12th JEE CHEMISTRY DPP

Biomolecules

DPP-01

1. Read the following statements:
I. It has general formula, $C_x(H_2O)_y$
II. They are hydrates of carbon.
III. The molecular formula of glucose is $C_6H_6O_6$ and general formula is $C_6(HO)_6$.
Select the incorrect statement about the carbohydrates?
(A) I (B) II
(C) II and III (D) III

2. "Carbohydrate that cannot be hydrolysed further to give simpler unit of polyhydroxy aldehyde or ketone." Name the type of carbohydrates.
(A) Monosaccharide
(B) Oligosaccharide
(C) Polysaccharide
(D) All of these

3. Find out the correct option among the following statements.
(A) In reducing sugars, aldehydic and ketone group are free bonded
(B) Maltose and lactose are non-reducing sugar
(C) Fehling's solution and Tollen's reagent are non-reducing sugar
(D) All monosaccharides whether aldoses or ketoses are reducing sugar

4. Carbohydrates have
(A) –OH group
(B) –CHO group
(C) > C = O group
(D) All

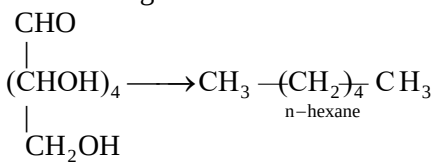
5. Glucose cannot be classified as ?
(A) Hexose (B) Carbohydrate
(C) Aldose (D) Oligosaccharide

6. Which carbohydrate is used in silvering of mirror?
(A) Sucrose (B) Fructose
(C) Glucose (D) B and C

7. Which one of the following is non-reducing sugar?
(A) Glucose (B) Maltose
(C) Fructose (D) Sucrose

8. Which one of the following is reducing sugar?
(A) Starch (B) Cellulose
(C) Glycogen (D) Fructose

9. Name the reagent and condition required for the following reaction



Choose the correct option
(A) HF, Δ (B) HCl, Δ
(C) HBr, Δ (D) HI/Red P, Δ

10. The two monosaccharide units obtained on hydrolysis of disaccharide may be
(A) same (B) different
(C) both (A) and (B) (D) none of these

Carbohydrate

DPP-02

1. Find out the correct option among the following statements

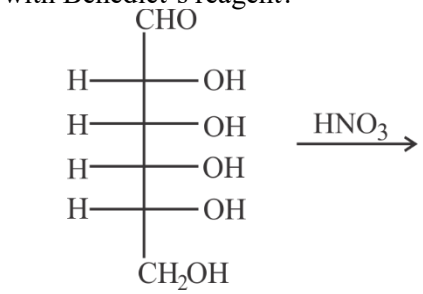
(A) In reducing sugars, aldehydic and ketonic group are free bonded

(B) Maltose and lactose are non-reducing sugar

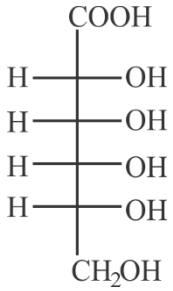
(C) Fehling's solution and Tollen's reagent are the non-reducing sugar

(D) All monosaccharides whether aldoses are ketoses are reducing sugar

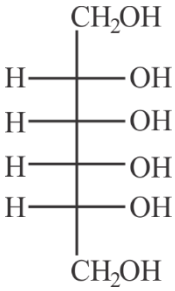
2. Which of the product of the following reaction is not going to give a positive test with Benedict's reagent?



