CELL BIOLOGY

QUESTION AND ANSWER SESSION

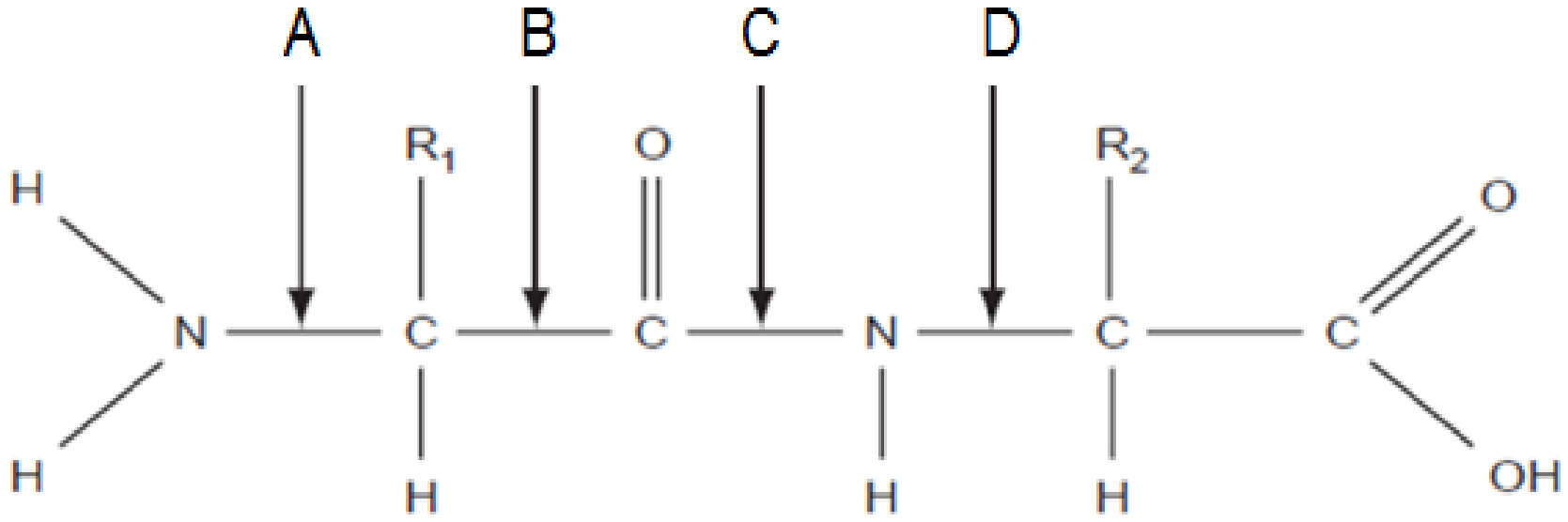
QUESTION 1

Which of the following do polysaccharides and proteins have in common?

A. They are both made of amino acids.
B. Their structures contain sugars.
C. They are large polymers.
D. They each consist of four basic kinds of subunits.

QUESTION 2

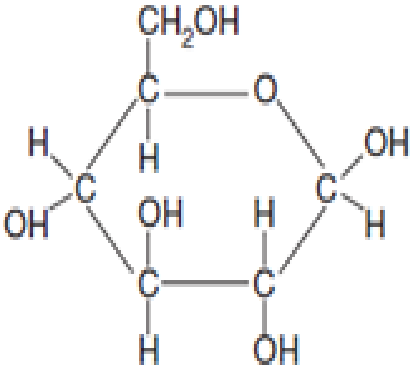
The diagram shows a dipeptide. Which bond is the peptide bond?



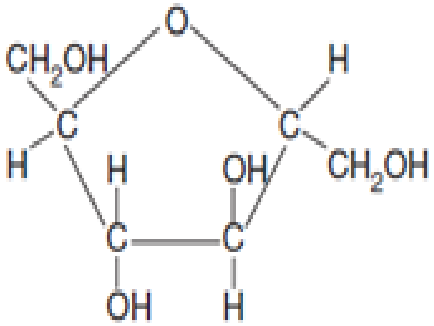
QUESTION 3

Which molecule is a **monomer** for **starch**?

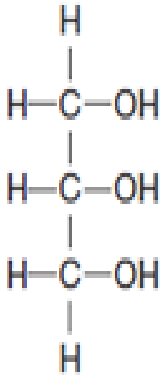
A



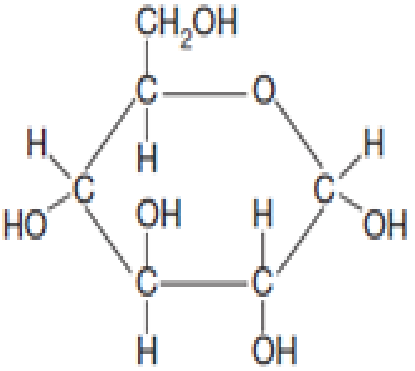
B



C



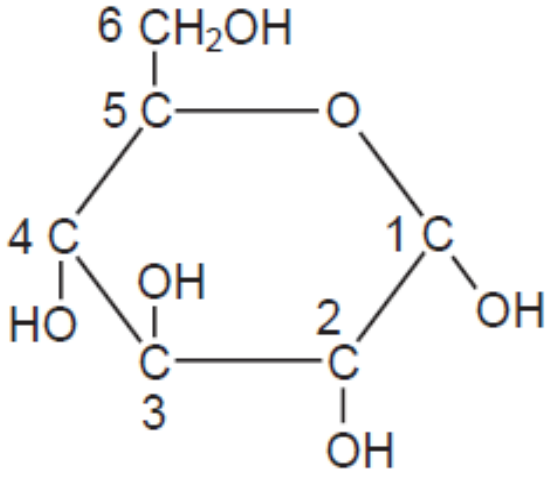
D



QUESTION 4

The hexose sugar molecule in the diagram has its six carbon atoms numbered.

