

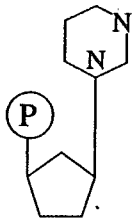
B+C

Cell Compounds + Biological Molecules

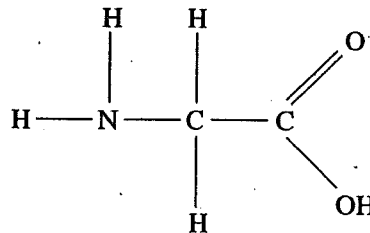
1. A water molecule is capable of forming hydrogen bonds because
- A. the oxygen atom gives up an electron to a hydrogen atom.
 - B. the electrons are shared at an equal distance between the hydrogen atoms and the oxygen atom.
 - C. both the hydrogen atoms and the oxygen atom have the same number of protons.
 - D. there is an unequal sharing of electrons between the oxygen atom and the hydrogen atoms.

2. Which of the following represents a lipid molecule?

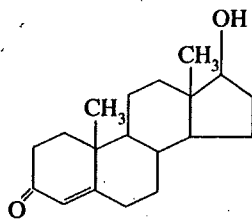
A.



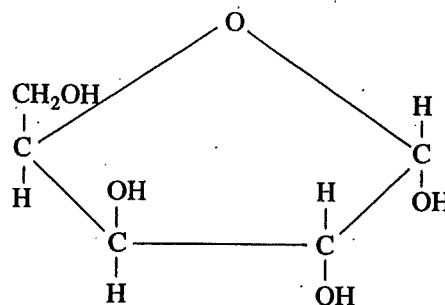
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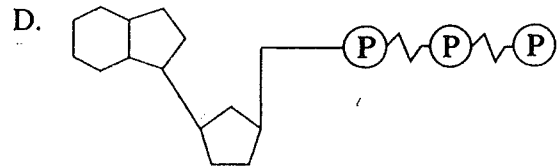
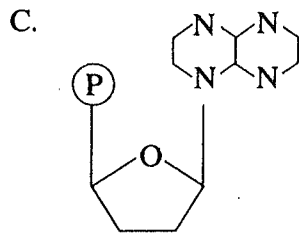
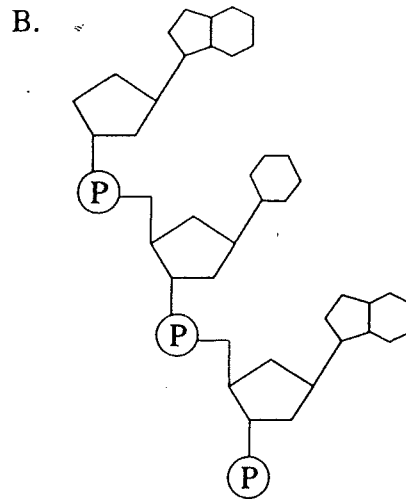
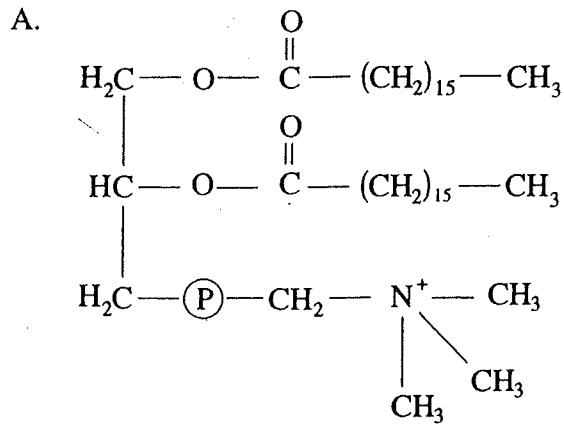
D.



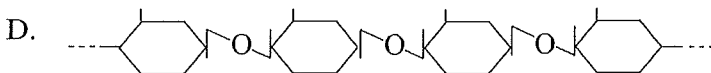
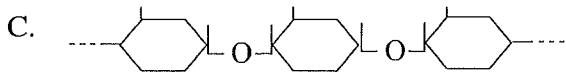
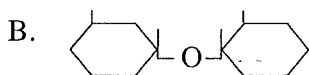
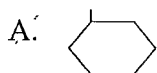
3. A bacterial nucleic acid containing the human insulin gene is an example of

- A. a nucleotide.
- B. an oncogene.
- C. messenger RNA.
- D. recombinant DNA.

