

**EXERCISE-I (Conceptual Questions)****Build Up Your Understanding**

1. Energy obtained by a cell from catabolic reaction is stored immediately in the form of  
 (1) Pyruvic acid      (2) Glucose      (3) ATP      (4) DNA
2. Which component of ETS is mobile carrier ?  
 (1) UQ (CO-Q)      (2) Cyt- a      (3) Cyto- b      (4) Cyt- f
3. R.Q. is less than one at the time of respiration of-  
 (1) Starch      (2) Sugarcane      (3) Glucose      (4) Ground nut
4. Number of ATP produced from one pyruvic acid during conversion to acetyl Co-A -  
 (1) 6      (2) 3      (3) 12      (4) 15
5. An example of competitive inhibition of an enzyme is the inhibition of :  
 (1) Succinic dehydrogenase by malonic acid  
 (2) Cytochrome oxidase by cyanide  
 (3) Hexokinase by glucose - 6 phosphate  
 (4) Carbonic anhydrase by carbon- dioxide
6. Conversion of pyruvic acid into ethyl alcohol is mediated by -  
 (1) Phosphatase      (2) Dehydrogenase  
 (3) Decarboxylase & dehydrogenase      (4) Catalase
7. The formation of Acetyl Co-A from pyruvic acid is the result of its  
 (1) Reduction      (2) Dehydration  
 (3) Phosphorylation      (4) Oxidative decarboxylation
8. Which of the following is link between carbohydrate and fat metabolism ?  
 (1) CO<sub>2</sub>      (2) Acetyl Co-A  
 (3) Pyruvic acid      (4) Citric acid
9. Pyruvate dehydrogenase complex is used in converting -  
 (1) Pyruvate to glucose      (2) Glucose to pyruvate  
 (3) Pyruvic acid to lactic acid      (4) Pyruvate to acetyl Co-A
10. The first member of TCA cycle is  
 (1) Oxalosuccinic acid      (2) Oxalo acetic acid  
 (3) Citric acid      (4) Cis aconitic acid
11. Excess of ATP inhibits the enzyme-  
 (1) Phosphofructokinase      (2) Hexokinase  
 (3) Aldolase (Lyases)      (4) Pyruvate decarboxylase
12. End product of glycolysis is-  
 (1) Citric acid      (2) Glyceraldehyde  
 (3) Phosphoglyceraldehyde      (4) Pyruvic acid

13. In the electron transport chain during terminal oxidation, the cytochrome, which donates electrons to  $O_2$  is?  
(1) Cytochrome-b (2) Cytochrome-C  
(3) Cytochrome-a<sub>3</sub> (4) Cytochrome-f
14. Respiration in plants  
(1) Occurs only during day (2) Results in the formation of vitamins  
(3) Occurs both during day and night (4) Often requires  $CO_2$
15. The end products of respiration in plants are  
(1)  $CO_2$ ,  $H_2O$  and energy (2) Starch and  $O_2$   
(3) Sulphur and oxygen (4)  $H_2O$  and energy
16. The incomplete breakdown of sugars in anaerobic respiration results in the formation of  
(1) Fructose and water (2) Glucose and carbon dioxide  
(3) Alcohol and  $CO_2$  (4) Water and  $CO_2$
17. Common immediate source of energy in cellular activity is  
(1) glucose (2) aldohexose (3) ATP (4) NAD
18. The following is required both by the process of respiration and photosynthesis  
(1) Carbohydrates (2) Sunlight  
(3) Chlorophyll (4) Cytochromes
19. The net gain of ATP molecules by glycolysis aerobic condition is  
(1) Zero (2) Two (3) Four (4) Eight
20. Cytochromes are concerned with  
(1) Protein synthesis (2) Cellular digestion  
(3) Cell division (4) Cell-respiration
21. In respiration pyruvic acid is  
(1) Formed only when oxygen is available  
(2) One of product of Krebs cycle  
(3) Broken down into Acetyl Co-A and  $CO_2$   
(4) Oxidised into Alcohol
22. Most of the energy of the carbohydrates is released by oxidation when  
(1) Pyruvic acid is converted into  $CO_2$  and  $H_2O$   
(2) Pyruvic acid is converted into acetyl Co-A  
(3) Sugar is converted into pyruvic acid  
(4) Glucose is converted into alcohol and  $CO_2$
23. Respiratory enzymes are localised in  
(1) Ribosomes (2) Chloroplast  
(3) Mitochondria (4) None of the above

