Uva Wellassa University, Sri Lanka

End Semester Examination – February/March 2012

SCT 211-2 General Physiology/ SCT 211-2 General Physiology (Repeat)

Time: Two (02) hours

Total **five (05)** Questions.

Answer **four (04)** questions including the question number **one (01)**.

1.

i. State the difference between passive diffusion and facilitated diffusion? (03 marks)

ii. Illustrate diagrammatically the water movement pathways from soil to xylem through the root system. (06 marks)

iii. What is guttation? (04 marks)

iv. Experimental procedure that was followed by a group of students to find out Ψ_s of a plant cell is as follows. *Rhoeo* lower epidermal peel cell was isolated (Ψs is unknown) and put in to X moldm^{-3} NaCl solution (i=2). At the equilibrium the cell was transferred into a certain solution (con. 0.1moldm^{-3}, i= 1) and kept until it reached to incipient plasmolysis stage. At the incipient plasmolysis stage (assume that the cell was in equilibrium with the solution at the incipient plasmolysis stage) the cell was taken out from the solution and put again in to pure water container. (Note: At the X moldm^{-3} solution Ψ_p of the cell = +0.125 MPa)

$\Psi_s = -miRT$ (R=8.314 cm^3·MPa·K^{-1}·mol^{-1}, temperature = 25^{o}C)

a. Calculate the concentration of the solution (con. X) and Ψ_s of the cell. (10 marks)

b. What is the water potential (ψ_w) of the cell after putting into pure water container?

(02 marks)

15

2.

i. What is meant by transpiration? (02 marks)

ii. Write down **three** advantages of transpiration to the plant. (03 marks)

iii. List out the adaptations of plants to reduce transpiration. (05 marks)

v. Explain H^+/K^+ pump hypothesis in order to close the stomata. (15 marks)

3.

i. Write down the complete equation for photosynthesis. (03 marks)

ii. What are antenna complexes? (04 marks)

iii. Compare the differences between C3 photosynthesis and C4 Photosynthesis. (08 marks)

iv. Briefly explain the Calvin cycle reactions. (10 marks)

4.

i. Name the phosphorylation processes found in cellular respiration. (02 marks)

ii. State the function of cytochrome C? (02 marks)

iii. Name the major steps of respiration and state the energy budget respectively. (06 marks)

iv. Explain all the steps of Kreb's cycle. (15 marks)

5.

i. What are the major cell types of phloem and xylem tissues? (02 marks)

ii. Give the reason why food is translocated as sucrose. (05 marks)

iii. List the differences between xylem transportation and phloem translocation. (08 marks)

iv. Briefly explain the pressure flow hypothesis. (10 marks)

Part C 2015

1. During the long evolution of plants in diverse environments, natural selection has refined photosynthetic adaptations that enable certain plants to continue produing food even in arid conditions. Decribe with relevant examples.

(30 marks)

2. Each enzyme is very selective in the reaction it catalyzes. Explain with examples. Draw diagrams where necessary.

(20 marks)

3. Briefly describe how a signal is transmitted along the neuron . Draw diagrams where necessary.

(20 marks)

15