DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE TOLD TO DO SO

T.B.C. : STS-K-TPT
Serial No.:

Test Booklet Series

B

TEST BOOKLET

Subject : Test 7 – ENERGY & AGRICULTURE
Question Paper

Time Allowed : Two Hours **Maximum Marks : 200**

INSTRUCTIONS

1.IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GOT IT REPLACED BY A COMPLETE TEST BOOKLET.

2. Please note that it is the candidate's responsibility to encode and fill in the Roll Number and Test Booklet Series A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet. Any omission/discrepancy will render the Answer Sheet liable for rejection.

3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. DO NOT write anything else on the Test Booklet.

4. This Test Booklet contains 100/80 items (questions). Each item is printed in English. Each item comprises of four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose ONLY ONE response for each item.

5. You have to mark all your responses ONLY on the separate Answer Sheet provided. See directions in the Answer Sheet.

6. All items carry equal marks

7. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.

8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator only the Answer Sheet. You are permitted to take away with you the Test Booklet.

9. Sheets for rough work are appended in the Test Booklet at the end.

10. **Penalty for wrong answers:**

THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS

(i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one third** if the marks assigned to that question will be deducted as penalty.

(ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct and there will be same penalty as above to that question.

(iii) If a question is left blank, i.e., no answer is given by the candidate, there will be no penalty for that question.

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1. Match the following unconventional hydrocarbon resources with their characteristic resource forms:

List I (Resource Type)	List II (Description)
A. Shale Gas	1. Hydrocarbons occurring in marine sediments under high pressure and low temperature
B. Tight Oil	2. Oil trapped in low-permeability rock formations requiring hydraulic fracturing
C. Methane Hydrates	3. Natural gas trapped in fine-grained shale formations
D. Oil Sands	4. Bitumen mixed with sand, clay, and water

Select the correct answer using the codes below:
(a) A-3, B-2, C-1, D-4
(b) A-2, B-3, C-1, D-4
(c) A-3, B-1, C-2, D-4
(d) A-2, B-3, C-4, D-1

2. Match the following Emerging solar energy technologies with their key characteristics:

List I (Technology)	List II (Feature)
A. Perovskite Solar Cells	1. Solar modules capable of capturing sunlight from both the front and rear surfaces
B. Floating Solar Farms	2. Solar installations deployed on water bodies to reduce land-use pressure and evaporation
C. Bifacial Solar Panels	3. Emerging photovoltaic technology known for flexible, lightweight, and potentially low-cost solar cells
D. Agrovoltaics	4. Integration of solar panels with agricultural activities on the same land

Select the correct answer using the codes below:
(a) A-3, B-2, C-1, D-4
(b) A-1, B-3, C-2, D-4
(c) A-2, B-4, C-1, D-3
(d) A-3, B-4, C-1, D-2

3. With reference to the proposed "*Battery Aadhaar*" system in India, consider the following statements:

1. Battery Aadhaar proposes a 21-character Battery Pack Aadhaar Number (BPAN) linked to a QR-based digital identity to track batteries across their lifecycle.
2. The system aims to record information such as battery chemistry, raw materials, manufacturer details, safety certifications, and performance history.
3. The initiative seeks to ensure end-to-end traceability from manufacturing to recycling, thereby improving safety and reducing counterfeit batteries.
4. The system is intended exclusively for lead-acid batteries used in conventional automobiles.

Which of the statements given above is/are correct?
(a) 1, 2 and 3 only
(b) 1 and 2 only
(c) 2, 3 and 4 only
(d) 1, 2, 3 and 4

4. Match the following energy-efficiency concepts in buildings with their appropriate descriptions:

List I (Concept)	List II (Description)
A. Net Zero Energy Building (NZEB)	1. Retrofitting existing buildings to improve energy performance
B. Passive House Design	2. Architectural approach using insulation, airtightness, and thermal mass to minimize heating and cooling needs
C. Green Retrofitting	3. Building that generates as much energy as it consumes over a year
D. Demand Response System	4. Adjusting electricity consumption to reduce load during peak demand periods

Select the correct answer using the codes below:
(a) A-1, B-2, C-3, D-4
(b) A-3, B-2, C-1, D-4
(c) A-2, B-1, C-3, D-4
(d) A-4, B-2, C-1, D-3

5. Match the following emerging energy technologies with their appropriate application areas:

List I (Technology)	List II (Application Area)
A. Antiferroelectric RAM Storage	1. Wastewater treatment and biosensing through bio-electrochemical processes
B. Flywheel Energy Storage	2. Stabilization of power grids through frequency regulation
C. Microbial Fuel Cells (MFCs)	3. High-density energy storage systems suitable for microgrid applications
D. Vehicle-to-Grid (V2G) Technology	4. Using electric vehicles as distributed or mobile energy sources

Select the correct answer using the codes below:
(a) A-3, B-2, C-1, D-4
(b) A-1, B-3, C-4, D-2
(c) A-4, B-1, C-3, D-2
(d) A-2, B-4, C-1, D-3

6. With reference to bifacial solar photovoltaic (PV) panels, consider the following statements:
1. Bifacial solar panels can generate electricity by capturing sunlight on both the front and rear surfaces of the module.
2. This technology is restricted mainly to rooftop solar installations and is not suitable for large utility-scale solar farms.
3. The capacity of these panels to capture reflected (albedo) light from surfaces such as snow, sand, or water can enhance their electricity generation efficiency.

Which of the statements given above is/are correct?
(a) 1 and 3 only
(b) 2 and 3 only
(c) 1 only
(d) 1, 2 and 3

7. With reference to agrovoltaic systems, consider the following statements:
1. Agrovoltaics refers to the simultaneous use of land for agricultural cultivation and solar power generation by installing solar panels above or alongside crops.
2. The presence of solar panels can modify microclimatic conditions such as shade, soil moisture, and temperature, which may improve crop productivity in certain cases.
3. Agrovoltaic systems are designed primarily for large-scale commercial agriculture and do not focus on electricity generation.

Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

8. Match the following emerging energy technologies with their distinctive features:

List I (Technology)	List II (Feature)
A. Supercapacitors	1. Generates electricity using differences in salt concentration between freshwater and seawater
B. Osmotic (Blue) Energy	2. High power density with very fast charge–discharge capability
C. Liquid Metal Battery	3. Uses molten metal electrodes suitable for large-scale grid energy storage
D. Microbial Fuel Cell	4. Produces electricity through metabolic activity of microorganisms

Select the correct answer using the codes below:
(a) A-2, B-1, C-3, D-4
(b) A-1, B-2, C-4, D-3
(c) A-2, B-3, C-1, D-4
(d) A-4, B-1, C-3, D-2

9. With reference to critical minerals and evolving global supply-chain strategies, consider the following statements:

1. The concept of "Ethical Cobalt" has emerged due to concerns regarding artisanal mining practices and the use of child labour in cobalt mining, particularly in the Democratic Republic of Congo.
2. Friendshoring refers to sourcing critical minerals and manufacturing inputs from trusted geopolitical partners to reduce supply-chain vulnerabilities.
3. Reshoring refers to relocating manufacturing or supply chains back to the home country or closer to domestic markets.

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

10. A *powertrain* refers to the system of components in a vehicle that generates power and transmits it to the wheels, including the engine/motor, transmission, and related systems.
Match the following types of alternative powertrain vehicles with their key characteristics:

List I (Vehicle Type)	List II (Characteristic)
A. Battery Electric Vehicle (BEV)	1. Uses hydrogen fuel cells to generate electricity onboard
B. Hybrid Electric Vehicle (HEV)	2. Uses electricity stored in batteries and does not have a conventional combustion engine
C. Plug-in Hybrid Electric Vehicle (PHEV)	3. Combines petrol engine with battery, charged through engine operation and regenerative braking
D. Fuel Cell Electric Vehicle (FCEV)	4. Combines electric battery and petrol engine with the ability to charge externally

Select the correct answer using the codes below:
(a) A-2, B-3, C-4, D-1
(b) A-3, B-2, C-4, D-1
(c) A-2, B-4, C-3, D-1
(d) A-1, B-3, C-2, D-4

11. Which of the following can function as decentralized energy storage systems?

1. Home battery storage systems
2. Community battery banks
3. Microgrid energy storage
4. Electric vehicle batteries used for grid services

Select the correct answer using the code below:
(a) 1 and 2 only
(b) 1, 2 and 3 only
(c) 2 and 4 only
(d) 1, 2, 3 and 4

12. Match the following emerging energy frontiers with their distinctive features:

List I (Energy Frontier)	List II (Feature)
A. Space-Based Solar Power (SBSP)	1. Uses artificial fracturing to access heat from deep geothermal reservoirs
B. Enhanced Geothermal Systems (EGS)	2. Concept of transmitting solar energy collected in space to Earth using microwave or laser beams
C. Seafloor Mining	3. Extraction of methane hydrates and critical minerals from ocean floors
D. Digital Oilfields	4. Real-time optimization of hydrocarbon extraction using AI, sensors, and IoT technologies

Select the correct answer using the codes below:
(a) A-2, B-1, C-3, D-4
(b) A-1, B-2, C-4, D-3
(c) A-3, B-4, C-1, D-2
(d) A-2, B-3, C-4, D-1

13. With reference to the use of remote sensing and satellite-based imaging in energy and mineral exploration, consider the following statements:

1. LiDAR and hyperspectral imaging are used to identify surface features and geological indicators associated with mineral deposits.
2. These technologies can be deployed through satellites as well as aerial platforms such as drones and aircraft.
3. Remote sensing techniques can directly determine the exact volume of hydrocarbon reserves located underground.

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

14. Which of the following are used for energy storage?

1. Pumped hydro storage
2. Flywheel systems
3. Molten salt tanks
4. Supercapacitors

Select the correct answer:
a) 1 and 2 only
b) 1, 2 and 3 only
c) 2, 3 and 4 only
d) 1, 2, 3 and 4

15. With reference to lithium resources and extraction technologies, consider the following statements:

1. Direct Lithium Extraction (DLE) technology is mainly designed to extract lithium directly from lithium-rich brine deposits, reducing evaporation time compared to traditional salt-flat methods.
2. The region known as the "Lithium Triangle" lies in Bolivia, Chile, and Argentina, which together account for a major share of the world's lithium resources.
3. India's first major lithium resource discovery was reported from Reasi district of Jammu & Kashmir.

Which of the statements given above is/are correct?

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

16. Match the following energy storage categories with their storage principle and example:

List I (Category)	List II (Storage Principle)	List III (Example)
A. Mechanical	1. Heat storage	a. Flywheels
B. Thermal	2. Kinetic or potential energy	b. Molten salt
C. Electrical	3. Electric or magnetic fields	c. Supercapacitors
D. Chemical	4. Energy stored in molecules	d. Hydrogen

Select the correct answer using the codes below:
(a) A-2-a, B-1-b, C-3-c, D-4-d
(b) A-1-a, B-2-b, C-3-d, D-4-c
(c) A-2-c, B-1-a, C-3-b, D-4-d
(d) A-3-a, B-1-c, C-2-b, D-4-d

17. With reference to energy storage technologies, consider the following statements:

1. Pumped hydro storage and gravity towers store energy by lifting mass against gravity.
2. Supercapacitors store energy through chemical reactions similar to lithium-ion batteries.
3. Molten salt storage systems are widely used in concentrated solar power plants.
4. Hydrogen can function as a chemical medium for long-term energy storage.

Which of the statements given above are correct?

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

18. With reference to the concept of *Second-Life Battery Storage*, consider the following statements:

1. It refers to the chemical recycling of lithium and other battery materials to manufacture new batteries.
2. It involves reusing retired electric-vehicle batteries for applications that require lower power demand, such as stationary energy storage.
3. It can reduce electronic waste and improve the overall lifecycle efficiency of battery systems.

Which of the statements given above is/are correct?
(a) 1 only
(b) 2 and 3 only
(c) 3 only
(d) 1 and 2 only

19. With reference to a *Building Energy Management System (BEMS)*, consider the following statements:

1. It is an automated system that monitors and controls a building's energy-consuming systems such as lighting, heating, ventilation, and air conditioning.
2. It helps optimize energy consumption in buildings through sensors, controllers, and data analytics.
3. It is primarily designed to store surplus electrical energy generated within a building for later use.

