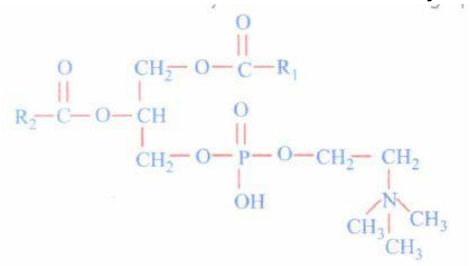
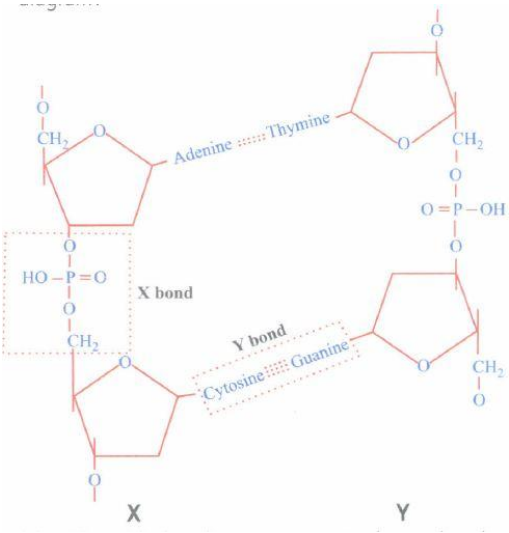
RAVI MATHS TUITION CENTRE , WHATSAPP - 8056206308

Time : 60 Mins **9 BIOMOLECULES 1** **Marks : 240**

1. The helical structure of protein is stabilized by
   a) dipeptide bonds b) hydrogen bonds c) ether bonds d) peptide bonds
2. Given structural formula is correctly identified along with Its related function by which of the following options?



   a) Cholesterol - A component of animal cell membrane b) Lecithin - A component of cell membrane
   c) Triglyceride - An energy source d) Adenosine - A component of nucleic acids
3. Which bonds are indicated by X and Y in the given diagram?



a)

X	Y
Glycosidic bond	Hydrogen bond

b)

X	Y
Phosphodiester bond	Hydrogen bond

c)

X	Y
Glycosidic bond	Phosphodiester bond

d)

X	Y
Phosphodiester bond	Glycosidic bond

4. The proteins which hasten the rate of a given metabolic conversation are called
   a) haemoglobins b) metabolites c) enzymes d) none of these
5. The standard free energy change and standard activation energy for four biochemical reactions are listed in the table below.

Reaction	Standard free energy change (kcal/mol)	Standard activation energy (kcal/mol)
P	-40	18
Q	-71	18
R	-40	11
S	-71	11

A few interpretations are given below. Among these, the most appropriate interpretation is

a)

P, Q, R and S represent the same reaction carried out in the presence of enzyme, high temperature, absence of enzyme and low temperature, respectively

b) Q and S represent the same reaction carried out at high and low temperatures, respectively

c) R and S represent the same reaction carried out in the presence and absence of catalyst, respectively

d) P and R represent the same reaction carried out in the absence and presence of enzyme, respectively

6. Which of the two groups of the given formula is involved in peptide bond formation between different amino acids?

   a) 2 and 3 b) 1 and 3 c) 1 and 4 d) 2 and 4

7. Transition state structure of the substrate formed during an enzymatic reaction is:

   a) Permanent but unstable b) Transient and unstable c) Permanent and stable d) Transient but stable

8. Carbohydrates, the most abundant biomolecules on earth, are produced by:

   a) Some bacteria, algae and green plant cells. b) Fungi, algae and green plant cells.

   c) All bacteria, fungi and algae. d) Viruses, fungi and bacteria.

9. Holoenzyme is the complete enzyme consisting of an apoenzyme and a co-factor. Select the option that correctly identifies the nature of apoenzyme and co-factor

a)

Apoenzyme	Co-factor
Protein	Non-protein

b)

Apoenzyme	Co-factor
Non-protein	Protein

c)

Apoenzyme	Co-factor
Protein	Protein

d)

