**Multiple Choice Section**

Question 1.

Some animals cough up food where it is chewed again and then re-swallowed. Animals most likely to do this are

A. carnivores.

B. omnivores.

C. foregut fermenters.

D. hindgut fermenters.

Question 2.

The part of the human digestive tract that is the most acidic is the

A. small intestine.

B. large intestine.

C. stomach.

D. caecum.

Question 3.

Which of the following is an example of an autotroph?

A. A bracket fungus growing from the trunk of a eucalypt.

B. A bacterium in the gut of a mammal.

C. A moss growing on a log in a rainforest.

D. A kangaroo eating grass in a paddock.

Question 4.

The cell that is specialised to transport oxygen to the various tissues in a mammal is

A. haemoglobin.

B. a red blood cell.

C. a white blood cell.

D. blood plasma.

*Use the following information to answer Questions 5 and 6.*

The photograph below shows the skull of a mammal.



Question 5.

It would be reasonable to assume that this animal

1. ate large amounts of plant food.
2. had a high proportion of meat in its diet.
3. had molar teeth suitable for slicing food.
4. was a foregut fermenter.

Question 6.

The dental formula of this animal is 3 1 4 3  
 3 0 3 3

From the dental formula, it can be concluded that in the complete skull of this mammal there would be

1. two canine teeth.
2. four canine teeth.
3. six canine teeth.
4. twelve canine teeth.

Question 7.

The element carbon is present in

1. carbohydrates and lipids but not proteins.
2. carbohydrates and proteins but not lipids.
3. proteins and lipids but not carbohydrates.
4. proteins, carbohydrates and lipids.

Question 8.

By what process does carbon dioxide enter a leaf from the atmosphere?

1. Simple diffusion.
2. Osmosis.
3. Active transport
4. Exocytosis.

Question 9.

Starch in food molecules is digested to

1. fatty acids and glycerol.
2. amino acids.
3. simple sugars.
4. ammonia.

Question 10.

In aerobic respiration,

1. oxygen is a by-product
2. carbon dioxide is a reactant
3. glucose is consumed
4. lactic acid is produced

Question 11.

In photosynthesis,

1. chlorophyll is converted to glucose
2. oxygen combines with carbon dioxide to form a carbohydrate
3. water and carbon dioxide are produced as waste products
4. light energy is trapped by chlorophyll and converted to chemical energy

Question 12.

The original source of energy in the sugars found in honey comes from

1. the sun
2. bees
3. the flowers that made the nectar
4. respiration

Question 13.

The cells of the body produce toxins. One such toxin is hydrogen peroxide. This substance is broken down to harmless substances by the enzyme hydrogen peroxidase in the

1. heart
2. kidneys
3. stomach
4. liver

Question 14.

Wombats, shown opposite, eat foods containing lots of fibre.

[](http://images.google.com/imgres?imgurl=http://www.artistcollectables.com.au/wombats.jpg&imgrefurl=http://www.artistcollectables.com.au/recentworks.htm&usg=__JqQ8LGLgr8JCs267aV1Oy83eflA=&h=745&w=1000&sz=238&hl=en&start=20&um=1&tbnid=mD2NONCxPNj4bM:&tbnh=111&tbnw=149&prev=/images?q=wombats&gbv=2&ndsp=18&hl=en&sa=N&start=18&um=1)

A food with lots of fibre would be

1. insects
2. tree roots
3. mice
4. milk

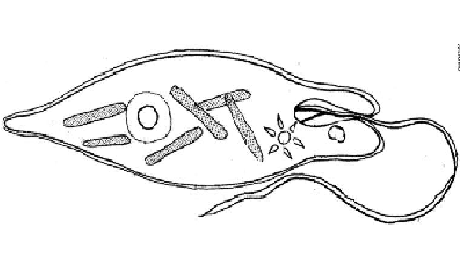
*Refer to the following information to answer questions 15-17.*

## The picture below shows a single celled organism from a pond that was observed using a light microscope under a magnification of X400.

