



NATIONAL OPEN UNIVERSITY OF NIGERIA
FACULTY OF SCIENCES
DEPARTMENT OF ENVIRONMENTAL SCIENCE AND RESOURCE MANAGEMENT
Plot 91, Cadastral Zone, Nnamdi Azikwe Expressway, Jabi, Abuja
2024 1 EXAMINATION

COURSE CODE: ESM 444

COURSE TITLE: INDUSTRIAL WASTE AND INDUSTRIAL WATER SYSTEM

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.

QUESTION 1

- i. Define the term industrial waste with examples (5mks)
- ii. List and describe five reasons why boiler water treatment is required (10mks)
- iii. Describe the three (3) main methods of waste collection (10mks)
- iv. State five reasons for continuous polluting of environment in Nigeria (5mks)

QUESTION 2

- i. Mention the three (3) different types of recirculation water system (3mks)
- ii. State at least five (5) components of the cooling system (5mks)
- iii. List six (6) advantages and disadvantages of waste management (12mks)

QUESTION 3

- i. State the reason of transferring heat absorbed in the closed recirculation system to open recirculation system (3mks)
- ii. Differentiate between biodegradable and non- biodegradable (8mks)
- iii. Mention three major types of wastewaters, source, examples and discuss briefly on them (9mks)

QUESTION 4

- i. Define the term pollution (2mks)
- ii. State the 3Rs in waste management and discuss on each of them with at least five examples of each (14mks)
- iii. State the three (3) main function of Oxygen Scavengers used for Boiler Treatment (4mks)

QUESTION 5

- i. Mention five (5) impacts of industrial waste on the environment (5mks)
- ii. Discuss on the four processes of solids removal from industrial wastewater(9mks)
- iii. Define water and describe the three various states of water (6mks)