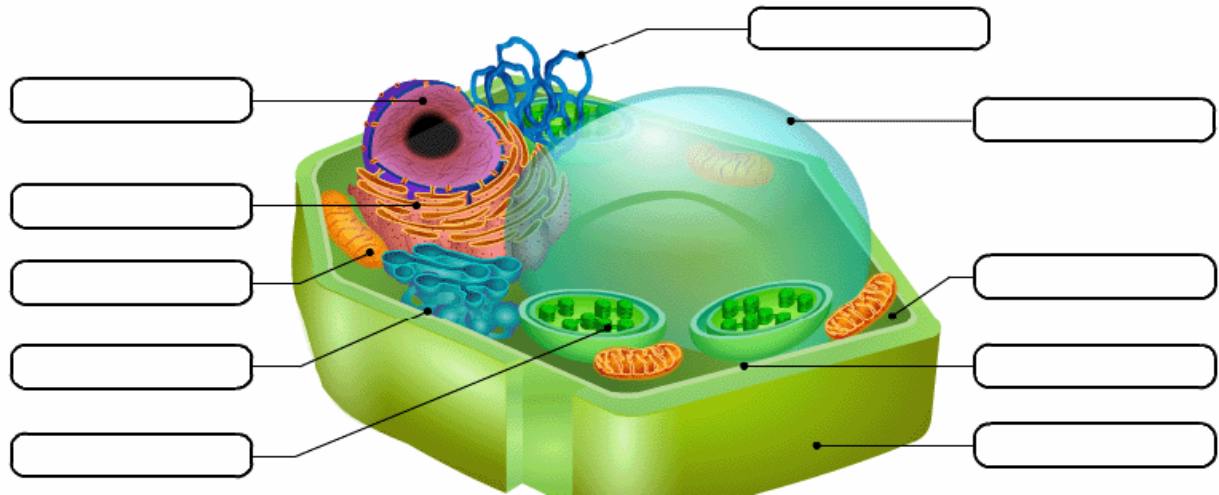


CHAPTER 2: CELL STRUCTURE AND CELL ORGANISATION


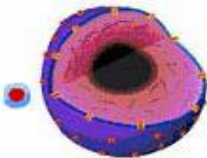
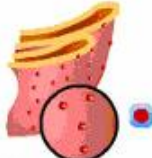



2.1 Cell Structure And Function

Activity 1 : Label the parts of a plant cell.



Activity 2 :

Match the following organelles with the correct functions



 Lysosomes	<p>Transports products of the ribosomes, that is, proteins from one part of the cell to another part of the cell</p> <p>Sites of protein synthesis</p> <p>The place where metabolic reaction of the cell takes place</p> <p>Vesicles that contain hydrolytic enzymes</p> <p>Involved in the synthesis of lipids and cholesterol</p> <p>Accepts vesicles from the endoplasmic reticulum, modifies the contents and distributes the products to other parts of the cell or to the cellular environment</p> <p>Controls and coordinates all cellular activities</p> <p>Produces energy for the chemical reactions of the cell</p>	 Nucleus
 Ribosome		 Mitochondrion
 Rough Endoplasmic Reticulum		 Golgi apparatus

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Activity 3

Complete the graphic organizer below to compare and contrast both cells.

Similarities		
		
Differences		
Animal cell	Structure	Plant cell
	Shape	
	Cell wall	
	Vacuoles	
	Chloroplast	
	Food storage	

2.2 Cell Organisation

Activity 4

Figure 1 shows four levels of cell organization in humans.

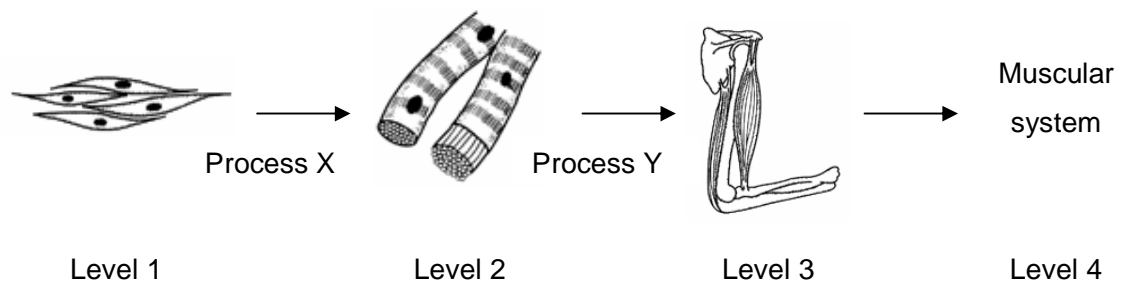


Figure 1

(a) Complete the table below by naming Level 2 and Level 3.

