3

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 5774

E

Unique Paper Code : 42164401

Name of the Paper : Plant Physiology and Metabolism

Name of the Course : B.Sc. (Programme) Life Sciences

Semester : IV

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Only **Five** questions are to be attempted in all.
3. Question 1 is compulsory.
4. **All** questions carry equal marks.
5. Attempt all parts of the question together.
6. Illustrate your answers wherever possible.

P.T.O.

1. (a) Give **one** significant contribution of the following **(any five)** : (1×5=5)

(i) R. Hill

(ii) T.W. Engelmann

(iii) F.W. Went

(iv) R Mitchell

(v) D. Neljubowa

(vi) M. Chailakhyan

(b) Expand the abbreviations **(any Five)** : (5)

(i) CoA

(ii) UDP

(iii) NR

(iv) Pfr

(v) NADP

(vi) FMN

(c) Name the following **(any five)** : (5)

(i) A Plant species carrying Selenium.

(ii) A natural Chelating agent.

(iii) A nutrient solution for hydroponics.

(iv) An element stimulating pollen tube germination and elongation.

(v) A type of P-protein that occur only in certain legumes.

(vi) Ordinary companion cells with the development of finger like wall ingrowths.

2. (a) Give the schematic representation of Electron Transport Chain in mitochondrion. Tabulate the total ATP produced at various stages in aerobic respiration of a glucose molecule. (5)

(b) Explain the following **(any five)** : (1×5=5)

(i) Feedback inhibition

P.T.O.

(ii) Florigen

(iii) Prosthetic group

(iv) Pfr

(v) Vernalization

(vi) Cofactor

(vii) Denitrification

(c) How the K^+ ion channels enhance the diffusion of K^+ across membrane? Discuss. (5)

3. (a) Write a detailed account of photosynthetic dark reaction. Illustrate your answer. (5)

OR

(a) With the help of vectorial arrangement of PSI & PS II, give the account of light reactions.

(b) What are enzymes? How are they classified under broad categories? (5)

(c) Discuss girdling experiment along with the structure of phloem and composition of the phloem sap. (5)

4 (a) Write an explanatory note on **(any four)** : (2.5×4=10)

(i) Discovery of Cytokinins

(ii) Ammonification

(iii) Interplay of hormones during abscission

(iv) *Rhizobium*

(v) Fruit Ripening

(vi) Dinitrogenase

(vii) Nod genes

(b) The value for water potential in the stem tissue was found to be –3.5 bars. If you take the root tissue and place it in a 0.1M solution of sucrose at 20°C in an open beaker, what is the water potential of the solution and in which direction will the net flow of water be? What will happen if we replace 0.1 M sucrose with 0.1 M NaCl. (5)

P.T.O.

OR

(b) Discuss three major factors that contribute to cell water potential. Give significance/uses of concept of water potential.

5. (a) Differentiate between PCO and PCR. (5)

OR

(a) Discuss *Kranz* anatomy in relation to functional features of C_4 syndrome.

(b) Describe the process of rhizobial infection and nodule development in a legume root. (5)

(c) Differentiate between **(any two)** : (2.5×2=5)

(i) Phloem loading and Phloem unloading

(ii) Hydroponics and Aeroponics

(iii) Passive transport and Active transport.

6 (a) Discuss the sequential events of Krebs cycle. Which reaction is commonly known a link reaction? (5)

OR

(a) Define RQ. Give its significance in plant metabolism.

(b) Describe briefly about phytochrome with reference to its structure and role in plants. (5)

(c) The driving force of transpiration is the difference in vapor pressure concentration, justify the statement. What pressure difference is needed to lift water 100 meters to a treetop? (5)

7. (a) With the help of a neat illustration, discuss the role of GAs in food reserve mobilization in barley seed. (5)

(b) Explain briefly **(any five)** : (1×5=5)

(i) K_m

(ii) photoperiod

P.T.O.

(iii) chromophore

(iv) Active site

(v) Epinasty

(vi) Activation energy

(c) Describe any two mechanisms that can explain the phloem loading. (5)