



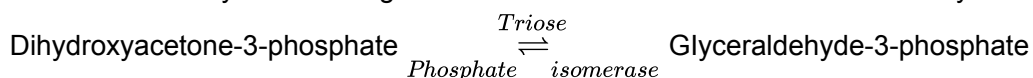
Biomolecules Important Questions With Answers

NEET Biology 2023

1. Dihydroxyacetone- 3-phosphate and glyceraldehyde- 3- phosphate are interconvertible. The enzyme responsible for this interconversion belongs to the category of
a) isomerases b) ligases c) lyases **d) hydrolases**

Solution : -

Isomerases catalyse the change of a substrate into a related isomeric form by rearrangement of molecules.



2. An acid soluble compound formed by phosphorylation of nucleoside is called
a) nitrogen base b) adenine c) sugar phosphate **d) nucleotide**

Solution : -

Nucleoside is basically sugar + nitrogenous base. Nucleotide is sugar + nitrogenous base + phosphate. DNA and RNA are composed of nucleotides.

3. 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 Å in B-DNA **d) One turn of Z-DNA has 12 bases**

Solution : -

Length of one helix or the pitch per turn of helix is 34 Å in B-DNA, 25 Å in A-DNA and 46 Å in Z-model of DNA. In Z-DNA sugar moieties are seen in opposite -direction. So the 3-5 diester bond forms zig-zag structure in Z-DNA.

4. Take a living tissue, grind it in trichloroacetic acid using pestle and mortar, and then strain it, you would obtain two fractions: acid-soluble and acid-insoluble fraction. Acid-insoluble fraction does not contain
a) polysaccharides b) nucleic acids c) lipids **d) flavonoids and alkaloids**

Solution : -

The acid-soluble pool represents roughly the cytoplasmic composition whereas the macromolecules from cytoplasm and organelles become the acid-insoluble fraction, Together they represent the entire chemical composition of living tissues of organisms or cellular pool. All the compounds which are found in the acid-soluble pool, have their molecular weights ranging from approx. 18 to around 800 daltons (Da). The acid-insoluble fraction, has only four types of organic compounds i.e., proteins, nucleic acids, polysaccharides and lipid.

5. Which of the following secondary metabolites are used as drugs?
a) Abrin and ricin **b) Vinblastin and curcumin** c) Anthocyanins d) Gums and cellulose

Solution : -

Some Secondary Metabolites	
Pigments	Carotenoids, anthocyanins, etc
Alkaloids	Morphine, Codeine, etc.
Terpenoids	Monoterpenes, Diterpenes, etc

Some Secondary Metabolites	
Essential oils	Lemon grass oil, etc
Toxins	Abrin, Ricin
Lectins	Concanavalin A
Drugs	Vinblastin, Curcumin, etc
Polymeric substances	Rubber, Gums, Cellulose

Vinblastin is used as an anticancer drug whereas curcumin is a component of turmeric and also used as a drug.

6. Which of the following nitrogen base is not found in DNA?

- a) Thymine b) Cytosine c) Guanine **d) Uracil**

7. Which of the following is the correct match?

a)

Acidic amino acid	Basic amino acid	Neutral amino acid
Glutamic acid	Lysine	Valine

b)

Acidic amino acid	Basic amino acid	Neutral amino acid
Glutamic acid	Lysine	Valine

c)

Acidic amino acid	Basic amino acid	Neutral amino acid
Glutamic acid	Valine	Lysine

d)

Acidic amino acid	Basic amino acid	Neutral amino acid
Lysine	Glutamic acid	Valine

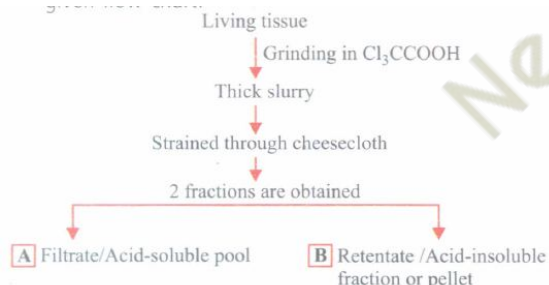
8. Which of the following is not pyrimidine N-base?

