



CHEMISTRY

BOOKS - DISHA PUBLICATION

CHEMISTRY (HINGLISH)

BIOMOLECULES

Jee Main 5 Years At A Glance

1. Among the following, the incorrect statement is:

A. Cellulose and amylose have 1,4-glycosidic linkage

B. Lactose contains β -D-galactose and β -D-glucose

C. Maltose and lactose have 1,4-glycosidic linkage

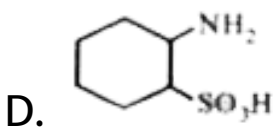
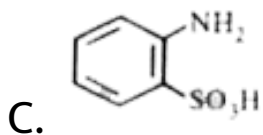
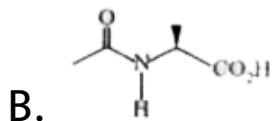
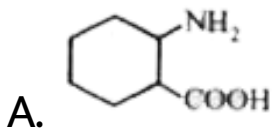
D. Sucrose and amylose have 1,2-glycosidic linkage

Answer: D



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2. Which of the following will not exist in zwitter ionic form at pH=7?



Answer: B



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3. Glucose on prolonged heating with HI gives

A. n-Hexane

B. 1- Hexene

C. Hexanoic acid

D. 6-iodohexanal

Answer: A



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4. The reason for “drug induced poisoning” is :

A. Binding reversibly at the active site of the enzyme.

B. Bringing conformational change in the binding site of enzyme.

C. Binding irreversibly to the active site of the enzyme.

D. Binding at the allosteric sites of the enzyme.

Answer: C



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5. Among the following, the essential amino acid is :

A. Alanine

B. Valine

C. Aspartic acid

D. Serine

Answer: B



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6. The incorrect statement among the following is:

A. α -D-glucose and β -D-glucose are anomers.

B. α -D-glucose and β -D-glucose are enantiomers.

C. Cellulose is a straight chain polysaccharide made up of only β -D-glucose units.

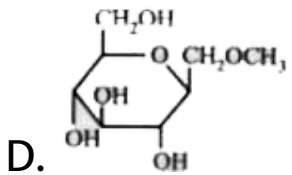
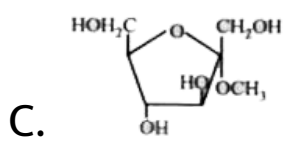
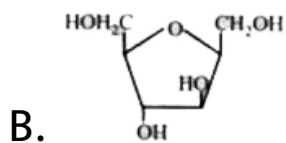
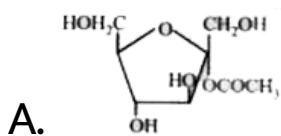
D. The penta acetate of glucose does not react with hydroxyl amine.

Answer: B



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7. Which of the following compounds will behave as a reducing sugar in an aqueous KOH solution ?



Answer: A



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8. Observation of "Rhumann's purple "is confirmatory test for the presence of :

A. Starch

B. Reducing sugar

C. Protein

D. Cupric ion

Answer: C



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9. Thiol group is present in

A. Cysteine

B. Methionine

C. Cytosine

D. Cystine

Answer: A



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10. Complete hydrolysis of starch gives:

A. glucose only

B. galactose and fructose in equimolar amounts

C. glucose and galactose in equimolar amounts

D. glucose and fructose in equimolar amounts

Answer: A





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11. Accumulation of which of the following molecules in the muscles occurs as a result of vigorous exercise ?

A. Glycogen

B. Glucose

C. Pyruvic acid

D. L-lactic acid

Answer: D



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12. Which of the vitamins given below is water soluble ?

A. Vitamin E

B. Vitamin K

C. Vitamin C

D. Vitamin D

Answer: C



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13. Which of the following will not show mutarotation?

A. Maltose

B. Lactose

C. Glucose

D. Sucrose

Answer: D



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14. The reason for double helical structure of *DNA* is the operation of:

- A. Electrostatic attractions
- B. van der Waals forces
- C. Dipole - Dipole interactions
- D. Hydrogen bonding

Answer: D



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

A. Quinoline

B. Adenine

C. Cytosine

D. Thymine

Answer: A



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1. Carbohydrates and Lipids Which of the following statement is true ?

- A. Epimers are also anomers
- B. Anomers are also epimers.
- C. Both of the above statements are true.
- D. Neither of the two statement is true.

