

Choose the most appropriate answer

(40M)

- Oxytocin is involved in control of blood pressure, as well as being implicated in male behavior of territoriality, aggression, pair bonding, and social group defense.
 (A) True
 (B) False
- Anthrone method is preferred in the determination of
 (A) Carbohydrates
 (B) Protein
 (C) Nucleic acids
 (D) Lipids
- Cellulose is made up of repeating units of
 (A) β -1-4 linkage between D-glucose units
 (B) α -1-4 linkage between D-glucose units
 (C) β -1-2 linkage between D-glucose units
 (D) α -1-2 linkage between D-glucose units
- Chitin consists of
 (A) N-acetyl muramic acid
 (B) D-glucose units
 (C) N-acetyl glucosamine
 (D) N-acetyl muramic acid and N-acetyl glucosamine
- From the abbreviated name of the compound Gal (β 1 $\rightarrow$ 4) Glc, we know that:
 (A) The glucose residue is the β anomer.
 (B) The galactose residue is at the non-reducing end.
 (C) C-4 of glucose is joined to C-1 of galactose by a glycosidic bond.
 (D) C-4 of galactose is joined to C-1 of glucose by a glycosidic bond.
- Side chains of amino acids can contribute titratable groups; the charge (if any) on the side chain must be taken into consideration in determining the net charge on the amino acid.
 (A) True
 (B) False
- The amino acids that are the dimer units of proteins have a general structure in common, with an amino group and a carboxyl group bonded to the same carbon atom.
 (A) True
 (B) False
- α -D-Glucose and β -D- Glucose are
 (A) Stereo isomers
 (B) Keto- Aldose Isomers
 (C) Anomers
 (D) Optical isomers
- The Polysaccharide found in the exoskeleton of insects is
 (A) Hyaluronic acid
 (B) Chitin
 (C) Cellulose
 (D) Chondrosamine
- Epimers stereoisomers that differ only in configuration around one of several chiral carbon atoms
 (A) True
 (B) False

11. Furanose a cyclic sugar with a five-membered ring, named for its resemblance to the ring system in furan

- ☒ A) True
- ☐ B) False

12. What type of non-covalent interaction helps to stabilize the secondary structure of proteins?

- ☐ A) Charge-charge interactions
- ☐ B) Van der Waals forces
- ☒ C) Hydrogen bonding
- ☐ D) Hydrophobic interactions

13. When $[S] = 10K_M$, the velocity of an enzyme catalyzed reaction is about:

- ☐ A) 0.1 V_{max} .
- ☐ B) 0.3 V_{max} .
- ☐ C) 0.9 V_{max}
- ☐ D) 0.7 V_{max}

14. Enzymes are catalysts. They increase the rate of chemical reactions by:

- ☐ A) Raising the activation energy
- ☐ B) Temporarily increasing the temperature
- ☒ C) Stabilizing the transition state
- ☐ D) Covalently binding the substrate

15. The addition of a phosphoryl group to a OH group of a sugar by a kinase is a form of:

- ☐ A) Dehydrogenation
- ☐ B) Oxidation
- ☐ C) Reduction
- ☒ D) Esterification

16. In type A blood group, α -D-galactose takes the place of N-acetylgalactosamine.

- ☒ A) True
- ☐ B) False

17. Cholesterol is a steroid-based lipid that is present in some cell membranes:

- ☐ A) constitutes only about 3% of plant cell membranes
- ☐ B) Makes animal cell membranes stiffer and less fluid.
- ☐ C) can serve as a covalently attached lipid arm to anchor proteins in membranes
- ☐ D) makes cell membranes more permeable

18. There are several levels of protein structure, the most complex of which is

- ☐ A) Primary
- ☐ B) Secondary
- ☐ C) Tertiary
- ☒ D) Quaternary

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

- ☒ A) Glucose
- ☐ B) Ribose
- ☐ C) Ribulose
- ☐ D) Glyceraldehyde

20. Which of the following is a true statement about glucose?

- ☐ A) It cannot be utilized by red blood cells
- ☐ B) It is stored as starch in animals
- ☒ C) It has 4 asymmetric carbon atoms
- ☐ D) It is oxidized to form glycerol