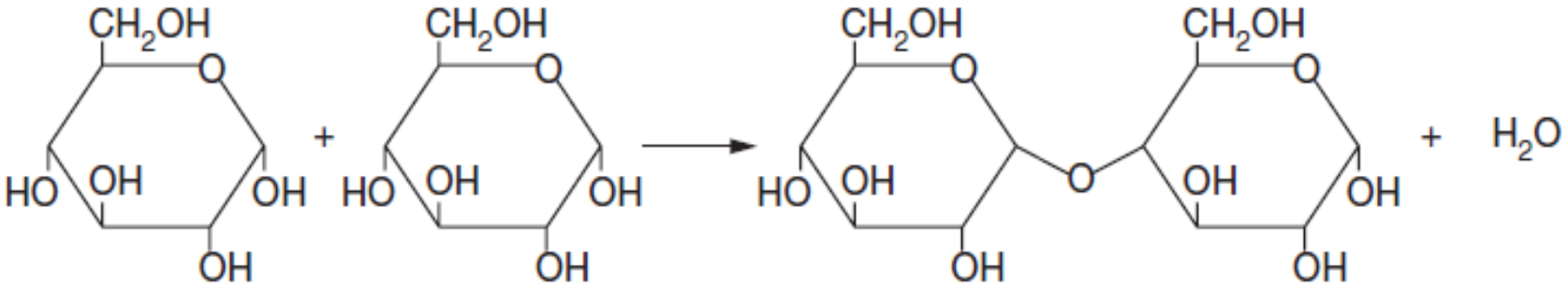
Which carbon atoms join by glycosidic bonds to form amylose and amylopectin?



	amylose	amylopectin
A	1 to 4	1 to 4 and 1 to 6
B	1 to 6	1 to 4 and 1 to 6
C	1 to 4 and 1 to 6	1 to 4
D	1 to 4 and 1 to 6	1 to 6

QUESTION 5

The diagram shows a reaction resulting in the formation of a bond between two molecules.



Which bond is formed and what is the type of reaction?

	bond formed	type of reaction
A	glycosidic	condensation
B	glycosidic	hydrolysis
C	peptide	condensation
D	peptide	hydrolysis

QUESTION 6

Which combination describes a triglyceride?

	hydrophilic	soluble in alcohol
A	✓	✓
B	✗	✗
C	✓	✗
D	✗	✓

QUESTION 7

Lipids differ from other large biological molecules in that they

A. are much larger.
B. are not truly polymers.
C. do not have specific shapes.
D. contain nitrogen atoms.

QUESTION 8

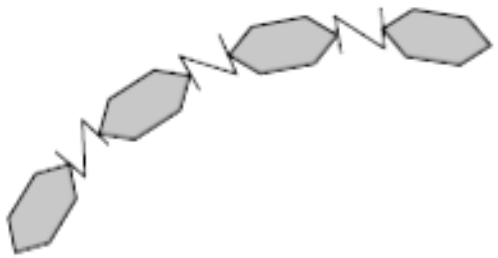
Which polysaccharides are branched and which are unbranched?

	branched	unbranched
A	amylose	cellulose
B	amylopectin	cellulose
C	cellulose	amylose
D	cellulose	amylopectin

QUESTION 9

The most appropriate representation of a triglyceride is

A



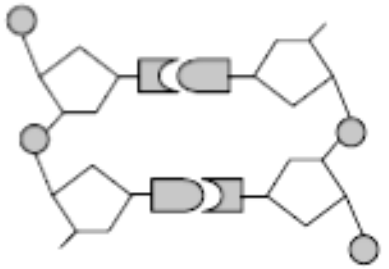
B



C

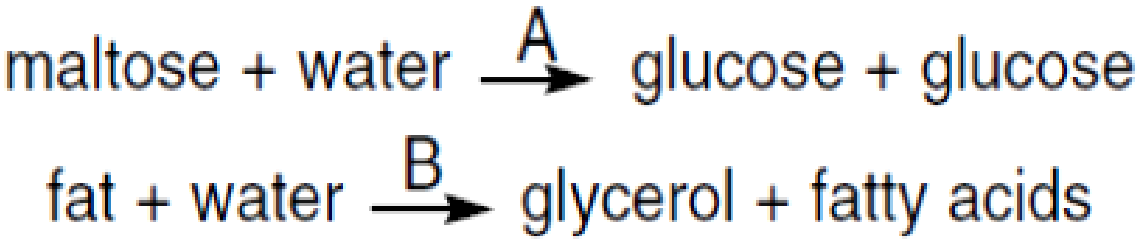


D



QUESTION 10

Two chemical equations are shown below.



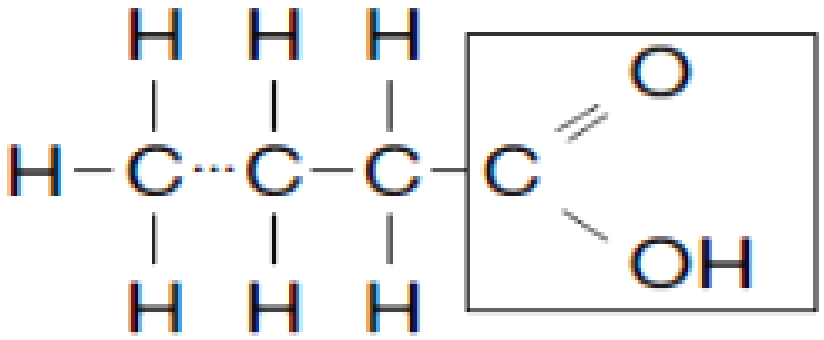
What do letters A and B represent?

A. A — lipase; B — protease
B. A — maltase; B — lipase
C. A — protease; B — maltase
D. A — protease; B — lipase

QUESTION 11

The structural formula of a molecule is shown below. The part of the molecule in the box is known as

A. A carboxyl group
B. A phosphate group
C. An amino group
D. A nitrogenous base



QUESTION 12

Glycogen is best described as a

A. Complex carbohydrate that is often stored in red blood cells
B. Complete protein necessary for the synthesis of cell membranes
C. Polysaccharide that is synthesized and stored within the human liver
D. By-product of sucrose digestion within the pancreas

QUESTION 13

Starch is digested to maltose by the enzyme amylase. According to the ‘lock and key’ hypothesis, which is the ‘key’ and which is the ‘lock’?

	‘key’	‘lock’
A	amylase	maltose
B	amylase	starch
C	starch	amylase
D	starch	maltose

QUESTION 14

What is the general formula for starch?

A. $(C_5H_{10}O_5)n$
B. $(C_5H_{10}O_6)n$
C. $(C_6H_{10}O_5)n$
D. $(C_6H_{12}O_6)n$

QUESTION 15

When a peptide bond is formed, which statement is correct?

A. One amino acid loses a hydroxyl group from its amine group.
B. One amino acid loses a hydroxyl group from its carboxyl group.
C. Both amino acids lose a hydrogen atom from their amine group.
D. Both amino acids lose a hydrogen atom from their carboxyl group.

QUESTION 16

Glycogen has a structure which is more similar to that of:

A. amylose of starch
B. amylopectin of starch
C. cellulose of cell wall
D. whole starch

QUESTION 17

The four main categories of macromolecules in a cell are

A. proteins, DNA, RNA, and steroids.
B. monosaccharides, lipids, polysaccharides, and proteins.
C. proteins, nucleic acids, carbohydrates, and lipids.
D. nucleic acids, carbohydrates, monosaccharides, and proteins.