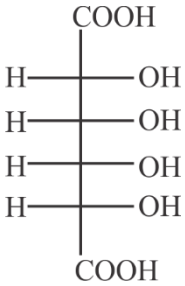
(A)



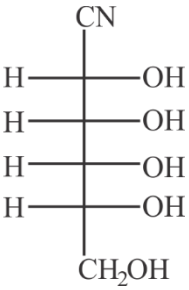
(B)



(C)



(D)



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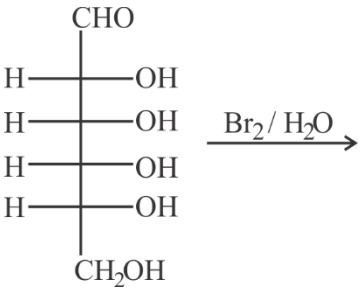
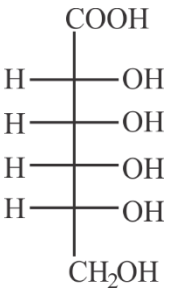
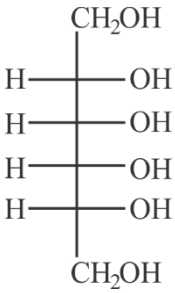


Product of the reaction is

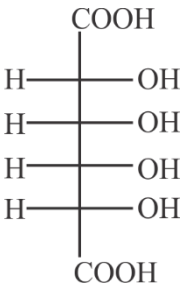
(A)



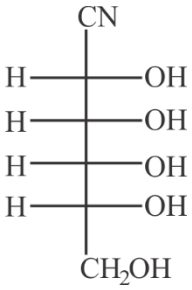
(B)



(C)



(D)



4. Reduction of hexose A (molecular formula $C_6H_{12}O_6$) with sodium borohydride gives compound B and C. Compound B is optically inactive, whereas compound C is optically active . Which of the following is compound A?

(A) D-fructose (B) D-glucose

(C) D-mannose (D) D-galactose

5. Osazone formation involves only 2 carbon atoms of glucose because of

(A) chelation (B) oxidation

(C) reduction (D) hydrolysis

6. D-Glucose $\xrightarrow[H_2O]{Br_2}$

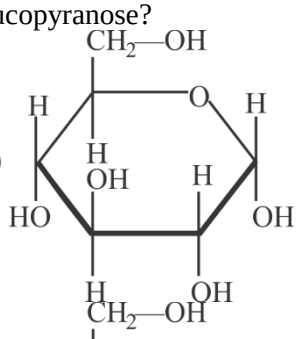
(A) Aldonic acid (B) Adaric acid
(C) Alditol (D) Tartaric acid

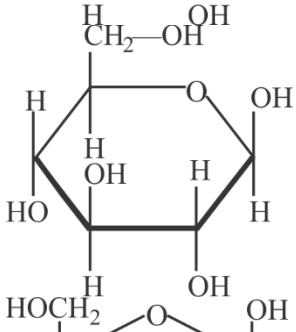
7. D-Glucose will form same osazone with
(A) D-Mannose
(B) D-Fructose
(C) D-Allose
(D) Both (A) and (B)

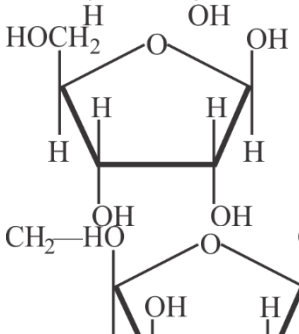
8. Which of the following statement is correct about fructose?
(A) It is dextrorotatory compound
(B) It exists in the two cyclic forms which is obtained by the addition of OH at C-5 to the $>C=O$ group
(C) It exists as six membered ring
(D) It is named as furanose as it contain one oxygen and six carbon atom

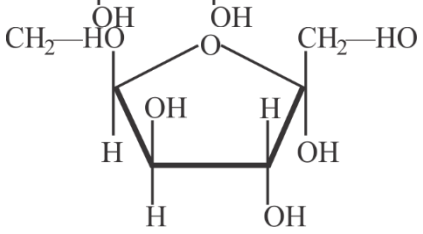
9. D-Glucose $\xrightarrow{5HIO_4}$; Product is
(A) $4HCO_2H$, HCHO
(B) $5HCO_2H$, HCHO
(C) $4HCO_2H$, CO_2, HCHO
(D) 5HCHO, HCO_2H

10. Which of the following is structure of β-D-Glucopyranose?

(A)


(B)