Answer: B





2. The artificial sweetener that has the highest sweetness value in comparison to cane sugar is :

A. Sucralose

B. Aspartane

C. Saccharin

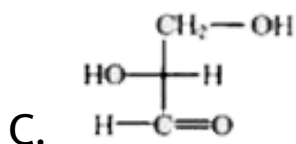
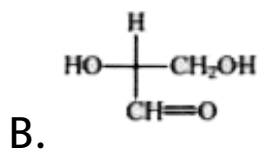
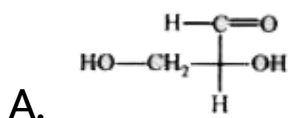
D. Alitame

Answer: D



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3. What is the structure of L-glyceraldehyde ?

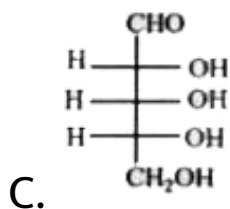
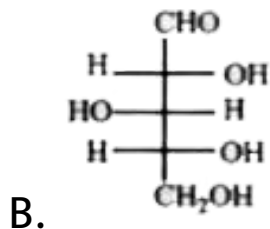
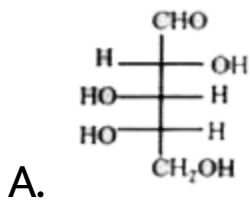


D. Both (a) and (b)

Answer: D



4. Which L-sugar on oxidation gives an optically active dibasic acid (2 COOH groups) ?



Answer: A



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5. Rapid interconversion of α D-glucose and β -D-glucose in solution is known as :

- A. racemization
- B. asymmetric induction
- C. fluxional isomerization
- D. mutarotation

Answer: D



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6. Natural glucose is termed D-glucose because :

A. — OH on the second carbon is on the right side in Fischer projection.

B. — OH on the sixth carbon is on the right side in Fischer projection.

C. – OH on the fifth carbon is on the right side in Fischer projection.

D. It is dextrorotatory.

Answer: C



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7. In prokaryotic cells, the number of ATPs generated from one glucose molecule is

A. 46

B. 32

C. 38

D. 40

Answer: C



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8. Which of the following gives positive Fehling solution test?

A. Protein

B. Sucrose

C. Glucose

D. Fats

Answer: C



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9. Glycolysis is

A. conversion of glucose to haem.

B. oxidation of glucose to glutamate.

C. Conversion of pyruvate to citrate.

D. oxidation of glucose to pyruvate.

Answer: D



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10. $\alpha - D$ glucose and $\beta - D$ -glucose differ from each other due to the difference in one of the carbon atoms, with respect to its.

A. size of hemiacetal ring

B. number of OH groups

C. configuration

D. conformation

Answer: C



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11. Which of the following does not reduce Benedict's solution?

A. Glucose

B. Fructose

C. Sucrose

D. Aldehyde

Answer: C



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12. Glucose gives silver mirror with Tollen's reagent, it shows the presence of

A. an acidic group

B. an alcoholic group

C. a ketonic group

D. an aldehydic group

Answer: D



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13. Which of the following compounds is found abundantly in nature?

A. Fructose

B. Starch

C. Glucose

D. Cellulose

Answer: D



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14. The highest calorific value is found in

A. proteins

B. fats

C. vitamins

D. carbohydrates

Answer: B



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15. The correct statement about the following disaccharide is



A. Ring (A) is pyranose with α - glycosidic link

B. Ring (A) is furanose with α - glycosidic link

C. Ring (B) is furanose with α - glycosidic link

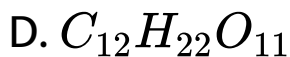
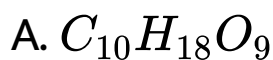
D. Ring (B) is pyranose with β -glycosidic link

Answer: A



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16. The commonest disaccharide has the molecular formula?



Answer: D



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17. In fructose, the possible optical isomers are

A. 12

B. 8

C. 16

D. 4

Answer: B



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18. What happens when conc. H_2SO_4 is treated with sugar?

- A. Oxidation
- B. Reduction
- C. Dehydration
- D. Hydrolysis

Answer: C



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19. Table sugar is

A. disaccharide of D-glucose and D-fructose.

B. a monosaccharide.

C. a disaccharide containing two glucose units.

D. D-glucose.

Answer: A



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20. Complete hydrolysis of cellulose gives:

A. D-fructose

B. D-ribose

C. D-glucose

D. L-glucose

Answer: C



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21. What will happen when $D - (+) -$ glucose is treated with methanolic HCl followed by Tollen's reagent ?

- A. A black ppt. will be formed
- B. A red ppt. will be formed
- C. A green colour will appear.
- D. No characteristic colour or ppt. will be formed.