4. Which of the following structures represents ATP?



5. Which of the following diagrams represents glucose?



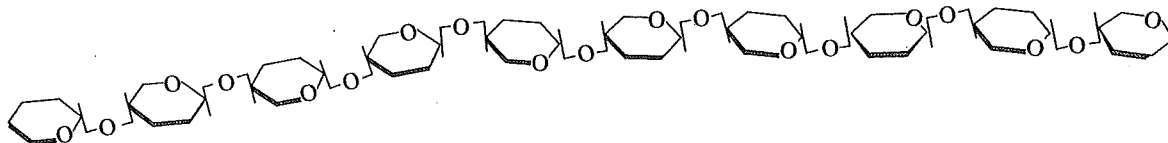
6. Unsaturated fatty acids, like those found in fish oils, are characterized by

- A. the ability to bond with glycerol to make lipids.
- B. bonds between an amine and a carboxyl (acid) group.
- C. having only single bonds between the carbon atoms in the chain.
- D. some carbon atoms in the chain that bond to only one hydrogen atom.

7. Which of the following is **not** a function of water in living systems?
- A. to act as a solvent
 - B. to lubricate the joints
 - C. to buffer changes in pH
 - D. to regulate body temperature
8. Which of the following food molecules is classified as a disaccharide?
- A. $C_6H_{12}O_6$
 - B. $C_{12}H_{22}O_{11}$
 - C. $C_{18}H_{32}O_{16}$
 - D. $C_{120}H_{300}O_{120}$
9. Which of the following is an example of hydrolysis?
- A. production of mRNA from DNA
 - B. conversion of glucose to glycogen
 - C. absorption of fatty acids and glycerol
 - D. formation of amino acids from proteins
10. Which of the following is the energy source produced in mitochondria?
- A. ATP
 - B. glucose
 - C. enzymes
 - D. acetylcholine
11. A substance which helps maintain a constant pH in a solution is a(n)
- A. salt.
 - B. acid.
 - C. base.
 - D. buffer.
12. The bonding of unit molecules to produce a polysaccharide is called
- A. hydrolysis.
 - B. translation.
 - C. cellular respiration.
 - D. dehydration synthesis.

13. Which of the following is the empirical formula for glucose?
- A. CHO
 - B. CH₂O
 - C. CH₂O₂
 - D. C₂HO₂

Use the following diagram to answer question 14



14. The molecule above would likely be found in a
- A. vacuole.
 - B. liver cell.
 - C. mitochondria.
 - D. plant cell wall.

-
15. Hemoglobin and antibodies are all composed of

- A. lipids.
- B. proteins.
- C. carbohydrates.
- D. polysaccharides.

16. Which of the following is necessary for hydrogen bonding?

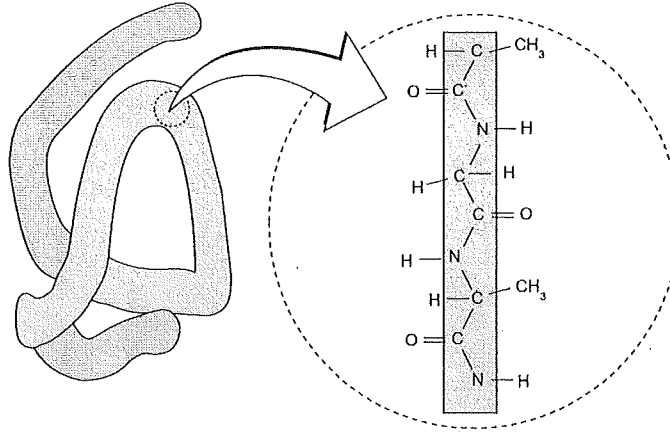
- A. Peptide bonds.
- B. Hydrogen ions.
- C. Polar molecules.
- D. Equal sharing of electrons.

17. The maintenance of a constant pH of the blood is achieved by

- A. acids.
- B. bases.
- C. water.
- D. buffers.

Use the following diagram to answer question 18:

Molecule X



18. i) Identify molecule X and name the organelle where the molecule is made.

Name of molecule:

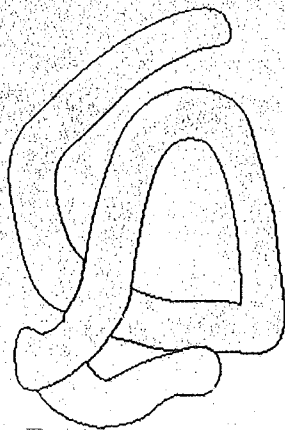
(1 mark)

Name of organelle where made:

(1 mark)

ii) Describe **two** ways in which molecule X is used by the cell membrane. (2 marks)

Use the following diagram to answer question 19



19. The diagram above represents which level of protein structure?

- A. Tertiary.
- B. Primary.
- C. Secondary.
- D. Quaternary.

20. In the human body, steroid molecules can act as

- A. buffers.
- B. vacuoles.
- C. hormones.
- D. coenzymes.

21. Which of the following is a function of water in cells?

- A. emulsifying fats
- B. dissolving chemicals
- C. copying nucleic acids
- D. catalyzing chemical reactions

Use the following chart to answer question 22

Reaction I	Reaction II
$\text{HX} \longrightarrow \text{H}^+ + \text{X}^-$	$\text{H}^+ + \text{Z} \longrightarrow \text{HZ}$

22. When substance Z is added to the products of Reaction I, Reaction II occurs. Substance Z is

- A. an acid.
- B. a buffer.
- C. an enzyme.
- D. a sodium ion.

