well as preventive measure National Core Group has finalized the action plan for **landslide studies** with inputs of GSI and other organization.

Statement 2: The United Nations Office for Disaster Risk Reduction (UNDRR) was created in

December 1999 to ensure the implementation of the International Strategy for Disaster Reduction. UNDRR (formerly UNISDR) is part of the United Nations Secretariat and it supports the implementation & review of the Sendai Framework for Disaster Risk Reduction. **Hence statement 2 is correct.**

Q.9) Consider the following statements with reference to National Disaster Response Fund (NDRF)

1. NDRF amount can be spent towards the mitigation of disaster risks.
2. The primary purpose of NDRF is to supplement the SDRF, in case there is a calamity of "severe nature".
3. NDRF is located in the "Public Accounts" of Government of India under "Reserve Funds not bearing interest"

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

Q.9) Solution (b)

Basic information:

National Disaster Response Fund is defined in Section 46 of the Disaster Management Act, 2005 (DM Act) as a fund managed by the Central Government for meeting the expenses for emergency response, relief and rehabilitation due to any threatening disaster situation or disaster.

Currently, funds contributed to the Prime Minister's Relief Fund or the State Chief Minister's Relief Fund are exempt from income tax.

Statement Analysis:

Statement 1: NDRF amount **can be spent only towards meeting the expenses for emergency response, relief and rehabilitation. For projects exclusively for the purpose of mitigation**, i.e, measures aimed at reducing the risk, impact or effect of a disaster or threatening disaster situation a **separate fund called National Disaster Mitigation Fund** has to be constituted. **Hence, statement 1 is incorrect.**

Statement 3: **The primary purpose of NDRF is to supplement the SDRF, in case there is a calamity of "severe nature"** which requires assistance over and above the funds available under SDRF. **Hence, statement 2 is correct.**

The memorandum of the state government for additional assistance from NDRF is examined by the MHA/MoA as the case may be, and in case there is any shortage, a central team is deputed for making an on the spot assessment. The recommendations of the central team are examined and the extent of assistance and expenditures which can be funded from the NDRF is recommended by the National Executive Committee (NEC) constituted for this purpose under the DM Act. Based on these recommendations, a high level committee (HLC) approves the quantum of immediate relief to be released from NDRF.

Statement 2: NDRF is **located in the "Public Accounts"** of Government of India under "Reserve Funds not bearing interest**". Hence, statement 3 is correct.**

Q.10) Consider the following statements with reference to Regional Integrated Multi-Hazard Early Warning System (RIMES) for Africa and Asia:

1. It is an international and intergovernmental institution, owned by its member states and managed by UN.
2. RIMES operates from its regional early warning center located at the campus of the Asian Institute of Technology in Pathumthani, Thailand.

Which of the above given statements is/are correct?

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

Q.10) Solution (b)

Explanation:

The Regional Integrated Multi-Hazard Early Warning System for Africa and Asia **(RIMES) is an international and intergovernmental institution, owned and managed by its Member States**, for the generation and application of early warning information. **Hence statement 1 is incorrect.**

- RIMES evolved from the efforts of countries in Africa and Asia, in the aftermath of the 2004 Indian Ocean tsunami, to establish a regional early warning system within a multi-

hazard framework for the generation and communication of early warning information, and capacity building for preparedness and response to trans-boundary hazards.

- RIMES was established on 30 April 2009, and was registered with the United Nations on 1 July 2009.
- **RIMES operates from its regional early warning center located at the campus of the Asian Institute of Technology in Pathumthani, Thailand**. Hence, **statement 2 is correct.**

Q.11) Consider the following statements with reference to Sendai Framework for disaster risk reduction

1. It is a 15 year long, voluntary, nonbinding agreement which recognizes that state has a primary role in disaster risk reduction.
2. It is a successor instrument to the Yokohama Framework for Action.
3. India is a signatory to this framework.

Which of the statements give above is/are correct?

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

Q.11) Solution (c)

Basic Information:

The **Sendai Framework for Disaster Risk Reduction 2015-2030 outlines** seven clear targets and four priorities for action to prevent new and reduce existing disaster risks: (i) Understanding disaster risk; (ii) Strengthening disaster risk governance to manage disaster risk; (iii) Investing in disaster reduction for resilience and; (iv) Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction.

