1. The term metabolism means
(a) sum of all the enzymatically catalysed chemical reactions constantly taking place in the cells and tissues of the living organisms
(b) processes that change the small molecules into larger ones
(c) processes that convert the large molecules into smaller ones
(d) None of the above

2. Choose the incorrect option.
(a) Removal of CO_2 from amino acids converts an amino acid into an amine
(b) All the biomolecules have a turnover
(c) Metabolic pathways are termed as transformation reactions
(d) Metabolic pathways always follow a linear route

3. One of the major feature of metabolic reactions is that they are … .
(a) elementary reactions
(b) non-linked reactions
(c) heat evolving reactions
(d) catalysed reactions

4. Identify, whether the given conditions are anabolic or catabolic.
I. Glucose $\longrightarrow$ Lactic acid
II. Amino acids $\longrightarrow$ Proteins
(a) I–Catabolic; II–Catabolic
(b) I–Anabolic; II–Catabolic
(c) I–Catabolic; II–Anabolic
(d) I–Anabolic; II–Anabolic

5. Catabolic and anabolic pathways are often coupled in cell because
(a) Both the paths have the same energy
(b) the free energy released from one pathway is used to drive other
(c) the intermediates of a catabolic pathway are used in the anabolic pathway
(d) their enzymes are controlled by their same activators and inhibitors

6. Biomolecules are constantly being changed into some other biomolecules and are made from … .
(a) amino acids (b) biomolecules
(c) monosaccharides (d) enzymes

7. The bond energy of which of the following chemicals is most important form of energy currency in living organisms?
(a) Adenosine Triphosphate (ATP)
(b) Nicotinamide Adenine Dinucleotide Phosphate (NADP)
(c) Flavin Adenine Dinucleotide (FAD)
(d) None of the above

8. The blood concentration of glucose and hormones in a normal healthy individual, respectively are
(a) 4.2-6.1 mM, nanograms/mL
(b) nanograms/mL, 4.5-5.0 mM
(c) 5.0-5-5 mM, nanograms/mL
(d) None of the above

9. Choose the correct option.
(a) The living state is a non-equilibrium steady state to be able to perform work
(b) The constant flow of materials for energy in and out of cell prevents the cell from reaching equilibrium
(c) Living state and metabolism are synonyms
(d) All are correct

10. Why living state cannot afford to reach equilibrium?
(a) Due to insufficiency of biomolecules
(b) To remain active all the time
(c) To save the energy
(d) None of the above

11. Those nucleic acids, which behave like enzymes are known as
(a) ribozymes (b) pepzymes
(c) ribose (d) Both (a) and (b)

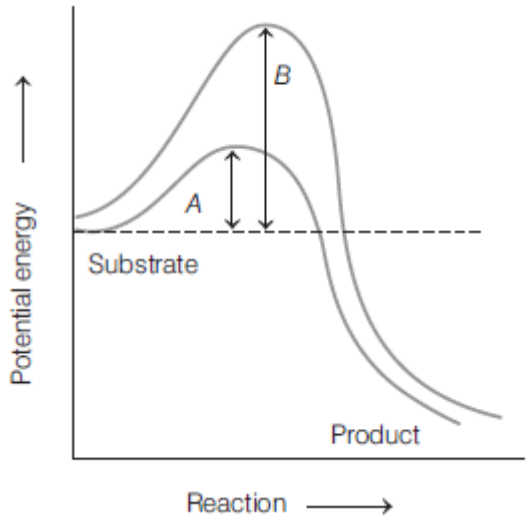
12. The crevice or pocket of an enzyme in which the substrate bind is called
(a) active site (b) inactive site
(c) allotropic site (d) Both (a) and (b)

13. Enzyme catalysts differ from inorganic catalysts in which way?
(a) Enzyme catalysts are smaller in size and lesser in weight in comparison to that of inorganic catalysts
(b) Inorganic catalysts can work efficiently at high temperature, but enzyme catalysts cannot (except few enzymes)
(c) Inorganic catalysts can work efficiently at high pressure, but enzyme catalysts cannot

(d) Both (b) and (c)

14. Aphysical change during a chemical reaction refers to
(a) change in shape without breaking of bonds
(b) change in state matter
(c) change in bond energy during the chemical reaction
(d) Both (a) and (b)