Answer: D





22. An organic compound with molecular formula C_6H_{12} upon ozonolysis gives only acetone as the product. The compound is :

A. fructose

B. glucose

C. mannose

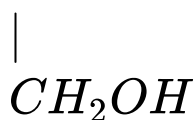
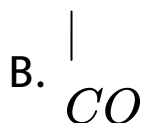
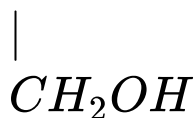
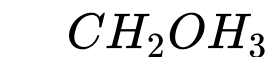
D. sucrose

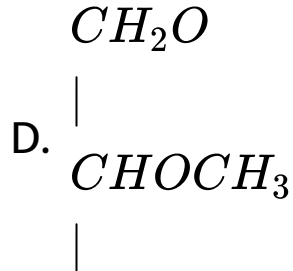
Answer: A



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23. For osazone formation, the effective structural unit necessary is





Answer: B



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Exercise 1 Concept Builder Topicwise Amino Acids Proteins And Enzymes

1. At iso-electric point :

A. Conc. of cation is equal to conc. of anion.

B. Net charge is zero.

C. Maximum conc. of di-polar ion (Zwitter ion) will be present

D. All of the above.

Answer: D



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2. Among the following organic acids, the acid present in rancid butter is :

A. Pyruvic acid

B. Lactic acid

C. Butyric acid

D. Acetic acid

Answer: C



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3. A strongly alkaline solution of a monoaminodicarboxylic acid contains how many basic groups ?

A. 1

B. 2

C. 3

D. 4

Answer: C



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4. Which of the following proteins destroy the antigen when it enters in body cell ?

A. Antibodies

B. Insulin

C. Chromoprotein

D. Phosphoprotein

Answer: A



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5. Number of essential amino acids in human is

A. 8

B. 10

C. 18

D. 20

Answer: B



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6. Which of the following structures represents the peptide chain?

A. 

B. 

C. 

D. 

Answer: C



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7. The helical structure of protein is stabilized
by

A. dipeptide bonds

B. hydrogen bonds

C. ether bonds

D. peptide bonds

Answer: B



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8. Which functional group participates in the disulphide bond formation in proteins?

A. Thioester

B. Thioether

C. Thiol

D. Thiolactone

Answer: C



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9. Pepsin enzyme hydrolyses

A. proteins to amino acids

B. fats to fatty acids.

C. glucose to ethyl alcohol.

D. polysaccharides to monosaccharides

Answer: A



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10. Which of the following tests is not used for testing proteins :

A. Millon's test

B. Molisch's test

C. Biuret test

D. Ninhydrin test

Answer: B



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11. The correct statement in respect of protein haemoglobin is that it

A. acts as an oxygen carrier in the blood.

B. forms antibodies and offers resistance to diseases.

C. enzymes are specific biological catalysts that can normally function at very high temperature ($T \sim 1000K$).

D. enzymes are specific biological catalysts that possess well-defined active sites.

Answer: A



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12. The enzyme which hydrolyses triglycerides to fatty acid and glycerol is called:

A. maltase

B. lipase

C. zymase

D. pepsin

Answer: B



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13. Which one of the following metals is required as co-factor by all enzymes utilizing ATP in phosphate transfer?

A. K

B. Ca

C. Na

D. Mg

Answer: D



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14. Which of the nitrogen of histidine is first protonated ?



A. α

B. β

C. both

D. None

Answer: B



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15. An electric current is passed through an aqueous solution (buffered at $pH = 6.0$) of a alanine ($pI = 6.0$) and arginine ($pI = 10.2$). The two amino acids can be separated because

A. alanine migrates to anode, and arginine to cathode.

B. alanine migrates to cathode, and arginine to anode.

C. alanine does not migrate, while arginine migrates to cathode.

D. alanine does not migrate, while arginine migrates to anode.

Answer: C



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16. A mixture of two amino acids having pI 9.60 and 5.40 can be separated

A. by adjusting the pH of the solution at

9.60

B. by adjusting the pH of the solution at

4.20

C. by adjusting the pH of the solution at 7.0

D. by adjusting the pH of the solution at 7.5

Answer: A



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17. Imino acid among these compounds is

A. serine

B. proline

C. tyrosine

D. lysine

Answer: B



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18. The structural feature which distinguishes proline from other natural α -amino acids is

- A. Proline is optically inactive.
- B. Proline contains aromatic group.
- C. Proline is a dicarboxylic acid.
- D. Proline is a secondary amine.