It aims to achieve the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries over the next 15 years.

The Framework was adopted at the Third UN World Conference on Disaster Risk Reduction in Sendai, Japan, on March 18, 2015.

Statement analysis

Statement 1: Sendai framework is **voluntary and non-binding agreement which recognizes that state has primary role to play in disaster risk reduction** by sharing responsibilities with other stakeholders including Local government, private sector along with others. **Hence statement 1 is correct.**

Statement 2: It **is the successor agreement to the Hyogo Framework for Action (2005–2015),** which had been the most encompassing international accord to date on disaster risk reduction. **Hence statement 2 is incorrect**

Statement 3: **India is a signatory to Sendai Framework**. United Nations Office for Disaster Risk Reduction oversees the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030, supporting countries in its implementation, monitoring and sharing what works in reducing existing risk and preventing the creation of new risk. **Hence statement 3 is correct.**

Q.12) The term 'Fujiwara effect' was in news with reference to

a) Effect of use nuclear energy
b) Collusion of two cyclone
c) Biodiversity loss caused due erratic rain
d) Quantum technology application

Q.12) Solution (b)

Explanation:

The Fujiwhara effect also known as Fujiwhara interaction or binary interaction, **is a phenomenon that occurs when two nearby cyclonic vortices move around each other and close the distance between the circulations** of their corresponding low-pressure areas.

The effect is named after Sakuhei Fujiwhara, the Japanese meteorologist who initially described the effect.

Extratropical cyclones can exhibit the binary interaction when within a distance of 2,000 km of each other. Tropical cyclones exhibit this type of effect when separated by a distance of less than 1,400 km.

Q.13) Consider the following statements

1. Under 15th finance commission in grant for disaster risk management more than two-third fund is for disaster mitigations.
2. Bioswales system is suggested as a potential solution for urban floods.

Which of the statement give above is/are correct?

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

Q.13) Solution (b)

Explanation:

Statement 1: The Commission recommended setting up National and State Disaster Management Funds (NDMF and SDMF) for the promotion of local-level mitigation activities. The Commission has recommended retaining the existing cost-sharing patterns between the centre and states to fund the SDMF (new) and the SDRF (existing). The cost-sharing pattern between centre and states is (i) 75:25 for all states, and (ii) 90:10 for north-eastern and Himalayan states. As can be seen below majority of amount is spent towards relief and Reconstruction (80%)- and not mitigation (20%). **Hence statement 1 is incorrect.**

Table 2: Grants for disaster risk management (In Rs crore)

Funding Windows	National corpus	States' corpus
Mitigation (20%)	2,478	5,797
Response (80%)	9,912	23,186
(i) Response and Relief (40%)	4,956	11,593
(ii) Recovery and Reconstruction (30%)	3,717	8,695
(iii) Capacity Building (10%)	1,239	2,998
Total	**12,390**	**28,983**

Sources: Report for the year 2020-21, 15th Finance Commission; PRS.

Statement 2: Bioswales are vegetated, shallow, landscaped depressions designed to capture, treat, and infiltrate stormwater runoff as it moves downstream. They are typically sized to treat the water quality event, also known as the "first flush," which is the first and often most polluted volume of water resulting from a storm event. **Bioswales are the most effective type**

of green infrastructure facility in slowing runoff velocity and cleansing water while recharging the underlying groundwater table. Many cities are considering it for its potential in managing Urban floods. Hence, statement 2 is correct.

Q.14) The term 'Torrefecation technology' was in news with reference to

a) Big data analytics
b) Terminator seeds
c) Solution to stubble burning
d) GM Crops

Q.14) Solution (c)

Explanation:

Pollution from **stubble burning** in winter is the key contributor to the sharp decline in air quality in Delhi. But stubble burning continues unabated. To find a solution to this issue, India is testing a Swedish technology — **torrefaction that can convert rice stubble into 'bio-coal'.**

Torrefaction is a thermochemical process typically at 200-350 °C in the absence of oxygen, at atmopsheric pressure with low particle heating rates and a reactor time of one hour. The process causes biomass to partly decompose, creating torrefied biomass or char, also referred to as 'biocoal'. Biocoal has a higher energy content per unit volume, and torrefaction followed by pelletisation at the harvest sites facilitates transport over longer distances. It also avoids problems associated with decomposition of biomass during storage. Hence the benefits of torrefaction may outweigh the additional cost in many cases.

