



NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91, Cadastral Zone, Nnamdi Azikwe Expressway, Jabi, Abuja
FACULTY OF SCIENCES
DEPARTMENT OF ENVIRONMENTAL SCIENCE AND RESOURCE MANAGEMENT
2025_2 EXAMINATIONS

COURSE CODE: ESM 444

COURSE TITLE: INDUSTRIAL WASTE AND INDUSTRIAL WASTEWATER

CREDIT: 2 Units

TIME ALLOWED: 2 Hours

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.*

- 1a). Discuss the impact of industrial waste on the environment. (12 marks)
- 1b). Describe the landfill method of waste disposal. (5 marks)
- 1c). Identify the variables on which the physical processes depend on (4 marks)
- 1d). List four (4) processes involved in the removal of solids (4 marks)
- 1e). Mention five ways used in reduction process of waste. (5 marks)

- 2a). What is boiler water treatment? (5 marks)
- 2b). Enumerate five (5) essentials of industrial boiler water treatment (10 marks)
- 2c). List five (5) physical treatment processes (5 marks)

- 3a). Describe the two (2) main types of boilers used for industrial applications (5 marks)
- 3b). List at least seven (7) advantages of recycling (7 marks)
- 3c). What are the advantages of closed recirculation water system? (any 8 points= 8 marks)

- 4a). Briefly describe the following: (each 4 marks= 16 marks)
 - i) Open recirculation systems
 - ii) Closed recirculation systems
 - iii) Additive cooling systems
 - iv) A boiler
- 4b). Identify four (4) major problems of landfill method of waste disposal (4 marks)

- 5a). Analyse the biological treatment process of waste water treatment. (15 marks)
- 5b). List five (5) physical treatment processes (1 mark each = 5mks)