

## CC10-Biochemistry & Metabolic Processes

### Section A

*Each question carries one mark*

#### Fill in the blanks

1. Citrate is converted to isocitrate by aconitase which contains \_\_\_\_.
2. In EM pathway 2-phosphoglycerate is converted to \_\_\_\_.
3. The conversion of alanine to glucose is termed as \_\_\_\_.
4. Under anaerobic conditions the glycolysis one mole of glucose yields \_\_\_\_ moles of ATP.
5. During glycolysis, Fructose 1, 6 diphosphate is decomposed by the enzyme \_\_\_\_.
6. The number of molecules of ATP produced by the total oxidation of acetyl CoA in TCA cycle is \_\_\_\_.
7. One molecule of glucose gives \_\_\_\_ molecules of CO<sub>2</sub> in EM-TCA cycle.
8. One molecule of glucose gives \_\_\_\_ molecules of CO<sub>2</sub> in one round of HMP shunt.
9. Fluoride inhibits \_\_\_\_ and arrests glycolysis.
10. \_\_\_\_ is also called as Christmas factor.
11. When O<sub>2</sub> supply is inadequate, pyruvate is converted to \_\_\_\_.
12. Pyruvate kinase requires \_\_\_\_ ions for maximum activity.
13. Synthesis of Glucose from amino acids is termed as \_\_\_\_.
14. Dinitrophenol acts as \_\_\_\_ of oxidative phosphorylation.
15. A lipoprotein associated with high incidence of coronary atherosclerosis is \_\_\_\_.
16. The main site of urea synthesis in mammals is \_\_\_\_.
17. The number of ATP required for urea synthesis is \_\_\_\_.
18. The enzyme carbamoyl phosphate synthetase requires \_\_\_\_ ion.
19. The 2 nitrogen atoms in urea are contributed by \_\_\_\_ and \_\_\_\_.
20. Pulses are deficient in \_\_\_\_ amino acid.
21. Ammonia is transported from muscles to liver mainly in the form of \_\_\_\_.
22. Pyruvic acid can be obtained by transamination of alanine with \_\_\_\_.
23. The metabolism of protein is integrated with that of carbohydrate and fat through \_\_\_\_.
24. The unwanted amino acids abstracted from the tissues are either used up by the tissue or in the liver converted into \_\_\_\_.
25. In human and other ureotelic organisms, the end product of amino acid nitrogen metabolism \_\_\_\_.
26. The end product of amino acid nitrogen metabolism in uricotelic organisms (reptiles and birds) is \_\_\_\_.
27. One mol. of Urea is synthesized at the expense of the \_\_\_\_ mols. of ATP.
28. Deterioration of food (rancidity) is due to presence of \_\_\_\_.
29. Unpleasant odours and taste in a fat (rancidity) can be delayed or prevented by the addition of \_\_\_\_.
30. Triglycerides are transported from liver to extrahepatic tissues by \_\_\_\_.
31. Cholesterol is transported from liver to extrahepatic tissues by \_\_\_\_.
32. Net generation of energy on complete oxidation of palmitic acid is \_\_\_\_.
33. Free fatty acids released from adipose tissue are transported in blood by \_\_\_\_.
34. Amount of urea excreted per minute is called as \_\_\_\_.
35. The precursor for the synthesis of bile salts is \_\_\_\_.
36. Standard free energy ( $\Delta G^\circ$ ) of hydrolysis of ATP to ADP + Pi is \_\_\_\_.

37. Standard free energy ( $\Delta G^\circ$ ) of hydrolysis of ADP to AMP + Pi is \_\_\_\_.
38. Redox potential (EO volts) of NAD<sup>+</sup>/NADH is \_\_\_\_.
39. A molybdenum containing oxidase is \_\_\_\_.
40. A copper containing oxidase is \_\_\_\_.
41. Chemiosmotic theory for oxidative phosphorylation has been proposed by \_\_\_\_.
42. In human Glycerol phosphate shuttle is present in \_\_\_\_ fat.

### Section- B

*Each question carries 1.5 mark (to be answered within 30 words)*

**Give the location and function of the following:**

1. *Vitro dentinae*
2.  $F_0-F_1$  particle
3. CoQ
4. Complex II of ETC
5. Hexokinase
6. Cytochrome oxidase
7. Aconitase
8. Glycerol phosphate shuttle
9. Malate shuttle

**Define in one to two lines:**

1. Anabolism
2. Catabolism
3. ATP
4. ETC
5. Chemiosmosis
6. Proton motive force
7. Gluconeogenesis
8. Glycogenesis
9. Glycogenolysis
10. Glucogenic amino acids
11. Ketogenic amino acids
12. Glycerol phosphate shuttle
13. Malate shuttle
14. Importance of oxaloacetate

### Section- C

*Each question carries 2.5 mark (to be answered within 75 words)*

**Give reason for:**

1. Babies can resist cold more effectively than adults.
2. ATP acts as 'energy currency of cell'.
3. Living beings need constant supply of energy for survival
4. Cyanide and CO are poisonous chemicals.

### Calculate

1. Calculate end systolic volume if cardiac output is 5.0 L/min, heart rate is 75 beats/min and end diastolic volume is 145 ml/min.
2. Calculate the stroke volume and then find the cardiac output if end systolic volume is 60 ml, heart rate is 72 beats/min and end diastolic volume is 130 ml/min.

### Write short notes

1. Coupled reactions
2. Shuttle system
3. Intermediary metabolism
4. Ketogenesis
5. Redox system
6. Glucogenic amino acids
7. Glycogenolysis
8. Glycerol phosphate shuttle
9. Malate shuttle
10. Importance of oxaloacetate

### Differentiate between the following

1. Catabolism and anabolism
2. Anaerobic respiration and Fermentation
3. Glycogenesis and glycogenolysis
4. Glycogenesis and Gluconeogenesis
5.  $\beta$ -oxidation and  $\omega$ -oxidation of fatty acids
6. Transamination and Deamination of amino acids
7. Inhibitors and un-couplers of ETC
8. Glucogenic and Ketogenic amino acids

### Section- D

*Each question carries 6 mark (to be answered within 500 words)*

1. Describe the metabolic fates of acetyl CoA in the body: How is acetyl CoA completely oxidized?
2. Define cellular respiration and give an account of mechanism of Krebs's cycle.
3. Define cellular respiration and give an account of mechanism of Glycolysis and its regulation.
4. Write a note on HMP pathway.
5. Write a note on gluconeogenesis. Briefly explain its regulation.
6. Write a note on the process of glycogenesis. Add a note on its regulation by epinephrine and calcium ions.
7. Write note on ETC.
8. What is oxidative phosphorylation? Add note on chemiosmotic theory.