Which of the statements given above is/are correct?

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

20. With reference to *gravity-based energy storage systems*, consider the following statements:

1. These systems store energy by lifting heavy masses to a higher elevation using surplus electricity and releasing the stored energy when the mass descends.
2. They typically generate electricity during discharge by converting gravitational potential energy into mechanical and then electrical energy.
3. Some modern systems employ mechanically lifted blocks or weights, such as concrete masses, to store energy.

Which of the statements given above is/are correct?

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

21. With reference to emerging innovations in solar energy systems, consider the following statements:

1. Floating solar power plants, installed on water bodies such as reservoirs, can help reduce water evaporation while generating electricity.
2. Bifacial solar panels are capable of producing electricity from both direct sunlight and reflected or diffused light.
3. Agrovoltaics refers to the installation of solar panels in desert regions to maximize solar radiation exposure.

Which of the statements given above is/are correct?

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

22. With reference to the application of Artificial Intelligence (AI) in seismic imaging and subsurface exploration, consider the following statements:

1. The integration of Artificial Intelligence in seismic imaging improves the accuracy of subsurface models used in the exploration of hydrocarbons and geothermal energy resources.
2. Machine learning algorithms used in seismic interpretation completely eliminate the need for seismic data acquisition using geophysical surveys.
3. The use of AI in seismic data processing can reduce exploration time and assist in faster decision-making in resource exploration.

Which of the statements given above is/are correct?

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

23. Match the following emerging energy trends with their most appropriate description:

List I (Concept)	List II (Description)
A. Virtual Power Plants (VPPs)	1. Produced using renewable electricity through electrolysis of water
B. Energy-as-a-Service (EaaS)	2. Subscription-based energy supply model where users need not own energy infrastructure
C. Green Hydrogen	3. Networked aggregation and AI-enabled coordination of decentralized energy resources
D. Carbon Capture Utilization and Storage (CCUS)	4. Capturing carbon dioxide emissions and storing or using them in industrial processes

Select the correct answer using the codes below:
(a) A-3, B-2, C-1, D-4
(b) A-2, B-3, C-1, D-4
(c) A-3, B-1, C-2, D-4
(d) A-4, B-2, C-3, D-1

24. Match the following battery minerals with the country that is a major global producer:

List I (Mineral)	List II (Major Producer Country)
A. Lithium	1. Democratic Republic of Congo
B. Cobalt	2. Indonesia
C. Nickel	3. China
D. Graphite	4. Australia
E. Manganese	5. South Africa

Select the correct answer using the codes below:
(a) A-4, B-1, C-2, D-3, E-5
(b) A-1, B-4, C-2, D-3, E-5
(c) A-4, B-2, C-1, D-3, E-5
(d) A-3, B-1, C-4, D-2, E-5

25. With reference to international initiatives and policies related to critical minerals and battery supply chains, consider the following statements:

1. The Mineral Security Partnership (MSP) is a multilateral initiative led by the United States to diversify global supply chains for critical minerals and reduce overdependence on a few dominant suppliers.
2. Battery Passports are digital records designed to track the origin, sustainability credentials, and lifecycle information of batteries and their components.
3. India has entered into agreements with countries such as Argentina and Bolivia to facilitate cooperation in the sourcing of lithium and other critical minerals.

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

26. Match the following energy storage technologies with their key characteristics:

List I (Technology)	List II (Characteristic)
A. Flow Batteries	1. Electrochemical storage using oxygen from air as the cathode reactant
B. Zinc–Air Batteries	2. Storage of rotational kinetic energy with rapid response capability
C. Flywheel Energy Storage	3. Energy stored in liquid electrolytes kept in external tanks, scalable for grid storage
D. Phase Change Materials	4. Storage of thermal energy during the transition of a material between different phases

Select the correct answer using the codes below:
(a) A-3, B-1, C-2, D-4
(b) A-2, B-3, C-4, D-1
(c) A-1, B-3, C-2, D-4
(d) A-4, B-1, C-2, D-3

27. Match the following innovations in energy exploration with their associated technological applications:

List I (Innovation)	List II (Technology / Application)
A. Plasma Pulse Technology	1. Uses microbial activity to enhance extraction of hydrocarbons from reservoirs
B. Microbial Enhanced Oil Recovery (MEOR)	2. Uses high-energy shockwaves to unclog pores in oil-bearing rocks and improve flow
C. Enhanced Geothermal Systems (EGS)	3. Uses advanced modelling and engineering to create or enhance permeability in hot dry rock reservoirs
D. Marine Energy Mapping	4. Uses underwater sensors, drones, and remote sensing to map ocean energy potential

Select the correct answer using the codes below:
(a) A-2, B-1, C-3, D-4
(b) A-1, B-2, C-4, D-3
(c) A-3, B-2, C-1, D-4
(d) A-4, B-3, C-1, D-2

28. With reference to Perovskite Solar Cells, consider the following statements:
1. Perovskite solar cells are lightweight and can be fabricated on flexible substrates, enabling their use on a variety of surfaces.
2. These solar cells are relatively low-cost to manufacture but currently have lower efficiency than conventional silicon-based solar cells.
3. Perovskite-based photovoltaic technology is approaching commercial scalability and has demonstrated high efficiency, making it a promising next-generation solar technology.

Which of the statements given above is/are correct?
(a) 1 only
(b) 1 and 3 only
(c) 2 and 3 only
(d) 1, 2 and 3

29. With reference to nickel resources and their role in modern battery technologies, consider the following statements:
1. Class 1 nickel, which has high purity, is widely used in the manufacturing of lithium-ion batteries.
2. Indonesia, despite being the world's largest producer of nickel, continues to export a significant portion of its raw nickel ore.
3. High Pressure Acid Leaching (HPAL) is a processing method used to extract nickel from laterite nickel ores.

Which of the statements given above is/are correct?
(a) 1 and 3 only
(b) 2 and 3 only
(c) 1 and 2 only
(d) 1, 2 and 3

30. With reference to Smart Grids in the power sector, consider the following statements:
1. Smart grids integrate digital communication technologies, sensors, and automated control systems to improve the efficiency and reliability of electricity distribution.
2. They facilitate two-way communication between electricity providers and consumers, enabling demand-side management and real-time monitoring.
3. Smart grids eliminate the need for renewable energy integration and decentralized power generation by centralizing electricity supply.

Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

31. Match the following categories of energy storage technologies with their typical examples:

List I (Storage Type)	List II (Example)
A. Electrochemical Storage	1. Hydrogen storage
B. Mechanical Storage	2. Lithium-ion batteries
C. Thermal Storage	3. Pumped hydro and compressed air
D. Chemical Storage	4. Molten salt storage

Select the correct answer using the codes below:
(a) A-2, B-3, C-4, D-1
(b) A-3, B-2, C-1, D-4
(c) A-2, B-1, C-4, D-3
(d) A-4, B-3, C-2, D-1

32. Match the following emerging energy technologies with their respective applications:

List I (Technology)	List II (Application)
A. Thermoacoustic Energy Storage	1. Converts temperature gradients into acoustic waves to generate or store energy
B. Microbial Fuel Cells (MFCs)	2. Generates electricity during wastewater treatment through microbial activity
C. Supercapacitors	3. High power density storage used in applications such as regenerative braking in electric vehicles
D. Sand Battery	4. Long-duration thermal energy storage used in district heating systems

Select the correct answer using the codes below:
(a) A-1, B-2, C-3, D-4
(b) A-2, B-1, C-3, D-4
(c) A-1, B-3, C-2, D-4
(d) A-3, B-2, C-1, D-4

33. Match the following energy storage technologies with their typical storage duration:

List I (Technology)	List II (Typical Duration)
A. Supercapacitors	1. Weeks to months
B. Batteries	2. Seconds
C. Pumped Hydro Storage	3. Minutes to hours
D. Hydrogen Energy Storage	4. Hours to days

Select the correct answer using the codes below:
(a) A-2, B-3, C-4, D-1
(b) A-3, B-2, C-4, D-1
(c) A-2, B-4, C-3, D-1
(d) A-4, B-3, C-2, D-1

34. With reference to Fuel Cell technology, consider the following statements:
1. A fuel cell generates electricity through an electrochemical reaction between hydrogen and oxygen without combustion.
2. The only by-products of hydrogen fuel cells are water and heat.
3. Fuel cells require external charging from the electricity grid to operate.

Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

35. With reference to unconventional hydrocarbon resources and their exploration in India, consider the following statements:
1. India's National Gas Hydrate Program (NGHP) has identified methane hydrate deposits in regions such as the Krishna–Godavari Basin, Mahanadi Basin, and the Andaman Sea.
2. Methane hydrates are considered a potential future energy resource because they contain large quantities of methane trapped within ice-like crystalline structures.
3. The extraction of shale gas and tight oil generally relies on technologies such as horizontal drilling and hydraulic fracturing.

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

36. With reference to manganese and its role in modern battery technologies, consider the following statements:

1. LMNO (Lithium Manganese Nickel Oxide) and LMFP (Lithium Manganese Iron Phosphate) battery chemistries utilize manganese-rich cathode materials.
2. One of India's major manganese-producing regions is located in Madhya Pradesh, particularly around the Balaghat belt.
3. High-Purity Manganese Sulphate (HPMSM) is primarily used in the anode component of lithium-ion batteries.

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

37. Match the following minerals with their commonly used extraction or processing technique:

List I (Mineral)	List II (Extraction Method)
A. Lithium	1. Brine evaporation or hard-rock (spodumene) mining
B. Nickel	2. High Pressure Acid Leaching (HPAL)
C. Graphite	3. Open-pit or underground mining of carbon-rich ore
D. Rare Earth Elements	4. Chemical/solvent extraction from monazite or other rare-earth bearing minerals

Select the correct answer using the codes below:
(a) A-1, B-2, C-3, D-4
(b) A-2, B-1, C-3, D-4
(c) A-1, B-3, C-4, D-2
(d) A-4, B-2, C-1, D-3

38. Which of the following best describes the functioning of a hydrogen fuel cell?
(a) It stores electricity chemically inside rechargeable batteries.
(b) It generates electricity through an electrochemical reaction between hydrogen and oxygen.
(c) It produces electricity by burning hydrogen in an internal combustion engine.
(d) It converts solar energy into electrical energy using photovoltaic cells.

39. Match the following battery types with their typical applications:

List I (Battery Type)	List II (Typical Application)
A. Lead-acid Battery	1. Flashlights and remote controls
B. Dry Cell Battery	2. Automobiles for starter batteries
C. Alkaline Battery	3. Household electronics and toys
D. Lithium-ion Battery	4. Electric vehicles and smartphones
E. Solid-state Battery	5. Next-generation EV and high-safety applications

Select the correct answer using the codes below:
(a) A-2, B-1, C-3, D-4, E-5
(b) A-1, B-2, C-3, D-4, E-5
(c) A-2, B-3, C-1, D-4, E-5
(d) A-3, B-1, C-2, D-4, E-5

40. Molten salt storage is a technology used in certain renewable energy systems to store energy in the form of heat.
With reference to Molten Salt Energy Storage, consider the following statements:

1. Molten salt storage is commonly used in concentrated solar power (CSP) plants to store thermal energy.
2. The stored heat can be used later to generate electricity even when sunlight is not available.
3. Molten salt storage primarily stores energy in the form of electrical charge similar to batteries.

Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

41. With reference to Primary and Secondary batteries, consider the following statements:
1. Primary batteries are designed for single use and cannot be recharged once their chemical energy is exhausted.
2. Secondary batteries can be recharged and used multiple times by reversing the electrochemical reactions.
3. Lead-acid batteries and lithium-ion batteries are examples of primary batteries.

Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

42. Spodumene, Petalite, and Lepidolite are important ores of which one of the following minerals?
(a) Cobalt
(b) Lithium
(c) Manganese
(d) Nickel

43. With reference to the chemical properties of Lithium, consider the following statements:
1. Lithium is a soft metal that can be cut with a knife and has very low density.
2. Lithium is highly reactive and is therefore often stored under mineral oil.
3. Lithium occurs freely in nature in elemental form and is commonly found in native deposits.
4. Lithium is among the few metals that can float on water due to its very low density.