Apoenzyme	Co-factor
Non-protein	Non-protein

10. Which substance is most abubdant in cells?

    a) Carbohydrates b) Protein c) Water d) Fats

11. Kinds of N bases in nucleic acids are -

    a) Three b) Four c) Five d) Eight

12. Variations in proteins are due to -

    a) Sequence of amino acids b) Number of amino acids c) R-group d) None

13. Which one of the following statements about cytochrome 450 is wrong?

    a) It contains iron b) It is a coloured cell c) It has an important role in metabolism

    d) It is an enzyme involved in oxidation reactions

14. A β-pleated sheet organisation in a polypeptide chain is an example of

    a) 1° structure b) 2° structure c) 3° structure d) 4° structure

15. Distance between two nucleotide pairs of DNA is-

    a) 0.34 nm b) 34 A^0 c) 3.4 μ d) 34 nm

16. The component present in both nucleotides and nucleosides is

    a) sugar b) phosphate c) nitrogenous base d) both (a) and (c).

17. Which protein is found in maximum amount?

    a) Catalase b) Carbonic anhydrase c) Transferase d) RUBISCO

18. Water is important for the body of animals in:-

    a) Reproduction b) Keeping the body only warm c) Working as solvent d) All of them

19. Read the given statements and select the correct option.
Statement 1: Low temperature destroys enzymes by causing their denaturation.
Statement 2: High temperature preserves the enzymes in their inactive stage.
a) Both statements 1 and 2 are correct b) Statement 1 is correct but statement 2 is incorrect
c) Statement 1 is incorrect but statement 2 is correct d) Both statements 1 and 2 are incorrect

20. Which of the following reactions is not enzyme-mediated in biological system?
a) Dissolving CO_2 in water b) Unwinding the two strands of DNA c) Hydrolysis of sucrose
d) Formation of peptide bond

21. Example of phospho protein is-
a) Mucin b) Fibrinogen c) Casein d) Myosin

22. Cytidine is a
a) nitrogenous base b) nucleoside c) nucleotide d) nucleic acid

23. In double helix of DNA, the two DNA strands are _____ .
a) Coiled around a common axis b) Coiled around each other c) Coiled differently
d) Coiled over protein sheath

24. Match column I with column II and select the correct option from the given codes.

Column I	**Column II**
A. Tetrose sugar	(i) Galactose
B. Pentose sugar	(ii) Maltose
C. Hexose sugar	(iii) Erythrose
D. Disaccharide	(iv) Ribose
	(v) Sedoheptulose

a) A-(v); B-(iv); C-(iii); D-(i), (ii) b) A-(iii); B-(iv); C-(v); D-(ii) c) A-(iii); B-(iv); C-(i); D-(ii)
d) A-(i), (ii); B-(iv); C-(iii); D-(v)

25. Which of the following statements regarding enzyme inhibition is correct?
a) Competitive inhibition is seen when a substrate competes with an enzyme for binding to an inhibitor protein.
b)
Competitive inhibition is seen when the substrate and the inhibitor compete for the active site on the enzyme.
c) Non-competitive inhibition of at enzyme can be overcome by adding large amount of substrate.
d) Non-competitive inhibitors often bind to the enzyrne irreversibly.

26. Back bone in structure of DNA molecule is made up of-
a) Pentose Sugar and phosphate b) Hexose sugar and phosphate c) Purine and pyrimidine
d) Sugar and phosphate

27. Which of the following bond is not related to nucleic acid?
a) H-bond b) Ester bond c) Glycosidic bond d) Peptide bond

28. Study the given data and answer the question that follow.
A sample of an enzyme called lactase was isolated from the intestinal lining of a calf. Assays were undertaken to evaluate the activity of the enzyme sample.
The substrate of lactase is the disaccharide lactose. Lactase breaks a lactose molecule in two, producing a glucose molecule and a galactose molecule.
Two assays were carried out
Assay 1

Lactose concentration (% w/v)	15	15	15	15	15	15
Concentration of enzyme sample (% v/v)	0	5	10	15	20	25
Reaction rate µmole glucose sec^{-1} mL^{-1}	0	25	50	75	100	125

Assay 2

Lactose concentration (% w/v)	0	5	15	20	25	30
Concentration of enzyme sample (% v/v)	5	5	5	5	5	5
Reaction rate µmole glucose sec^{-1} mL^{-1}	0	15	25	35	40	40

What are the variables in each of the two assays?

a)

Assay 1	**Assay 2**
Lactose concentration	Concentration of enzyme sample

b)

Assay 1	**Assay 2**
Concentration of enzyme sample	Lactose concentration

c)