Level	Name
1	Cells
2	
3	
4	System

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(b) Name the process X and Y:

Process X : _____

Process Y : _____

Structured items

Answer all questions. Write your answer in the spaces provided in the question paper.

1. Table1 shows the relationship between the density of certain organelles found in a specific cell.

Types of cell	Organelles found abundantly
Flight muscle cells in insects and birds.	X
Pancreatic cells	Y

Table 1

(a) (i) Name organelles X and Y

Organelle X:

Organelle Y :

[2 mark]

(ii) State the function of each organelles found in each specific type of cell.

Function of organelle X :

Function of organelle Y :

: [2 mark]

Figure2 shows some cells from the stem of a plant seen in cross section.

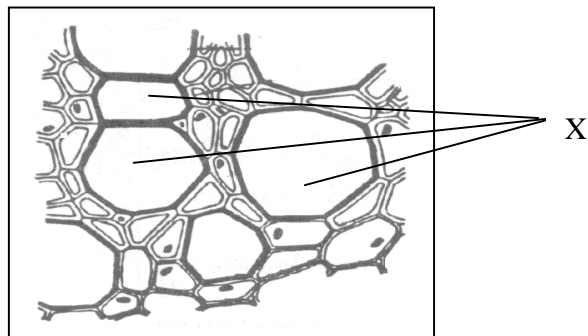


Figure2

(b) (i) What type of tissue is shown at X?

.....

[1 mark]

(ii) State two functions of this tissue.

[1 mark]

(iii) State one way in which the cells of tissue X are adapted to carry out one of these function.

[1 mark]

(c) (i) In the space below, draw and label your diagram to show a mesophyll cell from a leaf. [3 marks]

(ii) How are mesophyll cells adapted to carry out their function?

[3 marks]

2.2 Cell Organisation

2. Figure 3(i) shows the liquid composition of the human body.

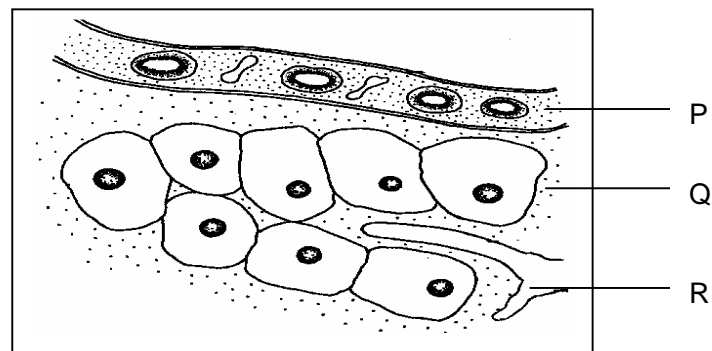


Figure 3(i)

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(a)(i) Based on Figure 3(i), name fluids P,Q , and R

Fluid P:

Fluid Q:

Fluid R:

[3 marks]

(ii) What is eventually formed from fluid P, Q and R

.....

[1 mark]

(b) Fluid Q exchange substances with P. Give two examples of these substances.

.....

.....

[2 marks]

Figure 3(ii) shows the body temperature of a person before, during and after taking a cold bath at 22°C.

