2021

BOTANY — HONOURS

Fifth Paper

Full Marks : 100

The figures in the margin indicate full marks.

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

Group - A

1. Answer the following in few words :

(a) What is osmotic potential? Mention its components. 2

(b) Give the reaction of TCA cycle which requires FAD as a co-enzyme. 1

(c) Name the organelle where CO_2 is evolved during the photorespiratory cycle. 1

(d) What do you mean by triple response of ethylene? 2

(e) What is R.Q.? Give its significance. 2

(f) Give a reaction catalyzed by aldolase in the C_3 cycle of photosynthesis. 2

2. Answer ***any two*** of the following : 5×2

(a) Discuss the role of CO_2 and K ion in stomatal movement.

(b) Discuss the biological significance of carotenoid pigments.

(c) Describe the role of brassinosteroid as plant growth regulator.

(d) Write a note on nitrate assimilation by plants.

3. Answer ***any two*** of the following :

(a) Schematically discuss citric acid cycle mentioning the enzymes and co-enzymes of each step. Give the reactions where substrate level phosphorylation and decarboxylation takes place in the above mentioned cycle. Distinguish between oxidative phosphorylation and substrate level phosphorylation. 6+6+3

(b) Discuss different methods of breaking seed dormancy. Briefly describe the biochemical changes associated with the process of seed germination. Write a note on hormonal regulation of seed germination. 5+5+5

(c) Give the biochemical reactions of β-oxidation of fatty acids. Why it is called β-oxidation? How many ATP molecules will be produced after complete oxidation of a molecule of palmitic acid (C=16)? State the significance of β-oxidation of fatty acids. 8+2+2+3

(d) Write down the process of IAA biosynthesis from tryptophan with the help of chemical structure and flow chart. Explain the effect of IAA on extension growth mediated by activating proton pump in plasma membrane. Mention a physiological process where auxin and cytokinin play an antagonistic role. 5+8+2

Group - B

4. Answer the following in few words :

(a) Define symport and antiport. 2

(b) What are oligosaccharides? Give examples. 2

(c) What do you mean by antiparallel feature of DNA helix? 2

(d) What do you mean by isoelectric point? 2

(e) Define K_m. 1

(f) What are non-essential amino acids? 1

5. Answer ***any two*** of the following :

(a) What are exergonic and endergonic reactions? Discuss the significance of coupling of biochemical reactions. 2+3

(b) Classify amino acids on the basis of their side chains (R-group). 5

(c) What are epimers? Cite example. State the difference between a D-glucose and a d-glucose. 2+1+2

(d) Point out the differences between mRNA and hnRNA. Distinguish between ribonucleotides and deoxyribonucleotides. 3+2

6. Answer ***any one*** of the following :

(a) Explain how fatty acid and glycerol molecule combine to form a lipid molecule. Differentiate between a simple lipid and a compound lipid. Write down the structure of phospholipid and glycolipid molecule. With suitable example explain saturated and unsaturated fatty acids. What is PUFA? When the carbon skeleton of a fatty acid is 18 : 1 (Δ^9) – Write down its structure. 2+2+4+4+1+2

(b) (i) Briefly discuss the structure and properties of water molecule.

(ii) What is G-protein? Mention the role of G-protein in signal transduction.

(iii) Compare between B-DNA and Z-DNA. 5+5+5

7. Mention the source plants, parts used and uses of the following pharmacologically active compounds : 3×5

Gingerol, Digitoxin, Vinblastin, Quinine and Catechin.

Or,

Write short notes on :

(a) Organoleptic evaluation of drugs.

(b) Discuss the role of flavonoids against pathogens.

(c) Classification of drugs on the basis of chemical constituents and therapeutic effects with examples. 5+5+5