GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

EXEMPLAR 2

2020

LIFE SCIENCES

MAY/JUNE

QUESTION PAPER

GRADE : 11

TIME : 2½ hours

MARKS: 150

NUMBER OF PAGES : 19

GAUTENG DEPARTMENT OF EDUCATION

EXEMPLAR

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in your ANSWER BOOK.
3. Start the answers to each question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. ALL drawings should be done in pencil and labelled in blue or black ink.
7. Draw diagrams or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and a compass.
11. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.10) in your ANSWER BOOK, for example 1.1.11 D.

1.1.1 Which ONE of the following terms best describes a tapeworm living inside a human intestine?

A Host
B Pathogen
C Parasite
D Symbiont

1.1.2 Insects are…

A acoelomate.
B triploblastic.
C diploblastic.
D asymmetrical.

1.1.3 The disorder resulting from insufficient intake of protein:

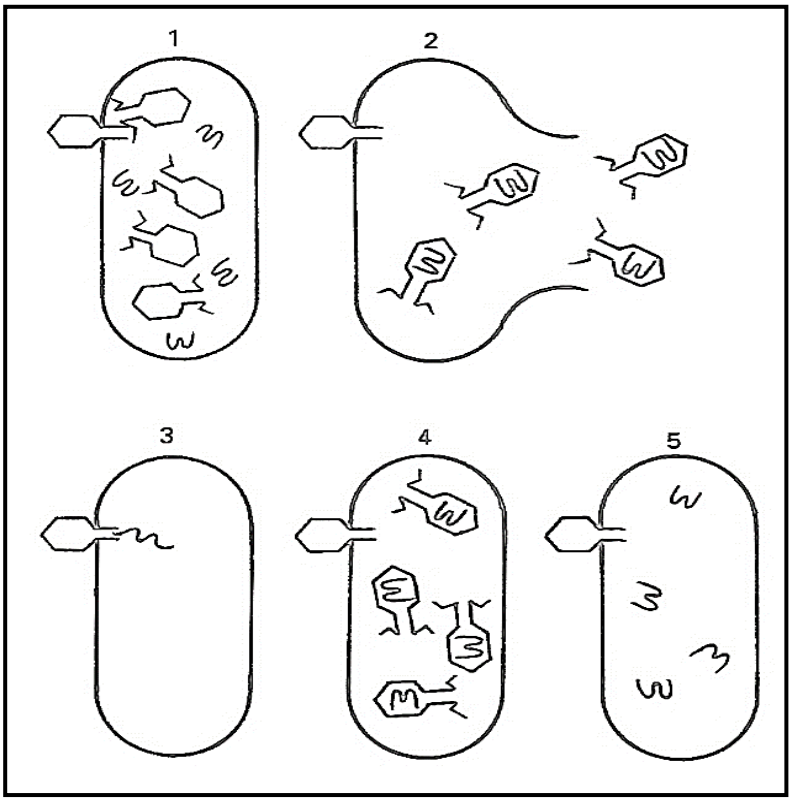
A Kwashiorkor
B Marasmus
C Atherosclerosis
D Bulimia

1.1.4 The stomata control the supply of the following raw material for photosynthesis:

A Carbon dioxide
B Water
C Oxygen
D ATP

1.1.5 The following diagram shows some of the stages that occur during

viral invasion of a bacterium.



Which of the following correctly shows the sequence in which this occurs?

A 3,1,5,4,2
B 2,4,1,5,3
C 3,5,1,4,2
D 2,5,1,3,4

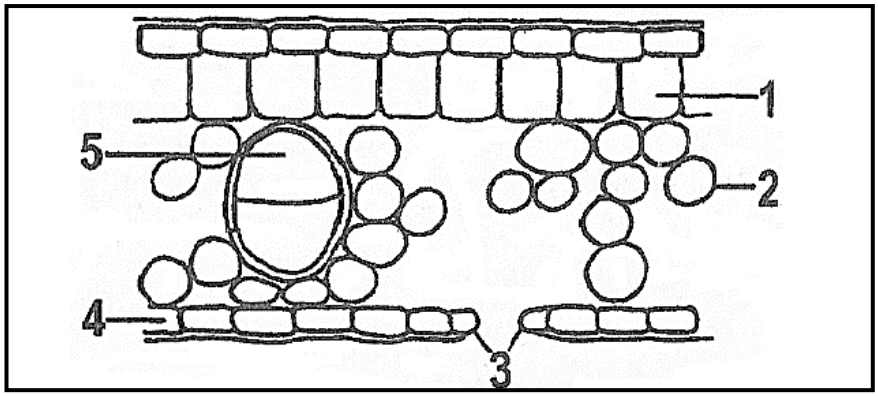
1.1.6 Nutrition in humans includes the following three processes, in the correct sequence, namely…