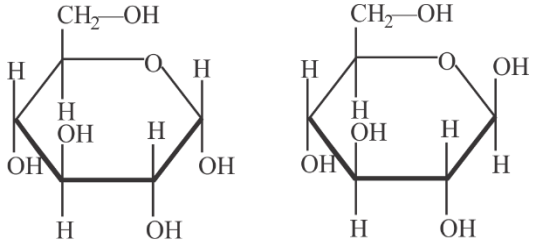
(C)


(D)


Carbohydrate

DPP-03

1. Study the structures of α-D-(+) glucopyranose and β-D-(+) glucopyranose and mark the correct statement.

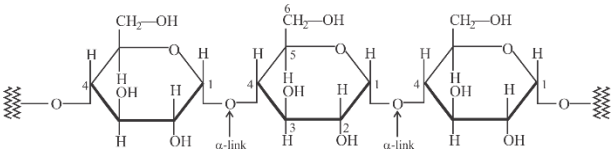


I II

(A) Structures I and II are enantiomers
(B) Structures I and II are anomers
(C) The two structures I and II differ in configuration of C_1 and C_4
(D) Both the structures I and II give 2, 4-DNP test

2. What is the basic formula for starch?
(A) $(C_6H_{12}O_6)_n$ (B) $(C_6H_{10}O_5)_n$
(C) $C_{12}H_{22}O_{11}$ (D) $(C_6H_{12}O_4)_n$

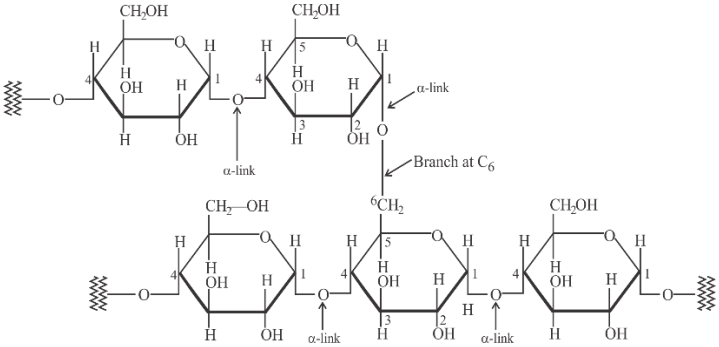
3. The below polysaccharide is called



(A) amylose (B) amylopectin
(C) cellulose (D) glycogen

4. In cellulose, D-glucose units are joined by
(A) α-1, 4-glycosidic linkage
(B) β-1, 6-glycosidic linkage
(C) β-1, 4 glycosidic linkage
(D) peptide linkage

5. Which of the following statement is correct about the above structure?



(A) It constitute 85% of starch
(B) It is branched chain polymer of α-D-glucose unit in which chain is formed by Cl-C4 glycosidic linkage whereas branching occurs by C1-C6 glycosidic linkage
(C) The above polysaccharide is amylopectin
(D) All of these

6. Which of the following is the correct statement?
(A) Starch is a polymer of α-glucose
(B) Amylose is not a component of starch
(C) Proteins are composed of only one type of amino acid
(D) In cyclic structure of fructose, there are five carbon and one oxygen atoms

7. The pair of compounds in which both the compounds give positive test with Tollen's reagent is
(A) glucose and sucrose
(B) fructose and sucrose
(C) acetophenone and hexanal
(D) glucose and fructose

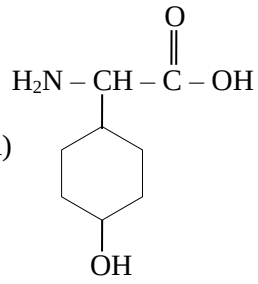
8. D-Glucose and L-Glucose are
(A) enantiomers (B) diastereomers
(C) epimers (D) anomers

9. Identify the pair of epimers
(A) D-glucose and D-fructose
(B) D-glucose and L-glucose
(C) D-glucose and D-mannose
(D) D-glucose and D-glucose