QUESTION 18

In a hydrolysis reaction, _____, and in this process water is _____ .

A. A polymer breaks up to form monomers . . . Consumed
B. A monomer breaks up to form polymers . . . Produced
C. Monomers are assembled to produce a polymer . . . Consumed
D. A polymer breaks up to form monomers . . . Produced

QUESTION 19

At which levels of protein structure do ionic bonds occur?

1 Secondary 2 Tertiary 3 Quaternary

A. 1 and 2 only
B. 1 and 3 only
C. 2 and 3 only
D. 1, 2 and 3

QUESTION 20

Cellulose is a _____ made of many _____.

A. polypeptide . . . monomers
B. carbohydrate . . . fatty acids
C. polymer . . . glucose molecules
D. protein . . . amino acids

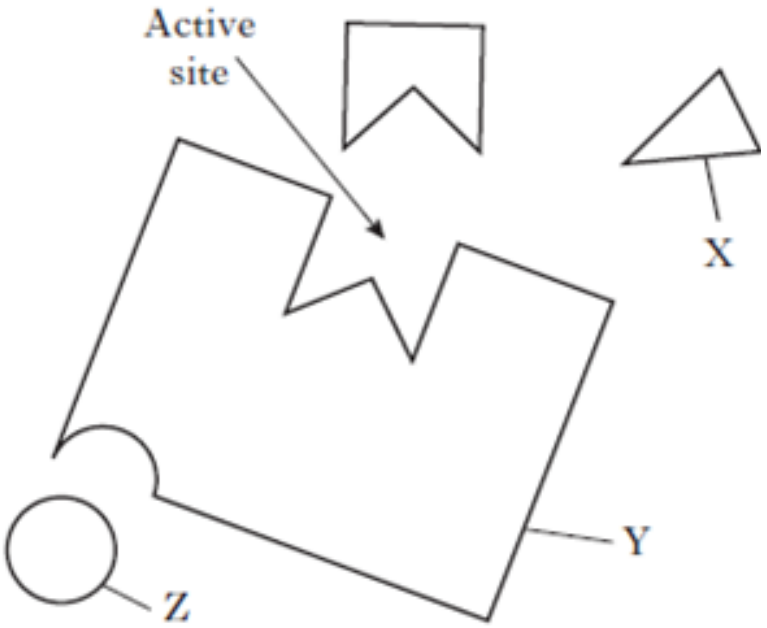
QUESTION 21

Which of the following ranks the molecules in the correct order by size?

A. Water . . . Sucrose . . . Glucose . . . Protein
B. Protein . . . Water . . . Glucose . . . Sucrose
C. Protein . . . Sucrose . . . Glucose . . . Water
D. Glucose . . . Water . . . Sucrose . . . Protein

QUESTION 22

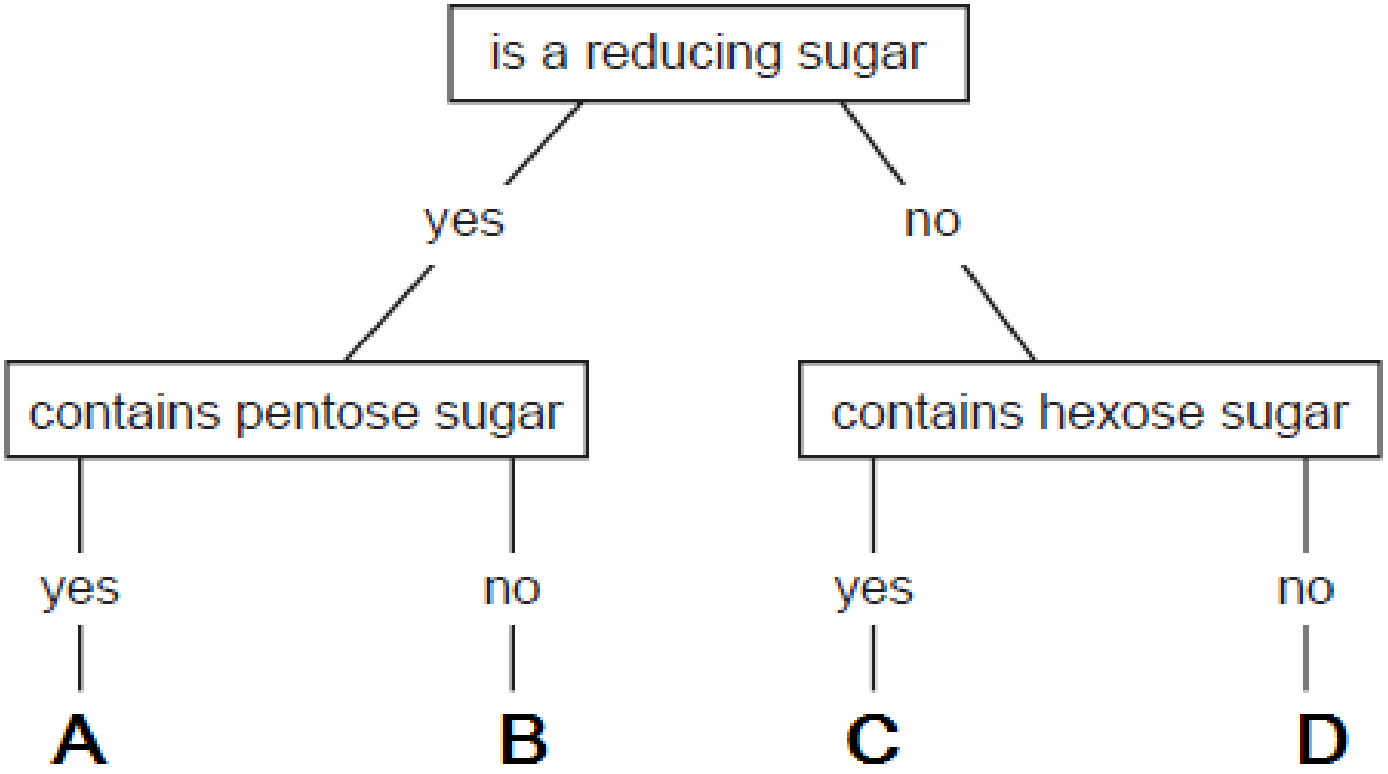
The diagram below represents the molecules involved in an enzyme reaction. Which line in the table correctly identifies the molecules?



	X	Y	Z
A	competitive inhibitor	enzyme	non-competitive inhibitor
B	competitive inhibitor	substrate	non-competitive inhibitor
C	non-competitive inhibitor	enzyme	competitive inhibitor
D	non-competitive inhibitor	substrate	competitive inhibitor

QUESTION 23

Which molecule in the key is sucrose?