Chloroplast

Contractile vacuole

Nucleus



Red eye spot

Flagellum

20 um

Question 15

The length of this organism (not including the flagellum) is approximately

1. 20 um
2. 40 um
3. 80 um
4. 400 um

Question 16

It would be reasonable to conclude that the organism would

1. carry out both photosynthesis and respiration.
2. carry out photosynthesis but not respiration.
3. carry out respiration but not photosynthesis.
4. carry out neither photosynthesis nor respiration.

Question 17

The presence of a contractile vacuole would indicate that it

1. lives in freshwater and pumps out excess water using ATP.
2. lives in freshwater and pumps out excess water using ADP.
3. lives in saltwater and pumps out excess water using ATP.
4. lives in saltwater and pumps out excess water using ADP.

Question18

A student observed a letter from a piece of newsprint under a light microscope. As the student looked down the microscope, the letter appeared as shown below.

G

A second student took the slide off the microscope and looked at the symbol as it appeared on the glass slide. To the second student, the symbol would appear as









1. B. C. D



Question 19

The molecule shown opposite is a

1. phospholipid.
2. nucleotide.
3. triglyceride.
4. lipase.

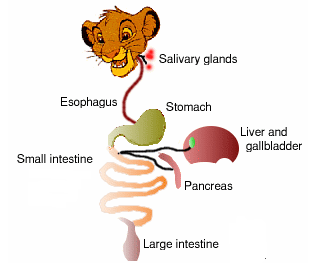
Question 20

A cell was observed to have a nucleus, mitochondria but no chloroplasts. Which of the following can be concluded from this observation?

1. The cell could be an animal cell but not a plant cell.
2. The cell could be a plant cell but not an animal cell.
3. The cell could be prokaryotic.
4. The cell could be a plant or animal cell.

Question 21

The diagram below shows the digestive tract of a lion.



It would be reasonable to conclude that

1. lions would be hindgut fermenters.
2. lions would absorb most of the products of digestion through their small intestine.
3. the stomach of a lion would have a high pH.
4. the liver of the lion would carry out fermentation using bacteria.

*Refer to the following information to answer Questions 22 and 23*

The diagram below shows the action of cellulase on cellulose in the digestive system of a termite.

Question 22

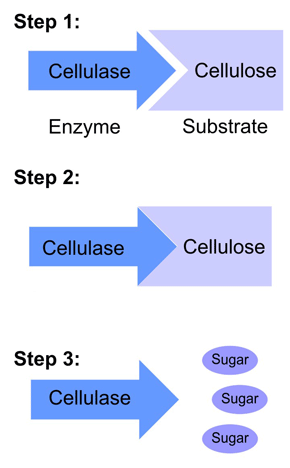
In the diagram shown opposite, the substrate molecule is

1. cellulose.
2. cellulase.
3. sugar.
4. an enzyme.

Question 23

Which of the molecules would be denatured if temperatures exceeded 45 degrees Celsius?

1. cellulose.
2. cellulase.
3. sugar.
4. all of the above.



Question 24.

A cell in the root tip of an onion plant was dividing. The amount of DNA in the cell was measured at the beginning of this process and at the end when two cells had been formed. Figure 3 shows the results of this analysis. Four stages have been labelled.

4

Amount of DNA in cell

(arbitrary units)

2

# Figure 3

Time

M N P Q

The G1 phase of the cell cycle would occur during

1. Stage M.
2. Stage N.
3. Stage P.
4. Stage Q.

Question 25.

The cell shown opposite is undergoing mitosis.



The stage of mitosis shown is

1. telophase.
2. metaphase.
3. anaphase.
4. prophase.

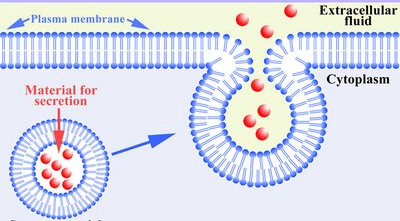
Question 26.

