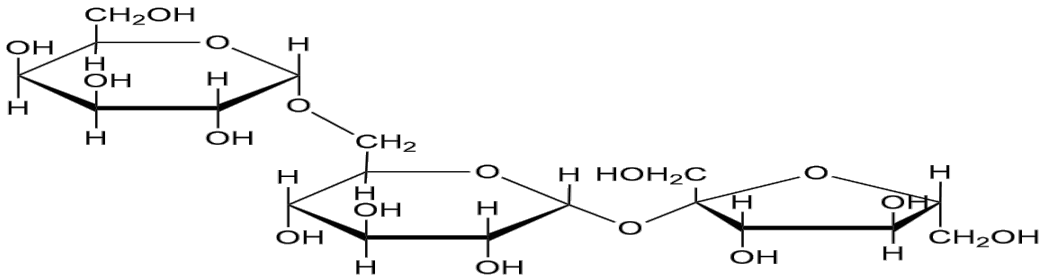
1. Which of the following best explains why individuals with galactosemia suffer from severe neurological damage?

- A) Accumulation of galactose in the bloodstream prevents oxygen transport to the brain.
- B) Nonmetabolized galactose is converted into galactitol, which draws water into cells, causing swelling and cellular damage, particularly in the brain.
- C) The absence of galactose leads to a deficiency in glucose, resulting in reduced energy production for brain cells.
- D) Excess galactose is excreted in the urine, leading to dehydration and subsequent brain cell damage.

2.Which of the following statements about raffinose is correct regarding its chiral centers?

- A) Raffinose has a total of 10 chiral centers, with each sugar unit contributing equally.
- B) Raffinose has 14 chiral centers, with galactose contributing 5, glucose contributing 5, and fructose contributing 4.
- C) Raffinose has 9 chiral centers, with galactose contributing 4 and glucose and fructose each contributing 2.
- D) Raffinose has 8 chiral centers, with galactose and glucose each contributing 3 and fructose contributing 2.



Raffinose

3.Which of the following statements accurately describes the distribution and function of starch components in organisms?

A) Starch is predominantly found in animal tissues, with amylopectin constituting 10-20% and amylose 80-90% of the starch present.

- B) In plants, starch is primarily stored in the form of amylopectin (10-20%) and amylose (80-90%), where amylopectin provides rapid energy release due to its highly branched structure.

- C) In plants, starch is composed of approximately 80-90% amylopectin and 10-20% amylose, with amylose being the primary form utilized for energy storage in response to rapid energy demands.

- D) Starch in fungi and bacteria consists mainly of amylose (10-20%) and amylopectin (80-90%), serving a primary role in structural integrity rather than energy storage.

4.Which of the following statements best explains the functional significance of the differences in branching between glycogen and amylopectin?

- A) Glycogen's higher branching density, with branch points occurring approximately every 10 residues, facilitates rapid mobilization of glucose during energy-demanding conditions, whereas amylopectin's less frequent branching (every 25 residues) provides a slower, more sustained release of glucose, supporting longer-term energy storage.
- B) The increased branching in glycogen, with branch points every 25 residues, enhances its solubility in water compared to amylopectin, which has branch points every 10 residues, making glycogen more suitable for structural functions rather than rapid glucose release.
- C) Glycogen's branching every 10 residues contributes to its higher water solubility and rapid glucose release, optimizing energy availability in animals, while amylopectin's less frequent branching every 25 residues leads to a more stable structure, favoring its role in plant energy storage.
- D) Both glycogen and amylopectin have similar branching frequencies, which equally facilitate glucose mobilization, but the differences in their solubility and crystallization properties are unrelated to their branching patterns.

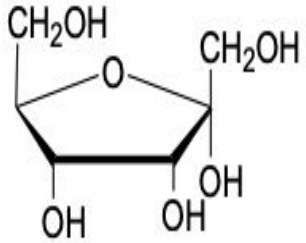
5.Match the following descriptions with the correct polysaccharide:

- A) Glycogen
- B) Starch
- C) Cellulose
- D) Chitin

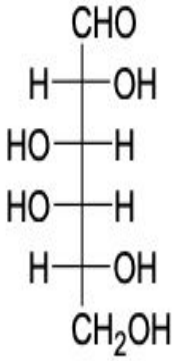
Descriptions:

8. Compact structure found in animal liver.
9. Exoskeleton of insects.
10. Extended structure found in plant cell walls.
11. Composed of two homo-glucose polymers.