Q.15) Bioremediation may not be best suited for removal of which of the following

a) Uranium
b) Cadmium
c) Chromium
d) All of the above

Q.15) Solution (d)

Explanation:

Bioremediation is a term that refers to a number of remediation technologies for treatment of

both soil and groundwater using microorganisms.

- Bioremediation is typically used to treat sites contaminated with organic substances . bioremediation uses microbes (e.g. bacteria, yeast, and fungi) to 'digest' toxic organic contaminants.
- The process of breaking down organic contaminants with microorganisms is referred to as biodegradation. This can occur in the presence of oxygen or without oxygen, known as aerobic and anaerobic conditions, respectively.
- Bioremediation provides a good cleanup strategy for some types of pollution, but as you might expect, it will not work for all. For example, **bioremediation may not provide a feasible strategy at sites with high concentrations of chemicals that are toxic to most microorganisms.** These chemicals include metals such as **cadmium or lead**, and salts such as sodium chloride.
- **Heavy metals including cadmium, chromium, lead and uranium are elements so they cannot be biodegraded**. However, bioremediation processes can potentially be used to reduce the mobility of these material in the subsurface, reducing the potential for human and environmental exposure. The mobility of certain metals including chromium (Cr) and uranium (U) varies depending on the oxidation state of the material.

Q.16) Which of the following factors are responsible for Glacial Lake Outbursts Floods?

1. Glacial retreat due to climate change.
2. Long-term dam degradation
3. Black carbon which melts ice on mountains due to albedo effect.

Choose correct answer:

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

Q.16) Solution (d)

Basic informstion:

When glaciers melt, the water in glacial lakes accumulates behind loose, natural "glacial/moraine dams" made of ice, sand, pebbles and ice residue. A GLOF refers to the

flooding that occurs when the water dammed by a glacier or a moraine is released suddenly.

Unlike earthen dams, the weak structure of the moraine dam leads to the abrupt failure of the dam on top of the glacial lake, which holds large volume of water.

Statement Analysis

Following factors can lead to Glacial lake Outburst floods

- **Retreat of glaciers due to climate change** and change in radiative balance in the region in the wake of global warming.
- **Increasingly erratic and unpredictable monsoon rainfall patterns** and increased climate variability.
- Anthropogenic activities such as **mass tourism; developmental interventions** such as roads and hydropower projects; and the practice of slash and burn type of farming in certain pockets of the Indian Himalayan region.
- Black carbon also plays important factor which melts the ice on the mountain due to albedo effect.
- Rapid slope movement into lakes.
- Other Factors like cascading processes (flood from a lake situated upstream), earthquake, blocking of subsurface outflow tunnels, and **long-term dam degradation** also trigger GLOFS.

So, all the statements are correct.

Q.17) Which of the following statements with respect to Coalition for Disaster Resilient Infrastructure (CDRI) is/are correct?

1. It is a voluntary international grouping linking government and UN agencies only.
2. It is second major coalition launched by India outside the UN, after the International Solar Alliance.
3. Its secretariat is in New Delhi.

Select the appropriate answer using the code given below:

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

d) 1, 2 and 3

Q.17) Solution (c)

Basic Information:

The Coalition for Disaster Resilient Infrastructure (CDRI) is a Voluntary partnership of national governments, UN agencies and programmes, multilateral development banks and financing mechanisms, the private sector, and knowledge institutions that aims to promote the resilience of new and existing infrastructure systems to climate and disaster risks in support of sustainable development. **Hence, statement 1 is incorrect.**

- CDRI promotes rapid development of resilient infrastructure to respond to the Sustainable Development Goals' imperatives of expanding universal access to basic services, enabling prosperity and decent work.
- It was launched by the Indian Prime Minister Narendra Modi at the 2019 UN Climate Action Summit in September 2019.
- The World Bank and the Green Climate Fund also supported the launch.
- Its secretariat is in **New Delhi. Hence, statement 3 is correct.**
- The CDRI is the **second major coalition launched by India outside of the UN, the first being the International Solar Alliance. Hence, statement 2 is correct.**
- Both of them are seen as India's attempts to obtain a global leadership role in climate change matters.

Q.18) What are the benefits of vertical farming?

