



NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi, Abuja
FACULTY OF SCIENCES
DEPARTMENT OF ENVIRONMENTAL SCIENCE AND RESOURCE MANAGEMENT
2025_1 EXAMINATION

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). Briefly define the following concepts (12 marks)
 - Waste Management
 - Integrated waste management method
 - Biochemical oxygen demand (BOD)
 - Chemical oxygen demand (COD)
 - Incineration method
 - Landfill method
- 1b). Name and explain the three (3) types of recirculation water system (6 marks)
- 1c). What are the major problems with landfills method of disposing wastes? (5 marks)
- 1d). Explain the control of scale and corrosion in closed systems. (7 marks)

- 2a). Discuss the external and internal treatments of boilers. (15 marks)
- 2b). List the various forms in which contaminants and/or impurities are found in wastewaters (5 marks)
- 3a). Explain the five (5) main sources of industrial waste waters. (10 marks)
- 3b). Specify the main processes involved in the treatment of industrial wastewater (3 marks)
- 3c). State the advantages of recycling. (7 marks)
- 4a). Explain biological reprocessing of wastes: (8 marks)
- 4b). List the various forms in which contaminants and/or impurities are found in wastewaters (5 marks)
- 4c). What do you understand by the term recycling? (7 marks)

- 5a). How are industrial waste produced? (8 marks)
- 5b). Explain the industrial wastewaters preliminary treatment (12 marks)