



**National Open University of Nigeria**  
**Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja**  
**Faculty of Science**  
**POP EXAMINATION 2022\_2**

**COURSE CODE: ESM322**

**COURSE TITLE: Water and Waste Water Management**

**CREDIT: 2Units**

**TIME ALLOWED: 2 Hours**

**Instruction:** Attempt question number ONE (1) and any other TWO (2) questions. Question number one (1) carries 30marks, while the other questions carry (20) marks each.

- 1a). Give an explicit definition of the terms BOD and COD (**3marks**)
- 1b). Discuss the following properties of a water body
  - i. Dissolved oxygen(**7marks**)
  - ii. Turbidity and Suspended Solids (**10marks**)
- 1c). Define preliminary treatment and state its major function(**3marks**)
- 1d). Why is the bush latrine system not a treatment technique? (**2marks**)
- 1e). Draw and label a structure of a flush toilet system (**5marks**)
  
- 2a). What is fresh water? (**1mark**)
- 2b). List 7 sources of fresh water and three sources of saline water (**5marks**)
- 2c). In the course of travelling over the surface of the land discuss the pollutants that are present in water. (**10marks**)
- 2d). List the physiochemical systems often employed in treatment of non-biodegradable wastewater (**4marks**)
  
- 3a). Discuss the following types of secondary treatment systems;
  - i. Subsurface absorption fields(**8marks**)
  - ii. Evaporation transpiration/absorption (ETA) system(**8marks**)
- 3b). Explain the Operation and Institutional Requirements for A Septic Tank and Soak-Away System (**4marks**)
  
- 4a). Attempt the justification of water and waste management studies (**10marks**)
- 4b). With the aid of a diagram show the structure of a Septic Tank and Soak-Away System(**10marks**)
  
- 5a). Define the role of biological components in the aquatic ecosystem (**9marks**)

5b). Explain the scope of advanced wastewater treatment (**5marks**)

5c). Describe the action involved on the biological treatment of waste water (**4marks**)