

Duration: 3 Hrs

Total marks: 75

**N.B. : 1. All questions are compulsory**  
**2. Figures to right indicate full marks**

**Q. 1 Choose appropriate option for following multiple choice based questions. 20**

- 1 \_\_\_\_\_ is the amino acid containing imine functional group.
  - a Leucine
  - b Proline
  - c Histidine
  - d Lysine
  
- 2 The linkage in sucrose is \_\_\_\_\_ glycosidic linkage.
  - a C1-C1
  - b C1-C2
  - c C1-C4
  - d C1-C6
  
- 3 \_\_\_\_\_ is a C18 saturated fatty acid.
  - a Stearic acid
  - b Linolenic acid
  - c Linoleic acid
  - d Oleic acid
  
- 4 The conversion of \_\_\_\_\_ into pyruvate is an example of substrate-level phosphorylation in glycolysis.
  - a Phosphoenolpyruvate
  - b 2-phosphoglycerate
  - c Glyceraldehyde 3-phosphate
  - d Oxaloacetate
  
- 5 The first committed step in TCA cycle is \_\_\_\_\_.
  - a Oxaloacetate to Citrate
  - b Citrate to Isocitrate
  - c Isocitrate to  $\alpha$ -Ketoglutarate
  - d  $\alpha$ -ketoglutarate to Succinyl CoA
  
- 6 Glucose 6-phosphate dehydrogenase catalyzes a key regulatory step in \_\_\_\_\_.
  - a Glycogenesis
  - b Glycogenolysis
  - c Pentose phosphate pathway
  - d Gluconeogenesis

- 7 \_\_\_\_\_ can catalyse the synthesis of a linear unbranched molecule containing  $\alpha$ -1,4 glycosidic linkages only.
- a Glycogen phosphorylase
  - b Glucosyl  $\alpha$ -4,6 transferase
  - c Glycogen synthase
  - d Glucose-6-phosphatase
- 8 \_\_\_\_\_ is the only electron carrier containing heme iron which can directly react with molecular oxygen.
- a Cytochrome a and  $a_3$
  - b Cytochrome b
  - c Cytochrome c
  - d CoQ
- 9 A defect in the \_\_\_\_\_ enzyme causes Lesch-Nyhan syndrome.
- a HGPRT
  - b ARPT
  - c ATCase
  - d CPS II
- 10 Gout is a metabolic disease associated with overproduction of \_\_\_\_\_.
- a Uric acid
  - b Orotic acid
  - c Propionic acid
  - d Lactic acid
- 11 The gaps between DNA segments on the lagging strand produced by restriction enzymes are joined by \_\_\_\_\_.
- a DNA Phosphorylase
  - b DNA Helicase
  - c DNA Topoisomerase
  - d DNA Ligase
- 12 AUG serves as \_\_\_\_\_.
- a Anticodon
  - b Non-sense codon
  - c Stop codon
  - d Start codon
- 13 The amino acids involved in pyrimidine De novo synthesis are \_\_\_\_\_.
- a Aspartate and Glutamine
  - b Asparagine and Glutamate
  - c Aspartate and Serine
  - d Glutamate and Glycine

- 14 Acyl CoA dehydrogenase catalyzes conversion of acyl CoA to \_\_\_\_\_.
- a trans- $\Delta^2$  enoyl CoA
  - b cis- $\Delta^2$  enoyl CoA
  - c trans- $\Delta^3$  enoyl CoA
  - d cis- $\Delta^3$  enoyl CoA
- 15 Ketone bodies cannot be utilized in the liver due to absence of \_\_\_\_\_ enzyme.
- a Thiophorase
  - b Thiolase
  - c  $\beta$ -hydroxybutyrate dehydrogenase
  - d HMG CoA lyase
- 16 \_\_\_\_\_ form of energy is required for fatty acid biosynthesis.
- a NADPH
  - b ATP
  - c NADH
  - d FADH<sub>2</sub>
- 17 \_\_\_\_\_ enzyme is involved in urea cycle.
- a Ornithine transcarbamoylase
  - b Asparaginase
  - c Glutamate synthase
  - d Glutamine transaminase
- 18 Acetyl CoA is carboxylated to \_\_\_\_\_ by the enzyme acetyl CoA carboxylase.
- a Lactate
  - b Glycerol
  - c Malonyl CoA
  - d Pyruvate
- 19 Hexokinase enzyme belongs to \_\_\_\_\_ class according to IUB.
- a Oxidoreductase
  - b Hydrolase
  - c Transferase
  - d Lyase
- 20 In \_\_\_\_\_ type of inhibition,  $V_{max}$  and  $K_m$  decreases.
- a Non-competitive
  - b Competitive
  - c Uncompetitive
  - d Irreversible

**Q. 2 Answer any two questions 20**

- a** i) Explain in detail, competitive, non-competitive and uncompetitive reversible inhibitors w.r.t. enzyme kinetics, plots and one example each. **5**  
 ii) Write the complete reactions for the regulatory steps of Glycolysis. Explain Proton Motive Force. **5**
- b** i) Discuss the conversion of acetyl CoA to mevalonate in cholesterol biosynthesis. Diagrammatically represent transport of acetyl CoA from mitochondria to cytosol in the biosynthesis of fatty acids. **5**  
 ii) Write the reactions involved in biosynthesis of AMP and GMP from its parent purine nucleotide. Name any two disorders of purine metabolism. **5**
- c** i) Give an outline of Urea cycle and give its linkage with TCA cycle. **5**  
 ii) Discuss the process of replication in prokaryotes. **5**

**Q. 3 Answer any seven questions 35**

- i)** Draw structure of Maltose and Stearic acid. Explain mutarotation.
- ii)** Write a note on secondary structure of proteins. Give structure of cholesterol.
- iii)** Give the names and structures of substrate and product for the following enzyme catalysed reactions:- i) Pyruvate carboxylase ii) Xanthine oxidase
- iv)** Explain the four reactions involved in  $\beta$ - oxidation of Palmitic acid and give the bioenergetics.
- v)** Discuss transamination reactions of amino acid metabolism. Explain thermodynamically favourable reaction.
- vi)** Classify enzymes as per IUB system of nomenclature with suitable example for each.
- vii)** Write the salvage pathway for biosynthesis of purines. Give an outline of oxidative phase of Pentose Phosphate Pathway.
- viii)** Define the term epimer. Write a note on Glycogenolysis.
- ix)** Classify lipids with suitable examples. Write the reactions for utilization of ketone bodies.