Which of the statements given above are correct?
(a) 1, 2 and 4 only
(b) 1 and 3 only
(c) 2, 3 and 4 only
(d) 1, 2, 3 and 4

44. Erythrite, Glaucodot, Skutterudite, Carrollite, Linnaeite, and Asbolite are important ores of which one of the following minerals?
(a) Nickel
(b) Cobalt
(c) Manganese
(d) Lithium

45. With reference to critical minerals important for the global energy transition, consider the following statements:
1. Elements such as neodymium, lithium, cobalt, and vanadium play an important role in technologies related to renewable energy and electric mobility.
2. Rare earth elements are widely used in the manufacture of permanent magnets used in wind turbines and electric vehicle motors.
3. The growing importance of critical minerals is expected to shift global geopolitics from oil-producing economies to mineral-rich economies.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

46. With reference to nuclear fission and uranium enrichment, consider the following statements:
1. Critical mass refers to the minimum quantity of fissile material required to sustain a self-sustaining nuclear chain reaction.
2. Weapon-grade uranium generally contains uranium enriched to about 90% or more of the isotope U-235.
3. Nuclear power reactors typically use low-enriched uranium, usually enriched to about 3–5% U-235.
4. Uranium found in nature contains more than 50% of the fissile isotope U-235.

Which of the statements given above are correct?
(a) 1, 2 and 3 only
(b) 1 and 2 only
(c) 2, 3 and 4 only
(d) 1, 2, 3 and 4

47. With reference to Vanadium Redox Flow Batteries (VRFB), consider the following statements:

1. In a Vanadium Redox Flow Battery, energy is stored in liquid electrolytes containing vanadium ions kept in external tanks.
2. The energy storage capacity of such batteries can be increased by increasing the volume of electrolyte stored in the tanks.
3. These batteries are primarily designed for short-duration energy storage in small portable electronic devices.

Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

48. With reference to Sodium-ion batteries, consider the following statements:

1. Sodium-ion batteries use sodium ions instead of lithium ions as the charge carrier during electrochemical reactions.
2. Sodium is more abundant and widely available in nature compared to lithium.
3. Sodium-ion batteries currently have higher energy density than lithium-ion batteries, making them the dominant technology for electric vehicles.

Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

49. With reference to India's participation in international nuclear and weapons control frameworks, consider the following statements:

1. India is a member of the Missile Technology Control Regime (MTCR) and the Wassenaar Arrangement.
2. India is a member of the Nuclear Suppliers Group (NSG).
3. India is a signatory to both the Biological Weapons Convention (BWC) and the Chemical Weapons Convention (CWC).
4. India is not a signatory to the Nuclear Non-Proliferation Treaty (NPT) and the Comprehensive Nuclear-Test-Ban Treaty (CTBT).

Which of the statements given above are correct?
(a) 1, 3 and 4 only
(b) 1 and 2 only
(c) 2, 3 and 4 only
(d) 1, 2, 3 and 4

50. With reference to India's Three-Stage Nuclear Power Programme, consider the following statements:

1. The first stage uses Pressurized Heavy Water Reactors (PHWRs) fueled by natural uranium to produce electricity and plutonium.
2. The second stage involves Fast Breeder Reactors (FBRs) that use plutonium and produce fissile material such as U-233 from thorium.
3. The third stage is designed to utilize thorium-based fuel cycles, with U-233 acting as the primary fissile material.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1, 2 and 3
(d) 1 and 3 only

AGRICULTURE

1. Match the following cultivation systems with their characteristics and typical applications:

List I (System)	List II (Principle)	List III (Common Application)
A. Hydroponics	1. Plants grown in nutrient-rich water without soil	a. Urban vertical farming
B. Aquaponics	2. Integrated system combining fish farming and plant cultivation	b. Circular food production systems
C. Aeroponics	3. Plant roots suspended in air and misted with nutrient solution	c. High-efficiency controlled environment agriculture
D. Geoponics	4. Traditional cultivation using soil as the growth medium	d. Conventional agriculture
E. Fogponics	5. Nutrients delivered to plant roots through ultra-fine nutrient fog	e. Advanced plant propagation and research

Select the correct answer using the code below:
(a) A–1–a, B–2–b, C–3–c, D–4–d, E–5–e
(b) A–2–a, B–1–b, C–3–c, D–4–d, E–5–e
(c) A–1–b, B–2–a, C–4–c, D–3–d, E–5–e
(d) A–1–a, B–3–b, C–2–c, D–4–d, E–5–e

2. With reference to emerging bio-based materials and technologies, consider the following statements:

1. Bioplastics are plastics derived wholly or partly from renewable biomass such as corn starch, sugarcane, or cellulose.
2. Bio-olefins are hydrocarbon molecules produced from biological feedstocks and can serve as building blocks for polymers and chemicals.
3. Biochar is produced by pyrolysis of biomass in limited oxygen and is widely used for improving soil fertility and carbon sequestration.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

3. With reference to Zero Budget Natural Farming (ZBNF), consider the following pairs:

Input	Primary Use
1. Jeevamrut	(a) Liquid bio-activator to enrich soil microbes
2. Beejamrut	(b) Seed treatment to protect against fungal and pest infections
3. Ghanjeevamrut	(c) Solid microbial compost used as a soil amendment

Which of the above pairs are correctly matched
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

4. With reference to plant-based feedstocks explored for biodiesel production in India, consider the following pairs:

Plant Species	Characteristic / Relevance for Biodiesel
1. *Jatropha curcas*	Traditional non-edible oilseed plant promoted for biodiesel production
2. *Pongamia pinnata* (Karanja)	Leguminous tree producing oil-rich seeds used in biofuel
3. Castor (*Ricinus communis*)	Oil extracted but rarely preferred for biodiesel due to high ricinoleic acid content
4. Neem (*Azadirachta indica*)	Oil with pesticidal properties that has also been explored as a biofuel source

Which of the pairs given above are correctly matched?
(a) 1, 2 and 3 only
(b) 2, 3 and 4 only
(c) 1, 2 and 4 only
(d) 1, 2, 3 and 4

5. With reference to Biofloc Technology (BFT) used in aquaculture, consider the following statements:

1. Biofloc technology utilizes microorganisms to convert toxic nitrogenous wastes such as ammonia into microbial biomass, which can serve as a protein source for aquatic species.
2. Biofloc systems operate with low aeration requirements and are best suited for low-density aquaculture systems.
3. The adoption of BFT can reduce dependence on commercial fish feed and improve sustainability in intensive inland aquaculture.