Amino Acid

DPP-04

1. Which of the following amino acids has pI ~ 9.8?

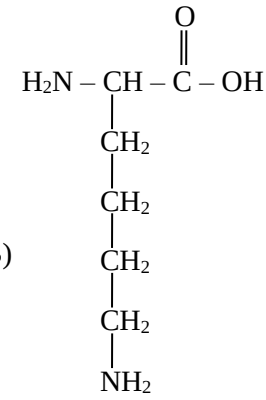
(A) 

Tyrosine:

pK_{a_1} (COOH) = 2.2

pK_{a_2} (NH_2) = 9.1

pK_{a_3} (R) = 10.1

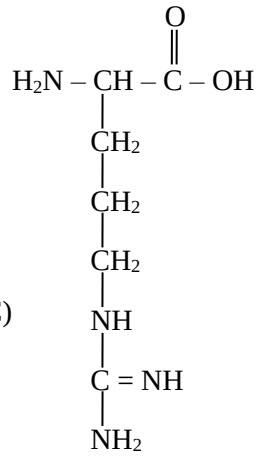
(B) 

Lysine:

pK_{a_1} (COOH) = 2.2

pK_{a_2} (NH_2) = 9

pK_{a_3} (R) = 10.5

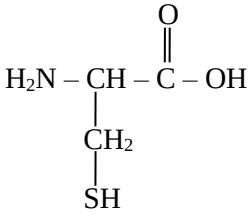
(C) 

Arginine:

pK_{a_1} (COOH) = 2.2

pK_{a_2} (NH_2) = 9

pK_{a_3} (R) = 12.5

(D) 

Cysteine:

pK_{a_1} (COOH) = 1.7

pK_{a_2} (NH_2) = 10.8

pK_{a_3} (R) = 8.3

2. Amino acids are classified as acidic, basic or neutral depending upon the relative number of amino and carboxyl groups in their molecule. Which of the following are acidic?

(i) $(CH_3)_2CH-\underset{\displaystyle NH_2}{\underset{|}{CH}}-COOH$

(ii) $HOOC-CH_2-CH_2-\underset{\displaystyle NH_2}{\underset{|}{CH}}-COOH$

(iii) $H_2N-CH_2-CH_2-CH_2-COOH$

(iv) $HOOC-CH_2-\underset{\displaystyle NH_2}{\underset{|}{CH}}-COOH$

(A) (ii) and (iv) (B) (iii) and (iv)
(C) (i) and (ii) (D) (ii) and (iii)

3. Amino acids generally exist in the form of Zwitter ions, This means they contain:
(A) Basic – NH_2 group and acidic – COOH group
(B) The basic – NH_3^+ group and acidic – COO^- group
(C) Basic – NH_2 and acidic – H^+ group
(D) Basic – COO^- group and acidic – NH_3^+ group

4. Proteins are the polymers of α-amino acids and they are connected to each other by ------ select an appropriate word for the above statement from the options given below:
(A) covalent bond (B) ionic bond
(C) peptide bond (D) coordinate bond

5. Which of the following statements is not correct?
(A) Proteins arc polyamides formed from amino acids
(B) Except glycine, all other amino acids show optical activity
(C) Natural proteins are commonly made up of L-isomer of amino acids
(D) In α-amino acids, - NH_2 and – COOH groups are attached to different carbon atoms.

6. Amino acid are classified are α, β, γ, δ on the basis of:
(A) their relative position of amino group
(B) their relative position of amino group with respect to carboxyl group
(C) their relative position of carboxyl group
(D) the relative position of ester with respect to carboxyl group

7. How many amino acids (approximately) are involved during the synthesis of protein?
(A) 15 (B) 18
(C) 20 (D) 91

8. How many number of water molecules are removed from the n number of amino acids during the formation of peptide bond?
(A) (n – 1) (B) n
(C) (n – 2) (d) (n – 3)

9. A compound which contains both ……and …….is called amino acid. The amino acids in polypeptide chain are joined by ……bonds
(A) amino, carboxylic group, ester
(B) amino, carboxylic group, peptide
(C) nitrogen, carbon, glycosidic
(D) hydroxyl, carboxylic group, peptide

10. Which of the following statements is not correct?
(A) Only α-amino acids are obtained on hydrolysis of proteins
(B) The amino acids which are synthesized in the body are known as non-essential amino acids
(C) There are 20 essential amino acids
(D) L-amino acids are represented by writing the $–NH_2$ group on the left side.

