

**M.Sc.(Ag.) Semester – I Examination, 2014**

**Soil Science and Agricultural Chemistry**

**Course : SSC – 509**

**(Analytical Techniques & Instrumental Methods in Soil & Plant Analysis)**

**Time: 3 Hours**

**Full Marks: 50**

*Questions are of value as indicated in the margin.*

Answer **any five** questions.

1. Draw the tentative graphs and appropriate indicators of the following titration (**any five**): 2×5=10
  - i) HCl and NaOH
  - ii) CH<sub>3</sub>COOH and NaOH
  - iii) H<sub>2</sub>SO<sub>4</sub> and NH<sub>4</sub>OH
  - iv) H<sub>2</sub>SO<sub>4</sub> and NaOH
  - v) NaCl and AgNO<sub>3</sub>
  - vi) (COOH)<sub>2</sub> and KMnO<sub>4</sub>
2. Write the differences between the following (**any five**): 2×5=10
  - i) Deionized and distilled water
  - ii) Primary and Secondary standard
  - iii) Internal and External indicator
  - iv) Wet and dry digestion of plant
  - v) Non polar and polar solvent
  - vi) Potentiometric and conductometric titration
  - vii) Normal and Molar solution
3. Write down the preparation of the following solution (**any five**): 2×5=10
  - i) 0.2 (M) 500ml NaOH
  - ii) 0.1 (N) 250ml KMnO<sub>4</sub>
  - iii) 0.5 (N) 500ml K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>
  - iv) 0.1 (N) 250ml (concentrated HCl, 12N)
  - v) 2 (M) 500ml KCl
  - vi) 100 ppm K<sup>+</sup> from KCl solution
  - vii) 2 ppm SO<sub>4</sub><sup>=</sup> from K<sub>2</sub>SO<sub>4</sub> solution

P.T.O.

4. i) Define the following terminology in chromatography (a) mobile and stationary phase (b) retention time (c) retardation factor ( $R_f$ ).  
ii) Mention the chemicals and glasswares for column chromatography and thin layer chromatography.  
iii) Write short note on Law of Mass action. 4+3+3=10
5. Draw the flow chart of the chromatographic instrument GLC and write different detectors of GLC. 10
6. Explain the principle of working of a flame photometer and draw a line diagram of a flame photometer and label its parts. Describe the function of each component. 10
7. Write short notes on (*any four*) the following: 2.5×4=10  
i) Combustion flame or fuel in AAS.  
ii) Hollow cathode lamp  
iii) Hydride generator  
iv) Neslor's reagent  
v) Masking and demasking reactions
8. (a) What is the basic principle of colorimetric analysis?  
(b) Describe the components (with line diagram) of colorimeter and discuss the functions of each component.  
(c) What are the basic precautionary measures in colorimetric analysis? 3+4+3=10
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