Questions 12-14 refer to the structures shown.



A



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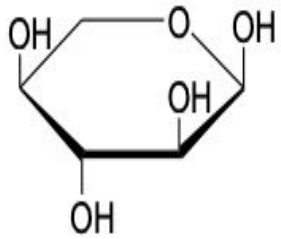

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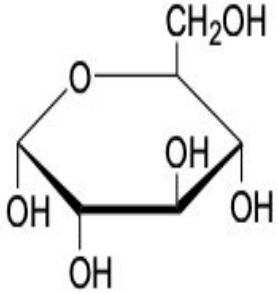

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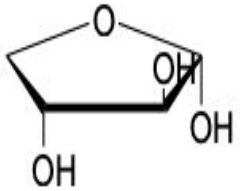


E

12. Which structure is a keto-hexose?
13. Which monosaccharide is the C4 epimer of glucose?
14. Which monosaccharide is aldo-pentose

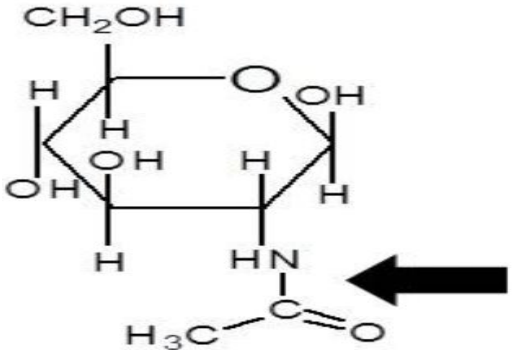
8.The repealing unit in chitin?

A)Glucose
b)Glucosamine
c)Galactose
d) N-acety1 glucosamine

9. Glucose residues in amylose are linked byl
A).Alpha 1-4
b) B l-4
c)Alpha1-6
d) B l-6

10.which of the following is an example of homopolysaccharide
a)Starch b)Glycogen.c)Cellulose.d) All of these

7.Which of the following true about this?



A)Fungi are the only living organisms which do not use chitin

B)The chitin monomer shown in the figure is in the 'alpha' configuration.

C)It is similar to cellulose except for the group shown by the arrow in the chitin monomer structure.

D)Chitin is a structural polysaccharide not only in animals, but also in plants.

11.Which of the following is not a reducing sugar?

- A) Glucose
- B) Ribose
- C) Fructose
- D) Maltose
- E) None of the above (all are reducing sugars)

12.Which of the following is the smallest carbohydrate – triose?

a) Ribose

b) Glucose

c) Glyceraldehyde

d) Dihydroxyacetone

13.Which of the following is an example of Epimers?

(a) Glucose and Ribose

(b) Glucose and Galactose

(c) Galactose, Mannose and Glucose

(d) Glucose, Ribose and Mannose

14. Which of the following has reducing properties?

a) Mucic acid

b) Glucaric acid

c) Gluconic acid

d) Glucuronic acid

15.Starch consists of?
A)Branched amylose and branched amylopectin
B)Unbranched amylose and branched amylopectin
C)Unbranched amylose and unbranched amylopectin
D)None of the above

16.The only carbohydrate which does not have any chiral carbon atoms is

A)Glyceraldehyde
B)Mannose
C)Dihydroxyacetone
D)Glucose

17. A molecule of amylopectin contains 1500 glucose residues and is branched after every 30 residues. How many reducing ends are there?

A)5
B)0
C)2
D)1

توضيح: بغض النظر عن عدد ال **residue** الاميلوبكتين والاميلوز والجلايكوجين دائما وأبدا **reducing end 1**
واعتمدوا قبل ما تسألوا

18.Which of the following glycosidic linkages is found in maltose?

A)Glucose (α-1 – 2β) Fructose
B)Glucose (α1 – 4) Glucose
C)Galactose (β1 – 4) Glucose
D)Glucose (β1 – 4) Glucose

19.Oligosaccharides linked to proteins are called

A)Glycolipids
B)Glycoproteins
C)Galactosides
D)Ganglioside

20.The alpha and Beta
forms of glucose are?

