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Internal Assessment Test 2 – November 2025

Sl.	Answer any FIVE Questions	Marks	CO	RBT
1	Explain the experiences of EPR (Extended Producer Responsibility) and the take-back campaign by Nokia in 2009 and 2012. 1. **Extended Producer Responsibility (EPR)** in India requires producers to collect and recycle their products after end-of-life. Most companies struggled in the early years, but Nokia became a leading example of successful implementation. 2. In **2009**, Nokia launched a large take-back campaign for old mobile phones to promote responsible e-waste disposal. 3. The company set up **around 1,400 secure collection bins** in Nokia Care Centres and Priority Dealer stores across four major Indian cities. 4. The campaign ran for **45 days** and collected about **160 tonnes of mobile phones**, showing that a producer-led system can work. 5. Nokia promised to **plant one tree for every handset collected**, which encouraged public participation. The campaign became well-known as **“Planet ke Rakhwaale.”** 6. Globally, Nokia collected **over 50 tonnes of phones** and planted **around 60,000 trees**, highlighting its commitment to environmental responsibility. 7. Nokia also conducted a survey of **6,500 people in 13 countries**, which showed low awareness about recycling. In India, **84%** did not think recycling phones was necessary, and **83%** did not know how phones are recycled. 8. These findings influenced later e-waste policies by showing the importance of **consumer awareness, convenience, and clear information** for effective EPR. 9. Nokia continued the initiative in **2012**, collecting another **65 tonnes** of used phones in India and again planting a tree for every phone returned. 10. Overall, Nokia’s 2009 and 2012 take-back campaigns are considered successful demonstrations of EPR in India. They proved that producers can set up effective collection systems, raise awareness, and ensure environmentally sound recycling.	10 Each point 1	CO3	L2
2	With a neat diagram, explain the linear economy model versus the circular economy model.	10 Dia-4 Exp-6	CO3	L2

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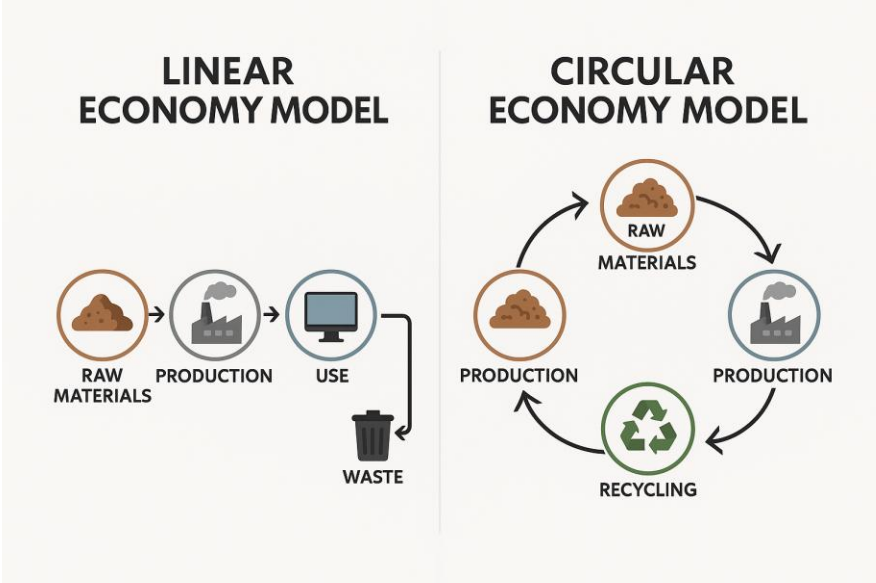

