



National Open University of Nigeria
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Science
2021_2 EXAMINATIONS

COURSE CODE: ESM 423

COURSE TITLE: Hydrology and Water Resources.

CREDIT: 3 Units

TIME ALLOWED: 2 Hours: 30 minutes

Instruction: Attempt question number ONE (1) and any other FOUR (4) questions. Question number one (1) carries 22 marks, while the other questions carry (12) marks each.

- 1a) What is the core and fundamental objective of hydrological studies? **(1mark)**
1b) Discuss the seven processes involved in water cycle. **(14marks)**
1c) Describe the characteristics of solid water and explain how it interacts in the biosphere **(7marks)**

2) Discuss the stages of hydrological development in the 17th and 19th centuries **(12 marks)**

- 3a) Diagrammatically illustrate the nine types of drainage patterns we have **(9marks)**
3b) Explain the run off within the drainage basin system **(3marks)**

4a) Complete the table with the appropriate term **(8marks)**

	is a rock layer that is permeable to groundwater flow in usable amounts
	is a body of rock that does not conduct water in usable amounts
	The zone of saturation is an unconfined aquifer i.e. where the gaps are filled with water
	A water-bearing layer that is not confined by an overlying impermeable layer.
	It is the contact surface or boundary between the zones of saturation and aeration
	Where gaps between soil are filled with both air and water
	The amount of water that can be held in the soil
	The rate at which water flows through the soil

4b) Diagrammatically illustrate the relationship between the four zones involved in ground water flow **(4marks)**

- 5a) Explain the role of wells in water table depletion **(7marks)**
5b) List the factors that cover influence input, output, and transport of sediment and water in a drainage **(5marks)**

- 6a) Explain the term surface water **(2marks)**
6b) Extensively discuss the scope of surface water pollution in urban and rural areas. **(10marks)**