21. From the abbreviated name of the compound Gal (β 1 $\rightarrow$ 4) Glc, we know that:

- ☐ A) The glucose residue is the β anomer.
- ☐ B) The galactose residue is at the non-reducing end.
- ☒ C) C-4 of glucose is joined to C-1 of galactose by a glycosidic bond.
- ☐ D) The compound is in its furanose form

22. A tripeptide functioning as an important reducing agent in the tissues is

- ☐ A) Bradykinin
- ☒ B) Tyrocidin
- ☐ C) Kallidin
- ☐ D) Glutathione

23. Electrostatic bonds can be formed between the side chains of
- | | |
|----------------------------|-------------------------|
| A) Alanine and leucine | C) Leucine and valine |
| B) Aspartate and glutamate | D) Lysine and aspartate |
24. Which of the characteristics below apply to amino acid Glycine?
- | | |
|-----------------------|------------------------------------|
| A) Optically inactive | C) Hydrophilic, basic and charged |
| B) Hydrophobic | D) Hydrophilic, acidic and charged |
25. Which of the amino acids below is the uncharged derivative of an acidic amino acid?
- | | |
|---------------------|-------------|
| A) Cystine | C) Tyrosine |
| <u>B) Glutamine</u> | D) Serine |
26. Tryptophan could be considered as precursor of Serotonin
- | | |
|----------------|---------------------|
| A) Melanotonin | C) Thyroid hormones |
| B) Melanin | D) Epinephrine |
27. Which of the following is/are unsaturated fatty acids?
- | | |
|---------------------|------------------------|
| A) Linoleic acid | C) Oleic acid |
| B) Palmitoleic acid | <u>D) All of these</u> |
28. Antibodies which bind to and immobilize antigens are glycolipid
- | |
|----------------|
| <u>A) True</u> |
| B) False |
29. Hydrolysis of fats by alkalies into fatty acids and glycerol is called
- | | |
|----------------|--------------------------|
| A) Coagulation | <u>C) Saponification</u> |
|----------------|--------------------------|
30. The fats and oils are respectively rich in
- | | |
|---|--------------------------|
| A) Unsaturated fatty acids | C) Saturated fatty acids |
| <u>B) Saturated and unsaturated fatty acids</u> | D) None of these |
31. The following is not a phospholipid
- | | |
|------------------|-----------------------|
| A) Sphingomyelin | C) Lecithin |
| B) Cephalin | <u>D) Cerebroside</u> |
32. Examples of monounsaturated fatty acids are:
- | | |
|----------------------|---------------------|
| <u>A) Oleic acid</u> | b) Arachidonic acid |
| B) Palmitic acid | d) Linolenic acid |
33. The following reaction represent condensation reaction $G + G + G \rightarrow G-G-G + 2H_2O$
- | |
|----------|
| A) True |
| B) False |
34. Triacylglycerols are
- | | |
|---------------------------------------|----------------------------|
| <u>A) Energy rich compounds</u> | C) Nonpolar in nature |
| B) Can be stored in unlimited amounts | <u>D) All of the above</u> |
35. Cholesterol is a precursor of all except
- | | |
|---------------|---------------------|
| A) Bile salts | <u>C) Bilirubin</u> |
| B) Steroids | D) vitamin D |
36. A membrane phospholipid that does not contain glycerol is?
- | | |
|----------------|-------------------------|
| A) Lecitin | <u>C) Sphingomyelin</u> |
| B) Cerebroside | D) Ceramide |

37. 49. Which one of the following substances is an intermediate in the synthesis of both glycerol-containing phospholipids and triacylglycerol?

- A) Acetocetyl CoA
 B) Phosphatidic acid
 C) Choline
 D) CDP-Ethanolamine

38. Choose the statement below that is correct:

- A) There is a phosphate group attached to 5'-carbon of sugar at the 5' end of DNA
 B) There is a hydroxyl group attached to 5'-carbon of sugar at the 5' end of DNA
 C) There is a phosphate group attached to 3'-carbon of sugar at the 3' end of DNA
 D) All answers are correct

39. A competitive inhibitor of an enzyme?

- A) Increases K_m without affecting V_{max}
 B) Increases V_{max} without affecting K_m
 C) Decreases K_m without affecting V_{max}
 D) Decreases V_{max} without affecting K_m

40. Membranes serve as a selective barrier for the cell. Small, non-polar molecules such as H_2O go through the membrane via simple diffusion. Facilitated diffusion is a protein-mediated process wherein particular integral membrane proteins, called permeases, form channels for certain molecules. In what ways are permeases similar to enzymes?