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

6. With reference to the Minimum Support Price (MSP) system in India, consider the following statements:

1. The Government of India announces MSPs for 22 mandated crops based on the recommendations of the Commission for Agricultural Costs and Prices (CACP).
2. The mandated crops include 14 Kharif crops, 6 Rabi crops, and 2 commercial crops.
3. MSP for toria and de-husked coconut is fixed independently and is not linked to the MSP of any other crop.

Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

7. With reference to the cultivation and trade of groundnut (peanut) in India, consider the following statements:

1. Groundnut in India is predominantly cultivated as a Kharif crop, though it is also grown in the Rabi and summer seasons in certain regions.
2. Gujarat is the largest producer of groundnut in India, followed by states such as Rajasthan, Tamil Nadu, and Andhra Pradesh.
3. India is among the major exporters of groundnut and groundnut oil, supplying markets in Southeast Asia and Europe.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

8. With reference to the Food Corporation of India (FCI), consider the following statements:

1. The Food Corporation of India was established under the Food Corporations Act, 1964.
2. One of the primary responsibilities of FCI is to procure foodgrains and maintain buffer stocks on behalf of the Government of India.
3. FCI plays a key role in implementing the National Food Security Act, 2013 by supplying foodgrains for distribution through the Public Distribution System (PDS).

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

9. With reference to the phenomenon termed "Dark Oxygen", consider the following statements:

1. "Dark oxygen" refers to the production of oxygen in the absence of sunlight, particularly in deep-sea environments.
2. It is believed to occur through chemical or microbial processes associated with deep-sea minerals, contributing to oxygen availability in deep-ocean ecosystems.
3. The production of dark oxygen primarily occurs through photosynthesis driven by sunlight.

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

10. With reference to cotton production and trade in India, consider the following statements:

1. India is among the largest producers of cotton in the world and has the largest area under cotton cultivation.
2. The Cotton Corporation of India (CCI) undertakes procurement operations to support farmers when market prices fall below the Minimum Support Price (MSP).
3. India exports a significant share of its cotton mainly to countries such as Bangladesh, Vietnam, and China.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

11. With reference to the cultivation and production of Masur (lentil) in India, consider the following statements:

1. Masur, being a leguminous crop, helps fix atmospheric nitrogen and improves soil fertility.
2. India is fully self-sufficient in lentil production and does not depend on imports to meet domestic demand.
3. Uttar Pradesh is among the leading producers of lentils in India.

Which of the statements given above are correct?
(a) 1 and 3 only
(b) 2 and 3 only
(c) 1 only
(d) 1, 2 and 3

12. With reference to certain plantation crops in India, consider the following pairs:

Crop	Associated Detail
1. Rubber	Regulated by the Rubber Board headquartered in Kottayam, Kerala
2. Arecanut	Predominantly cultivated in the coastal and hilly regions of Karnataka and Kerala
3. Cocoa	Commonly grown as an intercrop under coconut plantations in states such as Kerala, Tamil Nadu, and Andhra Pradesh

Which of the pairs given above are correctly matched?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

13. With reference to recent trends in India's maize sector, consider the following statements:

1. In recent years, India has shifted from being a net exporter to a net importer of maize due to rising domestic demand.
2. The poultry feed industry and ethanol blending programme have significantly increased the domestic demand for maize.
3. India's maize exports have risen sharply in the recent past, increasing by more than 50% in the last year.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

14. Consider the following pairs regarding jute cultivation and trade:
1. Major producing state — West Bengal
2. Key importing country of Indian raw jute — Bangladesh
3. Major application — Gunny bags and eco-friendly packaging
4. Crop season — Kharif

How many of the above pairs are correctly matched?
(a) Only one pair
(b) Only two pairs
(c) Only three pairs
(d) All four pairs

15. With reference to Toria cultivation in India, consider the following statements:
1. Toria is an early-maturing variety of rapeseed–mustard, typically grown during the Rabi season.
2. Toria cultivation is encouraged in rainfed and low-irrigation regions, including certain tribal and marginal farming areas.
3. Toria is often sown immediately after the harvest of Kharif crops such as paddy to make use of residual soil moisture.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

16. With reference to tobacco cultivation and regulatory mechanisms in India, consider the following statements:
1. India is among the leading producers and exporters of tobacco in the world, particularly of Flue-Cured Virginia (FCV) tobacco.
2. The Tobacco Board of India, responsible for regulating tobacco production and export of FCV tobacco, functions under the Ministry of Commerce and Industry.
3. Andhra Pradesh is the largest producer of Flue-Cured Virginia (FCV) tobacco in India.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

17. With reference to palm oil production and policy initiatives in India, consider the following statements:
1. India is the largest importer of palm oil in the world, sourcing the bulk of its imports mainly from Indonesia and Malaysia.
2. The National Mission on Edible Oils – Oil Palm (NMEO-OP) was launched to expand domestic oil palm cultivation and reduce India's dependence on edible oil imports.
3. Oil palm cultivation in India is restricted only to coastal regions because the crop cannot grow in inland areas or higher altitudes.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

18. With reference to sugarcane cultivation and pricing mechanisms in India, consider the following statements:
1. Sugarcane is a long-duration crop that requires high water availability and significant fertilizer inputs.
2. India is the largest exporter of raw sugar in the world.
3. The Fair and Remunerative Price (FRP) for sugarcane is announced annually by the Central Government on the recommendation of the Commission for Agricultural Costs and Prices (CACP).

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

19. With reference to Integrated Multi-Trophic Aquaculture (IMTA), consider the following statements:
1. IMTA involves cultivating species from different trophic levels in the same system to improve resource efficiency.
2. In IMTA systems, waste produced by one species serves as input (food or fertilizer) for another.
3. IMTA is widely adopted in freshwater ecosystems, especially in high-altitude cold-water lakes of northern India.