<table>
<tr><th>Linear Economy Model</th><th>Circular Economy Model</th></tr>
<tr><td>1. Follows a take–make–dispose pattern.</td><td>1. Follows a repair–reuse–recycle pattern.</td></tr>
<tr><td>2. Uses large amounts of raw materials from nature.</td><td>2. Focuses on reducing raw material extraction.</td></tr>
<tr><td>3. Products are designed with short lifespan.</td><td>3. Products are designed for long life and easy repair.</td></tr>
<tr><td>4. Waste is usually thrown away after use.</td><td>4. Waste is treated as a resource and returned to the cycle.</td></tr>
<tr><td>5. Produces high levels of pollution and landfill waste.</td><td>5. Helps in reducing pollution and saving resources.</td></tr>
<tr><td>6. No system for reuse, recycling, or recovery.</td><td>6. Closed-loop system where materials keep circulating.</td></tr>
<tr><td>7. Leads to resource depletion over time.</td><td>7. Ensures resource conservation and long-term availability.</td></tr>
<tr><td>8. High energy consumption in production.</td><td>8. Energy-efficient, since recycled materials require less energy.</td></tr>
<tr><td>9. Economically dependent on constant production and sales.</td><td>9. Supports a sustainable economic system with less waste.</td></tr>
<tr><td>10. Not environmentally sustainable.</td><td>10. Environmentally friendly and future-oriented.</td></tr>
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<td>Describe the performance analysis of EPR and CPCB (Central Pollution Control Board) regulatory mechanisms.
A. Performance of EPR (Extended Producer Responsibility)

EPR became the core strategy under the E-Waste Management Rules 2016 and 2018, where producers must collect, channelise and recycle e-waste.
Regulatory expectations included producer authorisation, annual collection targets, take-back systems, RoHS compliance and record-keeping.
In practice, many producers only complied on paper and did not translate their EPR plans into actual collection and recycling activities. Toxics Link (2019) found most brands were rated below average.
Collection and recycling systems remained weak, especially because consumers still found it inconvenient to deposit e-waste. Bhaskar and Turaga (2017) noted low consumer accessibility.

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<td>10
Each point 1</td>
<td>CO4</td>
<td>L1</td>
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	5. **Leakage of e-waste to the informal sector** continued, despite EPR, because informal actors offered higher immediate value and dominated the market. PROs often got “sandwiched” between producers and regulators. 6. Producers and PROs were often linked to **malpractices such as paper trading, misreporting, and multiple accounting**, weakening the reliability of the system. 7. EPR helped increase the number of **registered recyclers and dismantlers** to 400 units with over 1 million tonnes of authorised capacity, showing partial success in building formal infrastructure. 8. However, collection targets were often **not met**, and the rules did not clearly define penalties for non-achievement, limiting enforcement. **B.Performance of CPCB (Central Pollution Control Board)** 9. CPCB’s **regulatory mechanism was weak due to shortage of manpower**, poor coordination with SPCBs, and limited inspections and monitoring. CSE (2014) reported severe staff shortages. 10. **CPCB failed to conduct fresh national assessments** of e-waste generation after 2005. As a result, CPCB lacked updated data on actual quantities generated, collected or recycled. 11. Compilation of data was poor. Many states **did not submit product-wise e-waste data**, making national monitoring ineffective. 12. **Training and awareness programmes were not conducted**, even though these were mandatory under the rules. Several SPCBs confirmed lack of awareness among key stakeholders. 13. Annual reporting was weak: only **15 SPCBs and 3 PCCs** submitted reports for 2012–14, and CPCB took no further action based on these reports. 14. CPCB also **failed to enforce RoHS compliance**, as it lacked proper laboratory infrastructure and had not completed its MoU with C-MET for testing, even by 2015. 15. CPCB was supposed to **set up a committee to monitor EPR compliance**, but this committee was never formed due to poor compliance by producers. 16. The overall system remained **centralised, slow and under-resourced**, which limited CPCB’s ability to curb illegal recycling units or enforce proper channelisation.			
4	Describe policy issues for e-waste management before 2010. 1. **No dedicated e-waste law:** India did not have a specific legislation for e-waste before 2010. Electronic waste was loosely covered under general hazardous waste rules, which were not designed for the complexity of e-waste. 2. **No Extended Producer Responsibility (EPR):** Producers were not responsible for the collection or recycling of their products. There were no targets, no take-back systems, and no obligations placed on manufacturers. 3. **Dominance of the informal sector:** Most e-waste was collected and processed by informal scrap workers using unsafe, polluting, and crude techniques. There were no policy mechanisms to regulate or upgrade this sector. 4. **Lack of recycling standards:**	10 Each point 1	CO4	L2