1. Increased crop yield
2. Ability to cultivate large variety of crop at once.
3. Start-up cost is low compared to traditional farming.

Choose appropriate code:

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

Q.18) Solution (a)

Basic Information:

In vertical farming, crops are grown indoors, under artificial conditions of light and temperature.t aims at higher productivity in smaller spaces. It uses soil-less methods such as hydroponics, aquaponics and aeroponics.

Japan has been one of the early pioneers in vertical farming. It holds the largest share in the global vertical farming market. Now, countries like Denmark and USA are also taking up vertical farming.

Statement Analysis

Benefits of vertical farming

- Vertical farming uses significantly less water and pesticides than traditional agricultural methods.
- Being indoors, the crops aren't subject to seasons and hence **give high productivity year-round.** Lettuces, tomatoes and green crops can be produced through this practice.
- **The increased ability to cultivate a larger variety of crops at once** because crops do not share the same plots of land while growing is another sought-after advantage.
- Because of its limited land usage, vertical farming is less disruptive to the native plants and animals, leading to further conservation of the local flora and fauna.

Drawbacks

- **Vertical farming technologies face economic challenges with large start-up costs** compared to traditional farms.
- Vertical farms also face large energy demands due to the use of supplementary light like LEDs.
- Moreover, if non-renewable energy is used to meet these energy demands, vertical farms could produce more pollution than traditional farms or greenhouses.

Q.19) Kuttanad in India is primarily known for

a) Intricate tribal art
b) Salt production region
c) Below sea level farming
d) Has got GI for its silk saree

Q.19) Solution (c)

Explanation:

Kuttanad is a delta region of about 900 sq. km situated in the west coast of Kerala State, India. The area is a larger mosaic of fragmented landscape patches and varied ecosystems such as coastal backwaters, rivers, vast stretches of paddy fields, marshes, ponds, garden lands, edges, corridors and remarkably networked water ways.

The Kuttanad Below Sea-level Farming System (KBSFS) is unique, as it is the only system in India that practices rice cultvation below sea level. The major land use structure of KBSFS is flat stretches of rice fields in about 50,000 ha of mostly reclaimed delta swamps. The rice fields, which are popularly known as "Puncha Vayals" exist in three landscape elements: Karapadam (upland rice fields), Kayal (wetland rice fields) and Kari (land buried with black coal like materials).

Q.20) Which of the following are advantages of zero tillage in agriculture.

1. Increase in organic matter content
2. Reduction in the crop duration
3. Low amount of nitrogen needed

Select the correct code:

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

Q.20) Solution (a)

Basic introduction:

Zero tillage is the process where the crop seed will be sown through drillers without prior land preparation and disturbing the soil where previous crop stubbles are present. Zero tillage not only reduce the cost of cultivation.

Statement analysis:

Advantages of Zero Tillage Farming

- **Reduction in the crop duration** and thereby early cropping can be obtained to get higher yields.
- Reduction in the cost of inputs for land preparation and therefore a saving of around 80%.
- Zero tilled soils are homogenous in structure with more number of earthworms.
- Residual moisture can be effectively utilized and number of irrigations can be reduced.
- **Organic matter content increases** due to less mineralization
- Environmentally safe - Greenhouse effect will get reduced due to carbon sequestration.
- No tillage reduces the compaction of the soil and reduces the water loss by runoff and prevent soil erosion.
- As the soil is intact and no disturbance is done, No Till lands have more useful flora and fauna.

Disadvantages

- **Higher amount of nitrogen has to be applied for mineralization of organic matter in zero tillage.**
- Perennial weeds may be a problem
- There is a risk of carrying over plant diseases when crop residue is not incorporated into the soil after harvest.
- High number of volunteer plants and buildup of pests.
- It takes time to see the benefits of no-till.

Hence, statement 3 is incorrect.

Q.21) With reference to World Anti-Doping Agency (WADA), consider the following statements:

1. WADA is a foundation initiated by the International Olympic Committee.
2. Scientific Research is one of the key activities of WADA.
3. WADA monitors the provisions of World Anti-Doping Code.

Which of the statements given above is/are correct?

