UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2022/2023

COURSE NAME	:	WATERSHED MANAGEMENT
COURSE CODE	:	BNA 31903
PROGRAMME CODE	:	BNA
EXAMINATION DATE	:	JULY / AUGUST 2023
DURATION	:	3 HOURS
INSTRUCTION	:	1. ANSWER **ALL** QUESTIONS
		2. THIS FINAL EXAM IS CONDUCTED VIA **CLOSED BOOK**.
		3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

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Q1   (a)   List **FIVE (5)** objectives of watershed management.

(5 marks)

(b)   Discuss **FOUR (4)** classes of floodplain management.

(8 marks)

(c)   Explain **THREE (3)** short-term and long-term planning for watershed management.

(12 marks)

Q2   (a)   List out **THREE (3)** objectives of Integrated River Basin Management (IRBM).

(3 marks)

(b)   Sketch and demonstrate the concept of Integrated Flood Management (IFM).

(10 marks)

(c)   IRBM is a holistic approach to managing the natural resources of a river basin or catchment area, with the goal of achieving sustainable development and protecting the health and productivity of the ecosystem. Explain **SIX (6)** components in IRBM.

(12 marks)

Q3   (a)   During one year, the water balance for a lake consists of rainfall P = 1300mm/year, groundwater flow = 750 mm/year, surface inflow I = 40 mm/year, surface outflow O = 100 mm/year, and assuming the lake level remains constant. Calculate the net evaporation for the lake.

(4 marks)

(b)   National Water Balance System (NAWABS) was introduced by the Department of Irrigation and Drainage (DID) of Malaysia as a management tool for watershed resources in Malaysia. Show **SIX (6)** key components involved in NAWABS.

(9 marks)

(c) NAWABS has 9 key outputs which are related to SDG Indicators. Explain any **SIX (6)** key outputs of NAWABS .

(12 marks)

Q4 (a) Explain the aim of using MIKE 11, MIKE SHE, and MODFLOW software in water resource modeling.

(9 marks)

(b) Geographic Information Systems (GIS) and Remote Sensing are widely used in water resource management and modeling to support decision-making processes related to water resources. Explain the application of GIS and Remote Sensing in watershed management and flood management.

(10 marks)

(c) Show any **THREE (3)** activities in watershed rehabilitation for land use management.

(6 marks)

- **END OF QUESTIONS** -

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