

Faculty of Agriculture

End Semester Examination May 2025

AG3CO28 Problematic Soils & Their Management

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|------------------|---|----------------|------------------------------|---|----|
| Programme | : | B. Sc. (Hons.) | Branch/Specialisation | : | AG |
| Duration | : | 3 hours | Maximum Marks | : | 50 |

Note: All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary.
 Notations and symbols have their usual meaning.

Section 1 (Answer all question(s))

Q1. The capacity of soil to function as a vital living system within land use boundaries is known as-

Marks CO BL
1 1 2

| Rubric | Marks |
|-----------------|--------------|
| d) Both a and b | 1 |

- Soil health Soil quality
 Both (A) and (B) None of these

Q2. Productivity and sustainability of any production system depend upon-

1 1 2

| Rubric | Marks |
|------------------|--------------|
| All of the above | 1 |

- Management practices Environment
 Soil quality All of the above

Q3. Salt affected soils of the arid regions belong to the order-

1 2 1

| Rubric | Marks |
|---------------|--------------|
| Aridisols | 1 |

- Alfisols Gellisols
 Vertisols Aridisols

Q4. Which is the dominant clay mineral in the salt affected soils of the Indo Gangetic Plains?

1 2 1

| Rubric | Marks |
|---------------|--------------|
| Mica | 1 |

- Vermicellite Mica
 Both (A) and (B) None of the above

Q5. The quality of irrigation water differs in various regions based on-

1 3 2

| Rubric | Marks |
|------------------|--------------|
| All of the above | 1 |

- The groundwater quality The rainfall intensity
 Aquifer recharge All of the above

Q6. Which category of Residual Sodium Content (RSC, meq/l-1) is considered safe-

1 3 1

| Rubric | Marks |
|----------------|-------|
| Less than 1.25 | 1 |

- Less than 1.25
- 1.25-2.50
- Greater than 2.5
- None of these

Q7. Remote sensing technique for problematic soil assessment includes-

1 4 3

| Rubric | Marks |
|------------------|-------|
| All of the above | 1 |

- Multispectral imaging
- Hyperspectral imaging
- Drone based remote sensing
- All of the above

Q8. GIS technique for problematic soil assessment includes-

1 4 3

| Rubric | Marks |
|--------------|-------|
| Soil mapping | 1 |

- Soil mapping
- Spectroscopy
- Thermal imaging
- None of the above

Q9. The benefits from multipurpose tree species includes-

1 5 2

| Rubric | Marks |
|--------|-------|
| All | 1 |

- Food
- Cash
- Social production
- All of these

Q10. Which among the following is a bioremediation technique?

1 5 3

| Rubric | Marks |
|------------------|-------|
| All of the above | 1 |

- Phytoextraction
- Phytostabilization
- Rhizofiltration
- All of the above

Section 2 (Answer all question(s))

Marks CO BL

Q11. What do you understand by wasteland?

1 1 2

Q12. What are the causes of wasteland formation?

2 1 4

Q13. (a) Discuss soil quality indicators.

5 1 5

(OR)

(b) Classify cultivable and uncultivable wastelands.

| Rubric | Marks |
|------------------------------------|-------|
| cultivable wastelands. 2.5 marks | |
| uncultivable wastelands. 2.5 marks | 5 |

Section 3 (Answer all question(s))

Marks CO BL

Q14. Write the formula for exchangeable sodium percentage (ESP) and sodium adsorption ratio (SAR).

1 2 1

Q15. What are the major sources of salinity and alkalinity?

3 2 2

Q16. (a) Discuss various reclamation management techniques in saline soils.

4 2 3

(OR)

(b) How acid sulphate soils are formed? How it can be managed?

| Rubric | Marks |
|---|-------|
| How acid sulphate soils are formed? 2 marks | 4 |
| How it can be managed? 2 marks | |

Section 4 (Answer all question(s))

Marks CO BL

Q17. Write the formula for residual sodium carbonates (RSC) in meql-1.

2 2 1

Q18. (a) Enlist the basic criteria for evaluating water quality for irrigation purposes.

6 3 4

(OR)

(b) Discuss the management methods of salinity problems in irrigation water.

Section 5 (Answer all question(s))

Marks CO BL

Q19. What do you understand by remote sensing technique?

2 4 2

Q20. Write Geographic Information Systems.

2 4 2

Q21. (a) Discuss the remote sensing and GIS technique for problematic soil assessment.

4 4 3

| Rubric | Marks |
|---|-------|
| remote sensing technique for problematic soil assessment. 2 marks | 4 |
| GIS technique for problematic soil assessment 2 marks | |

(OR)

(b) Discuss the challenges and opportunity of using remote sensing and GIS to manage problematic soil.

| Rubric | Marks |
|--|-------|
| challenges of using remote sensing and GIS to manage problematic soil. 2 marks | 4 |
| opportunity of using remote sensing and GIS to manage problematic soil 2 marks | |

Section 6 (Answer any 2 question(s))

Marks CO BL

Q22. What are multi-purpose tree species (MPTs)? Discuss characteristics of MPTs using suitable examples.

4 5 3

| Rubric | Marks |
|--|-------|
| What are multi-purpose tree species (MPTs)? 2 marks | 4 |
| Discuss characteristics of MPTs with examples. 2 marks | |

Q23. Discuss bioremediation of problematic soils.

4 5 2

Q24. Define land capability. Elaborate land suitability classification.

4 5 3

| Rubric | Marks |
|--|-------|
| Define land capability. 1 marks | 4 |
| Elaborate land suitability classification. 3 marks | |