Answer: D



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19. Which amino acid is achiral?

A. alanine

B. valine

C. proline

D. None of these

Answer: D



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20. Denaturation of protein leads to loss of its biological activity by :-

A. formation of amino acids.

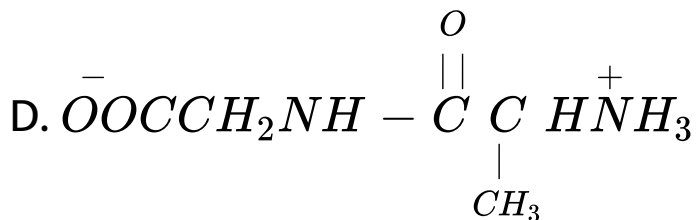
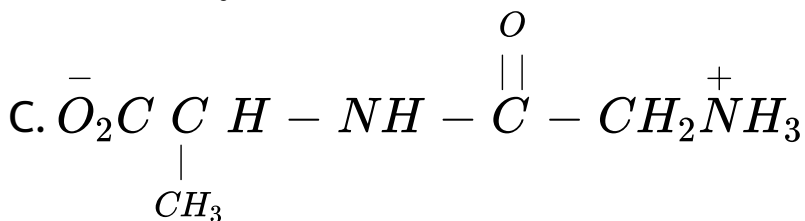
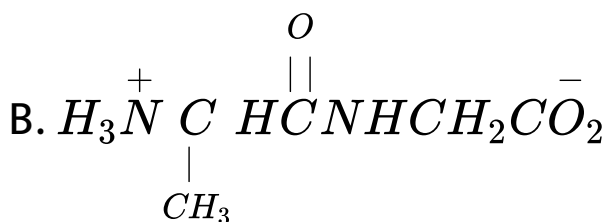
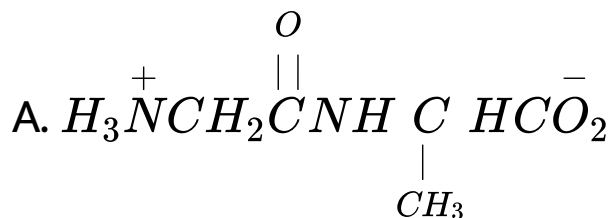
B. loss of primary structure.

C. loss of both primary and secondary structures.

D. loss of both secondary and tertiary structures.

Answer: D

21. The dipeptide, Gly. Ala has structure -



Answer: A



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Exercise 1 Concept Builder Topicwise Vitamins And Hormones

1. Vitamin K is associated with the disease:

A. Scurvy

B. Beri-beri

C. Blood coagulation

D. Sore throat

Answer: C



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2. Vitamin B_{12} contains

A. Ca(II)

B. Fe(II)

C. Co(III)

D. Zn(II)

Answer: C



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3. Vitamin B_6 is known as

A. pyridoxine

B. thiamine

C. tocopherol

D. riboflavin

Answer: A



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4. Night blindness is caused by deficiency of:

A. Vitamin B_{12}

B. Vitamin A

C. Vitamin C

D. Vitamin E

Answer: B



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5. A vitamin that contains both N and P is:

A. Vitamin C

B. Vitamin K

C. Vitamin B_{12}

D. Vitamin D

Answer: C



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6. The enzymes which convert glucose into ethyl alcohol is

A. diastase

B. invertase

C. sucrose

D. zymase

Answer: D



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7. Biotin is an organic compound present in yeast. Its deficiency in diet causes dermatitis and paralysis. It is also known as:

A. Vitamin H

B. Vitamin B_3

C. Vitamin B_{12}

D. Vitamin D

Answer: A



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8. Match List I (name of vitamin) with List II (deficiency result disease) and select the correct answer using the codes given below the lists:



A. I-B, II-A, III-C, IV-D

B. I-A, II - B, III-C, IV-D

C. I-D, II-C, III -B, IV-A

D. I-C, II-D, III -B, IV-A

Answer: D



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9. When adenine is attached to ribose sugar, it is called adenosine . To make a nucleotide from it, would require

- A. oxygenation
- B. addition of a base
- C. addition of phosphate
- D. hydrogenation

Answer: C



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10. Chargaff's rule states that in an organism:

A. Amounts of all bases are equal.

B. Amount of adenine (A) is equal to that of thymine (T) and the amount of guanine (G) is equal to that of cytosine (C).

C. Amount of adenine (A) is equal to that of guanine (G) and the amount of thymine (T) is equal to that of cytosine (C).

D. Amount of adenine(A) is equal to that of cytosine (C) and the amount of thymine (T) is equal to that of guanine (G).

Answer: B



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11. Which of the following is not present in a nucleotide?