- A) They obey Michaelis-Menten kinetics
 B) They catalyze reverse reactions
 C) They lower activation energy.
 D) They are nonspecific for many types of molecules.

41. The rate of an enzyme-catalyzed reaction was measured using several substrate concentrations that were much lower than K_m , the dependence of reaction velocity on substrate concentration can best be described as?

- A) Independent of enzyme concentration
 B) Equal to K_m
 C) A constant fraction of V_{max}
 D) Proportional to the substrate conc.

42. The presence of a noncompetitive inhibitor?

- A) Leads to both an increase in the V_{max} of a reaction and an increase in the K_m
 B) Leads to a decrease in the observed V_{max}
 C) Leads to a decrease in K_m and V_{max}
 D) Leads to an increased in K_m without affecting V_{max}

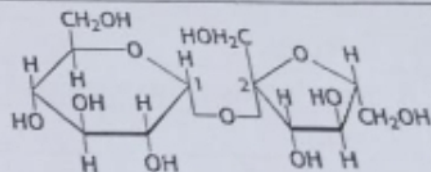
43. What enzyme do cows have that allows them to digest cellulose?

- A) beta-amylase
 B) alpha-amylase
 C) beta-phosphorylase
 D) beta-lactase

44. Genes contain:

- A) coding sequences
 B) noncoding RNA segments
 C) sequences required for synthesis of a particular RNA transcript
 D) a and b answers are correct

45. Identify the correct name for the following structure



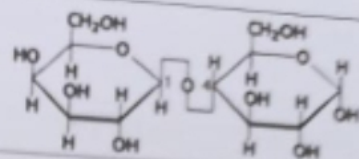
Maltose

Sucrose

B) Lactose

D) Cellobiose

46. Identify the correct name for the following structure



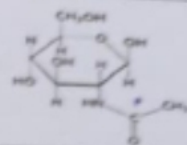
A) Maltose

B) Lactose

C) Sucrose

D) Cellobiose

47. Identify the correct name for the following structure



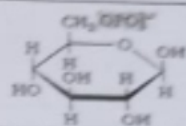
A) N-acetyl-beta-D-glucosamine

B) N-acetyl-beta-D-galactosamine

C) beta-D-glucose-6-Phosphate

D) beta-D-galactose-6-Phosphate

48. Identify the correct name for the following structure



A) beta-D-glucose-6-Phosphate

B) beta-D-galactose-6-Phosphate

C) N-acetyl-beta-D-glucosamine

D) N-acetyl-beta-D-galactosamine

49. The polysaccharide used in assessing the glomerular filtration rate (GFR) is

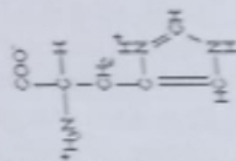
A) Glycogen

C) Starch

B) Inulin

D) Chitin

50. Identify the correct name for the following structure



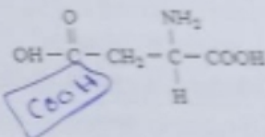
A) Histidine

B) Valine

C) Asparagine

D) Cysteine

51. Identify the correct name for the following structure



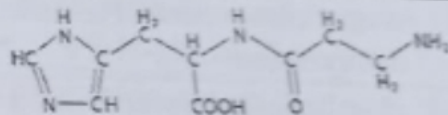
A) Aspartic acid

B) Glutamic acid

C) Lactic acid

D) Palmetic acid

52. Identify the correct name for the following structure



A) beta-alanyl-L-histidine

B) L-phenylalanyl-L-alanine

C) L-alanyl-L-phenylalanyl-glycine

D) beta-alanyl-L-histidine -L- glycine

53. The compound that consists of ribose linked by an N-glycosidic bond to N-9 of adenine is:

- | | |
|---------------------------|-----------------------------|
| A) a deoxyribonucleoside. | C) adenosine monophosphate. |
| B) a purine nucleotide. | <u>D) adenosine.</u> |

