

B.Sc. ZOOLOGY
FOURTH SEMESTER (SPECIAL REPEAT)
BIOCHEMISTRY OF METABOLIC PROCESSES
BSZ-403

SET
A

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

(Objective)

Time: 30 mins.

Marks: 20

Choose the correct answer from the following:

1 × 20 = 20

1. Acyl carrier protein(ACP) is utilised in:
a. Glycogenesis
b. Fatty acid synthesis
c. β -oxidation of fatty acids
d. Ketogenesis
2. During synthesis of palmitic acid, the mitochondrial acetyl CoA cross its membrane by formation of:
a. Pyruvate
b. Malate
c. Succinate
d. Citrate
3. What is the effect of increased levels of Hydrogen ions in the inter membrane space of mitochondria?
a. Increased levels of water in intermembrane space
b. Increased ATP production
c. Decreased levels of oxidative phosphorylation
d. Decreased levels of chemiosmosis
4. Lysine is degraded to acetoacetyl CoA and is described as a:
a. Ketogenic amino acid
b. Glucogenic amino acid
c. Keto-gluco amino acid
d. None of these
5. Which of the following statements regarding Glutamate dehydrogenase is correct?
a. Required for transamination reaction
b. Universally present in all cells of the body
c. Can utilize both NADP/NAD
d. Catalyzes conversion of glutamate to glutamine
6. Which product of glucose oxidation is essential for oxidative phosphorylation?
a. Acetyl CoA
b. Pyruvate
c. NADH & FADH
d. NADPH & ATP
7. Which of the following statements regarding transamination is correct?
a. Only non-essential amino acids undergo transamination
b. Transamination is an irreversible reaction
c. Transamination requires a coenzyme derived from vitamin B₁₂
d. Transamination requires a coenzyme derived from vitamin B₆
8. Which electron carrier would have the greatest negative impact on ATP production during oxidative phosphorylation if its production is inhibited?
a. FADH₂
b. Oxygen
c. NADH
d. Water

9. Rotenone acts as a inhibitor of electron transport chain by:
- Blocking electron transfer through complex III
 - Inhibiting terminal transfer of electrons to oxygen
 - Blocking electron transfer through complex I
 - Binding to complex IV
10. Which complex of the electron transport chain in cellular respiration does not directly impact the intermembrane space's pH?
- Complex I
 - Complex II
 - Complex III
 - Complex IV
11. Which of the following two molecules react to start the citric acid cycle?
- Acetyl CoA and citric acid
 - Acetyl CoA and oxaloacetic acid
 - Acetyl CoA and pyruvic acid
 - Acetyl CoA and malic acid
12. In Krebs' cycle $FADH_2$ molecule is formed in the reaction catalysed by:
- Succinate dehydrogenase
 - Isocitrate dehydrogenase
 - Malate dehydrogenase
 - Citrate synthetase
13. The nucleotide triphosphate which is needed to activate glucose during glycogenesis is:
- ATP
 - GTP
 - CTP
 - UTP
14. The hormone which does not have its role in regulation of glycogenesis is:
- Insulin
 - Glucagon
 - Adrenaline
 - Melatonin
15. Select the key enzyme in glycogenolytic pathway.
- Branching enzyme
 - Debranching enzyme
 - Glycogen phosphorylase
 - Phosphoglucomutase
16. Which one is the wrong statement about glycogenolysis process?
- Occurs during hypoglycaemia
 - Supply glucose during starvation
 - Supply glucose-6-phosphate to HMP pathway
 - Produce only the free glucose molecules
17. Find out the reaction product produced during HMP pathway together with Fructose-6-phosphate.
- Ribulose-5-phosphate
 - Erythrose-4-phosphate
 - Xylose-5-phosphate
 - α -Glyceraldehyde-3-phosphate
18. ω -oxidation of fatty acids occurs in:
- Cytoplasm
 - Mitochondria
 - SER
 - Ribosome
19. The last three carbon part of an odd chain fatty acid is called:
- Propionyl CoA
 - Acetyl CoA
 - Succinyl CoA
 - Malonyl CoA
20. Select the vitamin which is used as co-enzyme during fatty acid oxidation.
- Retinol
 - Tochopherol
 - Biotin
 - Vitamin C

(Descriptive)

Time : 2 hr. 30 mins.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. Mention the states during which ketone bodies serve as fuel. Write various steps of ketogenesis in the body. 2+8=10
2. What is oxidative phosphorylation? Explain how electrons are transferred in mitochondrial electron transport chain. 2+8=10
3. What is transamination? Describe in detail with proper example. 2+8=10
4. Explain with appropriate diagram the β oxidation pathway of fatty acids. What is the energy balance after oxidation of one molecule of palmitic acid? 8+2=10
5. Define metabolism. What are different types of metabolic pathways? Write with diagram the energy relation between major metabolic pathways. Mention the factors that regulate the metabolic pathways in animal body. 1+2+5+2=10
6. What is glycolysis? Give diagrammatic presentation of different phases and reaction steps in glycolysis. Add note on the regulation and energy yield in glycolysis. 1+5+2+2=10
7. Mention two sites of occurrence of gluconeogenesis. Explain how the glucose molecules are formed from fatty acids, glycerol, lactate and glucogenic amino acid. 2+8=10
8. Write on: 5+5=10
 - a) Inhibitors and uncouplers of electron transport chain.
 - b) Fate of Carbon skeleton of Glucogenic and ketogenic amino acids.

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