15. Which of the following describes the given graph correctly? ***NEET 2016***



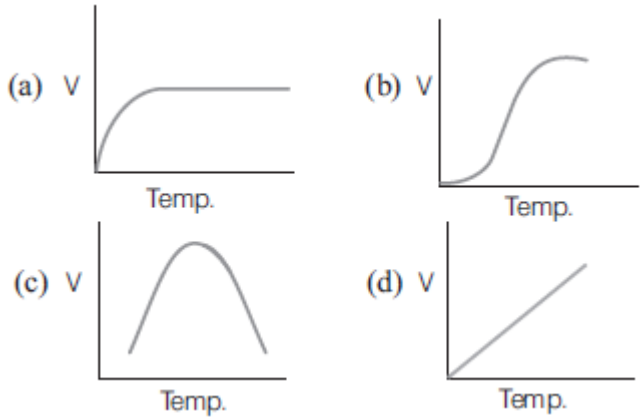
(a) Endothermic reaction with energy–A in the presence of enzyme and B in the absence of enzyme
(b) Exothermic reaction with energy–A in the presence of enzyme and B in the absence of enzyme
(c) Endothermic reaction with energy–A in the absence of enzyme and B in the presence of enzyme
(d) Exothermic reaction with energy–A in the absence of enzyme and B in the presence of enzyme

16.

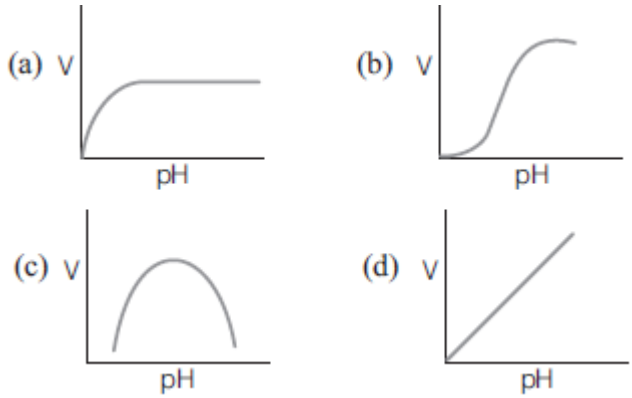
Choose the correct option.

(a) $E + S \longrightarrow ES \longrightarrow E + P \longrightarrow EP$
(b) $E + S \rightleftharpoons ES \longrightarrow E - P \longrightarrow E + P$
(c) $E + S \longrightarrow ES \rightleftharpoons E - P \longrightarrow E + P$
(d) $E + S \rightleftharpoons ES \rightleftharpoons E - P \rightleftharpoons E + P$

17. Select the correct graph, which shows the effect of temperature on the velocity (V) of a typical enzymatic reaction.



18. Choose the correct graph, showing the effect of pH on the velocity (V) of a typical enzymatic reaction.



19. Michaelis-Menten constant (K_m) is equal to
(a) the rate of enzymatic activity
(b) the rate of reaction
(c) substrate concentration at which the rate of the reaction attains half of its maximum velocity
(d) substrate concentration at which the rate of reaction is maximum

20. When the binding of the chemical shuts off enzyme activity, the process and the chemical are especively called as
(a) inhibition, inhibitor
(b) competition, substrate
(c) initiation, promoter
(d) None of the above

21. The inhibitor, which inhibits the enzyme activity by binding to the active site of the enzyme, due to he close resemblance to the substrate in its molecular structure is called
(a) non-competitive inhibitor (b) competitive inhibitor
(c) allosteric modulator (d) feedback inhibitor

22. In competitive inhibition, which of the following is true?
(a) E + IsEI (b) E + IeEI + SeEIS
(c) S + IsSI (d) E S + IeESI

23. Enzymes that catalyse the removal of groups from substrates by mechanism other than hydrolysis, addition of groups to double bonds are called
(a) lyases (b) ligases
(c) hydrolases (d) dehydrogenases

24. What are proenzymes?
(a) Inactive form of enzymes
(b) Active form of enzymes
(c) Neutral form of enzymes
(d) None of the above

25. The inhibitor, which binds to the enzyme at site other than the active site and does not resemble the substrate in structure is called
(a) activator (b) substrate analogue
(c) competitive inhibitor (d) non-competitive inhibitor