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

d) 1, 2 and 3

Q.21) Solution (d)

Statement 1	Statement 2	Statement 3
Correct	**Correct**	**Correct**
World Anti-Doping Agency (WADA) is a foundation initiated by the International Olympic Committee to promote, coordinate and monitor the fight against drugs in sports. It was established in 1999 and head quartered at Montreal, Canada.	**Its key activities include scientific research**, education, and development of anti-doping capacities. India has recently pledged a sum of USD 1 million to the WADA towards the agency's scientific research budget.	**WADA monitors the World Anti-Doping Code (Code)** – the document harmonizing anti-doping policies in all sports and all countries. Provisions of World Anti-Doping Code are enforced by the UNESCO International Convention against Doping in Sport.

Q.22) Consider the following pairs:

Wildlife Sanctuary	***State/UT***
1. Singalila	Odisha
2. Pobitora	Assam
3. Shoolpaneshwar	Maharashtra

Which of the pairs given above are correctly matched?

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

Q.22) Solution (b)

- **Singalila wildlife sanctuary** is part of the eastern Himalayas in Darjeeling, **West Bengal**.
- **Pobitora Wildlife Sanctuary of Assam** is often called 'Mini Kaziranga' because of similar landscape and a sizeable population of the one-horned rhino.

- **Shoolpaneshwar Wildlife Sanctuary** is a protected area in India's **Gujarat** state, located in the western Satpura Range south of the Narmada River.

Q.23) The Vanchit Ikai Samooh Aur Vargon Ki Aarthik Sahayta (VISVAS) Yojana is an interest subvention scheme for financial empowerment of which of the following marginalized groups?

1. Scheduled Castes (SC)
2. Scheduled Tribes (ST)
3. Other Backward Classes (OBC)

Select the correct answer using the code given below:

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

Q.23) Solution (c)

- **Vanchit Ikai Samooh Aur Vargon Ki Aarthik Sahayta (VISVAS) Yojana** is an Interest subvention Scheme of Ministry of Social Justice & Empowerment for financial **empowerment of economically marginalized OBC/SC SHGs & Individuals.**
- The scheme will benefit OBC/SC SHGs with loans up to Rs.4 Lakh and OBC/SC individuals with loan up to Rs.2 Lakh with a quick interest subvention benefit of 5% directly into the standard accounts of borrowing beneficiaries.
- Recently, National Backward Classes Finance & Development Corporation (NBCFDC) and National Scheduled Castes Finance and Development Corporation (NSFDC) entered in to MoA with Central Bank of India for implementation of VISVAS Yojana.

Q.24) Consider the following statements regarding 'Pneumosil' vaccine:

1. It is India's first pneumococcal conjugate vaccine.
2. It is developed by National Institute of Virology, Pune.

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.24) Solution (a)

Statement 1	Statement 2
Correct	**Incorrect**
The Pneumosil is India's first pneumococcal conjugate vaccine (PCV). A conjugate vaccine is a substance that is composed of a polysaccharide antigen fused (conjugated) to a carrier molecule. This enhances the stability and the effectiveness of the vaccine.	It is **developed by Serum Institute of India** in collaboration with partners like the Bill and Melinda Gates Foundation. Pneumosil targets the pneumococcal bacterium, which causes pneumonia and other serious life threatening diseases such as meningitis and sepsis.

Q.25) The 'Swadhinata Sarak' is a road route that connects India with which of the following neighbouring country?

a) Nepal
b) Bhutan
c) Pakistan
d) Bangladesh

Q.25) Solution (d)

- **The Swadhinata Sarak is a road route that connects Bangladesh with India**. It originates from the Mujibnagar district of Bangladesh.
- The Foreign Minister of Bangladesh has informed that 'Swadhinata Sarak' between Bangladesh and India will be opened on March 26, 2021. He added that the road remains functional in India while it will be connecting through Meherpur, Mujibnagar district in Bangladesh.

Q.26) Consider the following pairs:

Indigenous Games	*Origin*
1. Kalaripayattu	Kerala
2. Gatka	Punjab
3. Thang-Ta	Manipur

Which of the pairs given above are correctly matched?

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

Q.26) Solution (d)

- The Sports Ministry has approved the inclusion of four Indigenous Games to be a part of Khelo India Youth Games 2021, scheduled to take place in Haryana. The games include: Gatka, Kalaripayattu, Thang-Ta and Mallakhamba.
- **Kalaripayattu** has its origin from **Kerala** and has practitioners all over the world.
- Mallakhamba has been well-known across India. Madhya Pradesh and Maharashtra have been the hotspots of this sport.
- **Gatka** originates from the State of **Punjab**. This traditional fighting style of the Nihang Sikh Warriors is used both as self-defense and a sport.
- **Thang-Ta** is a **Manipur** marital art which has passed into oblivion in the recent decades.