A biology student saw cytoplasmic streaming occurring in cells of Canadian pondweed (Elodea). In this process,

1. chloroplasts move into and out of the large central vacuole of the cell.
2. the cytoplasm shrinks and the cell membrane pulls away from the cell wall.
3. chloroplasts move in the cytoplasm surrounding the vacuole.
4. the cell absorbs water and becomes turgid.

*Refer to the following information to answer Questions 27 and 28.*

The diagram below shows a cellular process occurring in an animal cell.



Substance Y

Structure X

Question 27.

Which organelle would have produced Structure X?

1. A mitochondrion.
2. The Golgi Complex.
3. The Endoplasmic Reticulum.
4. A ribosome.

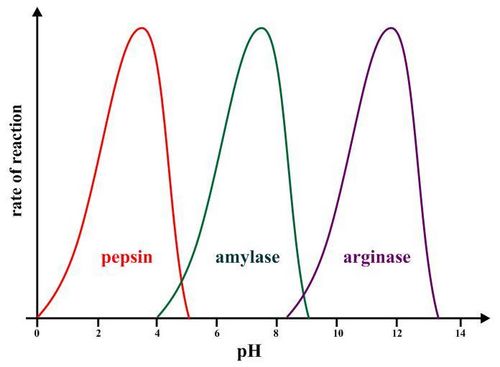
Question 28.

Substance Y is most probably

1. water.
2. starch
3. a phospholipid.
4. a protein.

Question 29.

The graph below shows the activity of three different enzymes with changing pH.



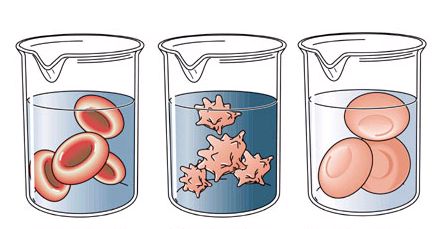
From the graph and your own knowledge, it can be concluded that

1. arginase would be active in the stomach of a mammal.
2. amylase would digest lipids.
3. pepsin would be active in an alkaline part of the digestive tract.
4. the active sites of all three enzymes are affected by changes in pH.

Question 30.

The figure below shows red blood cells after they have been put into three glucose solutions of different concentrations.

# Beaker A Beaker B Beaker C



Cells Normal Cells Shrunken Cells Swollen

Based on the diagram above, which of the following statements is true?

1. Beaker A is the most concentrated and Beaker B is the least concentrated.
2. Beaker B is the most concentrated and Beaker C is the least concentrated.
3. Beaker C is the most concentrated and Beaker A is the least concentrated.
4. Beaker C is the most concentrated and Beaker B is the least concentrated.

Question 31.

The diagram below shows a cell as seen under the microscope. The diameter of the field of view of the microscope is 450 um.

# Cell

The approximate length of the cell is

1. 450 um.
2. 45 um.
3. 150 um.
4. 300 um.

Question 32.

A biomacromolecule was found to contain the following elements: carbon, hydrogen, oxygen, nitrogen and sulphur. The molecule could be a

1. protein.
2. carbohydrate.
3. nucleic acid.
4. phospholipid.

Question 33.

Chlorophyll is a key molecule found in photosynthetic cells of plants. The structure of this molecule shows that it contains the element magnesium. A plant would be expected to obtain magnesium by

1. making it when it carries out photosynthesis.
2. absorbing it as a mineral ion from the soil.
3. diffusion through the stomata.
4. respiration in the mitochondria.

Question 34.

Plants that have inadequate amounts of magnesium would be expected to have

1. a reduced rate of growth.
2. dark green leaves.
3. large reserves of stored starch.
4. large numbers of chloroplasts.

Question 35.

A student examined four different, appropriately stained cells with a light microscope. The four cells were:

A white blood cell

Paramecium

A photosynthesizing cell

An onion epidermal cell.