11. What is the Zwitter ion?
(A) The carboxyl group can lose a proton and amino group can accept a proton in the aqueous solution which give rise to a dipolar ion
(B) The carboxyl group can accept a proton and amino group can loose a proton in aqueous solution which give rise to a dipolar ion
(C) The amino group can accept a proton and ester group can lose a proton in aqueous solution which give rise to dipolar ion
(D) The amino group can lose a proton in aqueous solution and ester group can accept a proton in aqueous solution which give rise to the dipolar ion.

Nucleic Acid and Vitamin

DPP-05

1. I. Vitamins are the organic compounds required in small amounts in the diet but their deficiency causes specific disease.
II. Vitamins cannot be synthesized by plant but our body can only synthesis them.
III. Some of the vitamins are produced by the bacteria's gut.
IV. Vitamins are necessary to perform the specific biological functions for the normal maintenance of optimum growth and health of the organism.
Select the incorrect statement about the vitamins:
(A) I
(B) II
(C) I and II
(D) II and IV

2. Vitamin A is present in
(A) fish liver oil
(B) milk
(C) butter
(D) all of these

3. Deficiency of biotin causes dermatitis and paralysis, biotin is also known as
(A) vitamin B_1
(B) vitamin H
(C) vitamin B_{12}
(D) vitamin D

4. Which of the following vitamins is water soluble?
(A) Vitamin E
(B) Vitamin D
(C) Riboflavin
(D) Ascorbic acid

5. Which of the following diseases is not correctly matched with the vitamins mentioned with it?
(A) Vitamin B_2-Cracking of lips
(B) Vitamin C-Bone deformities
(C) Vitamin D-Osteomalacia
(D) Vitamin A-Night blindness

6. Deficiency of vitamin E causes
(A) Sterility Anaemia
(B) Scurvy
(C) Muscular weakness
(D) Mode of synthesis

7. Which is a fat soluble vitamin?
(A) Vitamin A
(B) Vitamin B_6
(C) Vitamin C
(D) Vitamin B_2

8. Select the base which is not common in DNA and RNA.
(A) Adenine (A)
(B) Guanine (B)
(C) Cytosine (C)
(D) Uracil (U)

9. Vitamin C must be supplied regularly in diet because
(A) it is water soluble hence excreted in urine and can't be stored in the body
(B) it is fat soluble hence stored in the body and cannot be used on regular basis
(C) it is required in a large amount by the body hence supplied regularly
(D) it is water soluble hence used by the body on daily basis and is to be supplied regularly

10. Which of the following statement is correct ?
(A) Every individual has unique fingerprints and it occur at the tips of fingers.
(B) A sequence of bases on DNA is also unique for a person and information regarding this is called fingerprinting
(C) Fingerprints can be altered by the surgery
(D) All of these

11. Phosphodiester linkage is present between which carbon atoms of pentose sugars of nucleotides?

(A) 5' and 3' (B) 1' and 5'

(C) 5' and 5' (D) 3' and 3'

12. What will be the sequence of complimentary strand of DNA if the one strand of DNA has the sequence of TATGACTG?

(A) ATACACTC (B) ACGTTGAC

(C) ATACTGAC (D) ATACTGCA

13. Which of the following statement is correct regarding vitamins?

(A) They are designated by A, B, C and D

(B) They are further named as B_1, B_2, B_6 and B_{12}…..

