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

Final Examination- 2008

AEX5232 Soil Plant Water Relationship

Date : **17-03-2009**
Time : **9.30-12.30**

SECTION II

(1) Briefly discuss how the soil physical properties influence on soil water storage and movement.

(2) (a) Distinguish between steady and unsteady water movement

(b) Consider a case of steady downward percolation through a two layered soil profile, the top of which is submerged under a 1m head of water and the bottom of which is defined by a water table. Each of the two layers is 50 cm thick. In the one case, the conductivity of the top layer is 10^{-4} cm/sec and that of the sub layer is 10^{-5} cm/sec. Calculate the flux, and the hydraulic and pressure heads at the interface between the layers.

(3) (a) Write a brief note on the principle processes of the absorption of salt by plants.

(b) Explain the differences between non-metabolic absorption exchange and metabolic or active uptake ion accumulation processes in a plant.

(4) (a) Write a short essay on factors affecting transpiration

(b) Explain the available methods of measuring transpiration.

(5) (a) Write a brief account on "heavy metal pollution in soil"?

(b) Write a short note on eutrophication process of a lake

(6) (a) Explain how the lack of aeration affects on crop production.

(b) Consider a cropped field with an effective root zone depth of 60 cm, a daily transpiration rate of 4 mm, and a daily soil respiration rate of 10g $0_2/m^2$. Calculate what fraction of the oxygen requirement is supplied by convection if air is drawn from the atmosphere in immediate response to the pressure deficit created in the soil by the extraction of soil moisture. (Molecular weight of oxygen is 32 and 22.4 liter is the volume of 1 mole of gas at standard temperature and pressure).