

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



0042

Study Programme : Bachelor of Industrial Studies Honours (Agriculture)
Name of the Examination : Final Examination
Course Code and Title : AGI3450 Land and Soil Tillage Management
Academic Year : 2024/25
Date : 6th February 2026
Time : 09 30-12 30h
Duration : 3 hours



Index number

General instructions

1. Read all instructions carefully before answering the questions.
2. Answers should be in clear handwriting.
3. Do not use red colour pen.
4. This question paper consists of two (02) sections.

Section 1

- Consists of 15 questions in **six (06)** pages.
- Answer all questions.
- All questions carry equal marks.
- Write answers only in the space provided.
- Please do not remove the question paper from the examination hall.
- You may spend **one (01)** hour to answer this section.

Section 11

- Contain **six (06)** questions in **two (02)** pages.
- Answer any **four (04)** questions.
- You may spend **two (02)** hours to answer this section.
- All questions carry equal marks.
- Answer for each question should commence from a new page.

SECTION 1

1. What are the major **four (4)** components of soil with percentages?

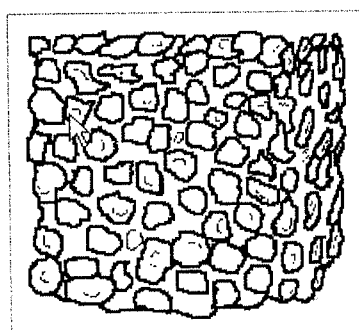
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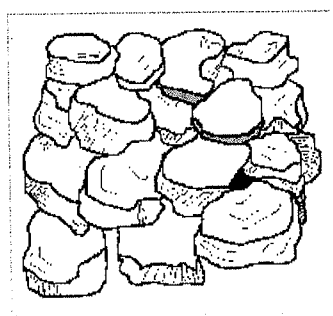
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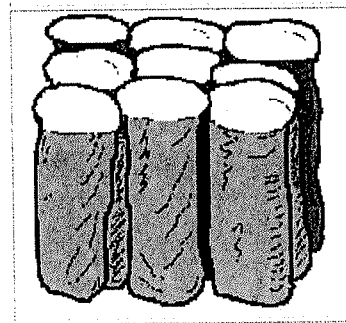
2. Identify the soil structural types given below.



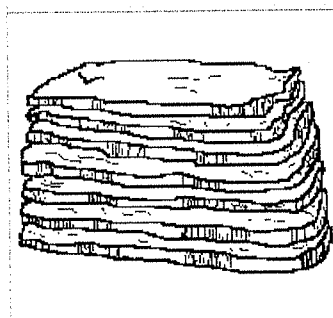
A



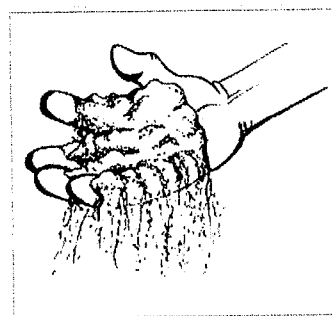
B



C



D



E

A

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E

3. Define soil porosity.

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4. Arrange sand, silt, and clay soils in increasing order of porosity.

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5. A soil sample has a bulk density of 1.45 g cm^{-3} and a particle density of 2.65 g cm^{-3} . Calculate the soil porosity (%).

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6. Briefly explain how land levelling affects irrigation efficiency.

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7. Name **three(3)** implements used for land levelling.

- i.
- ii.
- iii.

8. What is meant by "**Land reclamation**"?

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9. List **three (3)** Reasons for the formation of saline soil.

- i.....
- ii.....
- iii.....

10. Which tillage operation is required before seedbed preparation? Justify your answer.

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11. Which primary tillage implement is most suitable for a field with many obstacles such as stones and crop residues? Give a reason.

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12. What do you understand by "No tillage land preparation?"

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13. What is the specific function of the parts of given elements below in tillage practices?

Shear in the Mouldboard plough:

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Landslide in the Mouldboard plough:

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Frog in the Mouldboard plough:

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Scrapers of Disc plough:

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Disc angles (Horizontal or vertical) of Disc plough:

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14. State the function of the seed metering mechanism.

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15. List three (3) advantages and four (2) disadvantages of Transplanting.

Advantages:

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Disadvantages:

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SECTION 2: Answer any four (04) questions.

1. a) Explain how soil texture affects porosity, aeration, and water movement in sandy, loamy, and clayey soils.
(10 marks)

b) A soil core sample has a total volume of 2.0 cm^3 , including both soil solids and pore spaces. The oven-dry mass of the sample is 2.90 g. Calculate the bulk density of the soil.
(5 marks)

c) If the soil solids from part (b) are compressed to remove all pore spaces, the volume of the solids alone is 1.10 cm^3 . Calculate the **particle density** of the soil.
(5 marks)

d) Using the bulk density calculated in part (b) and the particle density calculated in part (c), determine the **porosity (%)** of the soil.
(5 marks)
2. Discuss how physical, chemical, and biological soil properties interact to support healthy plant growth.
(25 marks)
3. a) Define the following terms use in land levelling
(5 marks)
 - i) Bench mark
 - ii) Back sight
 - iii) Turning Point

b) Discuss how land levelling affects water distribution, water use efficiency, and drainage in agricultural fields.

(10 marks)

c) The table below shows a segment of a booking table of a level line. Complete the table with the missing data. All the values are in meters.

(10 marks)

B. S.	F. S.	HI	Reduced Level	Remarks
1.682			471.314	Bench mark
1.955	0.145			Point 1
0.890	0.537			Point 2
0.700	0.285	0.607		Point 3

4. Define land use planning and discuss its importance in agriculture and sustainable development.
5. a) Discuss the role of proper land and soil tillage management in improving soil health and crop yield.
b) Explain the benefits and possible problems caused by poor tillage practices
6. Write short notes on following **three (3)** topics.
 - i) Land levelling equipment
 - ii) Methods of soil moisture conservation in agriculture
 - iii) Advantages and disadvantages of transplanting
 - iv) Difference between disc plough and moldboard plough
 - v) Formation of saline soil

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