23. How are starch and cellulose similar?

- A. Both are polymers of glucose.
- B. Both are produced in human cells.
- C. Both are components of the cell membrane.
- D. Both can be digested by enzymes produced in the pancreas.

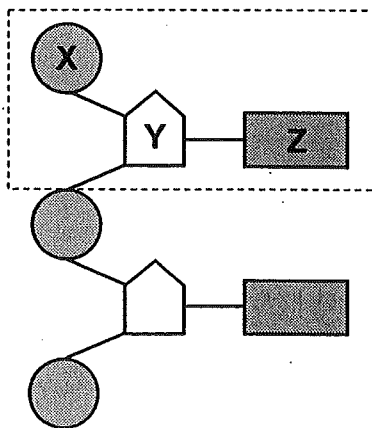
24. Neutral fats do **not** dissolve in water because

- A. water is non-polar.
- B. water is polar and neutral fats are non-polar.
- C. neutral fats are polar and form hydrogen bonds with water.
- D. neutral fats break down into ions when combined with water.

25. Which of the following describes the action of a buffer?

- A. Lysosomes hydrolyze proteins in the cell.
- B. During exercise, hemoglobin accepts hydrogen ions (H^+).
- C. Gastric secretions denature salivary amylase in the stomach.
- D. Reduced hemoglobin reacts with oxygen to form oxyhemoglobin in the lungs.

Use the following diagram to answer question 26



26. Identify the structure made up of parts X, Y and Z and state its function.
(2 marks: 1 mark for name; 1 mark for function)

Name: _____

Function: _____

27. Which of the following are components of a phospholipid?

- A. cholesterol, glycerol, fatty acids
- B. fatty acids, phosphate group, glycerol
- C. glycerol, amino acids, phosphate group
- D. phosphate group, cholesterol, monosaccharides

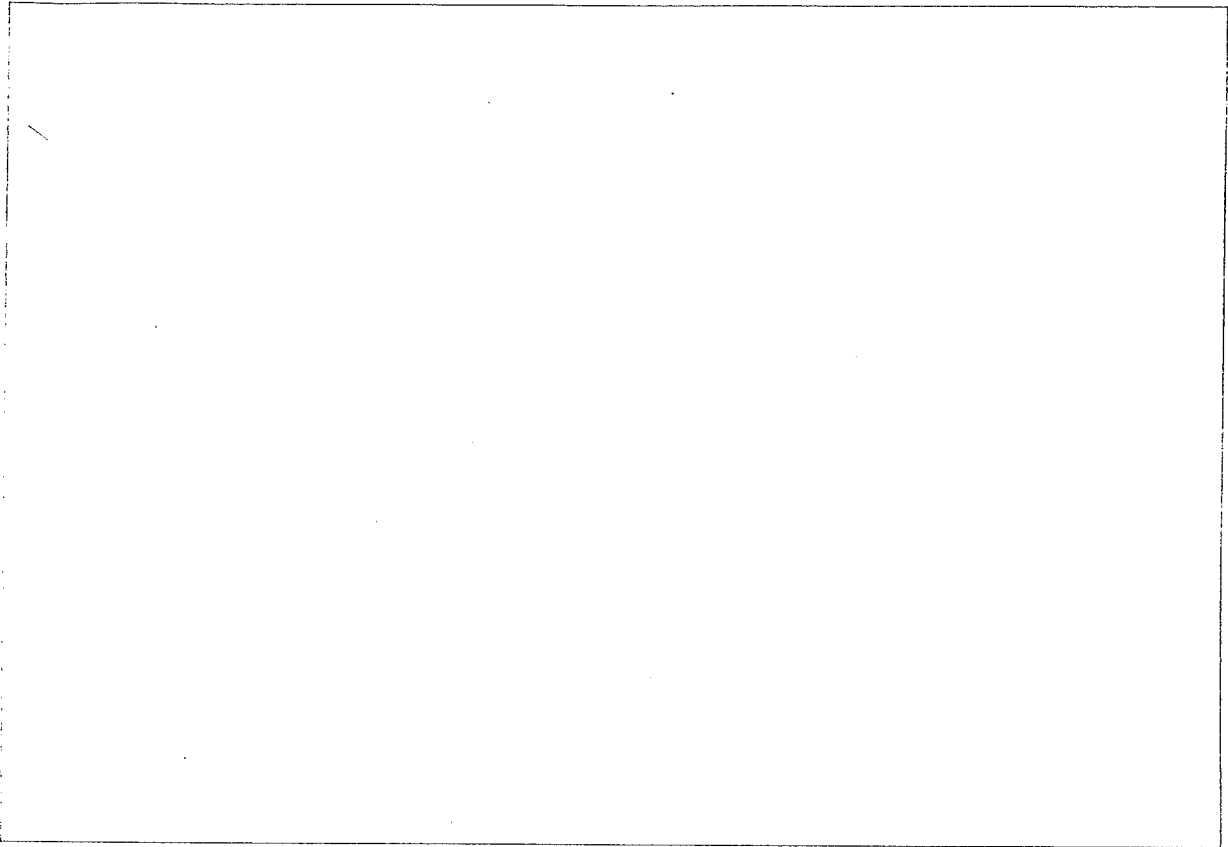
28. What is the ratio of hydrogen to oxygen molecules in a carbohydrate?