	There were no clear guidelines for environmentally sound dismantling, storage, or recycling. As a result, unsafe practices such as open burning and acid leaching were common. 5. **Poor data and absence of national inventory:** The government did not have reliable information on how much e-waste was being generated or processed. Without accurate data, planning and policy design were weak. 6. **No authorised collection channels:** There were no formal collection centres, drop-off points, or take-back mechanisms for consumers. This led to hoarding of old electronics at home or selling them to informal scrap dealers. 7. **No RoHS-type restrictions:** Before 2010, India had not introduced rules to limit hazardous substances such as lead, mercury, and cadmium in electronic products, even though other regions had already adopted such norms. 8. **Weak regulatory capacity:** Pollution control boards had limited staff, little technical expertise, and inadequate monitoring systems. This made enforcement almost impossible. 9. **Low public awareness:** Citizens, institutions, and even businesses had very little knowledge about the dangers of e-waste or safe disposal methods. No large-scale government awareness programs existed. 10. **Lack of coordination among stakeholders:** Policies did not define clear roles for producers, recyclers, government bodies, or consumers. This resulted in fragmented efforts and inconsistent practices across states.			
5	List and explain the steps involved in formal e-waste recycling. **Collection and Transportation** E-waste is collected through authorised collection centres, take-back systems, or scheduled pickups. The waste is packed safely and transported to registered recycling facilities using secure vehicles. **2. Segregation and Sorting** At the facility, the waste is sorted manually or mechanically into categories such as computers, mobile phones, appliances, batteries, circuit boards, plastics and metals. Hazardous items are separated for special treatment. **3. Dismantling** Skilled workers dismantle the devices into components like circuit boards, screens, wires, hard drives and casings. Reusable parts may be recovered while the remaining components move to further processing. **4. Removal of Hazardous Components** Parts containing lead, mercury, cadmium and other toxins are removed carefully. These components are stored safely and sent for specialised treatment to prevent contamination. **5. Shredding and Size Reduction** The remaining material is put into shredders or crushers, breaking it into smaller pieces. This helps in efficient separation of different materials. **6. Mechanical Separation** Machines separate materials using physical methods such as magnetic separation, eddy current separation, density separation	10 Each point 1	CO5	L2

	and air classification. Metals, plastics and glass get separated in this stage. **7. Metal Recovery** Precious and useful metals like gold, silver, palladium and copper are recovered from circuit boards using hydrometallurgical or pyrometallurgical processes. **8. Plastic and Glass Recycling** Plastics are cleaned, processed and converted into pellets for reuse. Glass from screens is handled separately, especially CRT glass which may contain lead. **9. Final Treatment and Disposal** Remaining residues and non-recyclable materials are sent to authorised hazardous waste treatment facilities or secured landfills. **10. Documentation and Reporting** All activities from collection to final disposal are documented. Authorised recyclers must submit annual reports to the pollution control authorities to demonstrate compliance.			
6	How does RoHS differ from REACH regulations? What is RoHS? List hazardous substances restricted under it. RoHS and REACH are both environmental regulations used mainly in the European Union, but they differ in purpose and scope. RoHS focuses specifically on restricting hazardous substances in electrical and electronic equipment. Its main goal is to reduce toxic materials at the product level. REACH, on the other hand, governs chemicals used in all industries. It covers the registration, evaluation and authorisation of chemicals used in manufacturing. RoHS controls what substances can be present in electronics, while REACH controls how chemicals are produced, transported and used. RoHS is product-specific, whereas REACH is chemical- and worker-safety-focused. **RoHS stands for Restriction of Hazardous Substances**. It is a European Union directive that restricts the use of certain toxic substances in electrical and electronic products. The aim of RoHS is to reduce the environmental and health impacts caused by hazardous materials during manufacturing, use, recycling and disposal of electronic waste. RoHS restricts the following substances: 1. Lead (Pb) 2. Mercury (Hg) 3. Cadmium (Cd) 4. Hexavalent chromium (Cr^{6+}) 5. Polybrominated biphenyls (PBB) 6. Polybrominated diphenyl ethers (PBDE) 7. Four types of phthalates (added later): o DEHP (Di-ethylhexyl phthalate) o BBP (Benzyl butyl phthalate) o DBP (Dibutyl phthalate) o DIBP (Di-isobutyl phthalate)	10 4+2+4	CO5	L2

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