



**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 322

COURSE TITLE: WATER AND WASTEWATER MANAGEMENT

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. List five water contaminants and discuss their effects on man (7.5mks)
- ii. Differentiate between water guidelines and standards (3mks)
- iii. What is the essence of wastewater treatment? (2mks)
- iv. With a diagrammatic sketch, give a description of water softening system (13.5mks).
- v. What is the difference between water softening system and reverse osmosis? (4mks)

QUESTION 2

- i. Discuss on five water treatment (10mks)
- ii. Discuss on SIX (6) symptom and the means of transmissions of water borne diseases (4mks)
- iii. Discuss on the three (3) sources of water pollutant basic on their drainage discharge (6mks)

QUESTION 3

- i. Discuss on the history water treatment (5mks)
- ii. Differentiate between Granular activated carbon (GAC) and Solid block activated carbon filters (SBAC) (4mks)
- iii. Describe the on-site disposal and treatment system and discuss on the two (2) components of on-site sewage disposal system (6mks)
- iv. Mention the two (2) inorganic and three (3) disinfection by product chemicals of primary maximum contaminant with their level limit (5mks)

QUESTION 4

- i. State at least five water treatment technology (2.5mks)