24. Number of ATP molecules formed during aerobic respiration in break down of one glucose molecule via malate aspartate shuttle.  
 (1) 38 (2) 18 (3) 28 (4) 4
25. The organism in which Kreb's cycle does not occur in mitochondria is  
 (1) Yeast (2) E.coli (3) Ulothrix (4) Plants
26. What causes R.Q. to vary?  
 (1) Respiratory Substrate (2) Light & O<sub>2</sub>  
 (3) Respiratory Product (4) Temperature
27. The first preferred respiratory substrate is  
 (1) Glucose (2) Fats (3) Proteins (4) Polypeptide
28. Respiration occurs in  
 (1) All living cells both in lights & dark  
 (2) Non green cells only in light  
 (3) Non green cells in both light and dark  
 (4) All living cells in light only
29. The value of RQ of starved cell is  
 (1) Zero (2) 0.9 / Less than one  
 (3) 1 / unity (4) infinite
30. RQ of an actively photosynthesizing tissue is  
 (1) 1 (2) < 1 (3) > 1 (4) Zero
31. R.Q. of germinating ground nut & castor seed is  
 (1) 1 (2) <1 (3) >1 (4) 0
32. The value of RQ of a ripening fatty seed is  
 (1) <1 (2) >1 (3) zero (4) unity
33. When the evolution of CO<sub>2</sub> is more than the intake of O<sub>2</sub>, the respired substrate should be  
 (1) Fatty acid (2) organic acid (3) Glucose (4) Polysaccharides
34. Respiration may take place -  
 (1) In the presence of O<sub>2</sub> (2) In the absence of O<sub>2</sub>  
 (3) In the presence or absence of O<sub>2</sub> (4) In the presence of CO<sub>2</sub>
35. The common phase between aerobic & anaerobic respiration is  
 (1) TCA cycle (2) Kreb's cycle (3) Glycolysis (4) Photo respiration
36. The enzyme which converts glucose to glucose-6-phosphate-  
 (1) Phosphorylase (2) Gluco-phosphorylase  
 (3) Hexokinase (4) Phospho glucomutase

37. Glycolysis give rise to  
(1) 8ATP, 2NADH(H<sup>+</sup>), 2 Pyruvate (2) 2ATP, 2CoA, 2NADH(H<sup>+</sup>)  
(3) 2ATP, 2NADH(H<sup>+</sup>), 2 Pyruvate (4) 2ATP, 2 acetate, 2NADH(H<sup>+</sup>)
38. Which of the following ETS complex is inhibited by cyanide-  
(1) Complex II (2) Complex V (3) Complex IV (4) Complex III
39. How many molecules of ATP are produced per molecule of FADH<sub>2</sub> oxidised?  
(1) One (2) Two (3) Three (4) Four
40. The full form of NADP is  
(1) Nicotine adenosine diphosphate phosphate  
(2) Nicotinamide adenosine dinucleotide phosphate  
(3) Nicotinamide adenine dinucleotide phosphate  
(4) Nicotinamide adenine diophosphate phosphate
41. How many ATP molecules produced from the complete oxidation of molecule of active acetate or acetyl Co-A?  
(1) 38 ATP (2) 15 ATP (3) 12 ATP (4) 4 ATP
42. How many ATP equivalents are produced by the oxidation of succinate into fumarate?  
(1) 1 ATP (2) 2 ATP (3) 3 ATP (4) 4 ATP
43. Product formed by the activity of malic dehydrogenase is  
(1) Fumaric acid (2) Malic acid  
(3) Oxaloacetic acid (4) Succinic acid
44. Which of the following is 5- carbon compound of Kreb's cycle?  
(1) Citric acid (2) Fumaric acid  
(3) Oxalosuccinic acid (4) α-Ketoglutaric acid
45. First discovered Enzyme was  
(1) Isomerase (2) Transaminase (3) Zymase (4) Transferase
46. Enzyme were discovered for the first time in  
(1) Bacteria (2) Yeast (3) Algae (4) Spinach
47. Who coined the term enzyme?  
(1) Pasteur (2) Buchner (3) Kuhne (4) Summer
48. Vitamin serves the function of :-  
(1) An enzyme (2) A coenzyme (3) A holoenzyme (4) A hormone
49. Which of the following is a coenzyme?  
(1) NAD (2) NADP (3) FAD (4) All of above
50. The first enzyme isolated in crystalline form was