A)isomers of D(+) glucose and L(-) glucose respectively
B)diastereoisomers of glucose
C)anomers of glucose
D)isomers which differ in the configuration of C-2

21.B-1, 4-Glycosidic bond is present in:
A))Maltose
B.Lactose
C. Sucrose
D. None ofthese

22.A homopolysaccharide made up of fructose is:
A.Glycogen
B.Dextrin
C.Cellulose
D. Inulin

23.a-1, 6-glycosidic bond is not present in:
A.Glycogen
B. Dextrin
C. Amylose.
D. Amylopectin

24.In fructofuranose, anomeric carbon atom is:
A.Carbon 1
B. Carbon 2
C. Carbon3
D. Carbon 4

25.A carbohydrate found in DNAis:
A.Ribose
B.Deoxyribose
C. Ribulose
D. Allofthese

26.A monosaccharide not having D- and L-isomersis:
A.Ribose
B.Deoxyribose
C.Erythrose
D. Dihydroxyacetone

27.. In D-glyceraldehyde, -OH group is presenton the right-hand side of carbon atom
number:
A.l
B.2
C.3
D. 1 ,2and3

28. The predominant form of glucose in solutionis:
A.Acyclic.form
B. Glucofuranose
C.Hydrated acyclic form
D.Glucopyranose

29. In straight chain structure of D-glucose.-OH groupi s present on left hand side of a
carbon atom number:
A.2 B.3 c.4 D.5

30. The carbon atom which becomes asymmetric when the straight chain form ofa
monosaccharide changes into ring form is known as:
A. Anomeric carbon atom B.Epimeric carbon atom
C. Isomeric carbonatom D.None of these

31. In glucopyranose, the anomeric carbon is:
A.Carbon1
B.Carbon2
C. Carbon 5
D. Carbon 6

32. a-Glycosidic bond is present in:
A.Lactose B.Maltose
C. Sucrose
D. All of these

33. Branching occurs in glycogen approximately after every:
A.4-6glucoseunits B.l2-15 glucose units
C.l5-20 glucose units D.20 _24glucoseunits

34.Which of the following molecules is a furanose in its cyclical form?

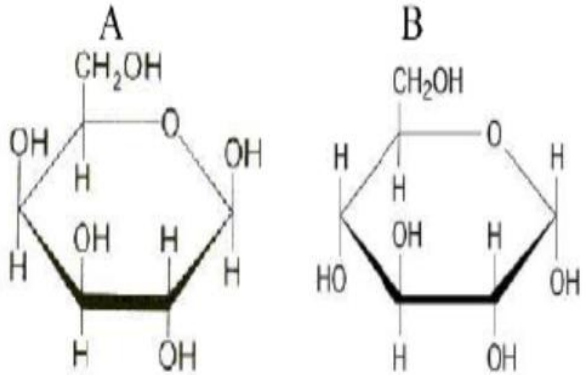
A)Sucrose
B)mannose
C)Fructose
D) Lactose
E)A and C

35. Mutarotation refers to change in?
(A) pH (B) Optical rotation
(C) Conductance (D) Chemical properties

36.Alpha-D-glucose and beta-D-glucose are?
(A) Stereoisomers (B) Epimers
(C) Anomers (D)Keto-aldo pairs

37.When an aldohexose such as glucose adopts the pyranose structure which atoms are connected by an oxygen atom?

a. C-1 and C-5 b. C-1 and C-6 c. C-2 and C-5 d. C-2 and C-6



38.For the carbohydrate molecules shown, which of the following is most CORRECT?

A). For carbohydrate A, the anomeric carbon is at the C-1 position in the orientation.

B). For carbohydrate A, the anomeric carbon is at the C-4 position in the orientation. .

C). For carbohydrate B, the anomeric carbon is at the C-1 position in the orientation.

D). For carbohydrate B, the anomeric carbon is at the C-4 position in the orientation

