

Internal Assessment Test 1 – Sept. 2025

Sl.	Answer any FIVE FULL Questions	Marks
1	Explain essentials of cohesive e-waste management thinking in India. Essentials of Cohesive E-Waste Management Thinking in India 1. Understanding E-Waste: E-waste includes discarded electrical and electronic equipment like computers, phones, and appliances. Managing this waste requires awareness of its hazardous components (e.g., lead, mercury) and valuable recoverable materials (e.g., gold, copper). 2. Policy Framework: India introduced the E-Waste Management Rules in 2016, amended in 2018, emphasizing Extended Producer Responsibility (EPR). These policies mandate producers to manage e- waste collection, recycling, and disposal responsibly. 3. Stakeholder Engagement: Effective management involves collaboration among multiple stakeholders, including producers, recyclers, policymakers, and consumers. Each plays a role in ensuring proper waste segregation, collection, and processing. 4. Formalizing Recycling: India's e-waste management is challenged by informal recyclers. Establishing a robust formal recycling sector with proper infrastructure and technology can ensure environmentally sound e-waste processing. 5. Awareness and Education: Promoting public awareness about the environmental and health risks of improper e-waste disposal is critical. Educational campaigns and take-back programs encourage responsible consumer behavior. 6. Resource Recovery: Emphasizing material recovery from e-waste reduces the dependency on raw material mining, conserving natural resources and reducing environmental degradation. 7. Sustainable Practices: Adopting a circular economy model by reusing, refurbishing, and recycling e- waste supports sustainability. It reduces landfill burden and mitigates pollution. Compliance and Enforcement: Strong enforcement of e-waste laws, penalties for non-compliance, and incentivizing compliant businesses are essential for cohesive management.	10 Definition – 2 Policy – 2 Stakeholders – 1 Recycling – 2 Awareness – 3
2	Illustrate e-waste flow and recycling scenarios in India. E-Waste Flow and Recycling Scenarios in India 1. E-Waste Flow in India: Generation: India is one of the largest producers of e-waste globally, generating over 3 million metric tons annually, mainly from discarded consumer electronics, IT equipment, and household appliances. Collection: Formal Sector: Less than 20% of e-waste is collected through formal mechanisms, like authorized e- waste collection centers and take-back programs by producers. Informal Sector: The remaining majority (~80%) is handled by informal recyclers, including scrap dealers and small workshops. Transport: E-waste is transported from consumers to collection centers or dismantling units. Informal recyclers often use local networks for collection.	10 Generation – 2 marks Collection – 2 marks Recycling – 2 marks Challenges – 2 marks Trends – 2 marks

	2. Recycling Scenarios in India: Formal Recycling: Authorized e-waste recyclers follow environmental regulations and use advanced technologies to recover valuable materials like gold, silver, copper, and rare earth metals. E-waste management rules (2016) encourage producers to partner with formal recyclers under Extended Producer Responsibility (EPR). Informal Recycling: Informal recyclers use rudimentary methods, such as acid leaching and open burning, to extract metals. These processes are hazardous to both human health and the environment, causing pollution and exposure to toxic substances like lead and mercury. 3. Challenges in E-Waste Recycling: Lack of consumer awareness about proper disposal methods. Limited infrastructure for formal recycling, especially in rural areas. Inadequate enforcement of e-waste management rules, allowing informal recycling to dominate. 4. Emerging Trends: Growth of formal e-waste recycling units with better technology and adherence to environmental norms. Increasing partnerships between producers and recyclers under EPR to improve collection and recycling efficiency. Implementation of e-waste take-back campaigns by companies like Nokia and Dell to promote safe disposal.	
3	Mention goals, implementation and challenges for e-waste management. Answer: 1. Goals of E-Waste Management ❖ Environmental Protection: Prevent pollution caused by improper disposal of hazardous materials like lead, mercury, and cadmium. ❖ Resource Recovery: Recover valuable resources such as gold, silver, copper, and rare earth elements, reducing dependence on virgin materials. ❖ Promote Circular Economy: Extend the lifecycle of materials through reuse, refurbishment, and recycling. ❖ Safe Disposal: Ensure environmentally sound dismantling and disposal of non-recyclable components. ❖ Consumer Awareness: Educate consumers about safe disposal practices and the importance of formal recycling. ❖ Compliance with Regulations: Enforce adherence to e-waste management rules to ensure accountability from manufacturers, recyclers, and consumers. 2. Implementation of E-Waste Management ❖ Policy Framework: E-Waste Management Rules, 2016, and subsequent amendments in 2018 provide guidelines for collection, recycling, and disposal under Extended Producer Responsibility (EPR). ❖ Formal Collection Mechanisms: Establishment of authorized collection centers and take-back programs by producers. ❖ Recycling Infrastructure: Development of formal recycling units with advanced technologies for resource recovery and safe disposal of hazardous materials. Extended Producer Responsibility (EPR): Mandates producers to collect and recycle a specified percentage of their products. Encourages partnerships between manufacturers and formal	10 Goals – 4 marks Environment – 1 mark Resources – 1 mark Circularity – 1 mark Compliance – 1 mark Implementation – 3 marks Policy – 1 mark Collection – 1 mark Awareness – 1 mark Challenges – 3 marks Awareness