(C) Vitamins pills should not be taken without the advice of doctor

(D) All of these

14. Guanine is an example of

(A) a nitrogenous base

(B) a nucleoside

(C) a nucleotide

(D) phosphate

15. Which of the following bases is not present in RNA?

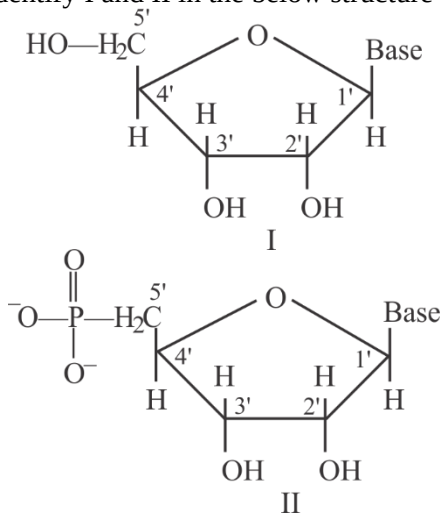
(A) Adenine

(B) Guanine

(C) Cytosine

(D) Thymine

16. Identify I and II in the below structure



(A) I Nucleoside and II Nucleoside

(B) I and II are nucleosides

(C) I and II are nucleotides

(D) I Nucleotide and II Nucleoside

17. Which of the following are purine bases?

I. Guanine

II. Adenine

III. Thymine

IV. Uracil

(A) I and II

(B) II and III

(C) III and IV

(D) I and IV

Nucleic Acid and Vitamin

DPP-06

1. Molisch's test reagent is
(A) 5% solution of α-Napthol in alcohol and few droplets of conc. H_2SO_4
(B) 1% of β-Napthol in alcohol
(C) Both (A) and (B)
(D) None

2. Fehling's solution test is given by
(A) glucose
(B) fructose
(C) lactose
(D) all of these

3. In Benedict's test
(A) Cu_2O reduces to Cu^{2+}
(B) Cu^{2+} reduces to Cu_2O
(C) Both (A) and (B)
(D) None of these

4. In iodine test of starch which colour of ppt had been observed
(A) blue
(B) black
(C) red
(D) white

5. Amino acid /proteins with only activate benzene ring give only
(A) Xanthoproteic test
(B) Benedict test
(C) Fehling's test
(D) All of these

6. Molisch's test and Millon's test is given by
(A) Protein, Fats
(B) Fats, proteins
(C) Carbohydrate, proteins
(D) None

7. Fructose reduce Tollen's reagent due to
(A) primary alcoholic group
(B) secondary alcoholic group
(C) enolisation of fructose followed by conversion of aldehyde by base
(D) asymmetric carbon

8. Which one given below is a non-reducing sugar
(A) Maltose
(B) Lactose
(C) Glucose
(D) Sucrose

9. Biuret test is used for
(A) Proteins
(B) Fats
(C) Sugar
(D) None

10. Millon's test is given by
(A) Proteins
(B) Sucrose
(C) Oil
(D) All of these

ANSWER KEY

DPP-1

1.	(D)	6.	(D)
2.	(A)	7.	(D)
3.	(D)	8.	(D)
4.	(D)	9.	(D)
5.	(D)	10.	(C)

DPP-2

1.	(D)	6.	(A)
2.	(C)	7.	(D)
3.	(A)	8.	(B)
4.	(A)	9.	(B)
5.	(B)	10.	(B)

DPP-3

1.	(B)	6.	(A)
2.	(B)	7.	(D)
3.	(A)	8.	(A)
4.	(C)	9.	(C)
5.	(D)		

DPP-4

1.	(B)	6.	(B)
2.	(A)	7.	(C)
3.	(D)	8.	(A)
4.	(C)	9.	(B)
5.	(D)	10.	(C)
		11.	(A)

DPP-5

1.	(B)	5.	(B)	9.	(A)	13.	(D)
2.	(D)	6.	(A)	10.	(D)	14.	(A)
3.	(B)	7.	(A)	11.	(A)	15.	(D)
4.	(C)	8.	(D)	12.	(C)	16.	(A)
						17.	(A)

DPP-6

1.	(A)	6.	(C)
2.	(D)	7.	(C)
3.	(B)	8.	(D)
4.	(A)	9.	(A)
5.	(A)	10.	(A)