050

The Open University of Sri Lanka

Faculty of Engineering Technology

Department of Agricultural & Plantation Engineering

Study Programme	: Bachelor of Industrial Studies Honours (Agriculture)
Name of the Examination	: Final Examination
Course Code and Title	: AGI6478-Hydrology and Water Resources
Academic Year	: 2023/2024
Date	: 08-02-2025
Time	: 1330-1630hrs
Duration	: 3 hours

Registration No : ..... .

INSTRUCTIONS

- This question paper consists of two sections. SECTION I and SECTION II

SECTION 1

- There are FIFTEEN (15) Structured Essay Questions. You are required to **answer all questions. Answers should be written in the space provided for each question.** No additional paper is provided. You may spend about **one hour** to answer this section.

SECTION 2

- There are SIX (06) Essay Type Questions. You are required to answer **ONLY FOUR** (04) questions. You may spend about **two hours** to answer the questions in this section.

Read the questions carefully before answering.

It is **EXTREMELY IMPORTANT** that you should not remove the **SECTION I** of the question paper from the examination hall.

Please note that you should write your registration number in the space provided above. Do not write your name.

SECTION 1: Answer all questions. Use the space give under each question.

1. Define 75% probability of rainfall.

2. Name **three (03)** components of Time series forecasting?

3. Explain the difference between the aquifer loss and well loss using a suitable diagram.

4. Draw and label the Wenner configuration of resistivity survey of Geophysical methods.

5. Draw and label the Cable tool or percussion drilling.

6. Give the maximum concentration in mg/l for the following parameters under the Quality criteria for drinking water for farm animals.

Nitrate Nitrogen

Mercury

Total dissolved solids

Arsenic

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7. Write **two (02)** main ways that aquifers may be artificially replenished.

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8. Draw a Hydrograph and name its components.

9. Show that every meter that the water table is above sea level fresh water will extend below sea level for 40 m in the coastal zone.

10. Precipitation station X was inoperative for part of a month during which a storm occurred. The respective storm totals at three surrounding stations A, B and C were 117, 98 and 120mm. The normal annual precipitation amount at stations X, A, B and C are 990, 1200, 950 and 1300mm. Estimate storm precipitation for station X.

11. Name **three (03)** shapes of frequency distribution curve.

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12. Define the following terms in Aquifer particle size analysis.

Effective size (D_{10})

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Uniformity Coefficient (U.C)

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13. Give the World Health Organization (WHO) standard of the following parameters for domestic water supply.

Dissolved Oxygen

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Arsenic

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Lead

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Chlorides

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Total dissolved solids

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14. What is meant by "Aquifuge"?

15. Write **three (03)** characteristics of an artesian aquifer

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SECTION 2: Answer any four (04) questions. All questions carry equal marks.

1. (a) Briefly explain the following in relation to the Hydrological Studies
   (i) Return period
   (ii) Risk
   (iii) Probability Distribution

   (15 marks)

   (b) A proposed village tank should have a desired life of 15 years. The designer wishes to take only 10% risk that the bund will be overtopped in these 15 years period. Determine the return period of the flood for which the bund should be designed.

   (10 marks)

2. (a) Briefly explain the Runoff Cycle with suitable diagram (10 marks)
   (b) Discuss the factors affecting the runoff (15 marks)

3. (a) Briefly explain the use of Parshall and Trapezoidal flumes in stream gauging with suitable diagrams. (10 marks)
   (b) Describe the types of current meters and their advantages and disadvantages in stream gauging. (07 marks)
   (c) Compute the discharge of the stream using the current meter measurements on velocity. and depth given below. (08 marks)

Depth(d) in m	0	0.3	1.2	2.1	2.5	2.2	1.6	1.4	1.0		0.6	0.4	0
Velocity (m/sec) at 0.2d	0	0.4	0.5	0.7	0.8	0.8	0.7	0.6	0.5		0.5	0.4	0
Velocity (m/sec) At 0.8d	0	0.2	0.3	0.5	0.6	0.3	0.5	0.4	0.3		0.3	0.3	0

4. (a) Briefly describe the construction of tube well in Sri Lanka (15 marks)
   (b) Describe the guidelines for well screen length specifications (10 marks)

5. Briefly explain the components of Hydrograph and the factors affecting the shape of the Hydrograph using suitable diagrams.

(25 marks)

6. Write short notes on any **three (03)** of the following.

   (i) Types of weirs and their use in stream gauging
   (ii) Drilling fluids
   (iii) Pumping Test
   (iv) Construction of open wells

(25 marks)

END OF PAPER