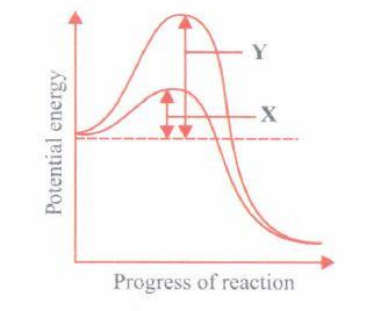
Assay 1	**Assay 2**
Lactose concentration	Lactose concentration

d)

Assay 1	**Assay 2**
Concentration of enzyme sample	Concentration of enzyme sample

29. **Assertion:** The long protein chain is folded upon itself like a hollow ball giving rise to the tertiary structure.
Reason: Tertiary structure gives a 3-dimensional view of a protein
a) If both assertion and reason are true and reason is the correct explanation of assertion
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

30. What is denoted by X and Y in the given graph?



a)

X	**Y**
Activation energy without enzyme	Activation energy with enzyme

b)

X	**Y**
Activation energy with enzyme	Activation energy without enzyme

c)

X	**Y**
Substrate concentration with enzyme	Substrate concentration without enzyme

d)

X	**Y**
Substrate concentration without enzyme	Substrate concentration with enzyme

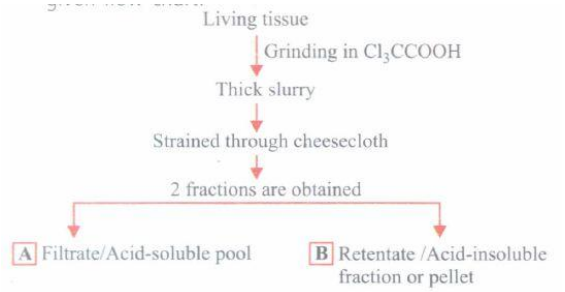
31. Study the given statements and select the correct option.
(i) Carbohydrates, proteins, nucleic acids and lipids are primary metabolites.
(ii) Alkaloids, flavonoids, rubber, etc., are secondary metabolites.
(iii) Linoleic, linolenic and palmitic acids are the three essential fatty acids
a) Statements (i) and (ii) are correct b) Statements (i) and (iii) are incorrect
c) Statements (i) and (iii) are correct d) Statements (i) and (iii) are correct

32. The 20 different amino acids have different:
a) R-groups b) carboxylic groups c) peptide bonds d) amino groups

33. The inhibitor which closely resembles the substrate in its molecular structure and inhibits the enzyme activity by binding to the active site of the enzyme is called
a) feedback inhibitor b) non-competitive inhibitor c) competitive inhibitor d) allosteric modulator

34. Read the given statements and select the correct option.
(i) Right end of a polysaccharide chain is called reducing end while left end is called non-reducing end.
(ii) Starch can hold iodine molecules in its helical secondary structure but cellulose being non-helical, cannot hold iodine.
(iii) Starch and glycogen are branched molecules.
(iv) Starch and glycogen are the reserve food materials of plants and animals, respectively
a) Statements (i) and (ii) are correct b) Statements (ii) and (iii) are correct c) Only statement (iv) is correct
d) All statements are correct

35. Read the given statements and select the option that correctly sorts these with respect to A and B in the given flow chart.



(i) Molecular weight ranging from 18 to 800 daltons (Da) approximately
(ii) Proteins, nucleic acids, polysaccharides and lipids
(iii) Contain chemicals that have molecular weight more than 800 Da
(iv) Has monomers
(v) Generally has polymers

a)

A	B
(i),(ii),(iii)	(iv),(v)

b)

A	B
(ii),(iv)	(i),(iii),(v)

c)

A	B
(i),(iv)	(ii),(iii),(v)

d)

A	B
(i),(iii),(v)	(ii),(iv)

36. Which of the following glucose transporters is insulin-dependent?
a) GLUT-II b) GLUT-III c) GLUT-IV d) GLUT-I

37. Sugar found in haemolymph of insects is called-
a) Maltose b) Lactose c) Trehalose d) Galactose

38. Which purine & pyrimidine bases are paired together by H-bonds in DNA?
a) AC & GT b) GC & AT c) GA & TC d) None of the above

39. Number of H-bonds between guanine and cytosine are -
a) One b) Two c) Three d) Four

40. Which one of the following is a non-reducing carbohydrate _____ .
a) Maltose b) Sucrose c) Lactose d) Ribose 5 - phosphate