54. The difference between a ribonucleotide and a deoxyribonucleotide is:

- | | |
|---|---|
| <u>A) a deoxyribonucleotide has an —H instead of an —OH at C-2.</u> | C) a ribonucleotide has an extra —OH at C-4. |
| B) a deoxyribonucleotide has α configuration; ribonucleotide has the β configuration at C-1. | D) a ribonucleotide has more structural flexibility than deoxyribonucleotide. |

55. The phosphodiester bonds that link adjacent nucleotides in both RNA and DNA:

- | | |
|--|---|
| A) always link A with T and G with C. | C) join the 3' hydroxyl of one nucleotide to the 5' hydroxyl of the next. |
| B) are susceptible to alkaline hydrolysis. | <u>D) form between the planar rings of adjacent bases.</u> |

56. What nucleotide base does RNA contain that DNA does not:

- | | |
|-----------------|----------------------|
| A) adenine (A) | C) thymine (T) |
| B) cytosine (C) | <u>D) uracil (U)</u> |

57. Which of the following is true about phosphodiester linkage?

- | | |
|---|--|
| <u>A) 5'-phosphate group of one nucleotide unit is joined to the 3'-hydroxyl group of the next nucleotide ✓</u> | C) 5'-phosphate group of one nucleotide unit is joined to the 5'-hydroxyl group of the next nucleotide |
| B) 3'-phosphate group of one nucleotide unit is joined to the 5'-hydroxyl group of the next nucleotide | D) 3'-phosphate group of one nucleotide unit is joined to the 3'-hydroxyl group of the next nucleotide |

58. Which of the following is True about purine and pyrimidine bases?

- | | |
|---|--|
| A) They are hydrophobic and relatively soluble in water at the near-neutral pH of the cell | C) Purines have two rings in their structure, but pyrimidine bases have only one ring |
| <u>B) At acidic or alkaline pH, the bases become charged and their solubility in water decrease</u> | D) At acidic or alkaline pH, the bases become charged and their solubility in water increase |

59. Which of the following statements is true?

- | | |
|---|---|
| A) Sugar component of a nucleotide is ribose | <u>C) The bases in nucleotides are attached to a pentose sugar moiety by a glycosidic linkage</u> |
| B) Sugar component of a nucleotide is deoxyribose | D) The sugar molecule of the nucleotide is in L-configuration |

60. 3', 5'-phosphodiester bond a covalent linkage in which phosphoric acid is esterified to the 3' hydroxyl of one nucleoside and the 5' hydroxyl of another nucleoside; it is the backbone of nucleic acids

True

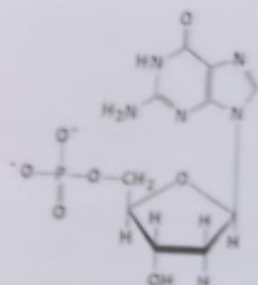
False

61. Double helix two polynucleotide chains wrapped around each other; the fundamental structural motif of DNA	
☒ A) True	
☐ B) False	
62. Purine bases nitrogen-containing aromatic compounds that contain a six-membered ring fused to a five-membered ring; the parent compounds of two nucleobases, adenine and guanine	
☒ A) True	
☐ B) False	
63. Pyrimidine bases nitrogen-containing aromatic compounds that contain a six-membered ring; the parent compounds of several nucleobases	
☒ A) True	
☐ B) False	
64. The primary structure of nucleic acids is the order of bases in the polynucleotide sequence, and the secondary structure is the three-dimensional conformation of the backbone.	
☒ A) True	
☐ B) False	
65. Which of the following statements about the competitive inhibition of an enzyme-catalyzed reaction is correct?	
☒ A) A competitive inhibitor and substrate can bind simultaneously to the enzyme.	☐ C) The V_{max} for a reaction remains unchanged in the presence of a competitive inhibitor
☐ B) The V_{max} and K_m (Michaelis constant) for a reaction are unchanged in the presence of a competitive inhibitor.	☐ D) The K_m for a reaction remains unchanged in the presence of a competitive inhibitor.
66. Which of the following statements about the reactions at the active center of chymotrypsin are correct?	
☒ A) The aspartate residue in the active site of chymotrypsin donates a proton to histidine.	☐ C) A proton moves from the aspartate to the serine to the histidine side chain in the catalytic triad of chymotrypsin.
☐ B) The aspartate residue in the active site of chymotrypsin holds the histidine in the correct orientation.	☒ D) The histidine residue in the active site of chymotrypsin don't accepts a proton to from water.
67. Which property is found in nucleosides and nucleotides?	
☐ A) Both contain a nitrogenous base, a pentose, and at least one phosphate group.	☒ C) Both contain an anomeric carbon atom that is part of a β -N-glycosidic bond.
☐ B) Both contain a covalent phosphodiester bond that is broken in strong acid	☐ D) Both contain an aldose with hydroxyl groups that can tautomerize.
Which is a general property of both nucleosides and nucleotides?	
☐ Both contain a pentose in the form of a furanose.	☒ C) Both contain a nitrogenous base that forms covalent H-bonds.