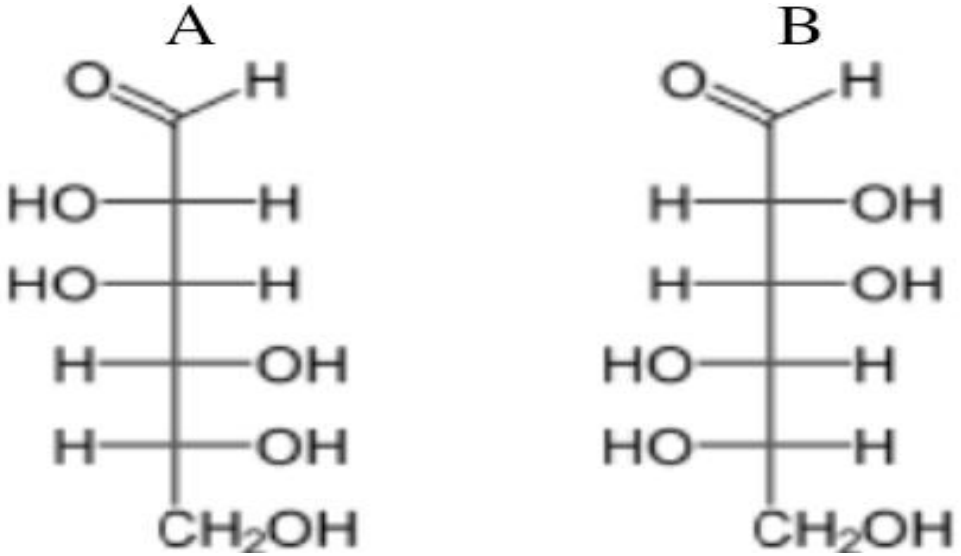
39.Which of the following is most CORRECT?

A. The carbohydrates are hexoses and diastereomers

B. The carbohydrates are pentoses and diastereomers

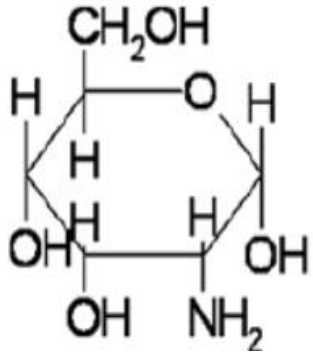
C. Carbohydrate A is the D form and carbohydrate B is the L form and they are diastereomers

D. Carbohydrate A is the D form and carbohydrate B is the L form and they are enantiomers



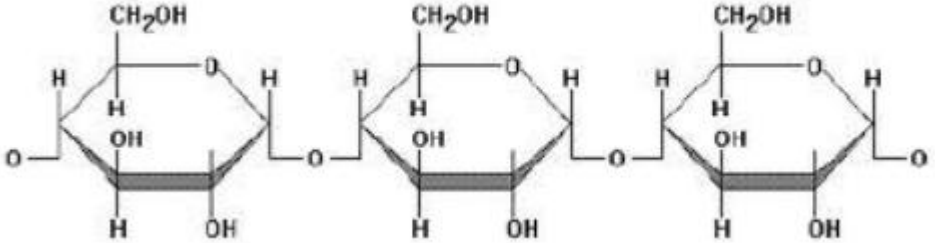
40.Choose the most correct answer. The structure shown is an example of a:

a. amino monosaccharide
b. sugar alcohol
c. monosaccharide
d. deoxy sugar



41.Choose the most correct answer. The bonds in the polysaccharide can be described as:

a.ALPHA (1-4) glycosidic bonds
b. BETA (1-6) glycosidic bond
c. ALPHA(1-6) glycosidic bond
d. BETA (1-4) glycosidic bon



42.Which of the following contains Beta (1 -4) glycosidic bonds?

a. amylopectin
b. amylose
c. glycogen
d. none of these

43.Choose the most CORRECT answer.

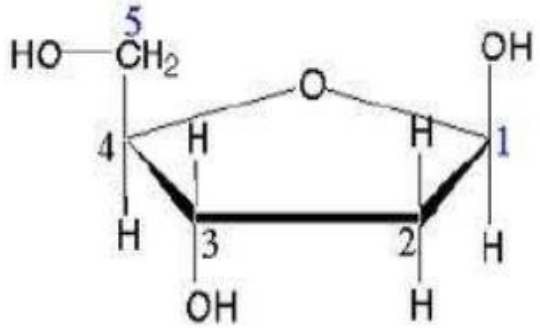
a. A homopolysaccharide consists of several different monosaccharides
b. A heteropolysaccharide is a polymer of the same monosaccharides
c. Cellulose is an example of a homopolysaccharide
d. Amylose is an example of a heteropolysaccharide

44.To which carbon of a monosaccharide is the amino group bound in the amino sugars commonly found in nature?