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

20. With reference to the colour-based classification of hydrogen according to production pathways, consider the following pairs:

Hydrogen Type	Production Method
1. Green Hydrogen	Produced through electrolysis of water using electricity generated from renewable energy sources
2. Blue Hydrogen	Produced from natural gas through steam methane reforming with carbon capture, utilisation and storage (CCUS)
3. Grey Hydrogen	Produced from fossil fuels such as natural gas through steam methane reforming without carbon capture
4. Pink Hydrogen	Produced through electrolysis of water using electricity generated from nuclear power

Which of the pairs given above are correctly matched?
Options
A. 1 and 2 only
B. 1, 2 and 3 only
C. 1, 3 and 4 only
D. 1, 2, 3 and 4

21. With reference to Methane Hydrates, consider the following statements:
1. Methane hydrates are crystalline solids in which methane molecules are trapped within a lattice of water ice under low temperature and high-pressure conditions.
2. They are found abundantly in deep ocean sediments and permafrost regions.
3. India has commercially exploited methane hydrates as a clean energy source since 2020.

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

22. With reference to Coffee cultivation in India, consider the following statements:
1. India primarily grows Arabica coffee, which is known for its mild flavor and is shade-grown.
2. Karnataka is the largest coffee-producing state in India, followed by Kerala and Tamil Nadu.
3. Robusta coffee has a higher caffeine content than Arabica and is mainly exported to West Asian countries.

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

23. With reference to statutory commodity boards in India, consider the following statements:
1. The Tea Board of India is a statutory body under the Ministry of Commerce and Industry and is headquartered in Kolkata.
2. The Coffee Board of India functions under the Ministry of Agriculture and Farmers' Welfare and regulates coffee production and export.
3. Both boards are responsible for research, extension, and promotion of their respective commodities in domestic and international markets.

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

24. With reference to the Essential Commodities Act, 1955, consider the following statements:

1. The Act empowers the Central Government to regulate the production, supply, and distribution of certain commodities to ensure their availability at fair prices.
2. Under the Essential Commodities (Amendment) Act, 2020, stock limits on agricultural commodities can be imposed only under extraordinary circumstances such as war, famine, or a sharp rise in prices.
3. The Act permanently lists commodities such as cereals, pulses, edible oils, fertilizers, and petroleum products as essential commodities that cannot be removed from the schedule.

Which of the statements given above is/are correct?
Options:
(a) 1 only
(b) 1 and 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

25. With reference to India's rice production and export policy in recent years, consider the following statements:

1. India's public rice stocks held with government agencies reached more than 60 million tonnes around early 2025, reflecting comfortable buffer availability.
2. The Government of India lifted the ban on non-basmati white rice exports in 2024, replacing it initially with a Minimum Export Price (MEP) mechanism.
3. India accounts for less than one-fifth of global rice exports.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

26. With reference to Makhana (Fox Nut), consider the following statements:

1. Makhana is obtained from the seeds of the aquatic plant Euryale ferox.
2. India is the largest producer of makhana, with Bihar accounting for the majority of production.
3. Makhana cultivation requires saline coastal soil conditions similar to mangrove ecosystems.

Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

27. With reference to the recently proposed Makhana Board in India, consider the following statements:

1. The Government of India has proposed a Makhana Board in Bihar to promote the production, processing, and export of makhana.
2. The board aims to support farmers through value addition, branding, and market linkages.
3. The initiative is primarily implemented under the Marine Products Export Development Authority (MPEDA).

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

28. With reference to the cultivation and trade of Jowar (Sorghum) in India, consider the following statements:

1. Maharashtra is the largest producer of jowar in India, followed by states such as Karnataka and Madhya Pradesh.
2. India has witnessed a noticeable decline in jowar exports in recent years, partly due to higher domestic consumption and price fluctuations.
3. Jowar in India is grown in both Kharif and Rabi seasons, with the Rabi crop being prominent in the Deccan plateau.

Which of the statements given above are correct?
(a) 1 only
(b) 1 and 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

29. With reference to Bajra (Pearl Millet) cultivation in India, consider the following statements:

1. Rajasthan is the largest producer of Bajra in India.
2. Bajra is mainly grown as a Kharif crop under rainfed conditions.
3. Bajra requires cool and high-rainfall conditions similar to rice cultivation.

Which of the statements given above is/are correct?
(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

30. With reference to Nigerseed in India, consider the following statements:

1. Nigerseed is a traditional oilseed crop cultivated mostly by tribal communities.
2. India exports Nigerseed oil in large quantities to North America.
3. Nigerseed cultivation is promoted under the Tribal Sub Plan and NFSM.

Which of the statements given above are correct?
A. 1 and 2 only
B. 2 and 3 only
C. 1 and 3 only
D. 1, 2 and 3

31. With reference to tea cultivation and the tea industry in India, consider the following statements:

1. The states of Assam and West Bengal together contribute more than 70% of India's total tea production.
2. India is the largest exporter of tea in the world.
3. Darjeeling Tea was the first product in India to receive a Geographical Indication (GI) tag.

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

32. With reference to certain traditional livelihood activities and agro-based industries in India, consider the following statements:

1. The Honey Mission implemented by TRIFED seeks to promote scientific beekeeping among tribal communities in order to enhance rural incomes and support pollination-based agriculture.
2. Lac cultivation, concentrated in states such as Jharkhand and Chhattisgarh, involves harvesting resin secreted by insects reared on host trees like Palash and Kusum.
3. India is the largest producer of silk in the world, and Muga silk is produced mainly in Karnataka and Tamil Nadu.

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

33. With reference to coconut cultivation and its value-added products in India, consider the following statements:

1. India is the largest exporter of coconut oil in the world.
2. Kerala accounts for more than 45% of India's coconut production.
3. Neera (coconut sap) and coir fibre are important value-added products derived from coconut.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

34. With reference to the role of coal in India's energy sector, consider the following statements:

1. Coal continues to be the largest source of electricity generation in India, contributing roughly around 70% of total power generation.
2. India is the second-largest producer of coal in the world and among the largest importers of coal globally.
3. India has committed to completely phasing out coal-based thermal power by 2035 under its national energy transition policies.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

35. With reference to Sesamum (Sesame) cultivation and trade in India, consider the following statements:

1. Sesamum is primarily cultivated as a biofuel crop in India.
2. India is among the major exporters of sesame seeds, supplying markets including East Asia and the Middle East.
3. Odisha is one of the important sesame-producing states in India.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

36. With reference to sunflower cultivation and sunflower oil trade in India, consider the following statements:

1. India meets a large share of its sunflower oil consumption through imports due to limited domestic production.
2. Ukraine and Russia are among the major suppliers of sunflower oil to India.
3. The area and production of sunflower in India have shown a consistent rise in the past five years.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

37. With reference to wheat cultivation and policy developments in India, consider the following statements:

1. India is the second-largest producer of wheat in the world, after China.
2. Wheat is a Rabi crop, generally cultivated in regions with cool winters and moderate rainfall, especially in the alluvial plains of north India.
3. The Government of India has recently lifted the export restrictions on wheat citing surplus production.

