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**1. The most abundant bio molecule on the earth**

- a) Nucleic acids
- b) proteins
- c) lipids
- d) carbohydrates

**2. The major functions of carbohydrates include**

- a) structural framework
- b) storage
- c) both a and b
- d) none of these

**3. The general formula of carbohydrate is**

- a)  $(CH_2O)_n$
- b)  $(C_4H_2O)_n$
- c)  $(C_6H_{12}O_6)_n$
- d)  $(C_2H_2O)_n$  COOH

**4. Carbohydrates are**

- a) polyhydroxy aldehydes and phenols
- b) polyhydroxy aldehydes and ketones
- c) polyhydroxy ketones and phenols
- d) polyhydroxy phenols and alcohols

**5. Structural polysaccharides include**

- a) cellulose, hemicellulose and chitin
- b) cellulose, starch and chitin
- c) cellulose, starch and glycogen
- d) cellulose, glycogen and chitin

**6. Nutritional polysaccharides are**

- a) starch and glycogen
- b) starch and chitin
- c) starch and cellulose
- d) starch and glucose

**7. Glycogen in animals are stored in**

- a) liver and spleen
- b) liver and muscles
- c) liver and bile
- d) liver and adipose tissue

**8. Carbohydrates accounts**

- a) 30% in plants and 20% in animals
- b) 30% in plants and 10% in animals
- c) 30% in plants and 1% in animals
- d) 50% in plants and 50% in animals

**9. Smallest carbohydrates are trioses. Which of the following is a triose?**

- a) glucose
- b) ribulose
- c) ribose
- d) glyceraldehyde

**10. Which of the following is a reducing sugar**

- a) glucose
- b) dihydroxyacetone
- c) erythulose
- d) none of these

**11. Oligosaccharides linked to proteins are called**

- a) glycoproteins
- b) glycolipids
- c) galactosides
- d) ganglioside

**12. In polysaccharides, monosaccharides are joined by**

- a) peptide bond
- b) glucose bond
- c) glycosidic bond
- d) covalent bond

**13. Sucrose is a**

- a) monosaccharide
- b) disaccharide
- c) polysaccharide
- d) triose

**14. Lactose is a disaccharide consists of**

- a) glucose and fructose
- b) glucose and galactose
- c) glucose and sucrose
- d) glucose and ribose

**15. In lactose, the linkage is**

- a)  $\beta$ -1-4 linkage
- b)  $\beta$ -1-2 linkage
- c)  $\alpha$ -1-4 linkage
- d)  $\alpha$ -1-2 linkage

**15. Maltose is a disaccharide consists of**

- a) glucose and fructose
- b) glucose and galactose
- c) glucose and sucrose
- d) glucose and glucose

**17. Starch consists of**

- a) unbranched amylose and branched amylopectin
- b) branched amylose and branched amylopectin
- c) unbranched amylose and unbranched amylopectin
- d) none of these

**18. Cellulose is made up of repeating units of**

- a)  $\beta$ -1-4 linkage between D-glucose units
- b)  $\beta$ -1-2 linkage between D-glucose units
- c)  $\alpha$ -1-4 linkage between D-glucose units
- d)  $\alpha$ -1-2 linkage between D-glucose units

**19. Amylopectin has**

- a)  $\beta$ -1-4 and  $\beta$ -1-6 linkage
- b)  $\beta$ -1-2 linkage
- c)  $\alpha$ -1-4 and  $\alpha$ -1-6 linkage
- d)  $\alpha$ -1-2 linkage

**20. Chitin consists of**

- a) N-acetyl muramic acid
- b) N-acetyl glucosamine
- c) D-glucose units
- d) N-acetyl muramic acid and N-acetyl glucosamine

**Answers**

1-d	2-c	3-a	4-b	5-a
6-a	7-a	8-c	9-d	10-a
11-a	12-c	13-b	14-b	15-d
16-c	17-a	18-a	19-c	20-b

**16. 4-hydroxy proline is present in**

- a) Collagen
- b) Plant cell wall
- c) Keratin
- d) Both plant cell wall and collagen

**17. Peptide bonds between amino acids are highly stable and have a half-life of seven years in intracellular condition. This is due to**

- a) High activation energy required for hydrolysis
- b) Low activation energy required for hydrolysis
- c) Peptide bond is a covalent bond
- d) Peptide bond is rigid and planar

**18. Tri-peptide consists**

- a) 3 amino acids and 3 peptide bonds
- b) 2 amino acids and 3 peptide bonds
- c) 3 amino acids and 2 peptide bonds
- d) 3 amino acids and 4 peptide bonds

**19. All the following statements are true except**

- a) Ornithine and citrulline are uncommon aminoacids
- b) Ornithine is an intermediates in Urea cycle
- c) Ornithine and citrulline are uncommon amino acids present in many proteins
- d) Both ornithine and citrulline are intermediates in urea cycle