- A. 1:1
- B. 1:2
- C. 2:1
- D. 3:1

29. Which of the following is an amino (amine) group?

- A. NH_2
- B. OH^{-1}
- C. PO_4^{-3}
- D. COOH

30. Draw a generalized amino acid and label the amine, acid (carboxyl) and R groups. (4 marks)
(You may use a pencil for your drawing.)



31. Give **three** functions of the bicarbonate ion (HCO_3^-) in the body and identify **one** specific location of each function. (6 marks: 2 marks each)

i) Function: _____

Location: _____

ii) Function: _____

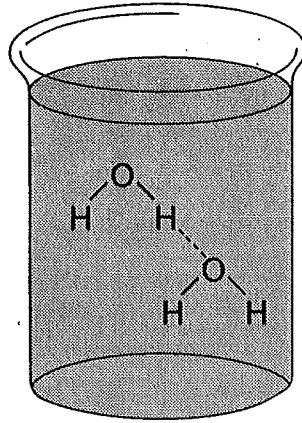
Location: _____

iii) Function: _____

Location: _____

32. The pH of blood is slightly basic. Which of the following would be the pH of blood?
- A. 2.0
 - B. 6.8
 - C. 7.4
 - D. 10.3
33. The bonding of a glucose molecule and a maltose molecule would result in a
- A. triglyceride.
 - B. disaccharide.
 - C. phospholipid.
 - D. polysaccharide.
34. Energy released from the breakdown of monosaccharides in the cytoplasm is stored in
- A. ATP.
 - B. RNA.
 - C. DNA.
 - D. ADH.
35. Which of the following is **not** a part of a nucleotide?
- A. Sugar.
 - B. Glycerol.
 - C. Phosphate.
 - D. Nitrogen base.
36. Which of the following molecules is broken down and reformed at a higher rate when the cell's metabolic activity increases?
- A. ATP
 - B. DNA
 - C. tRNA
 - D. rRNA
37. The breakdown of a disaccharide may produce
- A. glucose.
 - B. glycerol.
 - C. fatty acids.
 - D. amino acids.

Use the following diagram to answer question 38.



38. The type of bond shown between the two water molecules is

- A. ionic.
 - B. peptide.
 - C. covalent.
 - D. hydrogen.
-

39. Which substance releases hydrogen ions causing the pH of a solution to decrease?

- A. water
- B. lipids
- C. hydrochloric acid
- D. sodium bicarbonate

40. The type of digestive reactions that take place along the gastro-intestinal tract can be classified as

- A. synthesis.
- B. hydrolysis.
- C. dehydration.
- D. replacement.

41. State **two** biological functions of glucose in living organisms.

(2 marks)