Which of the statements given above are correct?
(a) 1 only
(b) 1 and 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

38. With reference to gram (chickpea) cultivation and trade in India, consider the following statements:

1. India is the largest producer of gram in the world and also imports gram occasionally to meet domestic demand.
2. Gram is predominantly a Rabi pulse crop, usually cultivated under rainfed conditions in semi-arid regions.
3. Madhya Pradesh is the leading gram-producing state in India.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

39. With reference to soybean cultivation and trade in India, consider the following statements:

1. Soybean is an important oilseed crop used for producing edible oil as well as protein-rich soybean meal for animal feed.
2. Madhya Pradesh and Maharashtra together account for a dominant share of India's soybean production, contributing more than three-fourths of the total output.
3. India freely imports genetically modified (GM) soybeans for human consumption, mainly from countries such as Argentina and Brazil.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

40. Consider the following pairs regarding barley cultivation and uses in India:

1. Major producing state — Rajasthan
2. Primary industrial use — Malt production for breweries
3. Major export destination — Middle East
4. Sowing season — Rabi season

How many of the above pairs are correctly matched?
(a) Only one pair
(b) Only two pairs
(c) Only three pairs
(d) All four pairs

41. With reference to Basmati rice production and Geographical Indication (GI) issues, consider the following statements:

1. India and Pakistan are widely recognized as the traditional producers of Basmati rice in the Indo-Gangetic plains.
2. In India, the GI tag for Basmati rice covers states such as Punjab, Haryana, Himachal Pradesh, Uttarakhand, Delhi, and parts of Uttar Pradesh and Jammu & Kashmir.
3. In recent years, India's attempt to obtain exclusive GI recognition for Basmati rice in the European Union has faced objections, including from Pakistan.

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

42. With reference to the Minimum Support Price (MSP) framework for oilseeds in India, consider the following statements:

1. Groundnut and Soybean are Kharif oilseed crops covered under MSP.
2. Rapeseed–Mustard and Safflower are Rabi oilseed crops covered under MSP.
3. Flaxseed (Linseed) and Castor seed are not among the oilseeds covered under MSP.

Which of the statements given above is/are correct?
Options:
(a) 1 only
(b) 1 and 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

43. With reference to the National Agricultural Cooperative Marketing Federation of India (NAFED), consider the following statements:
1. NAFED is a statutory body under the Ministry of Agriculture and Farmers Welfare.
2. It is involved in the procurement and price stabilization of agricultural commodities, including pulses and oilseeds.
3. NAFED is one of the implementing agencies for Operation Greens and the Price Support Scheme (PSS).

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

44. With reference to the food processing sector in India, consider the following statements:

1. India is among the largest producers of agricultural commodities globally and ranks among the top countries in food processing output, consumption, and exports.
2. The food processing industry contributes around 9–10% to India's Gross Domestic Product (GDP) and includes activities such as grain milling, sugar processing, edible oil production, beverages, and dairy products.
3. The sector is considered highly labour-intensive and generally requires lower capital investment compared to many heavy industries.

Which of the statements given above is/are correct?

Options:

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

45. With reference to business integration strategies in industry and value chains, consider the following statements:

1. Backward integration occurs when a company expands into activities related to its suppliers or raw material sources.
2. Forward integration refers to a firm expanding into distribution, retail, or direct access to consumers.
3. Vertical integration occurs when a firm operates across multiple stages of the production and distribution chain.
4. Horizontal integration refers to a company merging with or acquiring another company within the same stage of the industry.

Which of the statements given above are correct?

Options:

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

46. Consider the following crops:

1. Arecanut
2. Barley
3. Coffee
4. Finger Millet (Ragi)
5. Groundnut
6. Sesamum (Til)
7. Turmeric

The Government of India announces Minimum Support Prices (MSP) for which of the above crops on the recommendation of the Commission for Agricultural Costs and Prices (CACP)?

(a) 1, 2, 3 and 7 only
(b) 2, 4, 5 and 6 only
(c) 1, 4, 5 and 6 only
(d) 1, 2, 3, 4, 5, 6 and 7

47. With reference to the climatic requirements for the cultivation of major food crops in India, consider the following statements:

1. Wheat cultivation requires high humidity and annual rainfall exceeding 100 cm.
2. Rice cultivation generally requires annual rainfall in the range of about 100 cm or more and thrives in warm, humid conditions.

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

48. With reference to the Kisan Credit Card (KCC) Scheme in India, consider the following statements:

1. The Kisan Credit Card (KCC) Scheme was launched in 1998–99 to provide farmers with timely access to short-term institutional credit for agricultural operations.
2. The KCC facility has been extended to farmers engaged in fisheries and animal husbandry to support their working capital requirements.

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

49. With reference to lac cultivation, sericulture, and rubber cultivation in India, consider the following statements:

1. Lac is a natural resin secreted by insects such as *Kerria lacca* on host trees like Kusum, Palash, and Ber.
2. Sericulture refers to the cultivation of silkworms for the production of silk, and India is the only country producing all four major varieties of natural silk.
3. Rubber cultivation in India is mainly concentrated in humid tropical regions, with Kerala being the leading producer.

Which of the statements given above are correct?
Options:
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

50. With reference to the fruits and vegetables processing sector in India, consider the following statements:

1. India is among the largest producers of fruits and vegetables in the world, accounting for a significant share of global horticulture output.
2. Less than 5% of fruits and vegetables produced in India are processed commercially, which is considerably lower than the processing levels in many developed countries.
3. Mango and mango-based products constitute a major share of India's processed fruit and vegetable exports.

Which of the statements given above are correct?
Options:
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3