

B.Sc. (Ag.) Honours Semester-II Examination, 2017
Course No: SSC-121 (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 the following statements (any five):** 5×0.5=2.5

- (i) In acid soil availability of P and B is high. ☐
- (ii) Salt affected soils are mostly formed in arid and semiarid climate. ☐
- (iii) Good quality irrigation water must be applied before application of gypsum for reclaiming alkali soil ☐
- (iv) Ammonical fertilizers contribute towards the development of soil acidity. ☐
- (v) Rice crop is considered as low salt tolerant whereas pulses have high salt tolerant capability. ☐
- (vi) Soluble Sodium per cent below 60% is safe for crops. ☐
- (vii) If water contains higher concentration of HCO_3^- ion, there is a tendency for Ca and Mg to precipitate as carbonates result an increase in the SAR value. ☐

2. **Fill up the blanks with most appropriate words (any five):** 5×0.5=2.5

- (i) In root nodules anaerobic condition is created by _____.
- (ii) Phosphorus availability is highest at pH _____.
- (iii) Activity ratio of potassium = _____.
- (iv) Example of an ultra micronutrient is _____.
- (v) Characteristic disease for Mn deficiency is _____.
- (vi) The whole dried plant material analysis is known as _____ analysis of crop.
- (vii) The plant tissue is dried in air or in oven at _____ to _____ °C in either case protected carefully from fumes for plant analysis.
- (viii) Composition of Olsen's extractant is _____.

P.T.O.

(2)

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

10×0.5=5.0

- (i) CCE (%) of $\text{Ca}(\text{OH})_2$ is (a) 179 (b) 135 (c) 86 (d) 109
- (ii) Saline soil have SAR (a) >13 (b) <13 (c) >15 (d) <15
- (iii) If pH <8.5, EC >4 dSm^{-1} , ESP > 15%, the soil will be –
(a) Acid (b) Saline-sodic (c) sodic (d) Calcareous
- (iv) Liming to acid soil mainly satisfies
(a) Active acidity (b) Reserve acidity (c) Salt replaceable acidity (d) None
- (v) Soluble salts (me/litre) of irrigation water = EC (dS m^{-1}) × -
(a) 10 (b) 20 (c) 30 (d) 40
- (vi) Whiptail of cauliflower is caused due to deficiency of
(a) Mn (b) Mo (c) B (d) Cu
- (vii) At pH >8 dominant form of phosphorus is
(a) H_3PO_3 (b) H_2PO^- (c) HPO_4^- (d) PO_4^{3-}
- (viii) In soil fertility evaluation, *Aspergillus niger* test is done for
(a) Ca, P & K (b) P & K (c) N & K (d) N & P
- (ix) Sunflower pot culture techniques indicate the nutrient like
(a) Na (b) K (c) B (d) Mn
- (x) If the EC values of drainage water and irrigation water are 4 and 2 dSm^{-1} respectively, the Leaching Requirement (LR) of the saline soil will be %
(a) 2.5 (b) 0.5 (c) 1.5 (d) 2.0
- (xi) Khaira disease of rice is caused by deficiency of –
(a) Zn (b) Mo (c) S (d) B
- (xii) Mg is a major part of
(a) Nucleus (b) Chlorophyll (c) Mitochondria (d) Cell wall
- (xiii) Bray No. 2 is used for determination of available phosphorus in
(a) Acid soil (b) Saline soil (c) Saline-alkali soil (d) Sodic soil

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Course No: SSC-121
(Soil Chemistry, Soil Fertility and Nutrient Management)

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. What do you mean by 'essential nutrients'? State the criteria of essentiality as proposed by Arnon and Stout (1939). Briefly write down the function, available forms and deficiency symptoms of one macronutrient, one secondary nutrient and one micronutrient. 1.5+6=7.5
 5. Briefly state the characteristics of saline soil and alkali soil. How do soil salinity and alkalinity affect plant growth? Write a short note on reclamation and management practices of alkali soil. 2.5+2.0+3.0=7.5
 6. Briefly describe the Biological methods of soil fertility evaluation. How will you differentiate between total elemental analysis and plant tissue analysis? "What are role of Indicator plants for developing the nutrient deficiency symptoms? 3+2+2.5=7.5
 7. (a) What do you mean by quality of irrigation water? Mention the criteria of an irrigation water to be suitable for irrigation purpose. Mention the important parameters along with ratings to adjudge the quality of irrigation waters.
(b) Calculate the R.S.C. value of irrigation water containing $CO_3^{=}$ 7me/l, HCO_3^{-} 2me/l, Ca^{++} 3me/l and Mg^{++} 4me/l. Find the suitability class of irrigation water based on the result. 6+1.5=7.5
 8. Mention the objectives of soil testing. Describe in brief the principles for determination of pH, organic C and available potassium content on soil. 2.5+5.0=7.5
 9. Write differences between the following (**any three**) 3×2.5=7.5
 - (i) SAR and ESP
 - (ii) Active acidity and potential acidity
 - (iii) Laboratory and Green house test for soil fertility evaluation
 - (iv) Microbiological test for soil fertility evaluation
 - (v) Leaching requirement and Gypsum requirement
 10. Write short notes on the following (**any five**) : 5×1.5=7.5
 - (i) Luxury consumption
 - (ii) Dynamic equilibrium between different forms of potassium in soil
 - (iii) Effect of soil pH on phosphorus availability
 - (iv) Calcium carbonate equivalent
 - (v) Calcareous soil
 - (vi) Acid sulphate soil
 - (vii) Degraded alkali soil
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