a. C-1
b. C-2
c. C-5
d. C-6

45.Choose the most correct answer. The structure shown is an example of a

a. amino monosaccharide
b. sugar alcohol
c. monosaccharide
d. deoxy sugar



46. Which of the following statements is correct?

A. Amylose is a structural carbohydrate because β(1→4) glycosidic bonds allow it to adopt a linear structure.

B. Cellulose is a structural carbohydrate because β(1→4) glycosidic bonds allow it to adopt a linear structure.

C. Amylose is a structural carbohydrate because α(1→4) glycosidic bonds allow it to adopt a linear structure.

D. Cellulose is a structural carbohydrate because α(1→4) glycosidic bonds allow it to adopt a linear structure.

توضيح: Amylose is incorrect because it is a storage carbohydrate, not structural

47. Which of the following is most CORRECT for amylose?

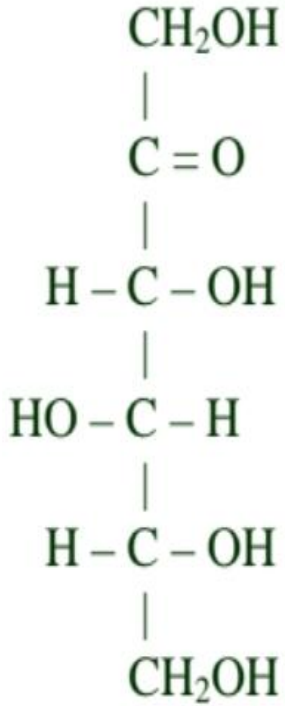
a. It consists of as many as 4000 D-glucose units linearly linked by α(1 → 4) glycosidic bonds.

b. It consists of as many as 4000 D-glucose units linearly linked by β(1 → 4) glycosidic bonds.

c. It consists of as many as 10,000 D-glucose units linearly linked by α(1 → 4) glycosidic bonds and there are branches every 24-30 units via α(1 → 6) glycosidic bonds.

d. It consists of as many as 10,000 D-glucose units linearly linked by β(1 → 4) glycosidic bonds and there are branches every 24-30 units via β(1 → 6) glycosidic bonds.

According to this structure (D-sorbose) answer on (48,49,50,51)



48. Which characteristic is different when comparing the open-chain forms of D-sorbose and D-ribose?

- a) The number of primary alcohol groups.
- b) The number of secondary alcohol groups.
- c) The number of stereogenic centers.
- d) The number of carbonyl groups.

49. Which characteristic is shared by the ring forms of D-sorbose and D-galactose?

- a) Both contain a hemiacetal bond.
- b) Both exist mainly as furanoses.
- c) Both can undergo mutarotation.
- d) Both are stable at neutral pH.

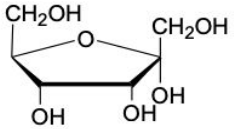
50. Which describes the relationship between D-sorbose and D-fructose?
    - a) They are diastereomers that are also epimers.
    - b) They are diastereomers but not epimers.
    - c) They are epimers but not diastereomers.
    - d) They are neither epimers nor diastereomers.
51. The enantiomer of D-sorbose:
    - a) Is a D-sugar that has opposite configuration around one carbon.
    - b) Is a D-sugar that has opposite configuration around three carbons.
    - c) Is an L-sugar that has opposite configuration around one carbon.
    - d) Is an L-sugar that has opposite configuration around three carbons.

1	B	9	A	17	D	25	B	33	B
2	B	10	D	18	B	26	D	34	C
3	C	11	E	19	B	27	B	35	B
4	C	12	C	20	C	28	D	36	C
5		13	B	21	B	29	B	37	A
6		14	D	22	D	30	A	38	C
7	C	15	B	23	C	31	A	39	D
8	D	16	C	24	B	32	D	40	A

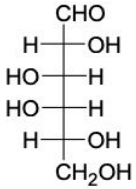
40	A	48	A				
41	A	49	C				
42	D	50	B				
43	C	51	D				
44	B						
45	D						
46	B						
47	A						

5.
A-8
9-D
10-C
12-B

Questions 12-14 refer to the structures shown.



A



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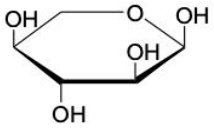

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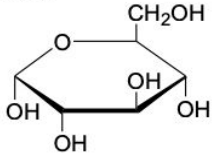

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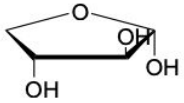

E

12. Which structure is a keto-hexose?
13. Which monosaccharide is the C4 epimer of glucose?
14. Which monosaccharide is aldo-pentose

12 with A
13 with B
14 With C