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1) **With reference to the priority areas of the BRICS Health Working Group, consider the following statements:**

1. Strengthening the BRICS Network of National Public Health Institutes is one of its focus areas.
2. It promotes the integration of Traditional, Complementary, and Integrative Medicine (TCIM) into public health systems.
3. It aims to establish an Integrated Early Warning System for large-scale infectious disease outbreaks.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) All three
- (d) None

Answer: (c)

Explanation

All three statements are correct and reflect the **multi-dimensional strategy** adopted by BRICS in global health governance:

- **Statement 1: Correct**
The HWG prioritizes strengthening the BRICS Network of National Public Health Institutes to enhance technical cooperation, research exchange, and coordinated response mechanisms among member countries. This institutional collaboration is crucial for harmonizing public health strategies.
- **Statement 2: Correct**
Integration of TCIM (Traditional, Complementary and Integrative Medicine) is a major pillar. Countries like India and China possess rich traditional medical systems (Ayurveda, Traditional Chinese Medicine). The focus is on evidence-based integration, not mere promotion, ensuring safety and scientific validation.
- **Statement 3: Correct**
The creation of an Integrated Early Warning System is strategically significant. It aims to enable real-time data sharing, early detection of outbreaks, and coordinated responses—lessons drawn from pandemics like COVID-19.

2) **In the context of GLP-1 receptor agonists, consider the following statements:**

1. They mimic natural hormones to regulate blood glucose levels by stimulating insulin secretion.
2. These drugs are available only in injectable form and cannot be administered orally.

Which of the above statements are incorrect?

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

Answer: (b)

Explanation

- Statement 1: Correct
GLP-1 receptor agonists mimic the naturally occurring Glucagon-Like Peptide-1 hormone, which plays a crucial role in glucose metabolism.
 - They stimulate insulin secretion when blood sugar levels rise
 - They suppress glucagon release
 - They slow gastric emptying, leading to reduced appetiteThis makes them highly effective for managing Type 2 diabetes and obesity.
- Statement 2: Incorrect
Initially, these drugs were available only as injectables. However, advancements in pharmaceutical technology have enabled oral formulations (e.g., semaglutide tablets).
This statement is a classic UPSC trap based on outdated knowledge.

3) Consider the following statements regarding Coal gasification:

Statement I: Coal gasification is considered a cleaner alternative to conventional coal combustion.

Statement II: The process involves high temperature and pressure conditions in the presence of steam and oxygen.

Statement III: Harmful impurities such as sulfur and nitrogen are removed from the produced gas before utilization.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement II and Statement III are correct and both explain Statement I
- (b) Both Statement II and Statement III are correct but only one explains Statement I
- (c) Only one of Statements II and III is correct and explains Statement I
- (d) Neither Statement II nor Statement III is correct

Answer: (a)

Explanation

- Statement I: Correct
Coal gasification is considered cleaner because it converts solid coal into syngas ($\text{CO} + \text{H}_2$) instead of directly burning it, allowing better pollution control.
- Statement II: Correct
The process involves partial oxidation of coal under high temperature and pressure in the presence of steam and controlled oxygen.
This controlled environment prevents complete combustion and produces a cleaner gaseous fuel.
- Statement III: Correct
One of the biggest advantages is that pollutants (sulfur, nitrogen compounds, mercury) can be removed before combustion (pre-combustion cleaning).
In contrast, traditional coal burning releases pollutants into flue gas, making removal difficult and costly.

4) With reference to the SAMPANN platform, consider the following statements:

1. It is an online pension management system developed by the Department of Pension and Pensioners' Welfare.

2. It is offered as a Platform-as-a-Service (PaaS) to government and quasi-government organizations.
3. It manages the entire pension lifecycle from initiation to final disbursement.

Which of the above statements are correct?

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

Answer: (c)

Explanation

- Statement 1: Incorrect
SAMPANN was developed by the Department of Telecommunications, not by the Department of Pension. This is a fact-based elimination trap.
- Statement 2: Correct
The platform is offered as Platform-as-a-Service (PaaS), meaning other government bodies (e.g., state governments, port authorities) can adopt and customize it without building their own system.
- Statement 3: Correct
It is a comprehensive digital system covering the entire pension process:
 - Application initiation
 - Processing and verification
 - Approval and sanction
 - Final disbursement

5) With reference to the YUVIKA Programme, consider the following statements:

1. It is a residential training programme conducted for students who have completed Class 10.
2. Selection is based on an online quiz along with academic performance.
3. A certain proportion of seats is reserved for students from rural and remote areas.

