



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
Plot 91, Cadastral Zone, Nnamdi Azikwe Expressway, Jabi, Abuja  
**FACULTY OF SCIENCES**  
**DEPARTMENT OF ENVIRONMENTAL SCIENCE**  
**2023\_1 POP EXAMINATION**

**COURSE CODE: ESM444**

**TIME: ALLOWED: 2HRS**

**CREDIT UNIT: 2**

**COURSE TITLE: INDUSTRIAL WASTE AND INDUSTRIAL WASTEWATER TREATMENT**

**Instruction:** Attempt question number ONE (1) and any other TWO (2) questions. Question number one (1) carries 30 marks, while the other questions carry (20) marks each.

1. (a) Write on any TWO of the methods of solid waste disposal. **12marks**
  - (b) Explain the method used in managing organic wastes. **10marks**
  - (c) What can be done to resolve issues related to the use of boiler water systems? **8marks**
- 2a. Outline and explain two Usefulness of Recycling. **4marks**
  - (b) List three (3) category of wastes are recyclable? **6marks**
  - (c) Write short note on Close re-circulating water system. **10marks**
- 3a. Explain the term waste management? **6marks**
  - b. How can wastes be minimized? **4marks**
  - c. In what ways can toxic materials from industrial wastewater be treated /removed. **4marks**
  - d. What is Waste Recycling? **6marks**
- 4(a) What are the major problems associated with the use of boiler system. **5marks**
  - (b) How can solids, oils and grease be removed from industrial wastewater? **5 marks**
  - (c) What do the two types of water-cooling systems involve? **5marks**
  - (d) Discuss briefly the main impact of industrial waste on the environment. **5marks**
- 5a. List the advantages of the most commonly used recirculation system. **5marks**
- 5b. Discuss how industrial wastewater can be treated by bio-chemical processes. **15marks.**