B)	Both contain at least one 5'-phosphate group.	D)	Both contain a hemiacetal or hemiketal bond.
69. Which will be a characteristic of this one single strand?			
A)	The single-stranded chain will contain both ribose and deoxyribose.	C)	The single-stranded chain will contain multiple phosphodiester bonds each linking a 2'-carbon and a 5'-carbon.
B)	The single-stranded chain will contain one 5'-end and one 3'-end.	D)	The single-stranded chain will contain both purines and pyrimidines.
70. The nucleotides in DNA and RNA have three components: a sugar group, a nitrogenous base, and a phosphate group. Adjacent nucleotides in a nucleic acid are joined by a phosphodiester bond. This bond links the <u>phosphate group of one nucleotide</u> to which one of the following components of a neighboring nucleotide?			
A)	Sugar	C)	Phosphate group
B)	Nitrogen base	D)	None of the above
71. Which of the following is true about phosphodiester linkage?			
A)	5'-phosphate group of one nucleotide unit is joined to the 3'-hydroxyl group of the next nucleotide	C)	5'-phosphate group of one nucleotide unit is joined to the 5'-hydroxyl group of the next nucleotide
B)	3'-phosphate group of one nucleotide unit is joined to the 5'-hydroxyl group of the next nucleotide	D)	3'-phosphate group of one nucleotide unit is joined to the 3'-hydroxyl group of the next nucleotide
72. α -helix one of the most frequently encountered folding patterns in the protein backbone			
A)	True		
B)	False		
73. All proteins have all four levels.			
A)	True		
B)	False		
74. β -pleated sheet one of the most important types of secondary structure, in which the protein backbone is almost fully extended with hydrogen bonding between adjacent strands			
A)	True		
B)	False		
75. One group of Nonpolar amino acids has nonpolar side chains and the side chains are mostly aliphatic or aromatic hydrocarbons or their derivatives.			
A)	True		
B)	False		
76. Oxytocin and vasopressin each have nine amino acids and only differ in two positions.			
A)	True		
B)	False		
77. Amino acid which acts as the precursor of epinephrine synthesis is _____.			
A)	Glycine	C)	Tyrosine
B)	Aspartate	D)	Valine

78. Identify the purine base of nucleic acids in the following

G, A



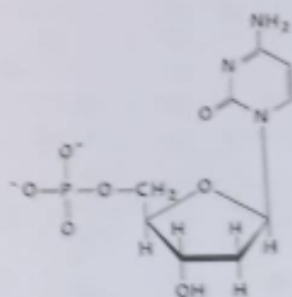
A) Cytosine

☒ B) Guanine

C) Thymine

D) Adenine

79. Identify the following structure



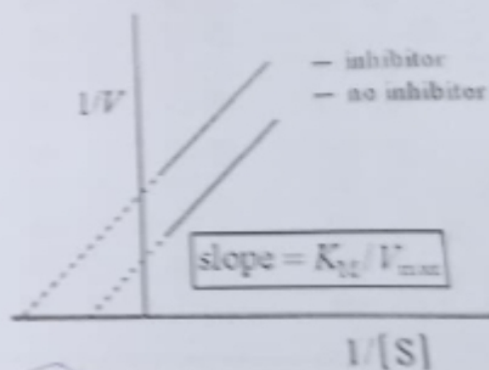
A) dAMP

☒ C) dCMP

B) dGMP

D) dTMP

80. What kind of inhibitor does this graph represent?



☒ A) Non-competitive inhibitor

☒ C) Uncompetitive inhibitor

B) Competitive inhibitor

D) Mixed inhibitor