QUESTION 24

Some foods contain ‘hydrogenated vegetable oils’. These are unsaturated fats that have been converted to saturated fats. Which property of the fats will have changed?

A. Their hydrocarbon chains will fit together more closely.
B. Their solubility in water will increase.
C. They will have more double bonds in their molecules.
D. They will remain liquid at room temperature.

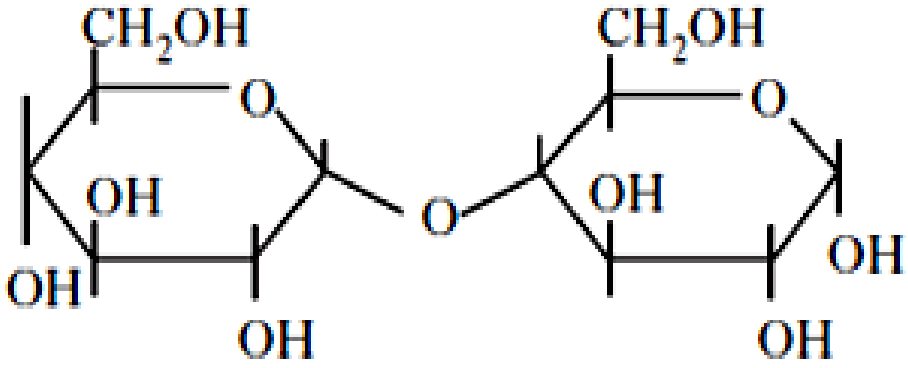
QUESTION 25

Which statement is true for cellulose, but not true for protein?

A. It is found in cell surface membranes.
B. It is synthesised from identical sub-units.
C. It is used as an energy source.
D. It may be a structural component.

QUESTION 26

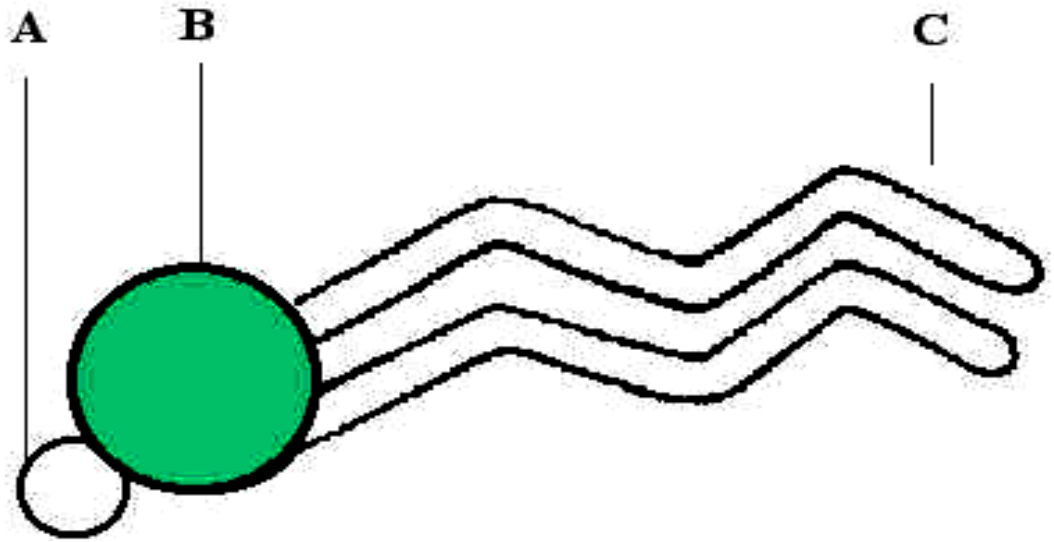
The diagram below shows the structure of a disaccharide sugar.



A. Name the disaccharide. ……
B. Nam the reaction that this sugar breaks down to monosaccharides. ……
C. Write chemical equation for this reaction. Name the enzyme involved.

QUESTION 27

The diagram represents a phospholipid molecule
Name the following parts of the molecule



A …… B ……

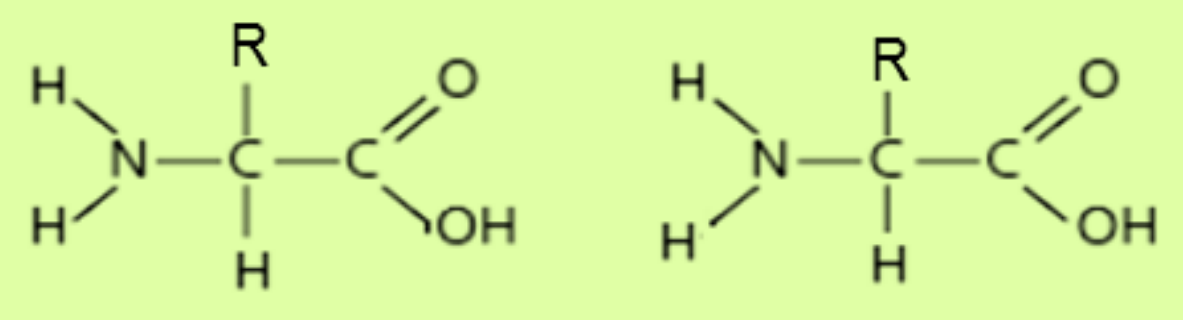
C ……

QUESTION 28 Put tick (√) or a cross (×)

Statement	Glucose	Starch	Amino acid	polypeptide	protein	lipid
Contains carbon						
Contains hydrogen						
Contains oxygen						
Contains nitrogen						
May contain sulphur						

QUESTION 29

The diagram below shows two amino acids



Name and show the product formed

QUESTION 30

What monomer sub-units make up each of the following carbohydrates?

A. Starch: ……

B. Sucrose: ……

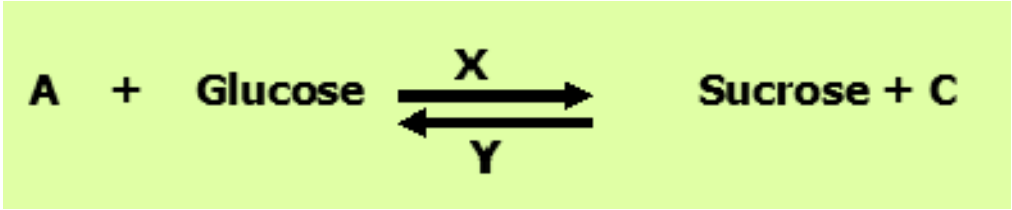
C. Lactose: ……

D. Triglycerides:……

E. Polypeptides: ……

QUESTION 31

The following reaction shows the formation of the disaccharide Sucrose.

