



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_2 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. What is a cooling system? (3mks)
- ii. Mention six (6) major classes of boilers based on its various classification (6mks) and state two example of each of them (6mks)
- iii. Discuss briefly on waste management (3mks)
- iv. State three reasons why the system needs to be cool (9mks)
- v. State three (3) main methods of waste collection (3mks)

QUESTION 2

- i. What is waste Recycling? (3mks)
- ii. Mention seven (7) sources of industrial waste water (7mks)
- iii. Discuss on the three (3) types of recirculation Water System (10mks)

QUESTION 3

- i. Define the term water cooling system (3.5mks)
- ii. What is industrial waste water treatment (4mks)
- iii. Discuss on at least five (5) components of the cooling system (12.5mks)

QUESTION 4

- i. List five types of pollution and discuss on each of them (10mks)
- ii. Identify the 3R in waste management and state six (6) advantages of it (10mks)

QUESTION 5

- i. Mention seven (7) Wastes that are commonly recycled and their various sources (10.5mks)
- ii. State the application of a closed cooling system (7.5mks)
- iii. State two (2) functions of using Water foaming in waste water treatment (2mks)