

B.Sc. (Ag.) Honours Semester-II Examination, 2019
Course No: SSC-121 (Old)
(Soil Chemistry, Soil Fertility and Nutrient Management)

Signature of Centre Superintendent

Roll No. : (in figure) _____ (in words) _____

Student Index No. _____ Regn. No. _____ of _____

Time : Two Hours

Full marks : 40

Questions are of value as indicated in the margin

Part - I
(Objective and Short Answer Type)
(Use only ball point pen)

Time : 20 minutes

Full marks : 10

- Note:** 1. Answer in question paper itself.
2. Striking, rewriting or overwriting are not allowed in the objective type questions.

1. **State True (T) or False (F) in respect of the following statements (*any five*):** 0.5×5=2.5
- a) Macronutrients are more important for crops than micronutrients. ☐
 - b) Hollow heart of cauliflower is caused due to deficiency of Mo. ☐
 - c) Available P of a soil with pH 7.0 can be measured using Olsen's extractant (0.5 M sodium bicarbonate). ☐
 - d) Among micronutrients Fe deficiency is the most widespread in Indian soil. ☐
 - e) ESP > 15 for alkali soil. ☐
 - f) In soil testing, soil analysis is more important than soil sampling. ☐
 - g) Saline and alkali soils originate under arid climate. ☐
2. **Fill up the blanks with most appropriate words (*any five*):** 0.5×5=2.5
- a) Osmotic potential of irrigation water with EC 2.0 dS m⁻¹ would be _____ (in bar).
 - b) Soil test based fertilizer recommendation for targated yield of crops was first introduced in India by _____.
 - c) pH of DTPA-CaCl₂-TEA solution for extraction of cationic micronutrients is _____.
 - d) Boron is absorbed by plant roots in the form of _____.
 - e) DRIS approach was given by _____.
 - f) A soil which has pH < 8.5, ESP < 15 and EC > 4 dS m⁻¹ at 25°C in saturated condition is called _____.
 - g) Khaira disease of rice occurs due to deficiency of _____.

P.T.O.

3. **Tick (✓) the correct alternatives (any ten):**

0.5×10=5.0

- a) Permissible limit of RSC (me l^{-1}) in irrigation water up to which gypsum application is not recommended –
 - i) 2.5 ii) 3.5 iii) 4.5 iv) 5.5
- b) Which micronutrient is fixed on the same sites of the soil colloids similar to phosphate?
 - i) Boron ii) Copper iii) Zinc iv) Molybdenum
- c) For tobacco crop, the preferred potassic fertilizer is
 - i) Potassium nitrate ii) Potassium chloride
 - iii) Potassium sulphate iv) Potassium iodate
- d) Amount of micronutrients required by various crops can be arranged as
 - i) $\text{Fe} > \text{Mn} > \text{Zn} > \text{Cu} > \text{Mo}$ ii) $\text{Mn} > \text{Zn} > \text{Fe} > \text{Cu} > \text{Mo}$
 - iii) $\text{Fe} > \text{Zn} > \text{Mn} > \text{Cu} > \text{Mo}$ iv) $\text{Mo} > \text{Cu} > \text{Zn} > \text{Mn} > \text{Fe}$
- e) Which of the following is not a secondary nutrient –
 - i) Ca ii) Mg iii) Mn iv) S
- f) If 3 ml of 1 N $\text{K}_2\text{Cr}_2\text{O}_7$ solution was consumed for oxidation of organic present in 1(one) g soil, the organic carbon percentage of the soil is –
 - i) 0.3 ii) 0.6 iii) 0.9 iv) 1.2
- g) Solution A has pH of 5 and solution B has pH of 7. The active acidity of solution A is how many times greater than that of solution B?
 - i) 2 times ii) 10 times iii) 20 times iv) 100 times
- h) Which of the following is boron containing mineral –
 - i) Zircon ii) Tourmaline iii) Biotite iv) Tale
- i) 'Hidden hunger' means –
 - i) Deficiency symptoms are seen when the nutrient is deficient.
 - ii) Significant yield reduction may occur without appearance of deficiency symptoms.
 - iii) The nutrient is not deficient but apparently seems to be deficient.
 - iv) Visual deficiency symptoms are suppressed by other element.
- j) Amount of K in plant is –
 - i) 8.0 to 15.0% ii) 10.0 to 19.0% iii) 0.1 to 0.5% iv) 0.5 to 5.0%
- k) Degree of soil salinity is indicated by its –
 - i) Total soluble salt content ii) Organic matter content
 - iii) Nitrogen content iv) Phosphorus content
- l) Diphenyl amine is an indicator, which is used for determination of
 - i) Organic carbon ii) Phosphorus
 - iii) Potassium iv) Iron
- m) Nutrient index is used to prepare –
 - i) Soil productivity map ii) Soil fertility map
 - iii) Soil acidity map iv) Soil salinity map

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Part - II
(Descriptive Type)

Time : 100 Minutes

Full marks : 30

Questions are of value as indicated in the margin

Answer *any four* questions of which *Question No. 9 and 10 are compulsory.*

4. State the criteria of essential plant nutrient. Which form of N, P and Mo are taken up by plants? State the factors affecting availability of cationic micronutrients in soil.
2+1.5+4=7.5
 5. Name different approaches of soil fertility evaluation. Describe in details about the biological methods of soil fertility evaluation.
1.5+6=7.5
 6. State and explain different forms of acidity in soil. Give an account of different measures of reclamation of soil acidity for crop production.
2.5+5=7.5
 7. How the quality of irrigation water be judged in respect of salinity hazard, sodium hazard and boron concentration? How can organic matter help in managing saline irrigation water?
6+1.5=7.5
 8. State the factors influencing use efficiency of N fertilizers. How can the use efficiency of N fertilizers be improved?
2.5+5=7.5
 9. Differentiate between the following (***any three***):
2.5×3=7.5
 - a) Lime requirement and gypsum requirement
 - b) Essential and beneficial elements
 - c) Agronomic efficiency and internal utilization efficiency
 - d) Soil testing and plant analysis
 - e) Mass flow and diffusion of plant nutrient in soil.
 10. Write short notes on the following (***any five***):
1.5×5=7.5
 - a) Write two important function of K in plants.
 - b) Indicator plant
 - c) Root interception
 - d) Black alkali soil
 - e) Residual sodium carbonate (RSC)
 - f) Leaching requirement
 - g) Crop logging
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