- (1) Catalase                      (2) Urease                      (3) Peroxidase                      (4) Amylase

- 51.** In plants enzymes are present in  
 (1) Only in flowers                      (2) Only in leaves  
 (3) All the living cells of plant body                      (4) Only in parenchyma
- 52.** Which of the following coenzyme is a derivative of pantothenic acid? (Vitamin-B complex)?  
 (1) NAD                      (2) NADP                      (3) FAD                      (4) Co-A
- 53.** Which of the following is not consumed in a biochemical process?  
 (1) Hormone                      (2) Enzyme                      (3) Vitamin                      (4) Nucleotide
- 54.** How the presence of an enzyme affects the activation energy of a reaction?  
 (1) It becomes increased  
 (2) It becomes decreased  
 (3) It is first increased and then decreased  
 (4) Activation energy is not affected at all
- 55.** Inhibition of succinic dehydrogenase by malonate is an example of  
 (1) Competitive inhibition                      (2) Non competitive inhibition  
 (3) Allosteric inhibition                      (4) Enzyme repression
- 56.** Enzyme inhibition caused by a substrate analogue is  
 (1) Competitive                      (2) Non competitive  
 (3) In competitive                      (4) Semi- competitive
- 57.** At boiling temperature an enzyme is  
 (1) Denatured                      (2) Unaffected                      (3) Inactivated                      (4) Killed
- 58.** Enzyme have very narrow optima for :-  
 (1) Light                      (2) Temperature                      (3) pH                      (4) Humidity
- 59.** Substrate level net gain of ATP molecules during complete oxidation of 1 molecule of glucose-  
 (1) 8 ATP                      (2) 6 ATP                      (3) 4 ATP                      (4) 2 ATP
- 60.** How many net ATP generates in aerobic respiration via glycerol phosphate shuttle in eukaryotes ?  
 (1) 38 ATP                      (2) 36 ATP                      (3) 40 ATP                      (4) 80 ATP
- 61.** There is gain of how many ATP in aerobic respiration of eukaryotic cell ?  
 (1) 28 ATP                      (2) 36 ATP                      (3) 20 ATP                      (4) 40 ATP
- 62.** Cyanide resistant respiration is found in -  
 (1) Homo sapiens                      (2) Brassica                      (3) Spinach                      (4) Bacteria
- 63.** SIP net gain of ATP from one molecule of glucose during glycolysis or EMP pathway-  
 (1) 2 ATP                      (2) 6 ATP                      (3) 36 ATP                      (4) 38 ATP

64. Which enzyme is chemically not a protein ?  
(1) Hexokinase      (2) Synthetase      (3) Endonuclease      (4) Ribozyme
65. Which enzyme break downs the fructose-1, 6-Diphosphate ?  
(1) Hexokinase      (2) Phosphatase      (3) Aldolase      (4) None
66. Acceptor of acetyl Co-A in Kreb's cycle is  
(1) Malic acid      (2) Fumaric acid  
(3)  $\alpha$ -ketoglutaric acid      (4) Oxalo acetic acid
67. Enzyme concerned with transfer of electrons are :  
(1) Hydrolasase      (2) Dehydrogenase  
(3) Transaminase      (4) Protease
68. Anaerobic respiration takes place in :  
(1) Ribosome      (2) Nucleus      (3) Cytoplasm      (4) Vacuole
69. During the formation of bread, it becomes porous due to release of  $\text{CO}_2$  by the action of :-  
(1) Yeast      (2) Bacteria      (3) Virus      (4) Protozoans
70. Allosteric enzymes have allosteric sites for -  
(1) Inhibition only      (2) Activation only  
(3) Reduction in activation energy      (4) Both activation and inhibition
71. Substrate concentration at which an enzyme attains half of its maxium velocity is ?  
(1) Half life of enzyme      (2)  $K_m$ -constant of enzyme  
(3) Concentration ratio      (4) None
72. In which one of the following do the two names refer to one and the same thing :-  
(1) Kreb's cycle and Calvin cycle  
(2) Tricarboxylic acid cycle and citric acid cycle  
(3) Citric acid cycle and Calvin cycle  
(4) Tricarboxylic acid cycle and urea cycle
73. In alcohol fermentation :-  
(1) Triose phosphate is the electron donor, while acetaldehyde is the electron acceptor  
(2) Triose phosphate is the electron donor, while pyruvic acid is the electron acceptor  
(3) There is no electron donor  
(4) Oxygen is the electron acceptor
74. In glycolysis, during oxidation electrones are removed by:  
(1) Molecular oxygen      (2) ATP  
(3) Glyceraldehyde      (4)  $\text{NAD}^+$
75. During which stage in the complete oxidation of glucose are the greatest number of ATP molecules formed from ADP ?