For each cell, it would be reasonable to expect the student to be able to see

**A.** chromosomes.

**B.** chloroplasts.

**C.** vacuoles.

**D.** a nucleus.

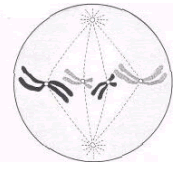
Question 36.

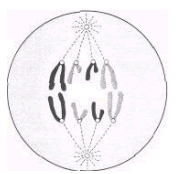
When glucose is respired anaerobically in animals the following are produced.

1. Alcohol, carbon dioxide and energy.
2. Lactic acid, carbon dioxide and energy.
3. Lactic acid and energy.
4. Carbon dioxide, water and energy.

*Use the following information to answer questions 37 to 39.*

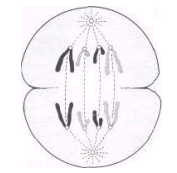
The diagrams below show different stages of cell replication.





W X





Y Z

Question 37.

The correct sequence for cells undergoing cell replication is

1. W, Y, X, Z.
2. X, Y, W, Z.
3. Z, W, X, Y.
4. Y, W, Z, X.

Question 38.

Cytokinesis is evident in cell

1. W.
2. X.
3. Y.
4. Z.

Question 39.

The cells shown in the diagram could be from

1. an animal.
2. a plant.
3. a bacterial colony.
4. a fungus.

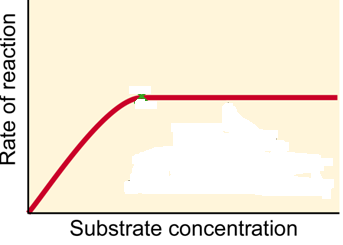
Question 40.

Chloroform and alcohol are both lipid soluble. They would be expected to pass through the cell membrane via

1. the phospholipid bilayer.
2. a protein channel.
3. exocytosis.
4. endocytosis.

Question 41.

An experiment was carried out on the rate of activity of an enzyme with increasing substrate concentration. Enzyme concentration and temperature were constant during the experiment. The results for the experiment are shown in the graph below.



X

At point X on the graph, it would be expected that

1. all the enzyme would have been used up.
2. the reaction is proceeding at a constant rate.
3. the enzyme has become denatured.
4. substrate concentration is the limiting factor.

Question 42.

Energy must be available for cells for a variety of processes. The immediate source of energy used by cells in humans is

1. ATP.
2. ADP.
3. Water
4. Oxygen

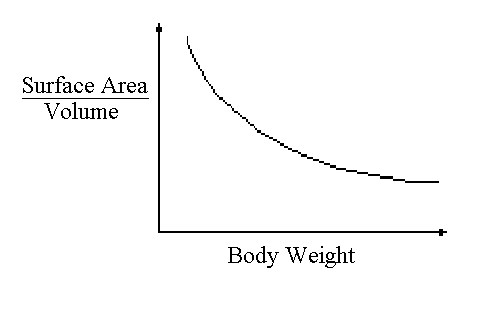
Question 43.

## Cancer is the uncontrolled growth of cells that have lost their original function. A suitable drug to control a cancerous growth should

1. kill all cells in the body that are undergoing cell replication.
2. kill all cells that have lost the ability to divide.
3. promote the growth of non-cancerous cells.
4. stimulate cancerous cells to undergo cell death (apoptosis).

Question 44.

The graph below shows the relationship between the surface area to volume ratio and the weight of animals.



## From this graph and your own knowledge it can be concluded that

## a baby elephant would have a lower surface area to volume ratio than an adult elephant.

## larger animals are better adapted than smaller animals.

## small koalas would be better adapted to cold environments than large koalas.

1. as body weight increases, surface area to volume ratio decreases.

Question 45.



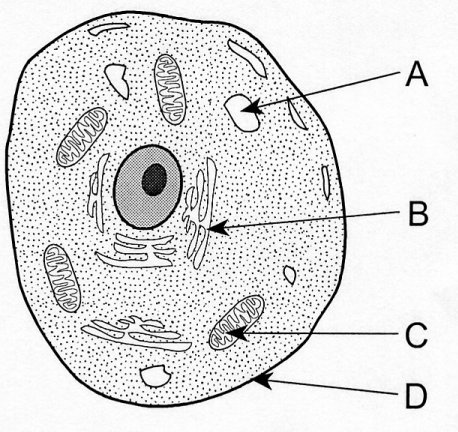
The number of stomata shown in the diagram is

1. eight.
2. sixteen.
3. thirty-two.
4. zero.