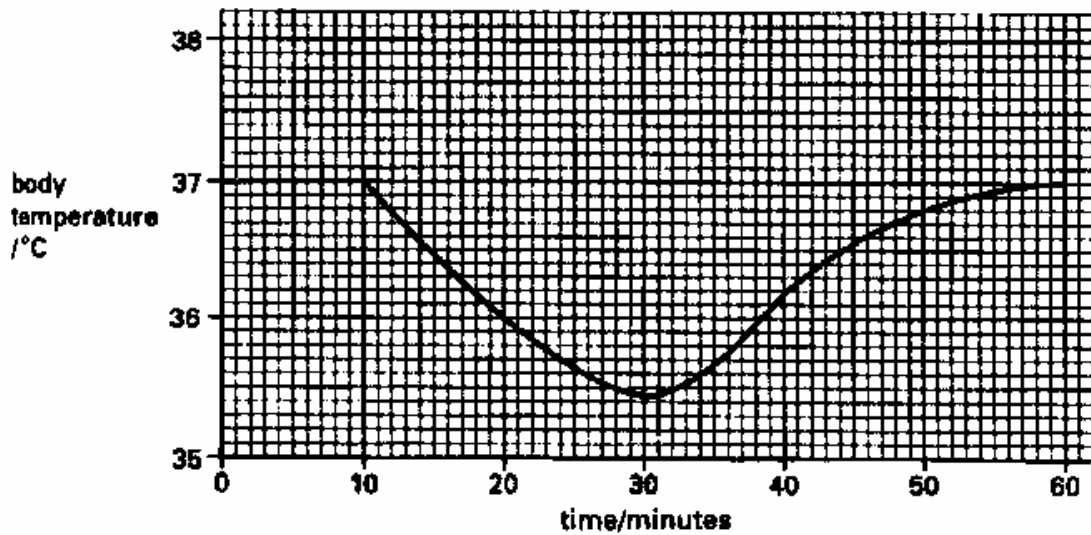


Figure 3(ii)

(c) For how long was the person in the bath?

.....

[1 mark]

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(d) Explain why the person's body temperature fell?

[2 marks]

(e) Explain how the blood capillaries help to increase the body temperature to normal.

[3 marks]

Essay Item

2.2 Cell Organisation

1. Figure 4 shows the process in the synthesis and secretion of extracellular enzymes in an animal cell.

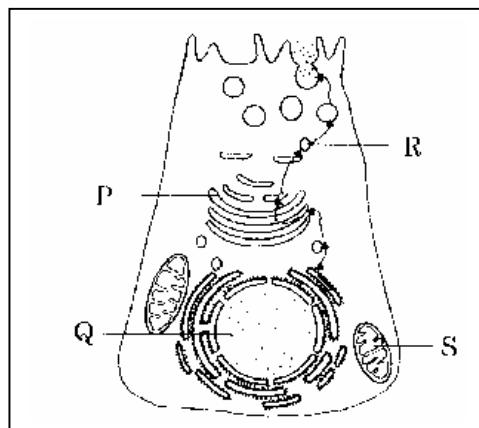


Figure 4

(a) Based on Figure 4:

(i) explain the role of nucleus in the synthesis of enzyme. [3 marks]

(ii) Name one extracellular enzymes and describe how the different cellular components are involved in the secretion of this enzyme.

[10 marks]

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b).

In multicellular organisms, cell specialization allows for division among tissues, organs and systems to carry out their specific roles

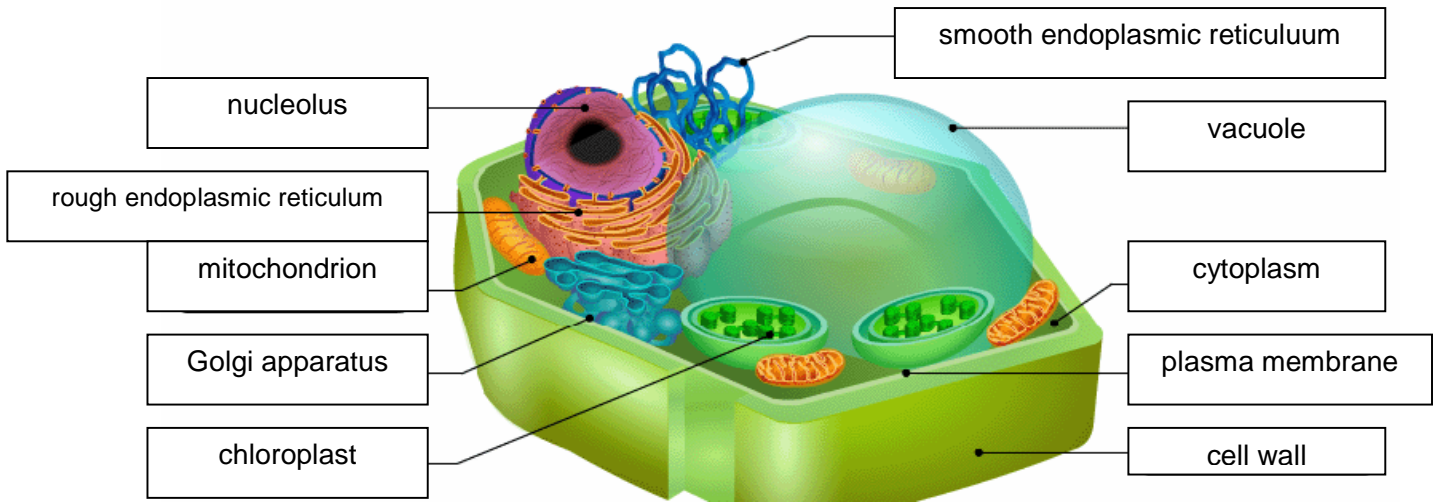
Using the information given, explain what will happen to a cell if particular cellular components are absent. [8 marks]