- (1) Conversion of pyruvic acid to acetyl Co A
- (2) Electron transport chain
- (3) Glycolysis
- (4) Krebs cycle

**76.** The deficiencies of micronutrients, not only affects growth of plants, but also vital functions such as photosynthetic and mitochondrial electron flow. Among the list given below, which group of three elements shall affect most, both photosynthetic and mitochondrial electron transport :

- (1) Cu, Mn, Fe                      (2) Co, Ni, Mo                      (3) Mn, Co, Ca                      (4) Ca, K, Na

**77.** Chemiosmotic theory of ATP synthesis in the chloroplast and mitochondria is based on :

- (1) Proton gradient                      (2) Accumulation of K ions  
(3) Accumulation of Na ions                      (4) Membrane potential

**78.** Which of the following statements regarding enzyme inhibition is correct ?

- (1) Non-competitive inhibition of an enzyme can be overcome by adding large amount of substrate  
(2) Competitive inhibition is seen, when a substrate competes with an enzyme for binding to an inhibitor protein  
(3) Competitive inhibition is seen, when the substrate and the inhibitor compete for the active site on the enzyme  
(4) Non-competitive inhibitors often bind to the enzyme irreversibly.

**79.** The catalytic efficiency of two different enzyme can be compared by the :

- (1) The  $K_m$  value                      (2) The pH optimum value  
(3) Formation of the product                      (4) Molecular size of the enzyme

**80.** Which is the site of Kreb's cycle -

- (1) Chloroplast                      (2) Golgibody  
(3) Mitochondria                      (4) Endoplasmic reticulum

## ANSWER KEY

- |            |     |            |     |            |     |            |     |            |     |            |     |            |     |
|------------|-----|------------|-----|------------|-----|------------|-----|------------|-----|------------|-----|------------|-----|
| <b>1.</b>  | (3) | <b>2.</b>  | (1) | <b>3.</b>  | (4) | <b>4.</b>  | (2) | <b>5.</b>  | (1) | <b>6.</b>  | (3) | <b>7.</b>  | (4) |
| <b>8.</b>  | (2) | <b>9.</b>  | (4) | <b>10.</b> | (2) | <b>11.</b> | (1) | <b>12.</b> | (4) | <b>13.</b> | (3) | <b>14.</b> | (3) |
| <b>15.</b> | (1) | <b>16.</b> | (3) | <b>17.</b> | (3) | <b>18.</b> | (4) | <b>19.</b> | (4) | <b>20.</b> | (4) | <b>21.</b> | (3) |
| <b>22.</b> | (1) | <b>23.</b> | (3) | <b>24.</b> | (1) | <b>25.</b> | (2) | <b>26.</b> | (1) | <b>27.</b> | (1) | <b>28.</b> | (1) |
| <b>29.</b> | (1) | <b>30.</b> | (1) | <b>31.</b> | (2) | <b>32.</b> | (2) | <b>33.</b> | (2) | <b>34.</b> | (3) | <b>35.</b> | (3) |

36.	(3)	37.	(3)	38.	(3)	39.	(2)	40.	(3)	41.	(3)	42.	(2)
43.	(3)	44.	(4)	45.	(3)	46.	(2)	47.	(3)	48.	(2)	49.	(4)
50.	(2)	51.	(3)	52.	(4)	53.	(2)	54.	(2)	55.	(1)	56.	(1)
57.	(1)	58.	(3)	59.	(3)	60.	(2)	61.	(2)	62.	(3)	63.	(1)
64.	(4)	65.	(3)	66.	(4)	67.	(2)	68.	(3)	69.	(1)	70.	(4)
71.	(2)	72.	(2)	73.	(1)	74.	(4)	75.	(2)	76.	(1)	77.	(1)
78.	(3)	79.	(1)	80.	(3)								