Which of the statements given above are correct?

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

Answer: (c)

Explanation

- Statement 1: Incorrect
The programme targets Class 9 students, not those who have completed Class 10.
The idea is to spark early interest in space science before students choose their academic streams.
- Statement 2: Correct
Selection is merit-based, combining:
 - Academic performance
 - Performance in an online quiz

This ensures selection of genuinely interested and capable students.
- Statement 3: Correct
Around 15% of seats are reserved for students from rural and remote areas, promoting inclusive access and addressing regional disparities.

6) Consider the following statements regarding the nationalisation of banks in India:

Statement-I: The nationalisation of 14 major private banks in 1969 was primarily aimed at shifting the “commanding heights” of the economy from private hands to the state.

Statement-II: The move was the culmination of “social control” policies intended to align credit flow with the needs of neglected sectors like agriculture and small-scale industries.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- (c) Statement-I is correct but Statement-II is incorrect
- (d) Statement-I is incorrect but Statement-II is correct

Answer: (a)

Explanation:

- Statement-I is correct as the 1969 Ordinance transformed the banking landscape by bringing 85-90% of the banking business under government control, effectively making bank employees public servants. This allowed the state to control the “commanding heights” of the economy, a key socialist objective of that era.
- Statement-II is also correct and provides the underlying rationale. Before 1969, private banks were often criticized for being “class-based” rather than “mass-based,” focusing credit on large industrial houses while neglecting agriculture and small-scale sectors. The concept of “Social Control” was introduced to make banks more responsive to the public interest.
- Since the private ownership structure made the implementation of social control difficult, the government opted for full nationalisation to ensure that public savings were mobilized for national development and Five-Year Plans. Thus, the need for social control and sectoral credit redirection directly explains why the state took ownership of the banks.

7) With reference to Marine Heatwaves (MHWs), consider the following statements:

1. They are defined as localized regions where sea surface temperatures remain at least 10°C above the seasonal average for several months.
2. The formation of MHWs is often characterized by a breakdown in the ocean’s natural cooling mechanisms, such as evaporation and vertical mixing.
3. MHWs can lead to the “Rapid Intensification” of tropical cyclones by providing high-octane thermal energy.
4. While MHWs destroy coral reefs, they generally have a positive impact on cold-water fish populations like salmon.

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: (b)

Explanation:

- Statement 1 is incorrect because the typical anomaly for a Marine Heatwave is 1°C to 3°C above the long-term average, not 10°C, which would be catastrophic and far exceed recorded levels.

- Statement 2 is correct; MHWs form when winds weaken, reducing evaporation and preventing the mixing of warm surface water with cooler, deeper layers. This leads to stratification, where a thin layer of surface water traps solar heat.
- Statement 3 is correct; MHWs act as fuel for storms, leading to Rapid Intensification (RI), making cyclones 60% more likely to become billion-dollar disasters.
- Statement 4 is incorrect; while some warm-water species may expand their range, cold-water species like salmon face mass die-offs, making them “losers” in the context of ocean warming. MHWs also trigger harmful algal blooms and the destruction of kelp forests, which are vital carbon sinks, leading to a broader ecosystem collapse.

8) Which of the following countries share a land border with Zambia?

1. Angola
2. Tanzania
3. South Africa
4. Democratic Republic of the Congo
5. Botswana

Select the correct answer using the code given below:

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

Answer: (d)

Explanation:

- Zambia is a landlocked country in south-central Africa with a distinctive butterfly shape.
- To its west lies Angola. To the north, it is bordered by the Democratic Republic of the Congo (separated by the Congo Pedicle).
- To the northeast is Tanzania. To the east is Malawi, and to the southeast is Mozambique. To the south, it shares borders with Zimbabwe (separated by the Zambezi River), Botswana, and Namibia (the Caprivi Strip).
- South Africa does not share a land border with Zambia, as they are separated by Zimbabwe and Botswana.