Q.27) The Emissions Gap Report is an annual report released by which of the following?

a) German Watch
b) United Nations Framework Convention on Climate Change (UNFCCC)
c) United Nations Environment Programme (UNEP)
d) World Wide Fund for Nature (WWF)

Q.27) Solution (c)

- **Emissions Gap Report is an annual report released by the United Nations Environment Programme (UNEP).**
- The annual report from UNEP measures the gap between anticipated emissions and levels consistent with the Paris Agreement goals of limiting global warming this century to well below 2°C and pursuing 1.5°C.

Q.28) The Tharu tribes live mostly in which of the following States of India?

1. Himachal Pradesh
2. Uttarakhand
3. Uttar Pradesh
4. Bihar
5. Jharkhand

Select the correct answer using the code given below:

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

Q.28) Solution (d)

- The community of Tharu people belongs to the Terai lowlands. The Tharus live in both India and Nepal. In the Indian terai, they live **mostly in Uttarakhand, Uttar Pradesh, and Bihar**.
- They speak various dialects of Tharu, a language of the Indo-Aryan subgroup, and variants of Hindi, Urdu, and Awadhi.
- Most of them are forest dwellers, and some practice agriculture.
- Tharus worship Lord Shiva as Mahadev, and call their supreme being "Narayan", who they believe is the provider of sunshine, rain, and harvests.

Q.29) India's largest renewable energy generation park is situated in which of the following State?

a) Rajasthan
b) Gujarat
c) Maharashtra
d) Karnataka

Q.29) Solution (b)

- The Hybrid Renewable Energy Park near Vighakot village in the district of Kutch in Gujarat will be the World's largest renewable energy generation park.
- This 30,000 megawatt capacity hybrid renewable energy park will be built along the Indo-Pak border at Khavda using both wind and solar energy.

Q.30) The National Mission on Inter-Disciplinary Cyber-Physical Systems (NM-ICPS) is implemented by which of the following?

a) Department of Science & Technology (DST)
b) Department of Scientific & Industrial Research (DSIR)
c) Department of Electronics and Information Technology (DeitY)
d) Department of Telecommunications (DoT)

Q.30) Solution (a)

- **National Mission on Inter-Disciplinary Cyber-Physical Systems (NM-ICPS)** is implemented by **Department of Science & Technology (DST)**.
- NM-ICPS covers entire India which includes Central Ministries, State Governments, Industry and Academia.
- It would address technology development, application development, human resource development & skill enhancement, entrepreneurship and start-up development in Cyber Physical System (CPS) and associated technologies.
- The mission aims at establishment of 15 Technology Innovation Hubs (TIH), six Application Innovation Hubs (AIH) and four Technology Translation Research Parks (TTRP).

Q.31) Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5?

a) 1/2
b) 2/5
c) 7/20
d) 9/20

Q.31) Solution (d)

Here, S = {1, 2, 3, 4...., 19, 20}.

Let E = event of getting a multiple of 3 or 5 = {3, 6, 9, 12, 15, 18, 5, 10, 20}.

Therefore, P(E) = n(E)/n(S) = 9/20

Q.32) A speaks truth in 75% of cases and B in 80% of cases. In what percentage of cases are they likely to contradict each other, narrating the same incident?

a) 25%
b) 30%
c) 35%
d) 40%

Q.32) Solution (c)

Let A = Event that A speaks the truth.

B = Event that B speaks the truth

Then P (A) = 75/100 = 3/4

P (B) = 80/100 = 4/5

P (A-lie) = 1-3/4 = 1/4

P (B-lie) = 1-4/5 = 1/5

Now

A and B contradict each other = [A lies and B true] or [B true and B lies]

= P (A)*P(B-lie) + P(A-lie)*P(B) [Please note that we are adding at the place of OR]

= (3/5*1/5) + (1/4*4/5) = 7/20

= (7/20 * 100) % = 35%

Study the following passage and answer the 3 (three) questions that follow. Your answers to these questions should be based on the passage only.

