

BINDURA UNIVERSITY OF SCIENCE EDUCATION
FACULTY OF SCIENCE AND ENGINEERING

AEH 207

Department Of Engineering and Physics
Bachelor of Science (Honours) in Agricultural Engineering
Hydrology

3 HOURS (100 MARKS)

JUN 2025

INSTRUCTIONS

Answer any **FOUR** questions. Each question carries 25 marks.

Question 1

- a. Briefly explain the following terms as used in hydrology:
- | | |
|-----------------------------|-----------|
| i. Aquifer. | [2 marks] |
| ii. Evapotranspiration. | [2 marks] |
| iii. Runoff. | [2 marks] |
| iv. Hydraulic Conductivity. | [2 marks] |
| v. Streamflow. | [2 marks] |
| vi. Floodplain. | [2 marks] |
| vii. Climate Change | [2 marks] |
- b. What is a hydrograph? Describe its components and significance in hydrology.
[11 marks]

Question 2

- a. Explain factors that affect infiltration capacity on the surface of the ground.
[10 marks]
- b. Outline the instruments that are used to measure the following quantities and explain how each works.
- | | |
|--------------------|------------|
| i) Evaporation | |
| ii) Rainfall depth | [15 marks] |

Question 3

Rain gauges record point rainfall. Describe any four methods that can be used to convert this to areal rainfall.
[25 marks]

Question 4

- a) Explain the principles behind the Rational Method for estimating runoff. [15 marks]
b) How is it applied in agricultural engineering? [10 marks]

Question 5

- a) Discuss the principles of watershed management. [10 marks]
b) How do human activities affect watershed health, and what practices can mitigate negative impacts? [15 marks]

Question 6

- a) Explain what is groundwater recharge, and why is it critical for sustainable water supply?
c) Explain the factors that affect recharge rates. [25 marks]

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