41. Which of the following statements is incorrect regarding enzymatic activity?
a) It initially increases with increase in temperature and then decreases
b) It increases with increase in substrate concentration upto the saturation point
c) It is highest at optimum pH value d) It initially decreases with increase in pH value

42. Which of the following diasaccharide gives two molecules of glucose on hydrolysis?
a) Maltose b) Lactose c) (1) and (2) both d) Sucrose

43. **Assertion:** The exoskeleton of arthropods is made up of complex polysaccharide called chitin.
Reason: Plant cell walls are made of cellulose.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion
c) If assertion is true but reason is false d) If both assertion and reason are false

44. Acidic amino acids have two -COOH groups and one -NH_2 group per molecule. Select the pair that consists of acidic amino acids
    a) Aspartic acid, glutamic acid b) Lysine, arginine c) Glycine, alanine d) Both (a) and (b)
45. Primary structure of proteins is due to the presence of
    a) peptide bonds b) disulphide (S-S) linkages c) hydrogen bonds d) ionic bonds
46. At some points a protein molecule may be folded back on itself. This is called _____ structure and folds or coils are held together in place by _____
    a) 2°, H-bonds b) 2°, peptide bonds c) 3°, H-bonds d) 1°, peptide bonds
47. In an organism DNA, which is double stranded 17% of the bases were shown to be cytosine percentage of the other three bases expected present in this DNA are:-
    a) G-17%, A-16.5%, T-32.5% b) G-17%, A-33%, T-33% c) G-8.5%, A-50%, T-24.5%
    d) G-34%, A-24.5%, T-24.5%
48. Enzymes, vitamins and hormones can be classified into a single category of biological chemicals, because all of these _____ .
    a) Help in regulating metabolism.
    b) Are exclusively synthesised in the body of a living organism as at Present. c) Are conjugated proteins.
    d) Enhance oxidative metabolism.
49. To get quick energy one should use-
    a) Carbohydrate b) Fats c) Vitamins d) Proteins
50. Which is wrong about nucleic acids?
    a) DNA is single stranded in some viruses b) RNA is double stranded occasionally
    c) Length of one helix is 45 A^o in B-DNA d) One turn of Z-DNA has 12 bases
51. Dipetide is-
    a) Structure of two peptide bonds b) Two amino acids linked by one peptide bond
    c) Bond between one amino acid and one peptide d) None
52. The introduction of T-DNA into plants involves:
    a) Altering the pH of the soil, then heat shocking the plants. b) Exposing the plants to cold for a brief period.
    c) Allowing the plant roots to stand in water. d) Infection of the plant by Agrobacterium tumefaciens.
53. Unit of nucleic acids are-
    a) Phosphoric acid b) Nitrogenous bases c) Pentose Sugar d) Nucleotides
54. The four elements making 99% of living system are _____ .
    a) CHOS b) CHOP c) CHON d) CNOP
55. Identify the given structural formulae and select the correct option.

a)

A	B
Adenine	Uracil

b)

A	B
Guanine	Thymine

c)

A	B
Adenine	Guanine

d)

A	B
Cytosine	Thymine

56. Chemically enzymes are:-
    a) Fats b) Carbohydrates c) Hydrocarbons d) Proteins
57. The correct order of chemical composition of living tissues/cells in term of percentage of the total cellular mass is

a) nucleic acids> proteins> H_2O > carbohydrates > Ions> iipids
b) H_2O > proteins> nucleic acids> carbohydrates > lipids> ions
c) H_2O > proteins> carbohydrates> nucleic acids > Lipids> ions
d) lipids> ions> carbohydrates> H_2O > proteins nucleic acids

58. An amino acid under certain conditions have both positive and negative charges simultaneously in the same molecule. Such a form of amino acid is called
a) acidic form b) basic form' c) aromatic form d) zwitterionic form

59. An unknown liquid collected from a sample of peas, is added to a beaker of water and is vigorously shaken. After few minutes, water and the unknown liquid made two separate layers. To which class of biomolecules, does the unknown liquid most likely belongs?
a) Polysaccharides b) Proteins c) Lipids d) Enzymes

60. A phosphoglycerate is always made up of:
a) Only an unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached
b)
A saturated or unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached
c)
A saturated or unsaturated fatty acid esterified to a phosphate group which is also attached to a glycerol molecule.
d) Only a saturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached