2021
BOTANY
[HONOURS]
Paper : VII

Full Marks : 80 Time : 4 Hours

The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.

Answer all the questions.

(Plant Physiology)

[Marks : 55]

1. Answer any **three** of the following: 1×3=3

   a) Why does a rice plant respire more in light than in darkness?

   b) What is P protein?

   c) What is Warburg effect?

   d) How many ATP molecules will be generated during complete oxidation of one molecule of fructose 1, 6 bis-phosphate?

   e) Why are higher plants not able to fix atmospheric nitrogen?

2. Answer any **seven** of the following: 2×7=14

   a) Why does application of Abscisic acid close the stomata?

   b) How does one can demonstrate that the floral stimulus is mobile in nature?

   c) What is meant by the terms 'critical photoperiod' and 'photoperiodic induction'?

   d) What is C-2 cycle? Which cell organelles are involved in its operation?

   e) Differentiate between phototropism and photoperiodism.

   f) When photosynthesizing plants are deprived of light, PGA content increases and why?

   g) Why does betacyanin come out from beet root when boiled but carotene from boiled carrot does not?

   h) Why all plant growth regulators are not termed as phytohormones?

   i) Why is there a lag phase in respiration during seed germination?

3. Answer any **three** of the following: 6×3=18

   a) Why is Krebs cycle called TCA cycle? Why do the reactions of the cycle stop in the

absence of oxygen? Why it is circular rather than a linear enzyme system? 2+2+2

b) Why 'Hexose monophosphate shunt' pathway of glucose oxidation is called 'direct oxidation pathway'? What is the importance of pentose sugars in plant? 2+4

c) What are CAM plants? Describe the organic acid metabolic pathway in CAM plants. 2+4

d) What are the salient features of the chemiosmotic theory of phosphorylation? How does oxidative phosphorylation take place in mitochondria? 3+3

e) What is Acid growth theory of auxin action? Cite evidence to show that the immediate effect of auxin on extension growth is mediated by activating proton pump in the plasma membrane. 3+3

4. Answer any **two** of the following: 10×2=20

a) Write a critical account of nitrogen fixation as brought about by symbiotic organisms. 10

b) What is Cohesion-tension theory? Add a note

on Soil Plant Atmosphere continuum concept. 5+5

c) Write down the general chemical structure of a cytokinin and abscissic acid. Describe the role of ABA in stomatal closure and root gravitropism. 4+6

d) Distinguish between: $2\frac{1}{2}\times4=10$

i) Transketolase reaction and Transaldolase reaction

ii) Trace element and Tracer element

iii) Substrate level phosphorylation and oxidative phosphorylation

iv) Emmerson's effect and Richmond Lang effect

(Plant Biochemistry)

[Marks : 25]

5. Answer any **three** of the following: 1×3=3

a) What is Redox potential?

b) Mention the significance of allosteric enzyme.

c) Mention the utility of buffer in biological system.

d) Define ionic bond.

e) Define Gibb's free energy.

6. Answer any **three** of the following: 2×3=6

a) Differentiate between oxidase and oxygenase.

b) Define uniport and symport.

c) Differentiate between essential and non-essential amino acids.

d) Draw the structure of lactose.

e) Distinguish between van der Waal force and hydrogen bond.

7. Answer any **one** of the following: 6×1=6

a) Structurally distinguish between cellulose and starch. Draw the structure of α-D glucopyranoside. 4+2=6

b) What is an apoenzyme? Briefly discuss about the mechanism of enzyme action. 2+4=6

8. Answer any **one** of the following: 10×1=10

a) What are Buffers? Discuss the mechanism of buffer action. Mention the factors influencing buffering capacity and pH. 2+4+4=10

b) Classify lipids with examples based on their function. With suitable illustrations, describe the formation of peptide bond. Citing example, define conjugated protein. 6+2+2=10