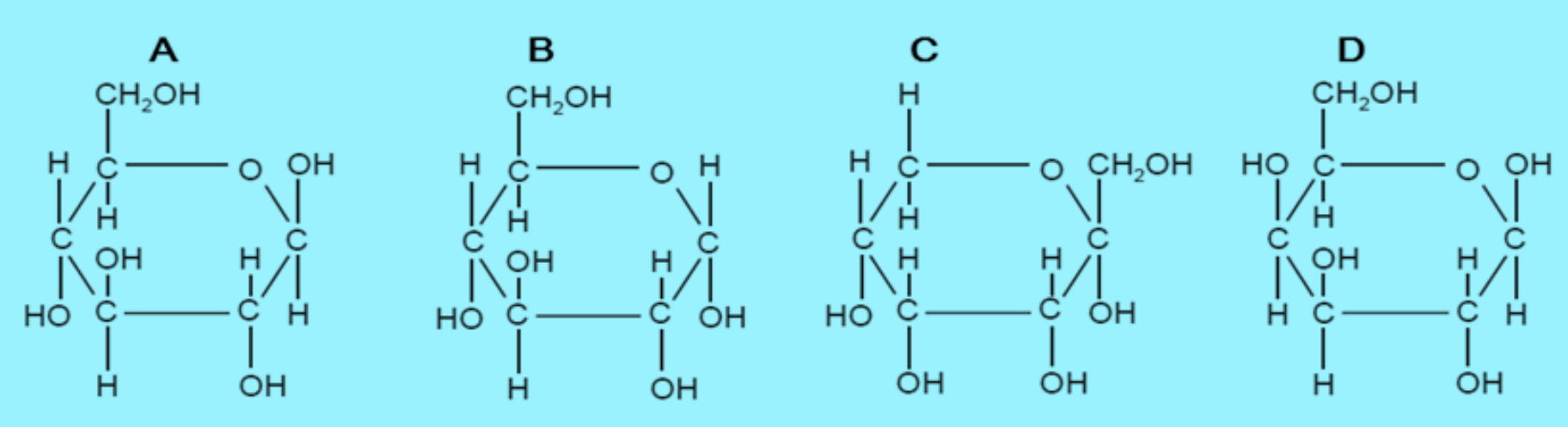


Which of the matches about the labels A, C, X and Y in the below table is correct?

	A	C	X	Y
A	Glucose	Water	Condensation	Hydrolysis
B	Fructose	Glucose	Condensation	Hydrolysis
C	Water	Glucose	Hydrolysis	Condensation
D	Fructose	Water	Condensation	Hydrolysis

QUESTION 32

Which of the following structures shows *α*-glucose?



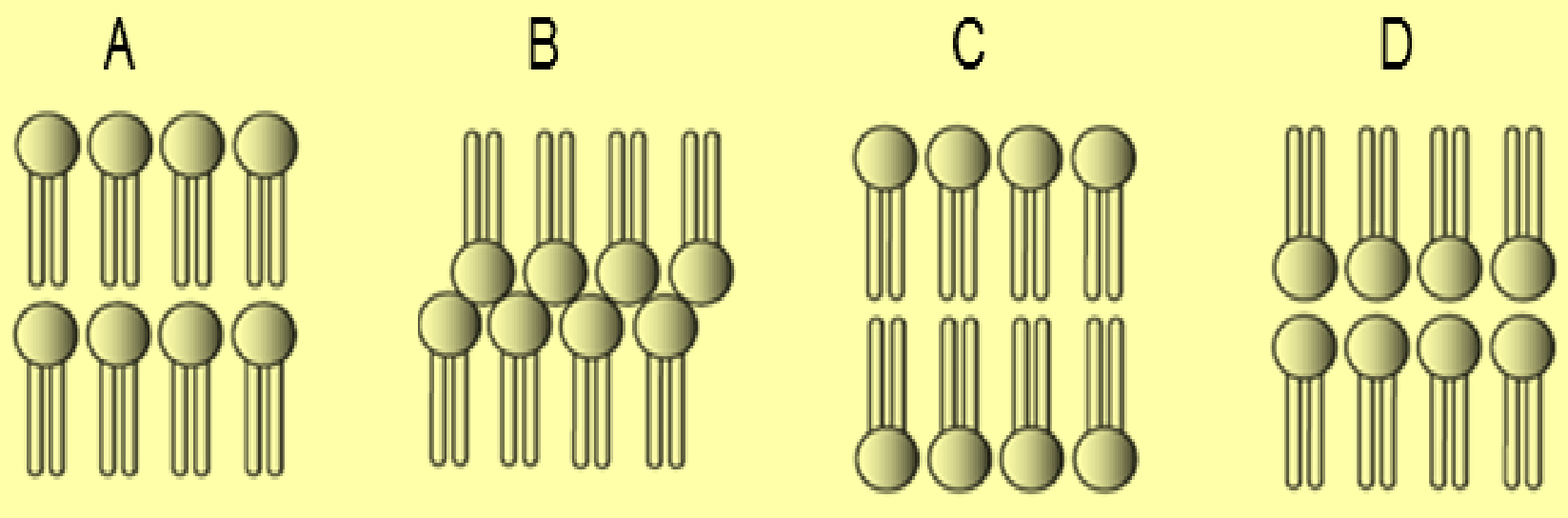
QUESTION 33

What is the function of nucleoli?

A. The formation and breakdown of the nuclear envelope.
B. The formation of centromeres.
C. The formation of ribosomes.
D. The organization of the spindles.

