

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, May 2026

B.Tech. & BCA Semester VI

Roll No.....

AS1211: Sustainable Electronic Waste
Management

Time: 02 hours

Max. Marks: 30

Instructions to students:

1. A non-programmable Scientific calculator is allowed.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1	Short answer type questions Write a short note on. A- Classifications of E-waste are based on European Union directives. [2] B- Critically explain the waste hierarchy. [2]	04 Marks CO1 & CO 3
Q.2	Case: A rapidly growing urban region has seen a surge in discarded electronic items such as smartphones, laptops, TVs, and household appliances due to fast technological upgrades and consumer demand. Most of this electronic waste (e-waste) is handled by informal recyclers using unsafe methods like open burning and acid leaching to recover valuable metals. As a result, toxic substances such as lead, mercury, and cadmium are released into the environment, contaminating soil, water, and air. Residents and workers are experiencing health issues such as respiratory problems, skin diseases, and neurological disorders. Question: 1. Critically analyze how improper e-waste management in urban areas creates a conflict between economic livelihood (informal sector) and environmental sustainability. Propose an integrated solution framework that aligns with the United Nations Sustainable Development Goals (SDGs)—particularly SDG 3 (Good Health and Well-being), SDG 6 (Clean Water and Sanitation), SDG 11 (Sustainable Cities), and SDG 12 (Responsible Consumption and Production). [4] 2. How emerging technologies like AI & ML can be applied to solve this problem (give flow diagram). [4]	08 Marks CO1 CO2

Q.3	Case: A manufacturing company plans to launch a new eco-friendly packaged product. Before introducing it into the market, the company wants to evaluate the environmental impacts associated with the product throughout its entire life cycle — from raw material extraction to production, transportation, usage, and final disposal. Question: As an environmental consultant, you are asked to: 1- Analyze the primary goals and key phases of Life Cycle Analysis (LCA), and examine how Artificial Intelligence (AI) can enhance the effectiveness and accuracy of LCA.” [4] 2- Critically evaluate the advantages and disadvantages of conducting an LCA, using relevant examples to justify your analysis. [3]	07 Marks CO2, & CO3
Q.4	Case: Mumbai city is facing a rapid increase in electronic waste due to frequent replacement of mobile phones, laptops, and household electronics. Most of this e-waste is handled by the informal sector, leading to unsafe recycling practices, environmental pollution, and health risks. To address this issue, the government has introduced the concept of a Producer Responsibility Organization (PRO) under E-Waste Management Rules. Electronics manufacturers are now required to take responsibility for collecting and recycling their products through authorized PROs. Question: Critically analyze and examine the concept and functioning of a Producer Responsibility Organization (PRO) in e-waste management, including its role in enhancing environmental sustainability, reducing risks in the informal sector, and suggest measures to strengthen its effective implementation in India.”	07 Marks CO4, CO2
Q.5	Write a short note on. A- Hybrid Technology B- Industrial E-Waste recycling process (flow diagram).	04 Marks CO3 & CO4

*****All The Best*****