BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – M.Sc.(AG)-Agronomy-2025
Course Name – Management of Problematic Soils and Water
Course Code - SOIL511(T)
(Semester II)

Full Marks : 40 **Time : 2:0 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 10=10

1. *Choose the correct alternative from the following :*

(i) Identify the soil pH range of acid soils.

a) >8.5 b) 7.0–7.5
c) <7.0 d) Exactly 7.0

(ii) Recognize the climatic region where saline soils are common.

a) Humid b) Per-humid
c) Arid and semi-arid d) Alpine

(iii) Indicate the dominant ion in sodic soils.

a) Ca^{2+} b) Mg^{2+}
c) Na^{+} d) K^{+}

(iv) Interpret the reason for restricted crop growth in saline soils.

a) Structural collapse b) Osmotic stress
c) Aluminium toxicity d) Iron deficiency

(v) Relate soil sodicity to soil structure.

a) Improves aggregation b) Causes dispersion of clay
c) Increases porosity d) Enhances infiltration

(vi) Differentiate physical and chemical properties of saline soils.

a) Structure vs texture b) Salinity vs sodicity
c) High EC vs normal structure d) High ESP vs low EC

(vii) Select the suitable amendment for reclaiming sodic soils.

a) Lime b) Gypsum
c) Farmyard manure d) Urea

(viii) Explain the occurrence of acid soils globally.

a) In high rainfall and high temperature regions b) In cold and dry regions
c) In coastal and saline regions d) In arid regions

(ix) Identify the concentration of boron in irrigation water that is considered safe for sensitive crops.

a) <0.33 ppm
b) <1.00 ppm
c) <0.67 ppm
d) >1.00 ppm

(x) Select the correct cropping practice for managing soil salinity in coastal areas.

a) Choose rice and barley rotation
b) Use salt-tolerant varieties like quinoa
c) Apply excess irrigation
d) Grow crops with deep roots

Group-B

(Short Answer Type Questions) 2.5 x 6=15

2. List any four major types of problem soils in India and indicate one key diagnostic feature of each. (2.5)
3. Differentiate between saline and sodic soils based on ECe, ESP, and pH. (2.5)
4. Explain why sandy soils are considered problematic for crop production. (2.5)
5. Calculate ESP if exchangeable Na^+ is 6 cmol(+) kg^{-1} soil and CEC is 30 cmol(+) kg^{-1} soil. (2.5)
6. Justify the use of integrated soil management practices in acid soils. (2.5)
7. Characterize acid soils based on chemical constraints affecting crop growth. (2.5)

OR

Distinguish between primary and secondary salinization processes. (2.5)

Group-C

(Long Answer Type Questions) 5 x 3=15

8. Analyze the factors responsible for the formation and distribution of problem soils in India. (5)
9. Compare the effectiveness of chemical amendments and agronomic practices in managing saline soils. (5)
10. Differentiate saline and sodic soils by relating EC, pH, and ESP to soil physical degradation. (5)

OR

Analyze the pedogenic, climatic, and management-related factors responsible for the development of acid soils in humid and sub-humid regions. (5)

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