	recyclers ❖ Awareness Campaigns: Conduct public awareness programs to encourage safe disposal and discourage informal recycling. ❖ Integration of Informal Sector: Train and incorporate informal recyclers into the formal framework to improve efficiency and reduce environmental hazards. 3. Challenges in E-Waste Management ❖ Lack of Consumer Awareness: Many consumers are unaware of formal collection centers or the environmental hazards of informal recycling. ❖ Dominance of Informal Sector: Informal recyclers handle approximately 80% of e-waste, using hazardous practices like acid leaching and open burning. ❖ Insufficient Infrastructure: Limited formal collection and recycling facilities, especially in rural and semi-urban areas. ❖ Regulatory Challenges: Weak enforcement of e-waste management rules and lack of monitoring mechanisms. ❖ High Costs: Formal recycling technologies are expensive, making them less competitive compared to the informal sector. ❖ Fragmented Supply Chain: Lack of a cohesive and efficient supply chain for collection, transportation, and recycling of e-waste. Producer Accountability: Non-compliance by many manufacturers with EPR obligations.	– 1 mark Informal – 1 mark Infrastructure – 1 mark
4	Explain considerations for successful implementation of EPR. Answer: To ensure the effective implementation of Extended Producer Responsibility (EPR), various factors must be addressed at different levels, including regulatory frameworks, producer accountability, and public awareness. 1. Robust Policy Framework Clear Guidelines: Policies must clearly define the responsibilities of producers, importers, recyclers, and consumers. E-Waste Management Rules: Governments must implement and enforce specific regulations, such as the E-Waste Management Rules, 2016, and subsequent amendments, to ensure accountability. Targets and Deadlines: Mandate specific collection and recycling targets for producers, with strict deadlines for compliance. 2. Effective Collection Mechanisms Accessible Infrastructure: Establish adequate collection centers and take-back systems across urban, semi-urban, and rural areas. Reverse Logistics: Develop efficient systems for reverse logistics to ensure safe and cost-effective transportation of e-waste. Integration of Informal Sector: Formalize and train informal recyclers to integrate them into the formal recycling framework. 3. Incentivization and Penalties Producer Incentives: Offer incentives such as tax benefits for companies that achieve or exceed their recycling targets. Consumer Incentives: Encourage consumer participation through discounts, exchange offers, or rewards for returning e-waste. Penalties: Impose fines or restrictions on producers that fail to meet their EPR obligations. 4. Consumer Awareness and Education Public Campaigns: Conduct awareness drives to educate consumers about the importance of proper e-waste disposal and the environmental	10 Policy – 2 marks Collection – 2 marks Incentives – 1 mark Awareness – 1 mark Collaboration – 1 mark Technology – 1 mark Monitoring – 1 mark Challenges – 1 mark