- a) Thymine b) Cytosine **c) Guanine** d) Uracil

9. Which element is normally absent in proteins?

- a) C b) N c) S **d) P**

10. 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)

11. In DNA, purine nitrogen bases are:-

- a) Uracil and Guanine **b) Guanine and Adenine** c) Adenine and cytosine d) None

12. Which of the following is the least likely to be involved in stabilizing the three-dimensional structure for most proteins?

a) Hydrophobic interaction **b) Ester bonds** c) Hydrogen bonds d) Electrostatic interaction

13. Read the given paragraph with few blanks.

Prosthetic groups are (i) compounds distinguished from other co-factors in being (ii) bound to the apoenzyme. For example, in peroxidase and (iii) which catalyse the breakdown of hydrogen peroxide to water and (iv), (v) is the prosthetic group.

Select the option that correctly fills blanks in the above paragraph.

a)

(i)	(ii)	(iii)	(iv)	(v)
organic	tightly	catalase	oxygen	haem

b)

(i)	(ii)	(iii)	(iv)	(v)
inorganic	loosely	catalase	hydrogen	haem

c)

(i)	(ii)	(iii)	(iv)	(v)
inorganic	tightly	isomerase	hydrogen	haem

d)

(i)	(ii)	(iii)	(iv)	(v)
organic	loosely	isomerase	oxygen	haem

14. ___ is the most abundant protein in animal world and ___ is the most abundant protein in the whole biosphere.

a) Collagen, RuBisCO b) Collagen, keratin c) Keratin, RuBisCO d) Keratin, collagen

Solution : -

Keratin is a fibrous protein which forms external protective structures of animals like nails, hoofs, scales, hair, feathers, horny layer of skin, etc.

15. Identify the substances having glycosidic bond and peptide bond, respectively in their structure.

a) Cellulose, lecithin **b) Inulin, Insulin** c) Chitin, cholesterol d) Glycerol, trypsin

Solution : -

Inulin is a polysaccharide have glycosidic bond, insulin is a polypeptide which is composed of two peptide chains.

16. The helical structure of protein is stabilized by

a) dipeptide bonds b) hydrogen bonds c) ether bonds d) peptide bonds

17. To get quick energy one should use-

a) Carbohydrate b) Fats **c) Vitamins** d) Proteins

18. Which of the following hormones can play a significant role in osteoporosis?

a) Estrogen and parathyroid hormone b) Progesterone and aldosterone c) Aldosterone and prolactin
d) Parathyroid hormone and prolactin

Solution : -

(i) Estrogen and parathyroid hormone can play significant role in osteoporosis. It is caused due to the deficiency of estrogen and excessive activity of parathormones. Estrogen helps to promote the activity of osteoblast (helps in the formation of bone cells) and inhibits osteoclast (destruct the bones). On the other hand, parathormone promotes the mobilisation of calcium from bones into blood hence causes demineralisation.

(ii) The other listed hormones also contribute to osteoporosis but their effects are insignificant or very less, e.g., low level of progesterone and aldosterone causes bone loss whereas raised level of prolactin have been linked with osteoporosis.

19. Consider the following statement:

(A) Coenzyme or metal ion that is tightly bound to enzyme protein is called prosthetic group.

(B) A complete catalytic active enzyme with its bound prosthetic group is called apoenzyme. Select the correct option.

a) (A) is true but (B) is false. b) Both (A) and (B) are false. c) (A) is false but (B) is true.
d) Both (A) and (B) are true.

Solution : -

Coenzyme or metal ion that is tightly bound to enzyme protein is called prosthetic group. A complete catalytic active enzyme with its bound prosthetic group is called holoenzyme.

20. Which substance is most abundant in cells?
 a) Carbohydrates b) Protein **c) Water** d) Fats
21. Which one of the given graphs shows the effect of temperature on the velocity of a typical enzymatic reaction?



22. Primary structure of proteins is due to the presence of
a) peptide bonds b) disulphide (S-S) linkages c) hydrogen bonds d) ionic bonds
23. Which of the following biomolecules does have phosphodiester bond?
 a) Monosaccharides in a polysaccharide b) Amino acids in a polypeptide **c) Nucleic acids in a nucleotide**
 d) Fatty acids in a diglyceride

Solution : -

Lipids are not polymeric, because it is made up of only fatty acids and glycerol. They do not form repetitive chains. Others are polymers. proteins are polymer of monomer (amino acids) which bond together by peptide bonds to form polypeptide chain of protein. Carbohydrates are also polymer of monosaccharide.