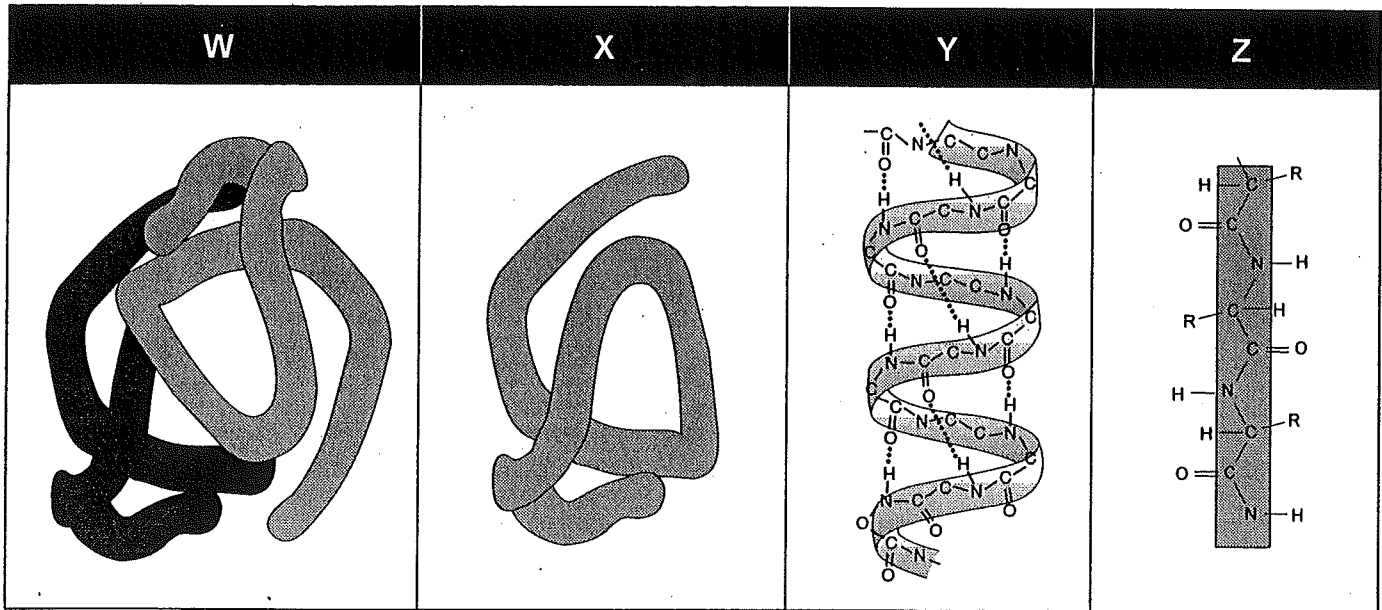
i) _____

ii) _____

42. Cellulose is composed of which of the following substances?

- A. glucose
- B. fatty acids
- C. nucleotides
- D. amino acids

Use the following diagrams to answer question 43.



43. Which diagram represents the tertiary structure of a protein?

- A. W
- B. X
- C. Y
- D. Z

44. A substance that prevents large changes in the pH of a solution is

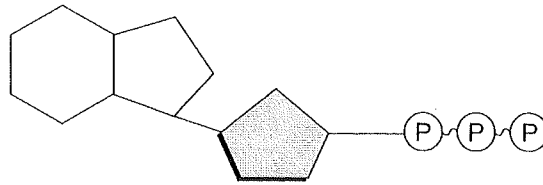
- A. DNA.
- B. water.
- C. a buffer.
- D. an enzyme.

45. Water molecules are connected to each other by

- A. buffers.
- B. base pairing.
- C. peptide bonds.
- D. hydrogen bonds.

Use the following diagram to answer question 46).

Molecule Y



46) i) Identify molecule Y and name the organelle where the molecule is made.

Name of molecule:

(1 mark)

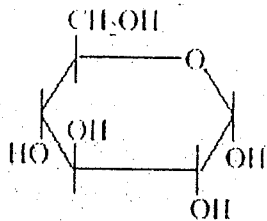
Name of organelle where made:

(1 mark)

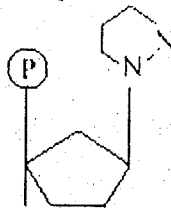
ii) Describe two ways in which molecule Y is used by the cell membrane. (2 marks)

47. Which of the following would be produced in a reaction catalyzed by enzymes known as nucleases?

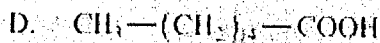
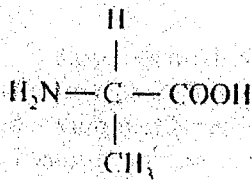
A.



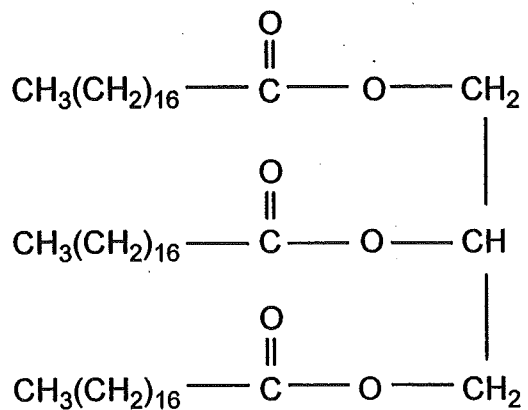
B.



C.



Use the following diagram to answer question 48



48. The chemical compound above is classified as a

- A. lipid.
 - B. protein.
 - C. nucleic acid.
 - D. carbohydrate.
-

49. An unsaturated fat is characterized by

- A. a helical structure.
- B. four fused carbon rings.
- C. double bonds between the carbon atoms.
- D. phosphate groups substituting for fatty acids.

50. Primary protein structure is dependent on

- A. peptide bonding.
- B. hydrogen bonding.
- C. bonding between R-groups.
- D. bonds between protein molecules.

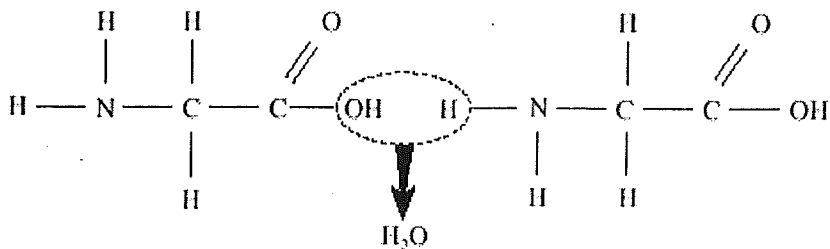
Use the following information to answer question 51.