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ANSWER :

Activity 1 :

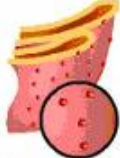


Activity 2


Match the following organelles with the correct functions



Lysosomes



Ribosome



Rough Endoplasmic Reticulum

Transports products of the ribosomes, that is, proteins from one part of the cell to another part of the cell

Sites of protein synthesis

The place where metabolic reaction of the cell takes place

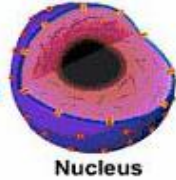
Vesicles that contain hydrolytic enzymes

Involved in the synthesis of lipids and cholesterol


Accepts vesicles from the endoplasmic reticulum, modifies the contents and distributes the products to other parts of the cell or to the cellular environment

Controls and coordinates all cellular activities


Produces energy for the chemical reactions of the cell



Nucleus





Mitochondrion



Golgi apparatus

Activity 3

Complete the graphic organizer below to compare and contrast both cells.

Similarities		
	Both have a nucleus, cytoplasm, plasma membrane, Golgi apparatus, mitochondria, endoplasmic reticulum and ribosomes	
Differences		
Animal cell	Structure	Plant cell
Does not have a fixed shape	Shape	Have a fixed shape
Does not have cell wall	Cell wall	Have cel wall
Does not have vacuoles	Vacuoles	Mature cells have a large central vacuole
Does not have chloroplasts	Chloroplast	Does not have chloroplasts
Carbohydrate is stored in the form of glycogen	Food storage	Carbohydrate is stored in the form of starch

2.2 Cell Organisation

Activity 4

Figure 1 shows four levels of cell organization in humans.

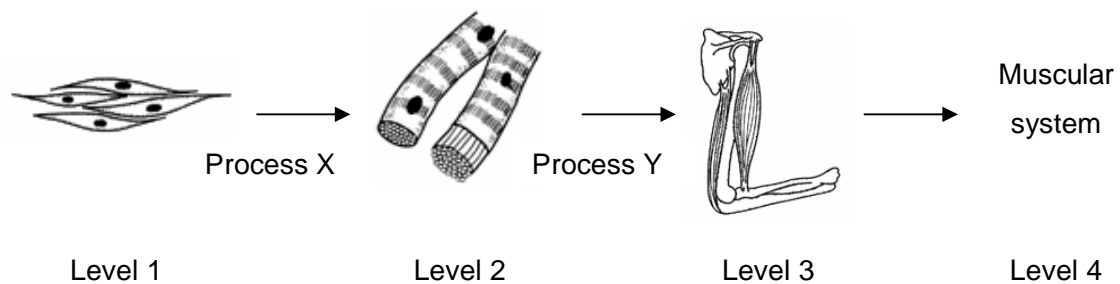


Figure 1

(a) Complete the table below by naming Level 2 and Level 3.

Level	Name
1	Cells
2	Tissues
3	Organ
4	System

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(b) Name the process X and Y:

Process X : Differentiation

Process Y : Specialisation

Structured items.

1. Table 1 shows the relationship between the density of certain organelles found in a specific cell.

Types of cell	Organelles found abundantly
Flight muscle cells in insects and birds.	X
Pancreatic cells	Y

TABLE 1

(a) (i) Name organelles X and Y

Organelle X: **mitochondria** . [1]

Organelle Y : **RER / SER/ Golgi Apparatus** [1]

(ii) State the function of each organelles found in each specific type of cell.

Function of organelle X : **To provide energy for contraction of muscle.** [1]

Function of organelle Y : **To secrete enzymes / hormones** [1]
: To transport protein [1]

Figure 2 shows some cells from the stem of a plant seen in cross section.