## Short Answer Section

Question 1.

The drawing below shows an animal cell.



E

a. In the box below, name each structure and briefly state its function.

|  |  |  |
| --- | --- | --- |
| **Structure** | **Name of Structure** | **Function of Structure** |
| **A** |  |  |
| **B** |  |  |
| **C** |  |  |
| **D** |  |  |
| **E** |  |  |

**(5 marks)**

b. Name the two main organic compounds that would be found in Structure D.

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1 mark)**

c. Would you expect the gas oxygen to be diffusing into or out of Structure C. Justify your answer.

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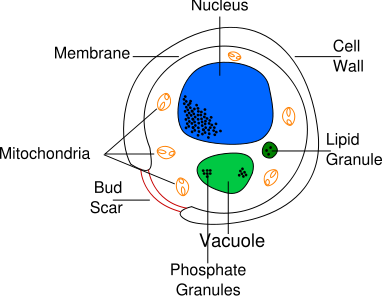
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**(1 mark)**

**Total = 7 marks**

Question 2.

The following diagram shows a yeast cell.



1. Yeasts are a type of fungus. Name a structural feature of a yeast cell that

makes it more like a plant cell than an animal cell.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1 mark)**

Yeast cells are capable of both aerobic and anaerobic respiration. Two cultures of yeast cells (A and B) were set up in flasks. Equal numbers of yeast cells were placed in both. In Flask A, oxygen was excluded while in Flask B oxygen was actively bubbled through the culture.

1. Apart from the number of cells in each flask, name two other factors that need to be controlled (kept constant) in this experiment.

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**(2 marks)**

1. Write a balanced chemical equation for the energy producing reaction taking place in Flask B.

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**(2 marks)**

After 24 hours, the number of yeast cells was determined in each flask.

1. In which flask, A or B, would you expect the number of yeast cells to be greater? Justify your answer.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**(2 marks)**

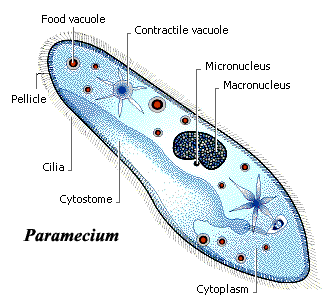
1. What substance would you expect to find in Flask A that would not be present in Flask B?

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**(1 mark)**

**Total = 8 marks**

Question 3.



The drawing above shows Paramecium, a single-celled organism. Paramecium contains a contractile vacuole. These organelles expel excess water that enters the cell, thereby maintaining the volume of the cell.

1. In which environment, high solute concentration or low solute concentration, would water enter these cells from their environment?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1 mark)**

1. i. By what process does water enter *Paramecium*?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1 mark)**

ii. If the *Paramecium* died, would the process mentioned in part b.i. still occur? Explain.

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**(2 marks)**

1. If the concentration of ions inside the cell was the same as outside the cell, would there still be movement of water? Explain.

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**(1 mark)**

1. Paramecium usually has large numbers of mitochondria surrounding the contractile vacuole. Suggest an explanation for this.