- solvent
- catalyst
- lubricant
- temperature regulator

51. How many of the above are roles of water in the body?

- A. 1
- B. 2
- C. 3
- D. 4

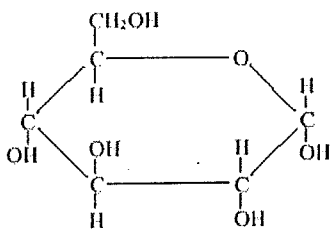
Use the following diagram to answer question 52



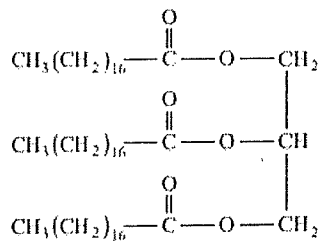
52. The diagram illustrates a step in the
- hydrolysis of a protein.
 - synthesis of an enzyme.
 - production of nucleic acid.
 - conversion of glucose molecules to starch.
53. The building blocks or monomers that make up carbohydrates are
- nucleotides.
 - amino acids.
 - monosaccharides.
 - fatty acids and glycerol.
54. Compared to saturated fats, unsaturated fats contain less
- oxygen.
 - glycerol.
 - hydrogen.
 - fatty acids.

55. Which of the following molecules is a building block or monomer of RNA?

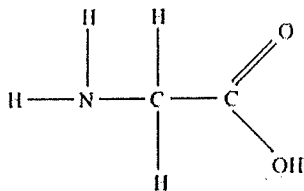
A.



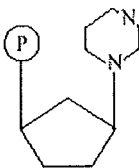
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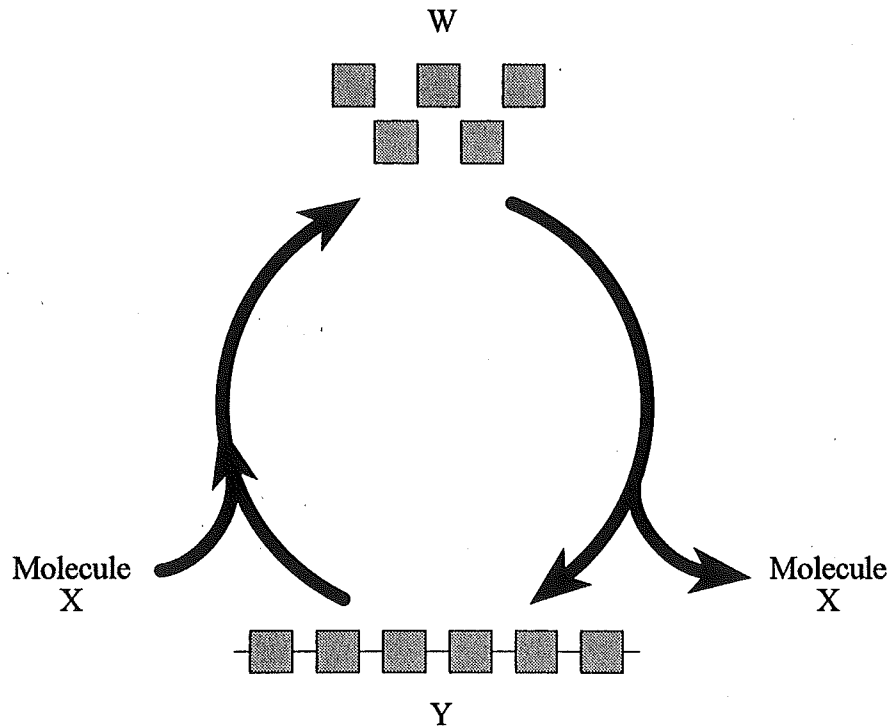
C.



D.



Use the following diagram to answer questions 56 + 57.



56. Which of the following correctly identifies molecules W and Y?

	W	Y
A.	proteins	amino acids
B.	glucose	glycogen
C.	nucleic acids	nucleotides
D.	lipids	fatty acids

57. What is molecule X?

- A. ATP
- B. DNA
- C. water
- D. peptides

58. Which of the following is composed of nucleotides?

- A. Fat.
- B. RNA.
- C. Starch.
- D. Protein.