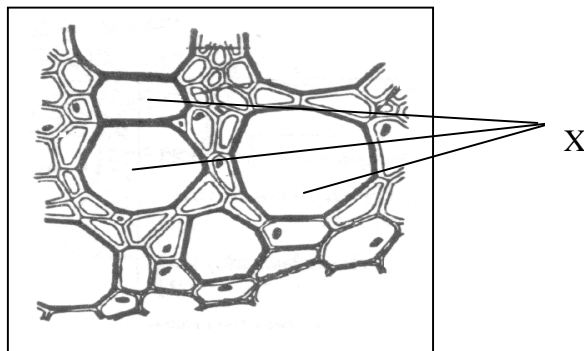


Figure 2

(b) (i) What type of tissue is shown at X?

Xylem [1]

(ii) State two functions of this tissue.

- **Transports water and mineral salts** [1]

- **Provides mechanical support for plant** [1]

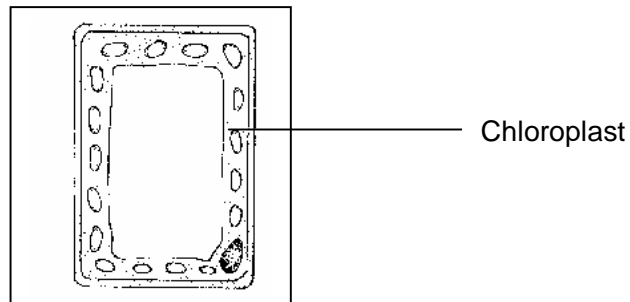
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- (iii) State one way in which the cells of tissue X are adapted to carry out one of these function.

- It has lignified cell wall (to support plant tissues) [1]

- (c) (i) In the space below, draw and label your diagram to show a mesophyll cell from a leaf.



- (ii) How are mesophyll cells adapted to carry out their function?

-cells are closely packed [1]

-contain many chloroplasts [1]

-long and cylindrical [1]

-located just below epidermis [1]

-for maximum light absorption [1]

-effective for photosynthesis [1]

[max 3]

2.2 Cell Organisation

2. Figure 3(i) shows the liquid composition of the human body.

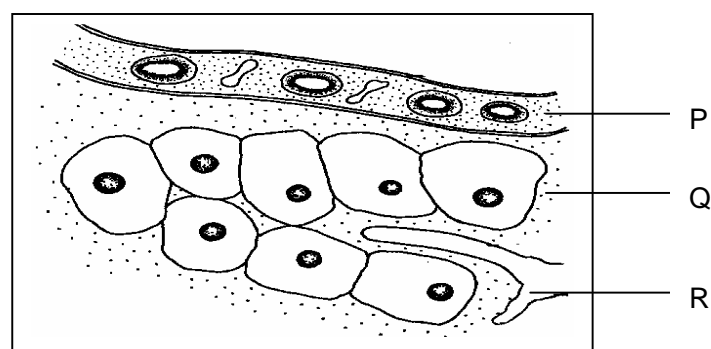


Figure 3(i)

- (a)(i) Based on Figure 3(i), name fluids P,Q , and R
- Fluid P: **blood plasma** [1]
- Fluid Q: **Interstitial fluid** [1]
- Fluid R: **lymph** [1]
- (ii) What is eventually formed from fluid P, Q and R
- Internal environment .** [1]
- (b) Fluid Q exchange substances with P. Give two examples of these substances.
- Nutrients** [1]
- Excretory wastes** [1]

Figure 3(ii) shows the body temperature of a person before, during and after taking a cold bath at 22°C.