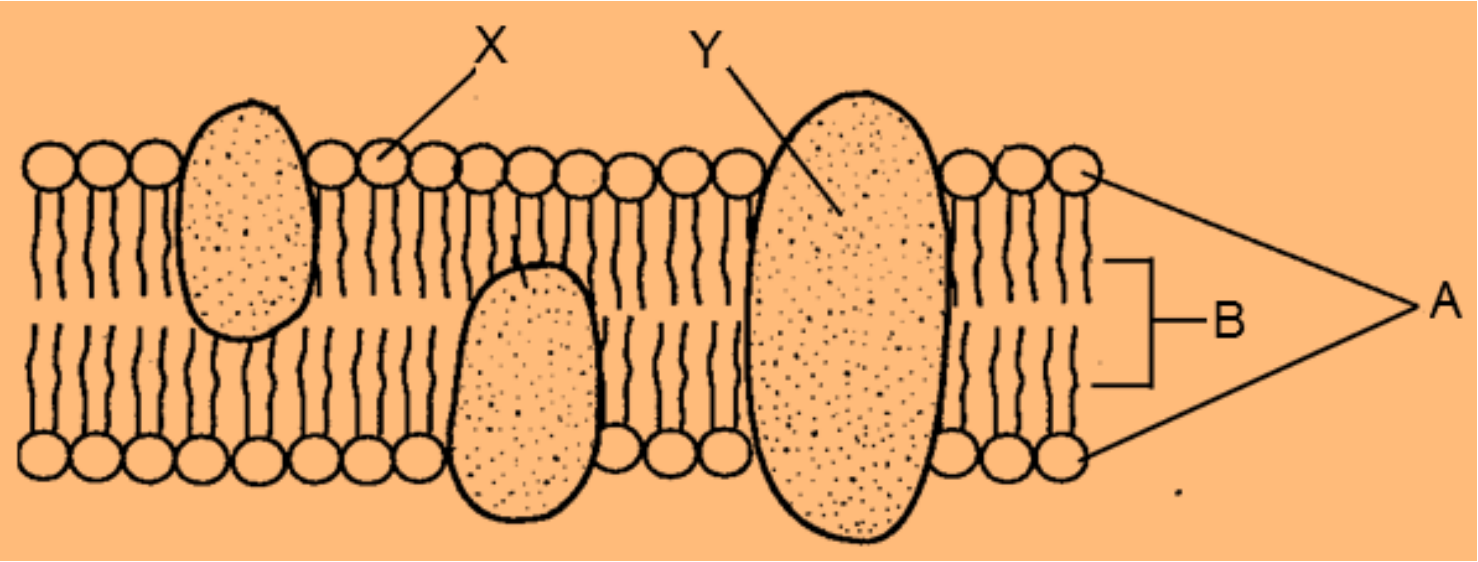
QUESTION 34

What is the correct arrangement of phospholipids in a plasma membrane?



QUESTION 35

The diagram below represents the fluid mosaic model of a cell membrane.



A. Name the parts of the cell membrane labeled X and Y.
B. State the properties of the membrane regions A and B.
C. On the basis of permeability, how is the cell membrane different from the cell wall?
D. Describe the meaning of fluid mosaic model.

SOLUTION FOR QUESTION 35

QUESTION 36

Which of the following is not found in all cells?

A. Genetic material
B. Cell membrane
C. Vacuoles
D. Cytoplasm

QUESTION 37

These organic compounds are found floating around in a sea of phospholipids. They are sometimes channels or pumps for moving substances in and out of the cell.

A. Carbohydrates
B. Proteins
C. Nucleic acids
D. Lipids

QUESTION 38

Which of the following cell organelles contain DNA?

A. Ribosomes
B. Golgi body
C. Mitochondria
D. Endplasmic reticulum (ER)

QUESTION 39

All living cells have

A. DNA
B. cytoplasm
C. nucleus
D. Plasma membrane

QUESTION 40

What is the function of the plasma membrane?

A. Makes proteins and lipids
B. Produces ATP
C. Gives the cell shape, protection, and regulates transport
D. Manufactures and assembles the ribosomes

QUESTION 41

What are the function and location of **cilia** and **flagella**?

A. Plasma membrane, help mobilize cell
B. Outside of cell, connect two cells
C. Cytoplasm, movement
D. Cell wall, communication

QUESTION 42

What organelles are associated with cell division function?

A. Centrioles
B. DNA
C. Ribosomes
D. ER

QUESTION 43

The main function of the cell wall is to

A. store DNA
B. support and protect the cell
C. help the cell move
D. direct the activities of the cell

QUESTION 44

Which molecular bonds will be broken by hydrolysis when a molecule of glycogen is converted to glucose?

	bonds		
	1,2	1,4	1,6
A	✓	✗	✗
B	✗	✓	✓
C	✓	✗	✓
D	✗	✓	✗

key

✓ = broken

✗ = unbroken

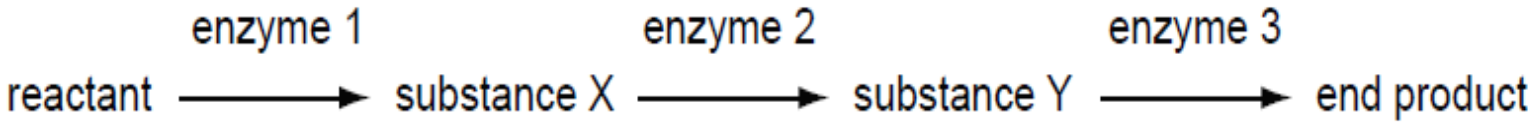
QUESTION 45

Which of the following terms is least like the others in the list below?

A. Phospholipid
B. Glycogen
C. Disaccharide
D. Starch

QUESTION 46

The diagram shows a metabolic pathway.

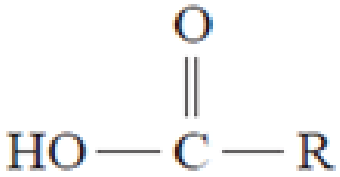


What would be the effect of adding a small amount of a non-competitive inhibitor of enzyme 2?

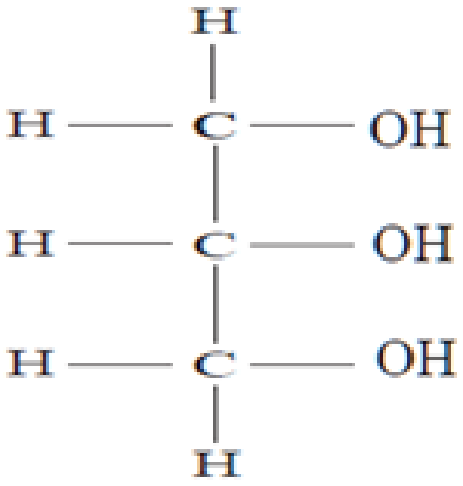
A. Enzyme 3 would be denatured.
B. Substance X would increase in concentration.
C. Substance Y would no longer be formed.
D. The initial reactant would no longer be metabolized.

QUESTION 47

The diagram below shows the formulae of a fatty acid and glycerol.



fatty acid



glycerol

Show and describe the reaction between fatty acids and glycerol to form lipid molecule.

SOLUTION FOR QUESTION 47

QUESTION 48

Which properties are characteristic of a non-competitive inhibitor of an enzyme?

	binding	effect of adding more substrate
A	at active site	reduces inhibition
B	at active site	does not reduce inhibition
C	not at active site	reduces inhibition
D	not at active site	does not reduce inhibition

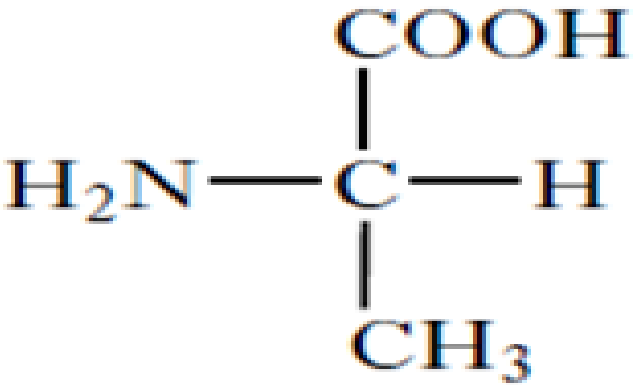
QUESTION 49

Complete the table below by ticking (√)

	Plants	Bacteria	Animals	Amoeba
Prokaryotic cell				
Eukaryotic cell				
Cell wall present				
Membranous organelles				
Unicellular				
Chromosome				

QUESTION 50

The diagram below represents the structure of the amino acid alanine.