	risks of informal recycling. E-Waste Literacy: Promote e-waste literacy in schools, colleges, and workplaces to create long-term awareness. 5. Collaboration Between Stakeholders Government-Producer Collaboration: Producers, recyclers, and policymakers should work together to design effective EPR systems. Industry Partnerships: Producers can collaborate within industries to share logistics and recycling infrastructure. Public-Private Partnerships (PPP): Encourage PPP models to enhance recycling efficiency and coverage. 6. Advanced Recycling Technologies Adoption of Modern Techniques: Promote the use of advanced, environmentally safe technologies for resource recovery and recycling. R&D Investments: Encourage research and development in innovative e-waste recycling methods. 7. Monitoring and Evaluation Tracking Systems: Implement digital systems to track the collection and recycling of e-waste under EPR. Third-Party Audits: Use third-party auditors to ensure transparency and compliance with regulations. Performance Metrics: Set measurable benchmarks to evaluate the success of EPR initiatives. 8. Addressing Challenges Informal Sector: Work towards eliminating unsafe practices like acid leaching and open burning in the informal sector. Cost of Implementation: Subsidize recycling costs or share the financial burden between producers and governments to make EPR economically feasible.	
5	What is the WEEE Directive? How does it impact global e-waste policy? Answer: <u>Answer:</u> The WEEE Directive stands for the Waste Electrical and Electronic Equipment Directive. It was first introduced by the European Union (EU) in 2003 (Directive 2002/96/EC) and later revised in 2012 (Directive 2012/19/EU). The directive provides a legal framework for the collection, recycling, and recovery of electrical and electronic waste within EU member states. Its main principle is the Extended Producer Responsibility (EPR), which makes producers (manufacturers, importers, and distributors) responsible for the entire life cycle of their electronic products, including end-of-life take-back, recycling, and safe disposal. Categories of covered equipment include large/small household appliances, IT and telecom equipment, lighting, toys, medical devices, and monitoring instruments. Impact on Global E-Waste Policy: Standard-Setting Role: The WEEE Directive became a benchmark for global e-waste legislation. Many countries, including India, China, and several African nations, have modeled their e-waste management rules on its EPR principle. Producer Responsibility & Take-Back Systems: The directive popularized the concept of producer take-back programs worldwide. It shifted responsibility away from municipalities alone and placed it	10 Definition – 2 marks EPR – 2 marks Standardization – 2 marks Responsibility – 2 marks Influence – 2 marks

	on manufacturers and importers, influencing global supply chains. Recycling Targets: WEEE introduced clear collection and recycling targets for different categories of e-waste. This pushed many non-EU countries to adopt quantitative targets for recycling and recovery in their own policies. Trade & Compliance Pressure: Non-EU manufacturers exporting to Europe were forced to comply with WEEE requirements. This created a spillover effect, encouraging companies worldwide to integrate eco-design, safe materials, and e-waste management practices. Influence on Indian Policy: India's E-Waste (Management and Handling) Rules 2011, and the updated E-Waste Management Rules 2016 & 2018, borrowed heavily from the WEEE model, especially the EPR provisions and take-back mechanisms.	
6	Explain the role of CPCB and SPCBs in enforcing e-waste rules. <u>Role of CPCB (Central Pollution Control Board)</u> The CPCB is the apex body for implementing and monitoring e-waste management rules in India. Its major roles are: 1. Regulation & Oversight Formulates guidelines for e-waste collection, storage, transportation, and disposal. Grants authorization/registration to producers, dismantlers, and recyclers. 2. Monitoring & Compliance Maintains a national inventory of e-waste generation and recycling. Conducts audits and inspections of registered recyclers and producers. 3. Capacity Building Provides technical support and training to State Boards and local bodies. Develops protocols for environmentally sound recycling. R4. eporting & Coordination Submits annual compliance reports to the Ministry of Environment, Forest and Climate Change (MoEFCC). Coordinates with international agencies to align India's policies with treaties like the Basel Convention. Role of SPCBs (State Pollution Control Boards) The SPCBs act as the field-level enforcement agencies. Their roles include: 1. Implementation at State Level Enforce e-waste management rules within their jurisdictions. Issue consent and authorization for collection centers, dismantlers, and recyclers. 2. Inspection & Compliance Conduct site inspections to verify compliance by producers, bulk consumers, and recyclers. Monitor illegal dumping, informal recycling, and unsafe disposal. 3. Data Collection & Reporting Collect data on state-level e-waste generation and recycling. Submit compliance reports to CPCB annually. 4. Awareness & Capacity Building Organize awareness campaigns for consumers and producers. Support development of collection networks in collaboration with municipalities.	10 CPCB (Central Pollution Control Board) – 5 marks Regulation – 1 mark Monitoring – 1 mark Capacity – 1 mark Reporting – 1 mark Coordination – 1 mark SPCBs (State Pollution Control Boards) – 5 marks Implementation – 1 mark Inspection – 1 mark Data – 1 mark Reporting – 1 mark Awareness

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