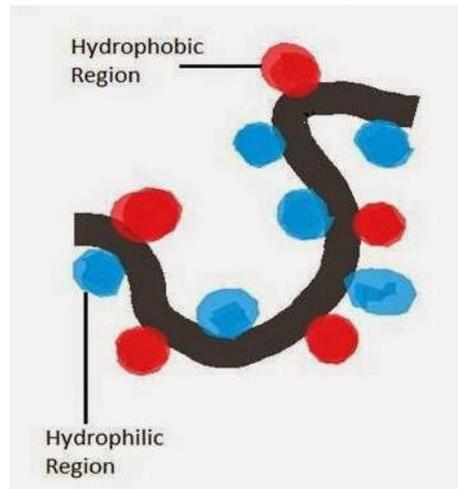
**20. The characteristic strong absorbance of 280nm of proteins is due to**

- a) All amino acids can absorb at 280nm
- b) Only Tryptophan and tyrosine can absorb at 280 nm
- c) Tryptophan is responsible for the absorbance
- d) Tryptophan, tyrosine and phenylalanine can absorb at 280 nm

**21. The formation of cystine occurs at**

- a) ER
- b) Golgi
- c) Cytosol
- d) Mitochondria

22. Which of the following interaction contributes most in protein folding



- a) Covalent bond
- b) Ionic bond
- c) Hydrophobic interaction
- d) Vander walls interaction

23. Which of the following aminoacid has pKa near neutrality

- a) Tryptophan
- b) Arginine
- c) Histidine
- d) Asparagine

24. Desmosine is an unusual amino acid found in

- a) Myosin
- b) Elastin
- c) Troponin
- d) Actin

25. How many small peptides are formed upon cleavage by trypsin if a protein has 5 lysine residues

- a) 4
- b) 5
- c) 6
- d) 7

26. EF-1 $\alpha$  and EF-Tu are

- a) Analogs
- b) Homologs
- c) Paralogs
- d) Syllogs

**27. All the statements regarding peptide bond are true except**

- a) Peptide bond is a co-valent bond
- b) Peptide bond is rigid and planar
- c) Peptide bond has partial double bond character
- d) Peptide bond is formed by non-condensation reaction

**28. Alpha-helix has**

- a) 3.6 residues/turn and is a right handed helix
- b) 3.8 residues/turn and is a right handed helix
- c) 3.6 residues/turn and is a left handed helix
- d) 3.8 residues/turn and is a left handed helix

**29. Which of the following amino acids are rarely present in alpha helix**

- a) Glycine and proline
- b) Proline and tryptophan
- c) Tryptophan and glycine
- d) Proline only

**30. PDI is an enzyme involve in**

- a) Protein synthesis
- b) Protein degradation
- c) Protein folding
- d) Protein quaternary structure formation

**Answers with explanation**

16.d)

Both plant cell wall and collagen

Explanation: 4-hydroxyproline, 5-hydroxy lysine, selenocysteine, desmosine, carboxy glutamate all are uncommon amino acids

17.a)

18.c) amino acids and 2 peptide bonds

19.c)

Ornithine and citrulline are uncommon amino acids present in many proteins

Remember, these two amino acids are not present in any proteins.

20.d

Tryptophan, tyrosine and phenylalanine can absorb at 280 nm. These are aromatic amino acids.

Tryptophan and tyrosine absorb strongly at 280nm where as phenylalanine has comparatively low absorbance.

21.a) ER.

Two cysteine amino acids are linked by di-sulphide bond to form cystine. Di-sulphide bonds are formed only in the highly oxidizing environment of ER.

22.c Hydrophobic interaction (Bonds in Proteins)

23.c histidine has a pKa of 6.0 and has buffering capacity

24.b) Elastin

25.c) 6 Trypsin cleave at C-terminal of lysine or arginine residue

26.b) homologs.

EF-Tu elongation factor is involved in protein synthesis of bacteria. The protein counterpart in eukaryote is EF-1a. Both are members of the same family with a common ancestry.

27.d) Peptide bond is formed by non-condensation reaction. Actually Peptide bond is formed by condensation reaction.

28.a) 3.6 residues/turn and is a right handed helix in all proteins. You have to read the options carefully before picking one.

29.a) glycine and proline.

Proline is an alpha helix terminator as it cannot form H-bond with other residues. Glycine is the simplest amino acid and has high conformational flexibility. Polymers of glycine form coiled structures entirely different from alpha helix.

30.c

PDI (protein di sulphide isomerase) is an enzyme involved in shuffling of di sulphide bonds in protein folding. Refer our post protein folding.

