

(3 Hours)

[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 The amino acid, which contains sulphur is \_\_\_\_\_.
  - a Methionine
  - b Serine
  - c Glycine
  - d Leucine
- 2 What is the standard free energy change of ATP?
  - a Small and negative
  - b Large and positive
  - c Large and negative
  - d Small and positive
- 3 A reaction, which proceeds with net release of free energy and is spontaneous, is called as \_\_\_\_\_.
  - a Endergonic reaction
  - b Exergonic reaction
  - c Endothermic reaction
  - d Exothermic reaction
- 4 Which of the following is correct about Krebs Cycle?
  - a Pyruvate condenses with Oxaloacetate to form Citrate
  - b Alpha ketoglutarate is a five Carbon compound
  - c Oxidative Phosphorylation occurs in the cytoplasm only
  - d Krebs cycle can operate in anaerobic condition
- 5 Gluconeogenesis involves conversion of \_\_\_\_\_.
  - a Glucose-6-Phosphate to Fructose-6-Phosphate
  - b Pyruvate to Lactate
  - c Pyruvate to Acetyl CoA
  - d Oxaloacetate to Phosphoenolpyruvate
- 6 Which of the following is a debranching enzyme?
  - a Glycogen synthetase
  - b Glucose-6-phosphatase
  - c Amylo 1,6 glucosidase
  - d Amylo 1,4-1,6 transglycosylase

- 7 Final acceptor of electrons in ETC is
- a Cyt c
  - b Oxygen
  - c  $\text{FADH}_2$
  - d CoQ
- 8 Pyruvate is converted to acetyl CoA by \_\_\_\_\_.
- a Oxidative Phosphorylation
  - b Oxidative decarboxylation
  - c Oxidative carboxylation
  - d Oxidative dephosphorylation
- 9 Number of ATP formed by oxidation of one molecule of palmitic acid is
- a 146
  - b 106
  - c 134
  - d 34
- 10 Conversion of acetoacetate to acetone is the step involved in
- a ketogenesis
  - b urea cycle
  - c glycolysis
  - d HMP shunt
- 11 Argininosuccinic aciduria is a recessive disease due to lack of \_\_\_\_\_ enzyme.
- a argininosuccinate lyase
  - b argininosuccinase
  - c arginase
  - d arginine transcarbamylase
- 12 Dopamine is synthesized from \_\_\_\_\_.
- a tyrosine
  - b tryptophan
  - c threonine
  - d lysine
- 13 Hydrolases enzymes are involved in \_\_\_\_\_.
- a Oxidation reduction reaction
  - b Hydrolysis reaction
  - c Isomerization reaction
  - d Addition or removal group reaction

- 14 If  $K_m$  changes and  $V_{max}$  remains the same. What is the type of enzyme inhibition?
  - a Competitive Inhibition
  - b Noncompetitive Inhibition
  - c Uncompetitive inhibition
  - d Suicide Inhibition
- 15 Puromycin is a drug that interferes with \_\_\_\_\_.
  - a Protein synthesis
  - b Nucleotide synthesis
  - c DNA replication
  - d RNA synthesis
- 16 Genetic lack of \_\_\_\_\_ causes Lesch Nyhan syndrome.
  - a Hypoxanthine guanine phosphoribosyl transferase
  - b Adenine phosphoribosyl transferase
  - c Adenine deaminase
  - d Guanine deaminase
- 17 AUG serves as
  - a Start codon
  - b Non-sense codon
  - c Stop codon
  - d Anticodon
- 18 In DNA replication \_\_\_\_\_ is responsible for removal of supercoiling as the replication fork moves ahead.
  - a Topoisomerase
  - b Primase
  - c Ligase
  - d Helicase
- 19 The role of sigma factor present in bacterial RNA polymerase is
  - a Positioning of RNA polymerase correctly on DNA template
  - b Catalyzing RNA synthesis
  - c Terminating RNA synthesis
  - d Separating the two strands of DNA
- 20 Which enzyme is a part of urea cycle?
  - a ornithine transcarbamoylase
  - b Asparaginase
  - c Glutamate synthase
  - d glutamine transaminase

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

- |          |   |          |
|----------|---|----------|
| <b>a</b> | i) Elaborate in detail the regulatory steps of glycolysis with respect to name and structure of intermediates, enzymes and cofactors. | <b>6</b> |
|          | ii) Discuss ketogenesis w.r.t reactions and regulation.   | <b>4</b> |
| <b>b</b> | i) Outline reactions involved in conversion of AMP to IMP and write a note on salvage pathway for purines.                            | <b>6</b> |
|          | ii) Explain in brief about initiation and elongation steps in prokaryotic replication.  | <b>4</b> |
| <b>c</b> | i) Discuss Michaelis Menten and line Weaver Burk plot with respect to enzyme inhibitors.  | <b>6</b> |
|          | ii) Explain the terms i) spontaneous reaction, ii) activation energy iii) $\Delta G$ iv) Entropy                                      | <b>4</b> |

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

- i) Write a note on secondary structure of proteins. Draw structure of Lecithin.
- ii) Classify carbohydrates based on their structure and chemical nature. Give structure of lactose.
- iii) Give the names and structures of substrate and product for the reactions catalysed by following enzymes.  
a) Lactonase, b) Pyruvate kinase.
- iv) Explain various steps involved in glycogenolysis.
- v) Write a note on carnitine shuttle. Explain the energetics for  $\beta$  oxidation of palmitic acid
- vi) Explain  $\beta$  oxidation of palmitic acid with energetics.
- vii) Explain the biosynthesis of adrenaline with its significance.
- viii) Outline the synthesis of CTP from orotate. Write a note on treatment of gout.
- ix) Discuss the IUB classification of enzymes with suitable examples.