24. Which of the following is an incorrect match?
 a) Purines - Adenine, guanine b) Pyrimidines - Cytosine, thymine c) Structural polysaccharides - Inulin
d) Storage polysaccharides - Starch

Solution : -

Inulin is a fructan storage polysaccharide of roots and tubers of Dahlia and related plants. Inulin is not metabolised in human body and is readily filtered through the kidney. It is, therefore, used in testing of kidney function, especially glomerular filtration.

25. One of the characteristics of DNA is-
 a) Uracil **b) Deoxyribose sugar** c) Single stranded d) Ability of protein synthesis
26. Which one of the following is a polysaccharide?
 a) Sucrose b) Lactose **c) Glycogen** d) Glucose
27. Which protein is found in maximum amount?
 a) Catalase b) Carbonic anhydrase c) Transferase **d) RUBISCO**

28. Cytidylic acid is:-

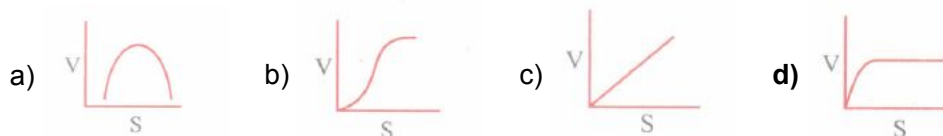
- a) Ribose + Cytosine + phosphate** b) Ribose + cytosine c) Nucleoside d) Deoxyribonucleotide

29. B-DNA which is right-handed double helix contains _____ base pairs per turn of the helix and each turn is _____ long.
 a) 10, 3.4 Å **b) 10, 34 Å** c) 11, 20 Å d) 11, 34 Å

Solution : -

In B-DNA, one turn of the helix has about 10 nucleotides on each strand of DNA. A turn occupies a distance of about 3.4 nm (34 Å or 3.4×10^{-9} m) so that adjacent nucleotides or their bases are separated by a space of about 0.34 nm (0.34×10^{-9} m or 3.4 Å).

30. Which of the following graphs shows the relationship between the rate of an enzymatic activity (V) and substrate concentration (S)?



Solution : -

Increase in substrate concentration increases the rate of reaction due to two factors: (i) occupation of more and more active sites by the substrate molecules; (ii) higher number of collisions between substrate molecules. The rise in velocity is quite high in the beginning but it decreases progressively with the increase in substrate concentration. If a graph is plotted for substrate concentration versus reaction velocity, it appears as a hyperbolic curve. A stage is reached where velocity is maximum. It does not increase further by increasing the substrate concentration. At this stage the enzyme molecule becomes fully saturated and no active site is left free to bind additional substrate molecules.

31. **Assertion:** The heterocyclic compounds in nucleic acid are the nitrogenous bases.

Reason: Adenine and guanine are substituted pyrimidines while uracil, cytosine and thymine are substituted purines.

- 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

Solution : -

Nucleic acids are polynucleotides. A nucleotide has three chemically distinct components. One is a heterocyclic compound, the second is a monosaccharide and the third a phosphoric acid or phosphate. The heterocyclic compounds in nucleic acids are the nitrogenous bases named adenine, guanine, uracil, cytosine and thymine. Adenine and guanine are substituted purines while the rest are substituted pyrimidines formed from the skeletal heterocyclic rings purine and pyrimidine, respectively.

32. Concanavalin A is _____ .

- a) An essential oil b) A lectin c) A pigment **d) An alkaloid**

Solution : -

Concanavalin A is a secondary metabolite e.g lectin, it has the property to agglutinates RBCs.

33. 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

34. When we homogenise any tissue in an acid the acid soluble pool represents

- a) cytoplasm** b) cell membrane c) nucleus d) mitochondria

Solution : -

The acid soluble pool has roughly similar composition as of cytoplasm. Biomolecules with molecular weights in the range of 18 - 800 Daltons come in acid-soluble fraction (with the exception of lipids). Though, the macromolecules from cytoplasm and organelles represent the acid-insoluble fraction.

