2015

BIOCHEMISTRY

Paper – BCT – 403

(Plant Biochemistry)

Full Marks – 25

The figures in the margin indicate full marks

Candidates are required to give their answers in their own words as far as practicable

1. Answer in ***one*** sentence (***any six***) : 1×6

(a) Why oxygenic photosynthesis having a single photosystem I or II did not evolve?

(b) How does higher irradiance affect quantum yield of photochemistry?

(c) Emersons effect first indicated the synergism between two photosystems how?

(d) How does Violoxanthin content in chloroplasts vary from dawn to dusk.

(e) Nitrogen fixation hides away from photosynthesis but cannot do away with it. Why?

(f) If you were to make a Nod factor deficient rhizobia why NodD is not the right choice ?

(g) Why is the nodule interior red?

(h) Why are hydrogenase containing rhizobia more efficient N fixers?

2. (a) How is ATP/NADPH ratio maintained by photosynthetic electron transport. If steady state ATP/NADPH ratio in an active chloroplast is 1, explain whether it would be >1 or <1 in presence of DCMU and Nigericin. 3

(b) Rice does not belong to the nitrogen fixing clade but it has several genes that is required to undertake the symbiosis with a nitrogen fixing bacteria. Explain. 2

(c) Give an example of intercellular symbiosis of plant with nitrogen fixing bacteria. 2

Or

(a) Calvin cycle is net carbon gain whereas photorespiration is net carbon loss? Explain. 3

(b) Nod ABC is the minimal requirement for making a nod factor, explain. 2

(c) What are legumes? What do we mean by nitrogen fixing clade within angiosperms? 2

3. Answer ***any two*** questions : 6×2

(a) The GALS1 is a galactosyltransferase A mutation (gals 1-2) of this gene is leaky while gals 1-1 is a null mutant. How would you prove this using transcript, cell wall and enzyme analysis?

(b) Give a scheme for pectin biosynthesis involving GAUT proteins. How would you prove that GAUT1 and GAUT 7 interact? What is the nature of this interaction?

(c) Antisense 4CL and sense CAld5H genes were transferred into aspen. What is the effect on lignin content and S/G ratio in the transgenic line expressing *both* sense CAld5H and antisense 4CL?

(d) How could you prove experimentally that cellulose synthase complex (CSC) aligns with microtubules in the cell wall?