The Open University of Sri Lanka
Faculty of Engineering Technology
Diploma/Degree in Technology (Agricultural Engineering) and Industrial Studies (Agriculture)

Final Examination- 2015/2016

AEX5232 Soil Plant Water relationship

Date : 24-11-2016
Time : 9.30-12.30

SECTION II -Answer any four (04) questions

1. (a) Briefly explain factors affecting the choice of an drainage system.

   (b) Discuss the different components of subsurface irrigation system.
   (c) Develop an equation for calculation of spacing between drains using clearly labelled diagram.

2. (a) Briefly explain the thermal regime in soils using suitable diagram.

   (b)Calculate the volumetric heat capacity of a soil with a bulk density of 1.50 g/cm^3 when completely dry, when completely saturated. Assume that the density of solids is 2.65 g / cm^3 and that organic matter occupies 15% of the solid matter (by volume).

3. (a) Briefly analyse and describe the soil-plant- atmosphere continuum concept using detail diagram.
   (b) Briefly explain the movement of water from leaves to air using suitable diagrams

4. (a) Define the "soil water potential", and briefly explain the components of soil water potential using a table indicating the factors affecting the potential energy, reference state and sign.

   (b) A soil in which the liquid the water is in equilibrium with a water table at- 80cm and the reference level is chosen as – 80cm. Find the values for all the components of water potential for a 110cm soil profile.

(c) If the reference level is soil surface in above question in section (b) find the values for all the components of water potential.

5. (a) Briefly explain the accumulation of ions in root cells

(b) Critically analyse the factors affecting the absorption of ions by plants

6. (a) Briefly explain the types of consumptive use and the factors affecting the consumptive use of plants

(b) An area of 20 hectares is to be irrigated by a pump working for 12 hours a day. The available moisture holding capacity of the soil is 16cm/m and the depth of root zone is 1m. Irrigation is to be done when 50 per cent of the available moisture in the root zone is depleted. Water application efficiency is 70 per cent. Peak moisture used by the crops is 4mm (weighted average). Losses in water conveyance are negligible.
(i) Determine the irrigation period?
(ii) Determine the depth of water pumped per application
(iii)Determine the net depth of water application?
(iv)Determine the required capacity of irrigation system?

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