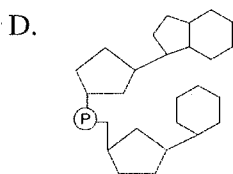
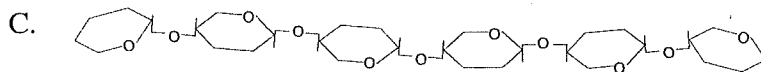
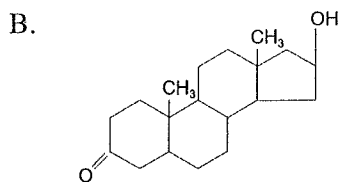
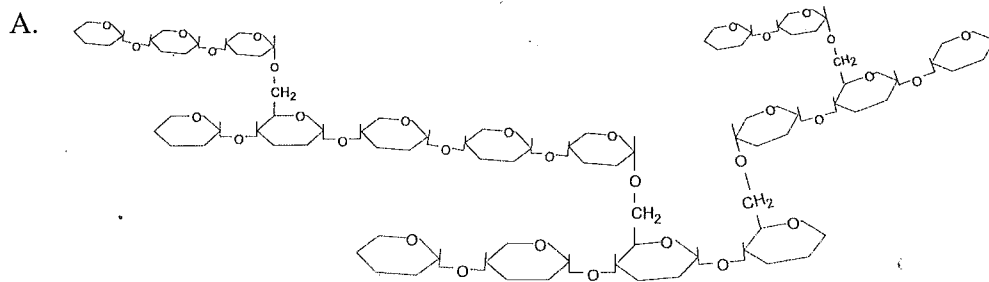
59. A solution with a high concentration of hydrogen ions (H^+) is

- A. basic.
- B. acidic.
- C. neutral.
- D. isotonic.

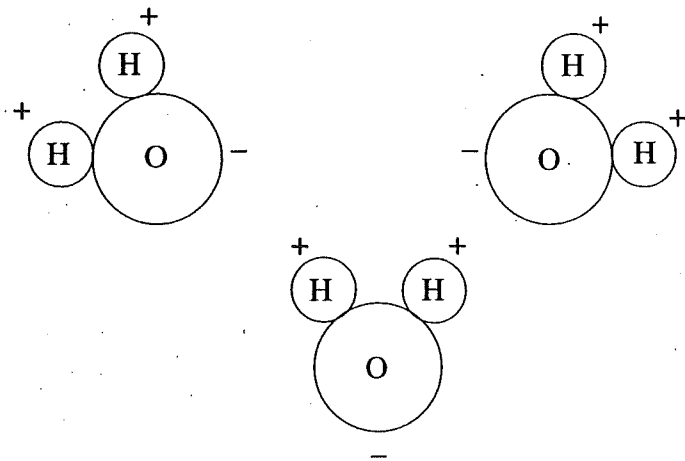
60. Which of the following is produced when glucose and fructose are chemically joined to form sucrose?

- A. water
- B. nucleotide
- C. peptide bond
- D. hydrogen bond

61. Which diagram illustrates an energy storage product of the liver?



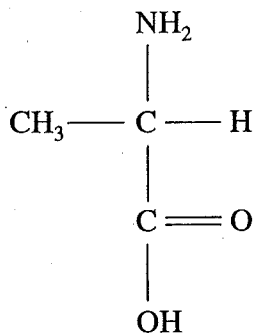
Use the following diagram to answer question 62



62. The indicated charges allow these molecules to

- A. act as a solvent.
- B. buffer a solution.
- C. form the cell membrane.
- D. store energy for cellular use.

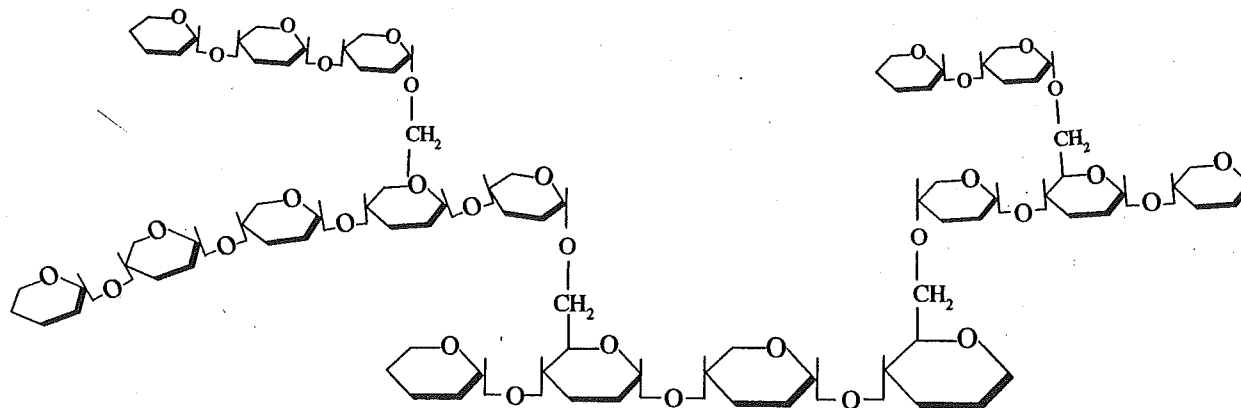
Use the following diagram to answer question 63



63. This molecule is the result of the hydrolysis of

- A. bile.
- B. testosterone.
- C. hemoglobin.
- D. phospholipid.