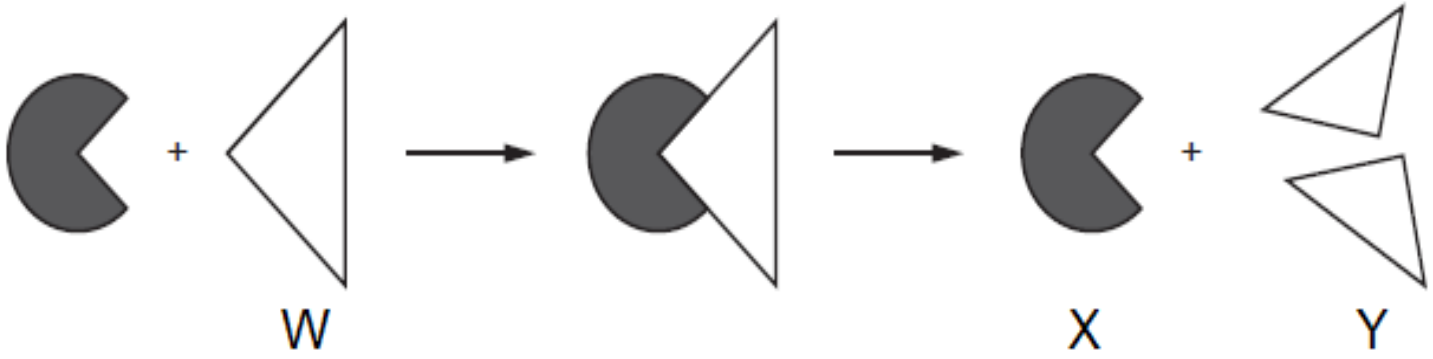


In this diagram, the R group has the composition

A. -H
B. -NH2
C. -CH3
D. -COOH.

QUESTION 51

The diagram represents enzyme action.



What are parts W, X and Y in this chemical reaction?

	enzyme	product	substrate
A	W	X	Y
B	X	W	Y
C	X	Y	W
D	Y	W	X

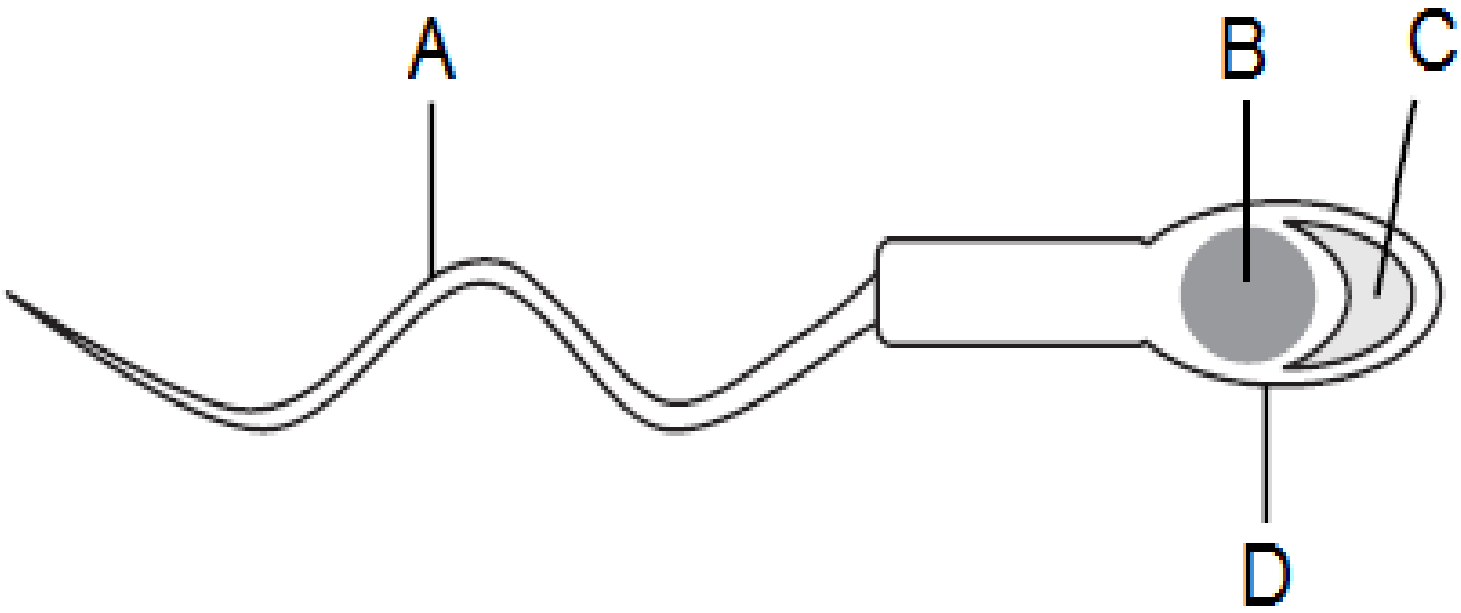
QUESTION 52

White blood cells, plant cells and prokaryotic cells all contain

A. a nucleus
B. Golgi apparatus
C. ribosomes
D. smooth endoplasmic reticulum

QUESTION 53

The diagrams below show a human sperm cell. Which letter represents the structure that contains a genetic material?