9) The “Super Credit Scheme” under the CAFE-III norms is designed to:

- (a) Provide low-interest loans to consumers for purchasing electric vehicles.
- (b) Subsidize the decommissioning of old petrol and diesel vehicles.
- (c) Grant tax holidays to international EV manufacturers for setting up plants in India.
- (d) Allow automakers to earn multipliers for clean vehicles to help meet fleet-wide emission targets.

Answer: (d)

Explanation:

- The CAFE-III norms regulate the weighted average fuel consumption of an automaker’s entire fleet rather than individual models. The Super Credit Scheme is a policy tool used by the Bureau of Energy Efficiency (BEE) to “nudge” manufacturers toward greener technologies. Instead of a simple one-to-one count, sales of high-efficiency vehicles like Battery EVs (3.0 multiplier) or Plug-in Hybrids (2.5 multiplier) are weighted more heavily.

- This effectively lowers the calculated average CO₂ emissions for the manufacturer, making it easier to comply with the strict target of 78.9 g/km. It is a market-based mechanism that rewards innovation and the adoption of advanced technologies like hybrids and flex-fuels without requiring direct cash subsidies, thereby aligning the automobile industry's profit motives with India's national climate goals.

10) Consider the following statements:

1. **Statement-I:** Tropical cyclones passing over regions experiencing marine heatwaves (MHWs) often undergo "Rapid Intensification."
2. **Statement-II:** Marine heatwaves create a localized "heat dome" by trapping solar radiation in a thin, stratified surface layer.
3. **Statement-III:** The absence of vertical mixing between the warm surface layer and deeper cool water provides sustained thermal energy to the storm.

Which one of the following is correct in respect of the above statements?

- (a) Both Statement-II and Statement-III are correct and both of them explain Statement-I
- (b) Both Statement-II and Statement-III are correct but only one of them explains Statement-I
- (c) Only one of the Statements II and III is correct and that explains Statement-I
- (d) Neither Statement II nor Statement III is correct

Answer: (a)

Explanation:

- Statement-I is correct; research shows that cyclones over MHWs result in 60% more billion-dollar disasters due to their increased power.
- Statement-II is correct; MHWs form when winds weaken, preventing evaporation and causing the top layer of the ocean to become thin and trapped. This layer absorbs solar radiation rapidly, creating a heat dome.
- Statement-III is also correct; because the warm water cannot mix with the deeper, colder water (stratification), the ocean surface remains unusually hot. This high-octane fuel (thermal energy) is transferred to the cyclone, allowing it to intensify rapidly, stall longer over land, and decay more slowly.
- Both the formation of the heat dome (II) and the lack of vertical cooling (III) are the direct physical mechanisms that provide the energy for the rapid intensification mentioned in Statement-I.

11) The "PAIMANA" framework, recently in the news, is associated with:

- (a) Assessing the carbon footprint of the Indian automobile industry.
- (b) A compensation scheme for women candidates in UT elections.
- (c) A geological survey for critical minerals in the Katangan Complex.
- (d) Real-time monitoring and analytics of central sector infrastructure projects.

Answer: (d)

Explanation:

- PAIMANA (Project Assessment, Infrastructure Monitoring & Analytics for Nation-building) is the underlying framework of Ministry of Statistics and Programme Implementation (MoSPI)'s revamped Integrated Performance Monitoring Dashboard. It represents a shift from the older OCMS-2006 system by using dynamic analytics and automated assessments. It tracks 116 specific indicators across 11 key sectors, such as Ports, Power, and Roads.
- The framework is significant because it allows the government to identify bottlenecks early, preventing cost overruns and delays. It specifically focuses on multi-dimensional metrics like quality

and affordability, ensuring that infrastructure development translates into tangible benefits for the public, such as better train punctuality or increased network penetration in telecommunications.

12) Which of the following were direct consequences of bank nationalisation in India?