Use the following diagram to answer question 64.



64. The diagram shows a molecule that is found in the

- A. liver.
 - B. blood.
 - C. pancreas.
 - D. gall bladder.
-

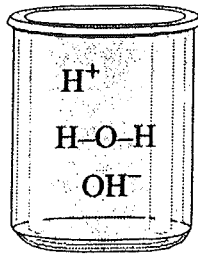
65. How many double bonds are there between carbon atoms in a saturated fatty acid?

- A. 0
- B. 1
- C. 2
- D. more than 2

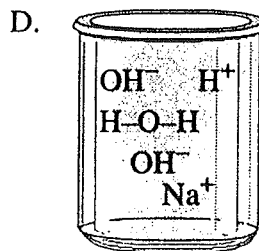
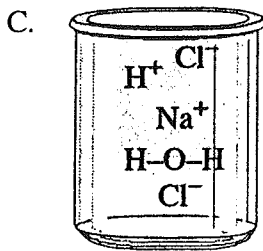
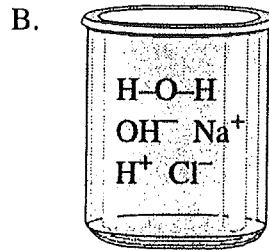
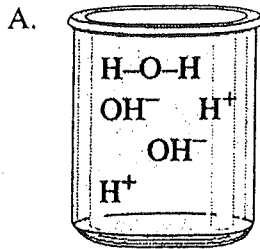
66. Which of the following types of bonding occurs during complementary base pairing?

- A. ionic
- B. peptide
- C. covalent
- D. hydrogen

67. The solution in the beaker below has a pH of 7.



Which of the following diagrams correctly represents a solution with a pH less than 7?



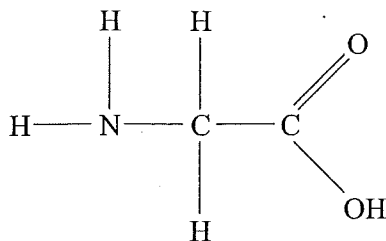
68. Synthesis of protein involves the bonding of amino acids to

- A. glucose.
- B. glycerol.
- C. peptides.
- D. fatty acids.

69. Nucleic acids are composed of

- A. glucose.
- B. enzymes.
- C. fatty acids.
- D. nucleotides.

Use the following diagram to answer questions 70 and 71.



70. The molecule above is

- A. a protein.
- B. a fatty acid.
- C. a nucleic acid.
- D. an amino acid.

71. During digestion, the process that produces this molecule is

- A. hydrolysis.
- B. deamination.
- C. transcription.
- D. dehydration synthesis.

72. An example of a substance that could be produced from this molecule is

- A. DNA.
 - B. trypsin.
 - C. sucrose.
 - D. cellulose.
-

73. An unsaturated fat is converted to a saturated fat when

- A. glucose forms covalent bonds with cellulose.
- B. amino groups are added to fatty acid molecules.
- C. hydrogen atoms are added to the unsaturated fat.
- D. the unsaturated fat is broken down into fatty acids and glycerol.

79. For each of the following molecules, give **one** function and describe a characteristic of the molecule that aids this function. (6 marks: 2 marks each)

a) ATP

Function: _____

Characteristic: _____

b) Water

Function: _____

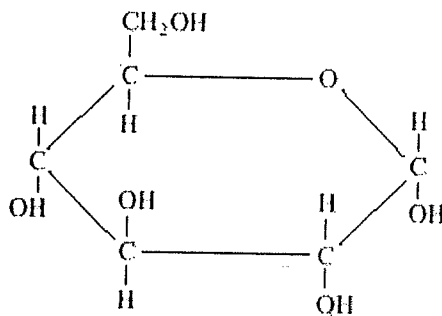
Characteristic: _____

c) Phospholipid

Function: _____

Characteristic: _____

Use the following diagram to answer question 80



80. a) Identify the molecule above. (1 mark)

b) What is the **general** term given to polymers formed from this molecule? (1 mark)

c) List **two** biological functions of these polymers. (2 marks)

i) _____

ii) _____

81. Amino acids are identical in structure **except** for their

- A. amines.
- B. R-groups.
- C. peptide bonds.
- D. acids (carboxyls).

82. The polarity of a water molecule results from

- A. more of the protons being in the hydrogen nucleus.
- B. more of the electrons being near the hydrogen nucleus.
- C. the equal numbers of protons in hydrogen and oxygen.
- D. the unequal sharing of electrons between hydrogen and oxygen.

83. A role of water in cells of the human body is to

- A. emulsify fats.
- B. act as a solvent.
- C. act as an enzyme.
- D. denature proteins.

84. Which of the following is a polymer?

- A. ATP.
- B. Glucose.
- C. Glycerol.
- D. Cellulose.