**1. The pentoses in nucleotides are**

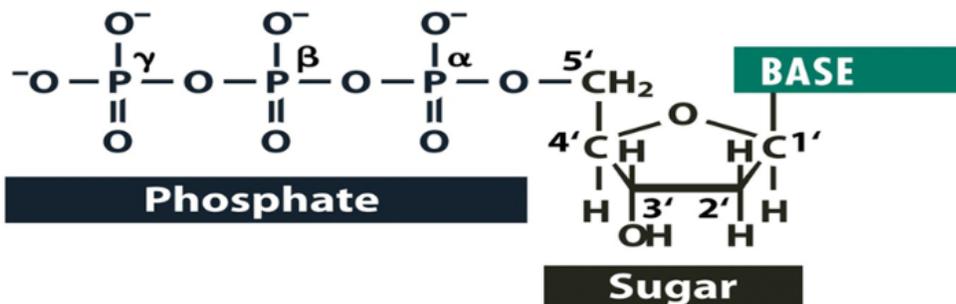
- a) in  $\beta$ -furanose form
- b) in  $\alpha$ -furanose form
- c) Both
- d) none of the above

**2. To identify self DNA from non-self DNA, the self DNA may be**

- a) glycosylated
- b) carboxylated
- c) phosphorylated
- d) methylated

**3. Functions of nucleotide includes**

**A nucleotide**



- a) information storage and transmission
- b) storage of chemical energy
- c) cell signalling
- d) All of the above

**4. Choose the best option**

- a) proteins has catalytic activity
- b) Proteins and RNA have catalytic activity
- c) Proteins, RNA and antibodies have catalytic activity
- d) Proteins, RNA, antibodies and phospholipids have catalytic activity

**5. The backbone of DNA is**

- a) hydrophilic
- b) hydrophobic
- c) neutral
- d) Both hydrophilic and hydrophobic

**6. Which is the most stable form of DNA under normal physiological conditions**

- a) A-DNA
- b) B-DNA
- c) Z-DNA
- d) H-DNA

**7. As far as the absorbance of DNA at 260nm. Which of the following is correct?**

- a) individual nucleotides > ss DNA > dsDNA
- b) dsDNA > ssDNA > individual nucleotides
- c) ssDNA > dsDNA > individual nucleotides
- d) absorbance remains same

**8. Which of the following statement is true?**

- a) DNA is more stable than RNA in alkaline condition because of the presence of 3'OH
- b) DNA is more stable than RNA in alkaline condition because of the presence of 2' H compared to RNAs 2'OH
- c) RNA is more stable than DNA in alkaline condition because of the presence of 2' and 3'OH compared to DNAs 2'H and 3'OH
- d) Both are equally stable in alkaline condition

**9. Dehydration of DNA samples may induce the formation of**

- a) A-DNA
- b) B-DNA
- c) Z-DNA
- d) H-DNA

**10. An increase in temperature of a DNA sample causes change in**

- a) absorbance at 260nm
- b) viscosity
- c) phosphodiester linkage
- d) absorbance and viscosity

**11. RNA-DNA hybrids are**

- a) more stable than DNA-DNA hybrid
- b) more stable than RNA-RNA hybrid
- c) less stable than RNA-RNA hybrid
- d) less stable than RNA-RNA hybrid and DNA-DNA hybrid

**12. An increase  $T_m$  (melting temperature) for a ds-DNA may be due to high content of**

- a) A+G
- b) A+T
- c) C+G
- d) none of the above

**13. Thymine is present in**

- a) prokaryotic mRNA
- b) mammalian mRNA
- c) ribosomal RNA
- d) tRNA

**14. RNA is genetic material in**

- a) some viruses and prokaryotes
- b) some viruses only
- c) some viruses, prokaryotes and some primitive eukaryotes
- d) none of the above

**15. DNA has**

- a) autocatalytic function
- b) heterocatalytic function
- c) both autocatalytic and heterocatalytic function
- d) none of the above

**Free online MCQ test on:** Nucleic acid -> DNA -> DNA Structure-> RNA

**Answers:**

- 1- a) in  $\beta$ -furanose form (closed 5-membered ring)
- 2- d) methylated.
- 3- d) All of the above
- 4- c) Proteins, RNA and antibodies have catalytic activity.  
RNA with catalytic activity: ribozymes  
Antibodies with catalytic activity: abzymes
- 5- a) hydrophilic. The OH group of sugar residue forms H-bond with water
- 6- b) B-DNA
- 7- a) individual nucleotides > ss DNA > dsDNA  
The reason for absorbance ( $A_{260}$  in DNA) is N2 bases. In ss DNA, N2 bases are exposed so more  $A_{260}$  than ds DNA. In free nucleotides, N2 bases are much more exposed and free so high  $A_{260}$  than ss and ds DNA.
- 8- b) DNA is more stable than RNA in alkaline condition because of the presence of 2' H compared to RNAs 2'OH
- 9- a) A-DNA
- 10- d) absorbance and viscosity

11- d) less stable than RNA-RNA hybrid and DNA-DNA hybrid

12- c) C+G has three H-bonds compared to two in A=T. So more temperature is needed for denaturation.

13- d) tRNA. t RNA has thymine and many unusual bases.

14- b) some viruses only

15- c) both autocatalytic and heterocatalytic function

Autocatalytic function: DNA replication

Heterocatalytic function: directs synthesis of RNA and proteins