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**(1 mark)**

1. The drawing at the start of this question shows several food vacuoles. Explain how these structures would form.

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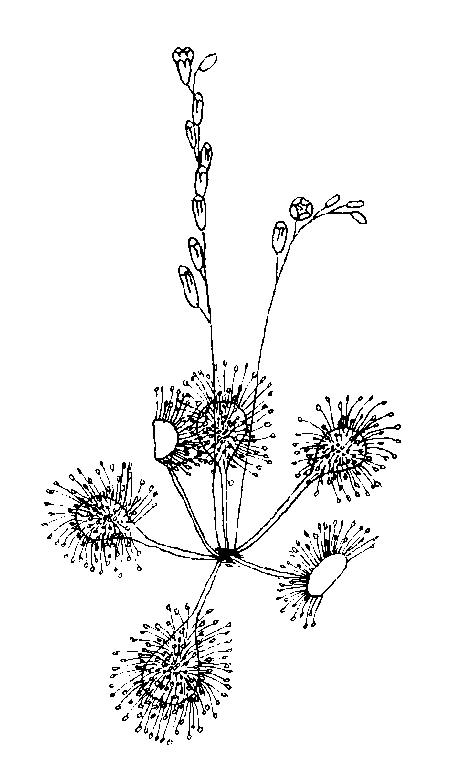
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**(2 marks)**

**Total = 8 marks**

Question 4.



The drawing opposite is of an insectivorous plant called a sundew. It supplements its nitrogen intake by trapping insects on specialised leaves and digesting their protein using an enzyme. The specialised leaves have small hairs covering them which glistens and gives the appearance of dew.

1. What is protein digested to?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(1 mark)**

1. From where would most plants obtain their nitrogen?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(1 mark)**

1. Protein digestion in mammals occurs much faster than it does in sundews. Suggest a reason for this.

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**Total = 3 marks**

Question 5.

1. What is a diastema?

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**(1 mark)**

The Sumatran rhinoceros has the following dental formula:

**1 0 3 3**

**0 1 3 3**

b. Suggest its likely diet. Justify your answer.

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1. **mark)**

c. Describe the probable shape of the molars of this rhinoceros. Justify your

answer.

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**(2 marks)**

1. How many teeth would there be in the skull of a Sumatran rhinoceros?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1 mark)**

The skull shown opposite is from a

hyaena.

1. Suggest whether the animal is a

carnivore, omnivore or herbivore. Justify your

answer.

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**(2 marks)**

**Total = 7 marks**

Question 6.

The following diagram shows two important cellular processes.

**Process 1**

**Inputs Outputs**

Oxygen

Substance B

Carbon dioxide

Substance A

**Inputs Outputs**

Oxygen

Substance C

Carbon dioxide

Substance D

**Process 2**

1. i. Name Process 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ii. Name Process 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(2 marks)**

1. i. Name Substance A. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ii. Name Substance B. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

iii. Name Substance C. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

iv. Name Substance D. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(2 marks)**

1. i. Name a cell type that would carry out Process 1.

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i. In what part of a cell would you expect Process 1 to occur?

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**(2 marks)**

1. Why do cells carry out Process 2?

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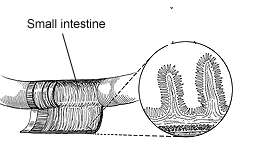
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**(2 marks)**

**Total = 8 marks**

Question 7.

The drawing below shows the finger-like projections of the small intestine.



1. What name is given to these finger-like projections?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1 mark)**

1. What purpose do they serve in the small intestine? In your answer include how their structure aids their function

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**(2 marks)**

1. Coeliac’s disease is a disorder where the body’s immune system destroys these finger-like projections. What effect would this have on a person who suffers from this disease?

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**(1 mark)**

**Total = 4 marks**

Question 8.

Carbohydrates are an important biomacromolecule found in all cells. Carbohydrates can be monosaccharides, disaccharides or polysaccharides.

1. How does a monosaccharide differ from a polysaccharide?

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**(1 mark)**

The shape below represents a monosaccharide.

1. In the space below, draw how a disaccharide would appear.

**(1 mark)**

1. Name two polysaccharides that you have studied this year. Indicate the role that each of these polysaccharides performs in a cell.

|  |  |
| --- | --- |
| **Name of Polysaccharide** | **Role of Polysaccharide** |
|  |  |
|  |  |

**(2 marks)**

1. Name the elements that make up carbohydrates.

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**(1 mark)**

**Total = 5 marks**

**END OF TASK**