To discover the relation between rules, paradigms, and normal science, consider first how the historian isolates the particular loci of commitment that have been described as accepted rules. Close historical investigation of a given speciality at a given time discloses a set of recurrent and quasi-standard illustrations of various theories in their conceptual, observational, and instrumental applications. These are the community's paradigms, revealed in its textbooks, lectures, and laboratory exercises. By studying them and by practising with them, the members of the corresponding community learn their trade. The historian, of course, will discover also a penumbral area occupied by achievements whose status is still in doubt, but the core of solved problems and techniques will usually be clear. Despite occasional ambiguities, the paradigms of a mature scientific community can be determined with relative ease.

That demands a second step and one of a somewhat different kind. When undertaking it, the historian must compare the community's paradigms with each other and with its current research reports. In doing so, his object is to discover what isolable elements, explicit or implicit, the members of that community may have abstracted from their more global paradigms and deploy it as rules in their research. Anyone who has attempted to describe or analyse the evolution of a particular scientific tradition will necessarily have sought accepted principles and rules of this sort. Almost certainly, he will have met with at least partial success. But, if his experience has been at all like my own, he will have found the search for rules both more difficult and less satisfying than the search for paradigms. Some of the generalizations he employs to describe the community's shared beliefs will present more problems. Others, however, will seem a shade too strong. Phrased in just that way, or in any other way he can imagine, they would almost certainly have been rejected by some members of the group he studies. Nevertheless, if the coherence of the research tradition is to be understood in terms of rules, some specification of common ground in the corresponding area is needed. As a result, the search for a body of rules competent to constitute a given normal research tradition becomes a source of continual and deep frustration.

Recognizing that frustration, however, makes it possible to diagnose its source. Scientists can agree that a Newton, Lavoisier, Maxwell, or Einstein has produced a permanent solution to a

group of outstanding problems and still disagree, sometimes without being aware of it, about the particular abstract characteristics that make those solutions permanent. They can, that is, agree in their identification of a paradigm without agreeing on, or even attempting to produce, a full interpretation or rationalization of it. Lack of a standard interpretation or an agreed reduction to rules will not prevent a paradigm from guiding research. Normal science can be determined in part by the direct inspection of paradigms, a process that is often aided by but does not depend upon the formulation of rules and assumption. Indeed, the existence of a paradigm need not even imply that any full set of rules exists.

Q.33) What is the author attempting to illustrate through this passage?

a) Relationships between rules, paradigms, and normal science
b) How a historian would isolate a particular 'loci of commitment'
c) How a set of shared beliefs evolve into a paradigm
d) Ways of understanding a scientific tradition

Q.33) Solution (d)

The main point of the first paragraph is to define what accepted rules are and how to identify them. In the second paragraph, the author talks about comparing different sets of accepted rules or community paradigms and analysing them. In the last paragraph, the author talks about how paradigm, even if they cannot be distilled into rules, can yet guide research and be widely accepted. Thus, the main point of the passage is how to understand scientific paradigms.

Option a is an answer to how the author is attempting to illustrate his point through the passage. It does not answer the 'what' part.

Options b and c give only partial answers to what the author is trying to illustrate through the passage.

Hence, Option d is the correct answer.

Q.34) The term 'loci of commitment' as used in the passage would most likely correspond with which of the following?

a) Loyalty between a group of scientists in a research laboratory
b) Loyalty between groups of scientists across research laboratories
c) Loyalty to a certain paradigm of scientific inquiry
d) Loyalty to global patterns of scientific inquiry

Q.34) Solution (c)

In the first line of the passage, the author describes the loci of commitment as accepted rules. The passage talks about the historian trying to isolate the particular loci of commitment, which he later concludes as the community's paradigms.

Option c succinctly captures this idea. None of the other options is appropriate.

Q.35) The author of this passage is likely to agree with which of the following?

a) A group of scientists investigating a phenomenon would benefit by defining a set of rules
b) Acceptance by the giants of a tradition is a sine qua non for a paradigm to emerge
c) Choice of isolation mechanism determines the types of paradigm that may emerge from a tradition
d) Paradigms are a general representation of rules and beliefs of a scientific tradition

Q.35) Solution (d)

Throughout the passage, the author highlights that "the paradigms" are "the general rules of science".

Rules are difficult to be defined. On the other hand, paradigms can follow without any rules. Option d accurately represents the idea.