INSTRUCTIONS

Answer ALL Questions

Q 1 (a) Differentiate between:
- (i)   Bulk density and particle density
- (ii)   Aggregate stability and soil consistence
- (iii)   Volumetric water content and degree of saturation
- (iv)   Silty soil and clay soil

(8 marks)

(b) (i)   Define soil structure and describe the fields of soil structure as observed in the field, giving examples of each.   (10 marks)

(ii)   Briefly discuss the concept of zero or minimum tillage and relate its importance to agricultural productivity.   (6 marks)

Q 2 (a)   Explain what you understand by the term 'Soil texture", and enumerate the importance of the property in land utilization for agricultural productivity.   (10 marks)

(b) (i)   Outline the dispersion and sedimentation processes of particle size analysis.   (8 marks)

(ii)   What purpose does the textural triangle serve?   (2 marks)

(iii) Briefly discuss the limitations of Stoke's law in the sedimentation process of the analysis in (i) above.   (8 marks)

(c)   A soil has a bulk density and particle density of 1.32 and 2.65 g/cm³, respectively.
Determine:
- (i)   The soil fraction attributed by the soil solids (Vs)
- (ii)   The volume fraction attributed by the pore space, porosity (Vv)
- (iii)   Volumetric water content of the soil at saturation (θv)
- (iv)   Gravimetric water content of the soil at saturation (θm)

(8 marks)