26. Select the option, which is not correct with respect to enzyme action. ***CBSE-AIPMT 2014***
(a) Substrate binds with enzyme at its active site
(b) Addition of a lot of succinate does not reverse the inhibition of succinic dehydrogenase by malonate
(c) A non-competitive inhibitor binds the enzyme at a site distinct from that, which binds the substrate
(d) Malonate is a competitive inhibitor of succinic dehydrogenase

27. Prosthetic groups differ from coenzymes in that ***NEET (Odisha) 2019***
(a) they require metal ions for their activity
(b) they (prosthetic groups) are tightly bound to apoenzymes
(c) their association with apoenzymes is transient
(d) they can serve as cofactors in a number of enzyme catalysed reactions

28. Non-protein constituents bound to enzyme, which make enzymes catalytically more active are
(a) cofactors (b) co-ions
(c) inhibitor (d) Both (a) and (b)

29. Apoenzymes are …… portion of the enzyme.
(a) acidic (b) non-protein
(c) protein (d) basic

30. Zinc is a cofactor for which enzyme?
(a) Trypsin (b) Peroxidase
(c) Carboxypeptidase (d) Apoenzyme

1. (a)
2. (*d*) The option (c) is incorrect and can be corrected as Metabolic pathways not always follow linear routes. They are circular sometimes. These pathways *criss-cross* each other.
3. (d)
4. (*c*) Glucose is degraded into lactic acid in skeletal muscles by a catabolic process through which energy is liberated. Assembly of a protein from amino acids requires energy and hence, it is an anabolic process.
5. (c)
6. (b)
7. (*a*) The bond energy of Adenosine Triphosphate (ATP) is the most important form of energy currency in living organisms. On conversion of ADP into ADP and inorganic phosphate there released 7.3 Kcal/mol of energy.

8. (a)
9. (d)
10. (*b*) To remain active all the time is the ability of living state. As a system at equilibrium cannot perform work thereby, beoming dead.
11. (a)
12. (a)
13. (*d*) Both options (b) and (c) are correct. As inorganic catalyst works efficiently at high temperature and pressure, while enzymes gets damaged at high temperature (say above 40ºC). However few enzymes isolated from thermophilic organisms works at up to 80º-90ºC. Other incorrect statement can be corrected as Enzyme catalysts are larger in size and higher in weight in comparison to that of inorganic catalyst.

14. (d)
15. (*b*) The graph shows exothermic reaction. The reaction graph depicted by A states its occurrence in the presence of enzyme as it lowers down the activation energy substantially. The B graph shows this reaction occurring in the absence of enzyme when activation energy is quite high. Thus, option (b) is correct.

16. (b)
17. (c)
18. (*c*) Each enzyme shows its maximum activity at a particular pH and temperature, known as optimum pH and optimum temperature respectively. Before and after, this optimum pH or temperature the enzyme activity is less. Thus, graph in option (c) is correct showing the effect of pH on the velocity of a typical enzymatic reaction.

19. (*c*) Michaelis Menten constant (Km) is equal to the substrate concentration at which the velocity of the reaction is half of the maximum velocity. It is inversely proportional to the enzyme ctivity.

20. (*a*) The activity of an enzyme is also sensitive to the presence of specific chemicals that bind to the enzyme. When the binding of the chemical shuts off enzyme activity, the process is called inhibition and the chemical involved is called as inhibitor.

21. (b)
22. (a)
23. (a)
24. (a)
25. (d)
26. (*b*) Option (b) is incorrect with respect to enzyme action and can be corrected as Addition of a lot of succinate reverses the inhibition of succinic dehydrogenase by malonate. Inhibition of succinic dehydrogenase by malonate is an example of competitive inhibition. Thus, both enzyme and inhibitor compete for the active site of enzyme owing to structural similarity resulting in the decrease of the enzymatic activity. Rest of the options are correct.

27. (*b*) Prosthetic groups are organic compounds and are distinguished from other cofactors in that they are tightly bound to the apoenzyme. For example, in peroxidase and catalase, which catalyse the breakdown of hydrogen peroxide to water and oxygen, haem is the prosthetic group and it is a part of the active site of the enzyme. Co-enzymes are also organic compounds, but their association with the apoenzyme is only transient, usually occurring during the course of catalysis.

28. (a)
29. (c)
30. (c)