1. Weakening of the regulatory authority of the Reserve Bank of India over commercial banks
2. Reduction in the concentration of wealth among a few industrial houses
3. Provision of institutional credit to support adoption of High-Yielding Variety (HYV) seeds during the Green Revolution
4. Transition from “class banking” to “mass banking”

Select the correct answer using the code given below:

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

Answer: (b)

Explanation

Bank nationalisation (1969 and later 1980) was a major structural reform aimed at aligning banking with social and developmental objectives:

- Statement 1: Incorrect
Nationalisation actually strengthened the control of the RBI and the government over commercial banks. Policy direction, credit allocation, and regulatory oversight became more centralized.
- Statement 2: Correct
Before nationalisation, banks were often controlled by large industrial houses, leading to credit concentration. Nationalisation aimed to democratize access to finance and reduce this concentration of economic power.
- Statement 3: Correct
It enabled expansion of institutional credit to agriculture, especially for inputs like fertilizers, irrigation, and HYV seeds—key drivers of the Green Revolution.
- Statement 4: Correct
A major philosophical shift occurred:
 - Before: “Class banking” (serving urban elites and big businesses)
 - After: “Mass banking” (financial inclusion, rural outreach, priority sector lending)

👉 Thus, banking became a tool for socio-economic transformation, not just profit-making.

13) “Domoic acid,” frequently reported in marine environmental studies, is primarily associated with:

- (a) Mineral leaching from geological formations into river systems
- (b) Harmful algal blooms intensified by marine heatwaves
- (c) Chemical emissions from automobile cooling technologies
- (d) Industrial pollutants monitored in port ecosystems

Answer: (b)

Explanation

- Domoic acid is a neurotoxin produced by certain marine algae, particularly during Harmful Algal Blooms (HABs). These blooms are often intensified by marine heatwaves, which create favorable warm-water conditions for algal growth.
- The toxin accumulates in marine food chains, especially in shellfish and small fish, and can cause Amnesic Shellfish Poisoning (ASP) in humans.
- Ecological and Economic Impact:
 - Leads to mass mortality of marine animals (fish, birds, marine mammals)
 - Forces closure of fisheries and aquaculture industries
 - Indicates ecosystem stress due to climate change

14) With reference to Coal Gasification, consider the following:

1. Slag
2. Elemental sulfur
3. Fly ash
4. Carbon dioxide

Which of the above are primary by-products of the process?

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

Answer: (c)

Explanation

Coal gasification converts coal into syngas ($\text{CO} + \text{H}_2$) and produces several by-products:

- Slag (1): Correct
Formed from the mineral impurities in coal, which melt under high temperatures and solidify into a glass-like, non-leachable material.
It is environmentally safer and used in construction and road building.
- Elemental Sulfur (2): Correct
During gas cleaning, sulfur compounds are removed and recovered as pure sulfur, which has commercial uses (e.g., fertilizers, chemicals).
- Fly Ash (3): Incorrect
Fly ash is typically associated with coal combustion in thermal power plants, where fine particles escape with flue gases.
In gasification, impurities are converted into slag, not fly ash.
- Carbon Dioxide (4): Correct
 CO_2 is produced in a concentrated, high-pressure stream, making it easier to capture for Carbon Capture and Storage (CCS) compared to conventional plants.

15) Match the following features of nuclear reactions with Nuclear Fusion and Nuclear Fission:

Feature	Column-II (Fusion)	Column-III (Fission)
1. Fuel Source	A. Deuterium/Tritium	X. Uranium/Plutonium
2. Energy per unit mass	B. Significantly higher	Y. High but comparatively lower

Feature	Column-II (Fusion)	Column-III (Fission)
3. Operational Risk	C. Risk of meltdown	Z. No risk of meltdown

Select the correct answer using the code given below:

- (a) 1-A-X and 2-B-Y only
- (b) 2-B-Y and 3-C-Z only
- (c) 1-A-X and 3-C-Z only
- (d) 1-A-X, 2-B-Y and 3-C-Z

Answer: (a)

Explanation

- Feature 1 (Fuel Source): Correct Match (1-A-X)
 - Nuclear fusion uses light isotopes such as deuterium and tritium.
 - Nuclear fission involves heavy elements like uranium-235 and plutonium-239. This reflects the core distinction: fusion = combining light nuclei, fission = splitting heavy nuclei.
- Feature 2 (Energy per unit mass): Correct Match (2-B-Y)
 - Fusion releases significantly more energy per unit mass than fission due to a larger mass defect (as per Einstein's $E = mc^2$).
 - Fission also releases large energy, but comparatively less on a per-mass basis.
- Feature 3 (Operational Risk): Incorrect Match (3-C-Z)
 - The given pairing is reversed.
 - Fission reactors carry a risk of meltdown due to uncontrolled chain reactions (e.g., nuclear accidents).
 - Fusion reactions do not pose meltdown risks, as they require extreme conditions; if disrupted, the reaction stops automatically.