63/1 (SEM–4) CC10/ZOOHC4106

2025

ZOOLOGY

Paper : ZOOHC4106

(Biochemistry and Metabolic Processes)

Full Marks : 60

Pass Marks : 24

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer from the following : ***(any five)*** 1×5=5

   (a) An example of a coupled reaction in glycolysis is

   (i) Conversion of pyruvate to lactate

   (ii) Hydrolysis of ATP to ADP

   (iii) Breakdown of glycogen

   (iv) Phosphorylation of glucose using ATP

(b) Which type of transport does not require energy (ATP) ?

(i) Active transport

(ii) Primary active transport

(iii) Facilitated diffusion

(iv) Endocytosis

(c) Which of the following allows water to cross the plasma membrane ?

(i) Aquaporins

(ii) Sodium channels

(iii) ATPase pumps

(iv) Proton pumps

(d) Where does glycolysis occur in the cell ?

(i) Mitochondrial matrix

(ii) Cytoplasm

(iii) Nucleus

(iv) Endoplasmic reticulum

(e) How many GTP molecules are produced directly in one Krebs cycle ?

(i) 4

(ii) 3

(iii) 2

(iv) 1

(f) How many carbon atoms are removed in each cycle of β-oxidation ?

(i) 1

(ii) 2

(iii) 3

(iv) 4

(g) The first step of the urea cycle occurs in the

(i) Cytosol

(ii) Golgi apparatus

(iii) Mitochondrial matrix

(iv) Rough ER

(h) Which of the following amino acids is not glucogenic ?

(i) Isoleucine

(ii) Phenylalanine

(iii) Arginine

(iv) Leucine

(i) A redox reaction involves

(i) Transfer of protons

(ii) Transfer of electrons

(iii) Transfer of neutrons

(iv) Transfer of ATP

(j) The main function of the electron transport chain is to

(i) Produce glucose

(ii) Oxidize pyruvate

(iii) Generate carbon dioxide

(iv) Convert ADP into ATP

2. Answer the following questions in brief : ***(any five)*** 2×5=10

(a) What do you mean by catabolic and anabolic reactions ?

(b) What is the proton pump in electron transport system ?

(c) What are saturated and unsaturated fatty acids ?

(d) What is a cofactor in an enzyme reaction ?

(e) Write briefly about ATP production during the glycolysis step.

(f) What is ketogenesis ?

(g) What is the function of the shuttle system in the cell membrane ?

3. Answer the following questions : ***(any five)*** 5×5=25

(a) Write briefly about the inhibitors and uncouplers of electron transport system.

(b) Write a short note on Urea cycle.

(c) Write a short note on fates of C-skeleton of glucogenic amino acid.

(d) Explain briefly about the process of β-oxidation of fatty acids.

(e) Write briefly about the compartmentalization of metabolic pathways.

(f) ATP is the energy currency of cell– explain.

(g) Write the reaction sequence of pentose phosphate pathway.

(h) Write a short note on redox reactions with example.

(i) Write a short note on the stages of catabolism.

4. Answer the following questions in brief : ***(any two)*** 10×2=20

(a) What is oxidative phosphorylation ? Describe the mitochondrial respiratory chain and ATP synthesis in cells. 2+8=10

(b) What are membrane transporters ? Describe the various types of membrane transporters and their functions. 2+8=10

(c) What is meant by metabolism ? Describe the detailed process of glycogenolysis. 2+8=10

(d) Describe the role of transamination and oxidative deamination in amino acid metabolism.