A. Guanine

B. Cytosine

C. Adenine

D. Tyrosine

Answer: D



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12. A sequence of how many nucleotides in messenger RNA makes a condon for an amino acid

A. Three

B. Four

C. One

D. Two

Answer: A



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13. The chemical change in DNA molecule that could lead to synthesis of protein with an altered amino acid sequence is called

A. replication

B. lipid formation

C. cellular membrane

D. mutation

Answer: D



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14. DNA has deoxyribose, a base and the third component is

A. phosphoric acid

B. ribose

C. adenine

D. thymine

Answer: A



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15. In both *DNA* and *RNA*, the heterocyclic base and phosphate ester linkages are at:

A. C'_5 and C'_5 respectively of the sugar molecule

B. C'_1 and C'_5 respectively of the sugar molecule

C. C'_2 and C'_5 respectively of the sugar molecule

D. C'_5 and C'_2 respectively of the sugar molecule

Answer: B



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Exercise 1 Concept Builder Topicwise Nucleic Acids

1. The reactions of (a) oxygen and (b) carbon monoxide with heme (the prosthetic group of haemoglobin) give

A. only oxygen-heme complex.

B. only carbon monoxide-heme complex.

C. both oxygen-heme and carbon monoxide-heme complexes but oxygen-

heme complex is more stable.

D. both oxygen-heme and carbon monoxide-heme complexes but carbon monoxide-heme complex is more stable.

Answer: D



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Exercise 2 Concept Applicator

1. Vitamin D is also known as

A. sunshine vitamin

B. ascorbic acid

C. growth vitamin

D. reproductive vitamin

Answer: A



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2. Which of the following pairs of compounds can be distinguished by using Fehling's Fehling's solution?

A. Glucose and fructose

B. Glucose and sucrose

C. Methanal and ethanal

D. Hydroxypropanone and benzaldehyde

Answer: B



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3. Which of the following carbohydrates is not related to (+)-glucose?

A. Amylopectin

B. Amylose

C. Inulin

D. Glycogen

Answer: C



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4. Number of possible stereoisomers of glucose and fructose.

A. 14

B. 15

C. 16

D. 7

Answer: A



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5. For the complex conversion of D-glucose into the corresponding osazone, the minimum number of equivalents of phenyl hydrazine required is :

A. two

B. three

C. four

D. five

Answer: B



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6. Which reagents can be used to distinguish glucose and fructose ?

(I) Bromine water , (II) Tollen's reagent , (III) Schiff's reagent

A. (I), (II) and (III)

B. (II) and (III)

C. Only (I)

D. Only (III)

Answer: C



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7. Among the three compounds shown below, two yield the same product on reaction with warm HNO_3 . The exception is :

A. 

B. 

C. 

D. None of these

Answer: B



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8. A distinctive and characteristic functional group of fat is

- A. an ester group
- B. a peptide group
- C. a ketonic group
- D. an alcoholic group

Answer: A



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9. Iso-electric point of alanine is ($\text{pH} = 6$). At which pH , maximum concentration of zwitterion of alanine will be present ?

A. $\text{pH} > 6$

B. $\text{pH} < 6$

C. $\text{pH} = 6$

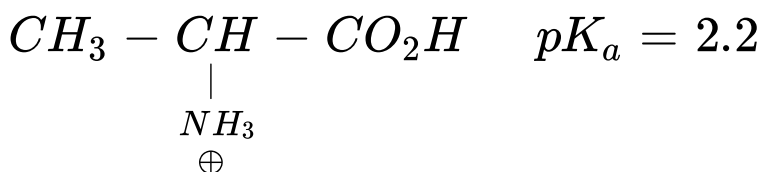
D. $\text{pH} = 7$

Answer: C



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10. Find iso-electric point of given amino acid



A. 3.3

B. 5.9

C. 9.6

D. 11.8

Answer: B



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11. A biological catalyst is essentially

- A. a carbohydrates
- B. an amino acid
- C. a nitrogen molecule
- D. fats

Answer: B



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12. In an amino acid, the carboxyl group ionises at $pK_{a1} = 2.34$ and ammonium ion at $pK_{a2} = 9.60$. The isoelectric point of the amino acid is at pH

A. 5.97

B. 2.34

C. 9.60

D. 6.97

Answer: A



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13. Which of the following statements is incorrect?