35. Kinds of N bases in nucleic acids are -

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

36. One of the major components of cell wall of the fungi is:-

- a) Cellulose b) Hemicellulose **c) Chitin** d) Peptidoglycan

37. Chemically enzymes are:-

- a) Fats b) Carbohydrates c) Hydrocarbons **d) Proteins**

38. Many elements are found in living organisms either free or in the form of compounds. One of the following is not found in living organisms

- a) Silicon** b) Magnesium c) Iron d) Sodium

Solution : -

A comparison of elements present in non-living and living matter is given in the table below:

Elements	% weight of	
	Earth crust (non living matter)	Human body (living matter)

Hydrogen	0.14	0.5
Carbon	0.03	18.5
Oxygen	46.6	65.0
Nitrogen	very little	3.3
Sulphur	0.03	0.3
Sodium	2.8	0.2
Calcium	3.6	1.5
Magnesium	2.1	0.1
Silicon	27.7	Negligible

39. Sweetest sugar among the naturally occurring sugar-
a) Glucose **b) Fructose** c) Sucrose d) Saccharine
40. Which of the following biomolecules have phosphodiester bonds?
a) Fatty acids in diglyceride b) Monosaccharides in a polysaccharide c) Amino acid in a polypeptide
d) Nucleotides in a nucleic acid

Solution : -

In a nucleic acid, a phosphate moiety links the 3'-carbon of one sugar of one nucleotide to the 5'-carbon of the sugar of the succeeding nucleotide. The bond between the phosphate and hydroxyl group of sugar is an ester bond. As there is one such ester bond on either side, it is called phosphodiester bond.

41. 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**

Solution : -

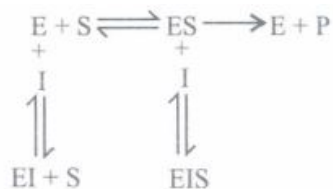
Standard free energy represents the energy available to do work at standard temperature. Activation energy represents the energy required to start a reaction. The enzyme works by lowering down the activation energy.

42. DNA was first discovered by-
a) Meischer b) Robert Brown c) Flemming d) Watson & Crick
43. The inhibitor which does not resemble the substrate in structure and binds to the enzyme at site other than the active site is called
a) competitive inhibitor **b) non-competitive inhibitor** c) activator d) substrate analogue.

Solution : -

In non-competitive inhibition, the inhibitor binds at a site other than the active site on the enzyme surface. This binding impairs the enzyme function. The inhibitor has no structural resemblance with the substrate. It does not interfere with the enzyme-substrate binding but the catalysis is prevented, possibly due to a distortion in the enzyme conformation. Non-competitive inhibition is usually irreversible

because it cannot be overcome by increasing the substrate concentration. The inhibitor (I) generally binds with the enzyme as well as the ES complex. The overall relation in noncompetitive inhibition is represented as :



44. Nucleic acids are found in
 a) Nucleus b) Cytoplasm **c) Both nucleus & Cytoplasm** d) Nucleus & ribosomes
45. An organic substance bound to an enzyme and essential for its activity is called _____ .
 a) Holoenzyme **b) Apoenzyme** c) Isoenzyme d) Coenzyme

Solution : -

Apoenzyme is the protein part of an enzyme to which the coenzyme attaches to form an active enzyme. While Coenz, me is an organic substance that enhances the action of an enzyme by binding with the protein molecule. Isoenzyme is one of the several forms of an enzyme that catalyse the same reaction but differ from each other in such properties as substrate affinity and maximum rates of enzyme substrate reaction.

46. Pyrimidines have nitrogen atoms at _____ positions.
 a) 1', 3', 7', 9' b) 1', 5', 7', 9' **c) 1', 3'** d) 1', 9'
47. Which type of configuration is shown by nucleic acids?
 a) Primary **b) Secondary** c) Tertiary d) Quaternary
48. Sugar found in haemolymph of insects is called-
 a) Maltose b) Lactose **c) Trehalose** d) Galactose
49. 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
50. Which of the following is a saturated fatty acid?
 a) Oleic acid b) Linoleic acid c) Arachidonic acid **d) Palmitic acid**