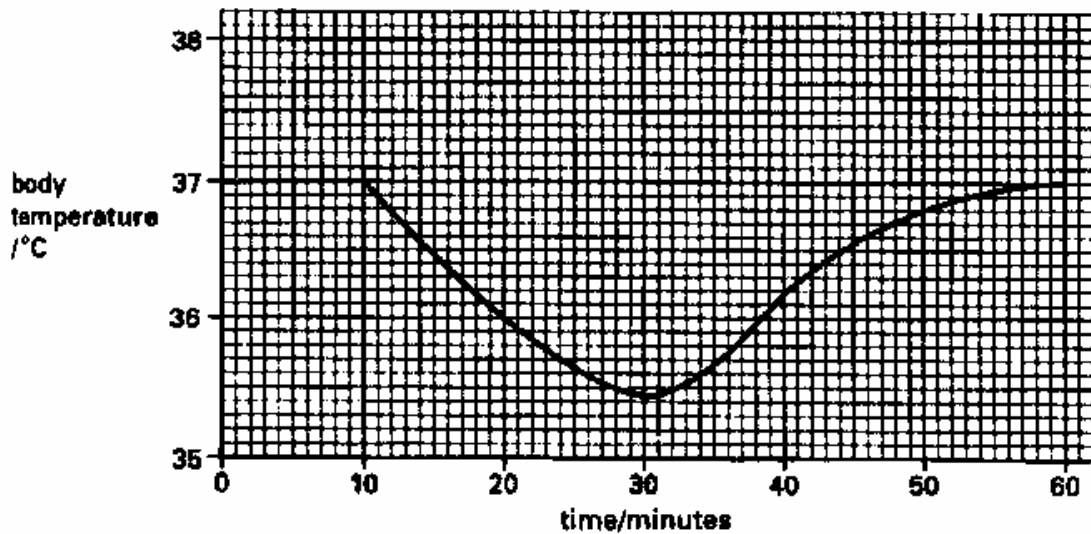


Figure 3(ii)

- (c) For how long was the person in the bath?
- 120 minutes** [1]
- (d) Explain why the person's body temperature fell?
- Expose to low temperature** [1]
- So, more heat is loss through convection and conduction** [1]
- (e) Explain how the blood capillaries help to increase the body temperature to normal.
- blood vessel dilate** [1]
- more blood flow to the surface body** [1]
- more heat is loss to the environment** [1]

Essay Item

2.2 Cell Organisation

1. Figure 4 shows the process in the synthesis and secretion of extracellular enzymes in an animal cell.

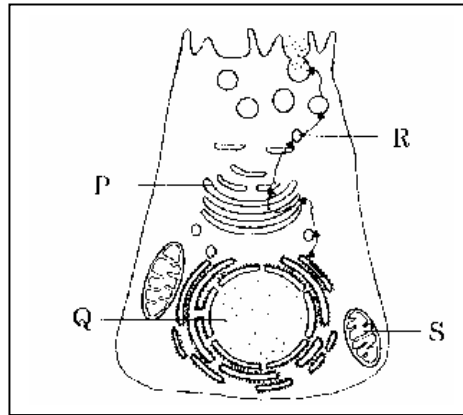


Figure 4

- (a) Based on Figure 4:
- (i) explain the role of nucleus in the synthesis of enzyme
- DNA in the nucleus carries genetic information for the synthesis of protein [1]
 - The genetic information is transcribed from DNA to RNA. [1]
 - Messenger RNA leaves the nucleus. [1]
 - Attaches itself to ribosomes on the RER [1]
- [max 3]
- (ii) Name one extracellular enzymes and describe how the different cellular components are involved in the secretion of this enzyme.
- Ribosomes synthesis protein [1]
 - And transports the proteins to RER [1]
 - In RER proteins are encapsulated in transport vesicles [1]
 - Transport vesicles fuse with Golgi Apparatus [1]
 - Proteins are modified into enzyme [1]
 - The inactive enzyme are encapsulated in secretory vesicles [1]
 - Secretory vesicles move to plasma membrane [1]
 - Enzymes are released outside the cell [1]
 - Examples of enzymes are amylase, pepsin, rennin [1]
- [10 marks]

b).

In multicellular organisms, cell specialization allows for division among tissues, organs and systems to carry out their specific roles

Using the information given, explain what will happen to a cell if particular cellular components are absent.

i. Nucleus

-protein and enzyme cannot be synthesized [1]

-Cellular activities cannot be carried out [1]

ii. Ribosomes

-protein cannot be synthesized [1]

-Enzymes/hormones cannot be produced [1]

iii. Mitochondria

-aerobic respiration cannot be carried out [1]

-Energy is not released (for cellular activities) [1]

iv. Golgi Apparatus

-synthesised protein cannot be processed, packaged and transported
(to other parts of the cell or to the plasma membrane) [1]

- digestive enzymes/hormones is not secreted [1]

v. Chloroplast

-Cell cannot absorb light energy [1]

-Photosynthesis cannot take place [1]

[max 8]

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