2015

ZOOLOGY

Paper : 301

BIOCHEMISTRY

Full Marks : 80

Time : 3 hours

The figures in the margin indicate full marks for the questions

1) Answer the following multiple choice questions (any eight) 1 x 8=8

i) In the hypoxic condition, NAD^+ is regenerated from NADH by reduction of

a) Phosphoenol pyruvate to pyruvate

b) Pyruvate to Lactate

c) Pyruvate to Acetyl CoA

d) None of these

ii) Which among these is not a prosthetic group of Pyruvate Dehydrogenase?

a) TPP

b) FAD

c) FeS

d) NAD 1

iii) In Kreb's cycle the second oxidative decarboxylation occurs during the reaction step of

a) α-Ketoglutarate → Succinyl CoA

b) Succinyl CoA → Succinate

c) Isocitrate → α-Ketoglutarate

d) Fumarate → Malate 1

iv) The glycogen phosphorylase during glycogenolysis acts repetitively on the non-reducing ends of glycogen branch until it reaches

a) 6 glucose residues away from (α 1-6) branch

b) 5 glucose residues away from (α 1-6) branch

c) 4 glucose residues away from (α 1-6) branch

d) None of these 1

v) Mitochondrial membrane has no transporter for oxaloacetate, so before export to the cytosol, oxaloacetate formed from pyruvate must be converted to

a) Lactate

b) Malate

c) Both (a) & (b)

d) None of these 1

vi) Wernicke-Korsakoff Syndrome is a disorder caused by severe deficiency of

a) Thiamine

b) Uracil

c) Flavin

d) None of these 1

vii) In these, which amino acid do have the negative R-group

a) Lysine

b) Histidine

c) Arginine

d) Asparate 1

viii) Proline has the least proclivity to form α-helices during protein folding because

a) Its N-atom is part of a rigid ring, thus N-C_α bond rotation is not possible

b) It has no substitute H to participate in H-bond with other residue

c) Both (a) & (b)

d) None of these 1

ix) How many amino acid residues are generally found in complete one turn of α-helix structure of protein folding?

a) 3.6

b) 4.9

c) 5.4

d) 5.0 1

x) How many cycles do C_{19} fatty acid undergoes to give last one Acetyl CoA and one Propinoyl CoA?

a) 11

b) 10

c) 9

d) 8 1

2) Answer the following short type questions (any five) 2 × 5=10

i) What is Transmethylation? 2

ii) What do you mean by Allosteric enzymes? 2

iii) What is the significance of Malonyl CoA in biosynthesis of fatty acid? 2

iv) What do you mean by Ketosis? 2

v) How relative concentration on NADPH and NADP+ in cytosol does determine pathway of Glucose 6 Phosphate? 2

vi) What is the role of ATP cycle in biological system? 2

3) Answer the following (any four) 5 x 4=20

i) How triacylglycerol gets activated and transported into the matrix of mitochondria? 5

ii) Explain how NADPH and glutathione can prevent or undo the oxidative damage to proteins? 5

iii) Describe the particular non-identical steps of gluconeogenesis which does not get catalyzed by the same enzymes of glycolysis. 5

iv) Describe the Glycerol Phosphate shuttle and its significance 5

v) What are the different forces which contribute on specific folding or structure of the proteins? 5

4) Answer the following long type question (any two) 9 × 2=18

i) Explain the non-oxidative phase and non-oxidative Phase of the Pentose Phosphate pathway. What are the significance of this pathway? (3+4+2)

ii) What do you mean by Free Energy? What are the differences between exergonic & exothermic and between endergonic and endothermic reactions? (3+3+3)

iii) Describe the different complexes and prosthetic groups of the Electron Transport Chain. How does all these complexes contributes in ATP synthesis? (3+2+4)

5) Answer the following very long type question 12 × 2=24

i) What are the different physio-chemical factors that affect the enzyme activity? Derive the Michaelis Menten equation. (6+6)

ii) Describe the β -oxidation pathway of the unsaturated fatty acids. How biosynthesis of Fatty acids does get