A. Enzymes are organic catalysts.

B. Enzymes have a very large turnover number.

C. Enzymes action is specific.

D. Enzymes always require a coenzyme in their catalytic action.

Answer: D



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14. Among the following vitamins the one whose deficiency causes rickets (bone deficiency) is

A. Vitamin A

B. Vitamin B

C. Vitamin D

D. Vitamin C

Answer: C



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15. Which of the following statements is correct?

A. RNA controls the synthesis of proteins.

B. The sugar present in DNA is Deoxyribose.

C. RNA has double stranded a-helix structure.

D. DNA mainly occurs in the cytoplasm of the cell.

Answer: B



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16. Which of the following is known as the universal energy currency of the cell?

A. ATP

B. AMP

C. DNA

D. RNA

Answer: A



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17. The base present in DNA, but not in RNA is

A. guanine

B. adenine

C. uracil

D. thymine

Answer: D



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18. Double stranded DNA virus with 20,000 base pairs has nucleotides

A. 20000

B. 10000

C. 666

D. 40000

Answer: D



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19. Fructose reduces Tollens' reagent due to :

A. enolisation of fructose followed by conversion to glucose (having aldehydic group) by the base present in Tollen's reagent.

B. asymmetric carbons

C. primary alcoholic group.

D. secondary alcoholic group.

Answer: A



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20. Which one of the following statements is not true regarding (+) Lactose ?

A. On hydrolysis (+) Lactose gives equal amount of D(+) glucose and D(+) galactose.

B. (+) Lactose is a B-glycoside formed by the union of a molecule of D(+) glucose and a molecule of D(+) galactose.

C. (+) Lactose is a reducing sugar and does not exhibit mutarotation.

D. (+) Lactose, $C_{12}H_{22}O_{11}$ contains 8-OH groups.

Answer: C



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21. Which of the statements about "Denaturation" given below are correct ?

(1) Denaturation of proteins causes loss of

secondary and tertiary structures of the protein.

(2) Denaturation leads to the conversion of double strand of DNA into single strand.

(3) Denaturation affects primary structure which gets distorted.

A. (B) and (C)

B. (A) and (C)

C. (A) and (B)

D. (A),(B) and (C)

Answer: C



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22. Which one of the following statements is incorrect about enzyme catalysis?

A. Enzymes are mostly proteinous in nature.

B. Enzyme action is specific

C. Enzymes are denaturated by ultraviolet rays and at high temperature.

D. Enzymes are least reactive at optimum temperature.

Answer: D



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23. Deficiency of vitamin B_1 causes the disease

A. Convulsions

B. Beri-beri

C. Cheilosis

D. Sterility

Answer: B



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24. Which of the following acids does not exhibit optical isomerism?

A. Maleic acid

B. α -Amino acids

C. Lactic acid

D. Tartaric acid

Answer: A



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25. Which one of the following sets of monosaccharides forms sucrose ?

A. α -D-Galactopyranose and α -D-

Glucopyranose

B. α -D-Glucopyranose and β -D-Fructofuranose

C. β -D-Glucopyranose and α -D-Fructofuranose

D. α -D-Glucopyranose and β -D-Fructopyranose

Answer: B



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26. In DNA the linkages between different nitrogenous bases are

- A. peptide linkage
- B. phosphate linkage
- C. H-bonding
- D. glycosidic linkage

Answer: C



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27. $D(+)$ glucose reacts with hydroxylamine and yields an oxime. The structure of the oxime would be :

A. 

B. 

C. 

D. 

Answer: D



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28. Which of the following hormones is produced under the conditions of stress which stimulate glycogenolysis in the liver of human beings ?

A. Thyroxin

B. Insulin

C. Adrenaline

D. Estradiol

Answer: C



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29. The correct statement regarding *RNA* and *DNA*, respectively is :

A. The sugar component in RNA is arabinose and the sugar component in DNA is 2'-deoxyribose.

B. The sugar component in RNA is ribose and the sugar component in DNA is 2'-deoxyribose.

C. The sugar component in RNA is arabinose.

D. The sugar component in RNA is 2' deoxyribose and the sugar component in DNA is arabinose.

Answer: B



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30. Which of the following statements is not correct

A. Ovalbumin is a simple food reserve in egg-white.

B. Blood proteins thrombin and fibrinogen are involved in blood clotting.

C. Denaturation makes the proteins more active.

D. Insulin maintains sugar level in the blood of a human body.

Answer: C



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