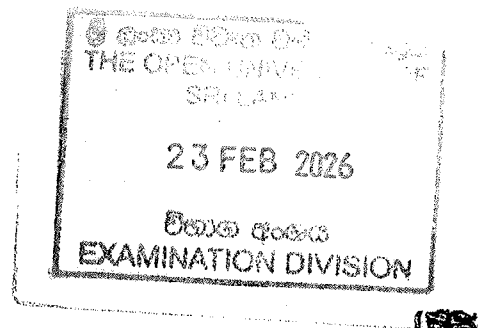




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The Open University of Sri Lanka  
Faculty of Engineering Technology  
Department of Agricultural & Plantation  
Engineering



|                         |                                                                                                                                       |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Study Programme         | : Bachelor of Science Honors in<br>Engineering (Agricultural Engineering) &<br>Bachelor of Industrial Studies Honors<br>(Agriculture) |
| Name of the Examination | : Final Examination                                                                                                                   |
| Course Code and Title   | : AGX5565-Soil Plant Water Relationship                                                                                               |
| Academic Year           | : 2024/2025                                                                                                                           |
| Date                    | : 23-02-2026                                                                                                                          |
| Time                    | : 0930-1230hrs                                                                                                                        |
| Duration                | : 3 hours                                                                                                                             |

Registration No: .....

Index No.....

## INSTRUCTIONS

This question paper consists of two sections.

### SECTION 1

Contains FIFTEEN (15) 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

1. Contains 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.
2. Read the questions carefully before answering.
3. It is **EXTREMELY IMPORTANT** that you do not remove the SECTION I of the question paper from the examination hall.
4. Please note that you should write your registration number in the space provided above. Do not write your name.
5. In case of doubt, please consult the supervisor or an invigilator conducting the examination.

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

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1. Define "Plant available water"

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2. Name the **three (03)** methods to control seepage.

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3. State **four (04)** components of soil water potential.

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4. Name **three (03)** basic elements of the cohesion theory for the ascent of sap in tall trees.

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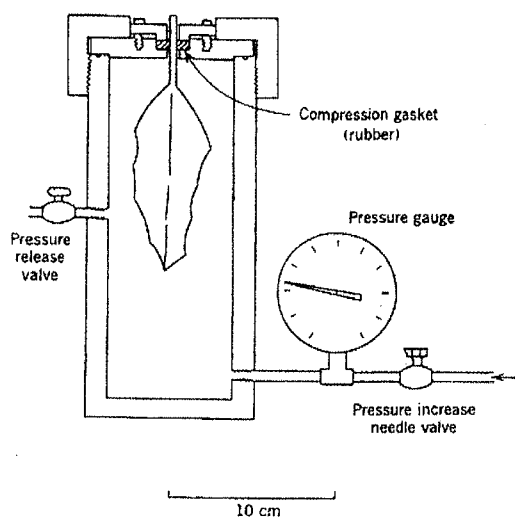
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5. Name the equipment shown below and briefly explain the uses of it.



6. Give **five (05)** methods that can be used to measure the rooting depth and root density in a soil profile.

7. Name **three (03)** types of Tensiometers.

8. Name the method based on dielectric constant in soil water measurement.

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**Answer questions 9-12 based on the information given here**

An area of 20 hectares is to be irrigated by a pump working for 11 hours a day. The available moisture holding capacity of the soil is 15cm/m and the depth of root zone is 1m. Irrigation is to be done when 50 per cent of the available moisture in the root zone is depleted. Water application efficiency is 75 per cent. Peak moisture used by the crops is 4mm (weighted average). Losses in water conveyance are negligible.

9. Determine the irrigation period?

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10. Determine the net depth of water application?

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11. Determine the depth of water pumped per application?

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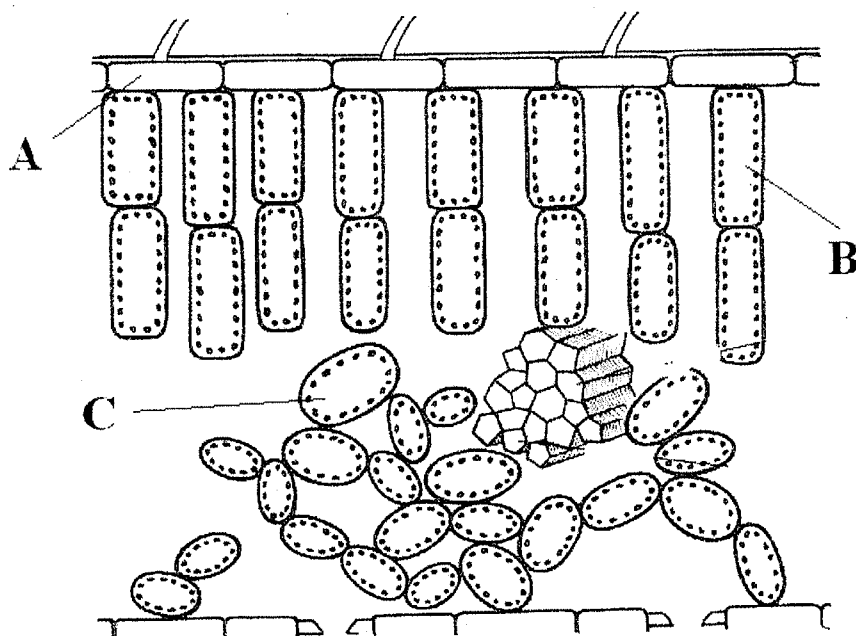
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12. Determine the required capacity of irrigation system?

13. Name three (03) parameters to measure water status in plants and write the equations for at least one parameter to calculate.

14. Name A, B and C in the diagram below and explain their functions on soil-water plant environment.



A

B

C

15. Name **two (02)** methods each for acidity control in higher and lower pH.

(i) Low pH

(ii) High pH



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**SECTION II -Answer any four (04) questions.**

- (1). (a) Briefly explain what "Infiltration"  
 (b) Discuss the factors affecting the infiltration
- (2). Briefly explain percolation, internal drainage, redistribution and seepage with suitable diagrams.
- (3). (a) Briefly explain Water Deficit and how water deficit develops in plants  
 (b) Explain briefly the effects of water deficit on plants.
- (4). Briefly describe the use of porous blocks, thermal dissipation blocks, gypsum blocks and watermark blocks in measurement of soil water with suitable diagrams.
- (5). (a) Briefly explain the thermal regime in soils using suitable diagram.  
 (b) Calculate the volumetric heat capacity of a soil with a bulk density of  $1.50 \text{ g/cm}^3$  when completely dry, when completely saturated. Assume that the density of solids is  $2.65 \text{ g/cm}^3$  and that organic matter occupies 15% of the solid matter (by volume).
- (6). Write a brief note on any **three (03)** of the following
  - (a) Types of soil degradation
  - (b) Reclamation of Acid Sulphate soil (ASS)
  - (c) Nitrogen Cycle
  - (d) Factors affecting the absorption of ions

**End of the paper**