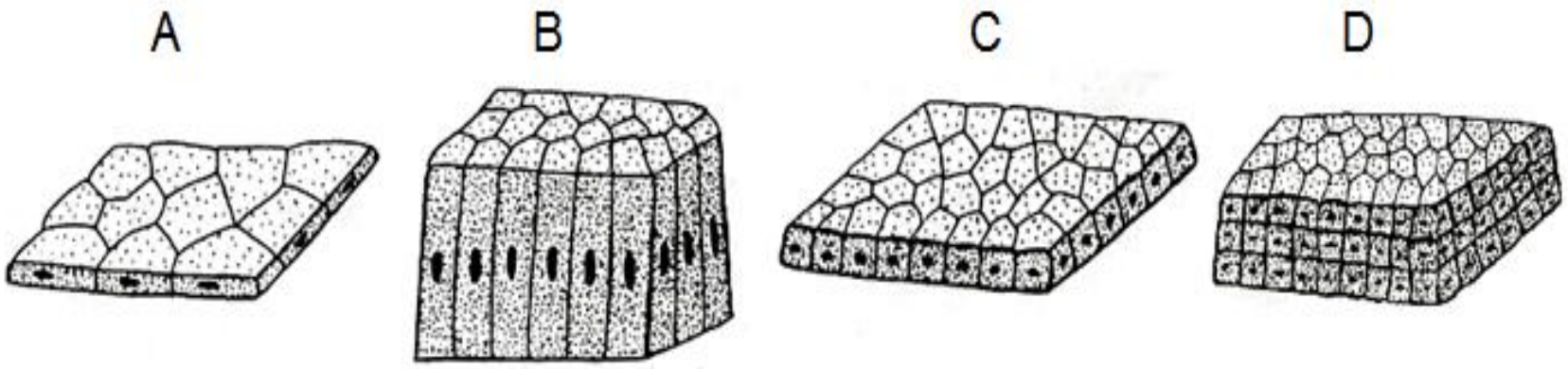
QUESTION 54

Which of the cell structures below is NOT found in Prokaryotic cells?

A. Ribosome
B. Nucleus
C. Cell membrane
D. Chromosome

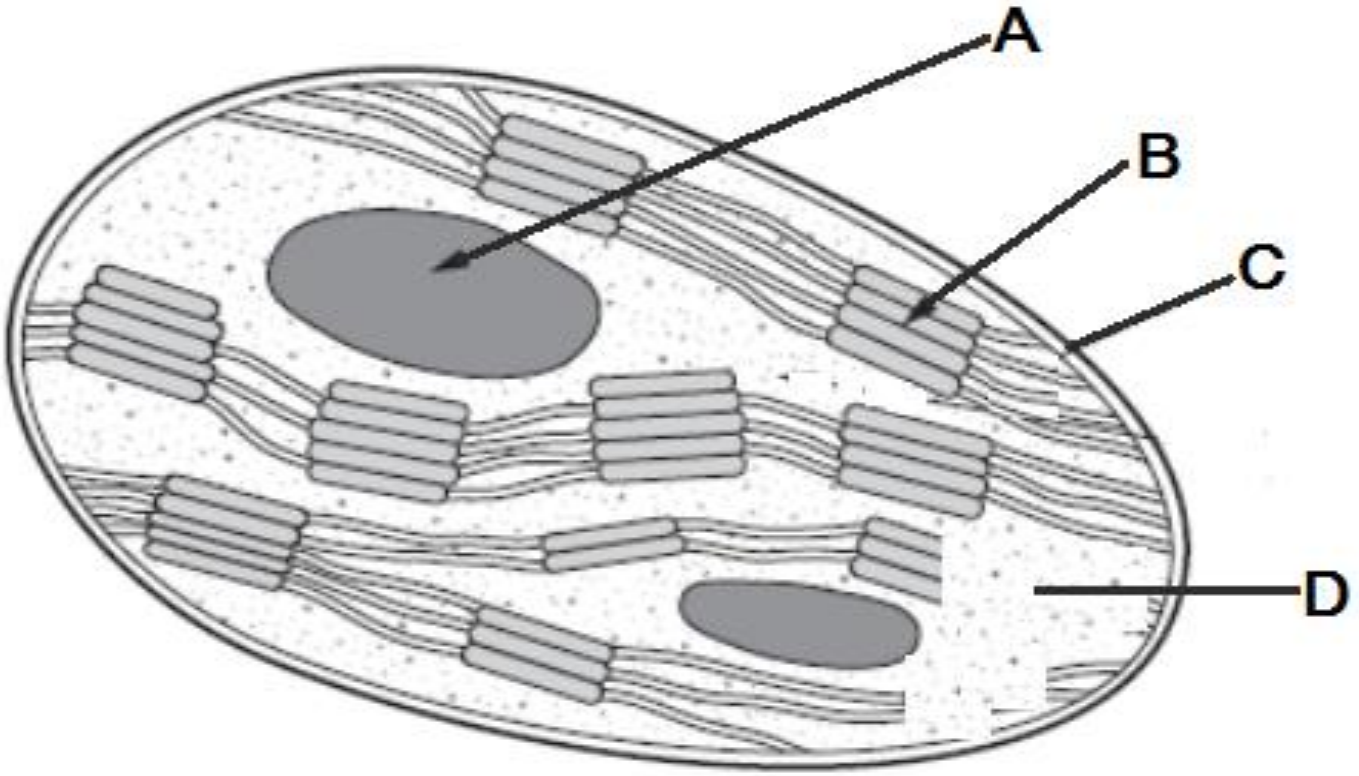
QUESTION 55

The figures below show animal epithelia. Which epithelium is a **simple squamous epithelium**?



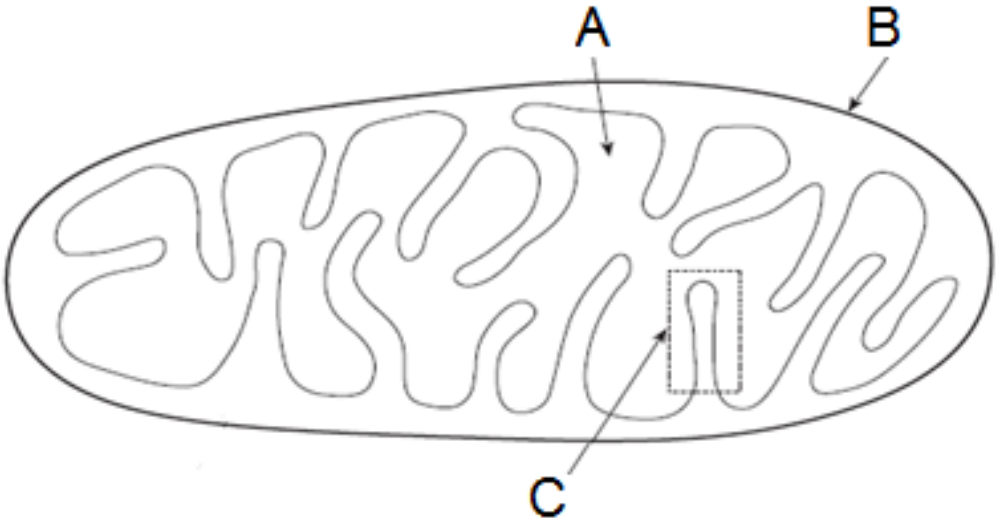
QUESTION 56

The diagram below shows a chloroplast. In which region does the **dark-reaction** occur?



QUESTION 57

The diagram shows a mitochondrion.



A. Name the structures labeled A, B, and C on the diagram.
B. Name the main molecule that is synthesized in this organelle.
C. What is the function of the part labeled C?