A ingestion, digestion and absorption.
B ingestion, digestion and excretion.
C digestion, absorption and ingestion.
D excretion, absorption and digestion.

1.1.7 Which of the following animals possesses an exoskeleton?

A Locust
B Tapeworm
C Sponge
D Earthworm

Questions 1.1.8 and 1.1.9 are based on the diagram below



1.1.8 Which tissues contain chloroplasts?

A 1, 2 and 4
B 2, 3 and 5
C 2, 4 and 5
D 1, 2 and 3

1.1.9 The cells that do not contain chlorophyll but allow light to pass through are labelled…

A 2
B 1
C 3
D 4

1.1.10 Cephalisation is most likely to be associated with:

A A primitive nerve network
B Radial symmetry
C Bilateral symmetry
D Sedentary types of animals

(10 x 2) **(20)**

1.2 Give the correct **biological term** for each of the following descriptions. Write

only the term next to the question number (1.2.1 to 1.2.10) in your ANSWER BOOK.

1.2.1 The structure of the flower that develops into the fruit

1.2.2 Reproductive structure found only in gymnosperms

1.2.3 The process where food is moved down the oesophagus.

1.2.4 The splitting of water molecules into hydrogen and oxygen in the presence of light

1.2.5 The tough outer protective coat of a seed

1.2.6 An animal, usually an insect, that carries and transmits pathogenic micro-organisms from one host to another

1.2.7 A chlorophyll-containing organelle in the cytoplasm of a plant cell

1.2.8 The gas given off by plants during the night

1.2.9 A fertilized ovum

1.2.10 The part of the stamen that contains the pollen

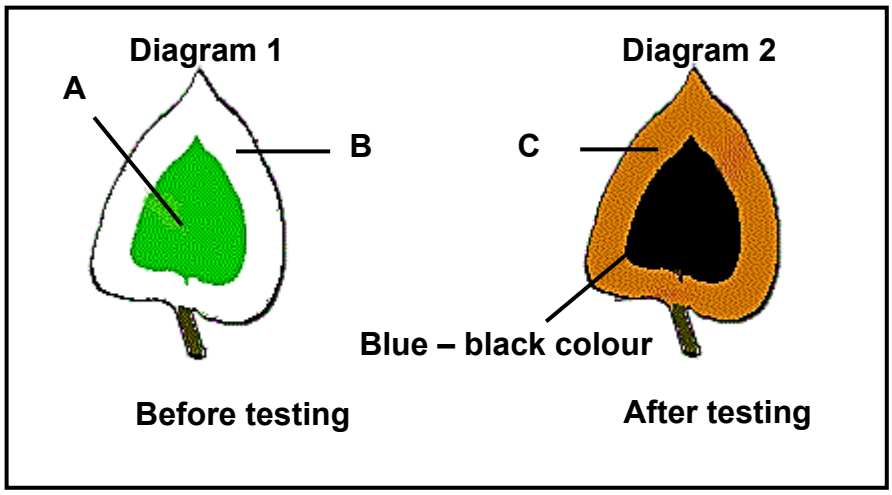
(10 x 1) **(10)**

1.3 Indicate whether each of the statements in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B or NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B,** or **none** next to the question number (1.3.1 to 1.3.3) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Athlete's foot	A: Viruses B: Protista
1.3.2	Has true roots and leaves and produces spores	A: Bryophytes B: Pteridophytes
1.3.3	The dominant generation in flowering plants	A: Gametophyte B: Sporophyte

(3 x 2) **(6)**

1.4 The diagram below shows a leaf that has been tested for starch.



1.4.1 Which indicator (chemical substance) is used to test for starch? (1)

1.4.2 What factor is being investigated in the leaf shown in Diagram **1**? (2)

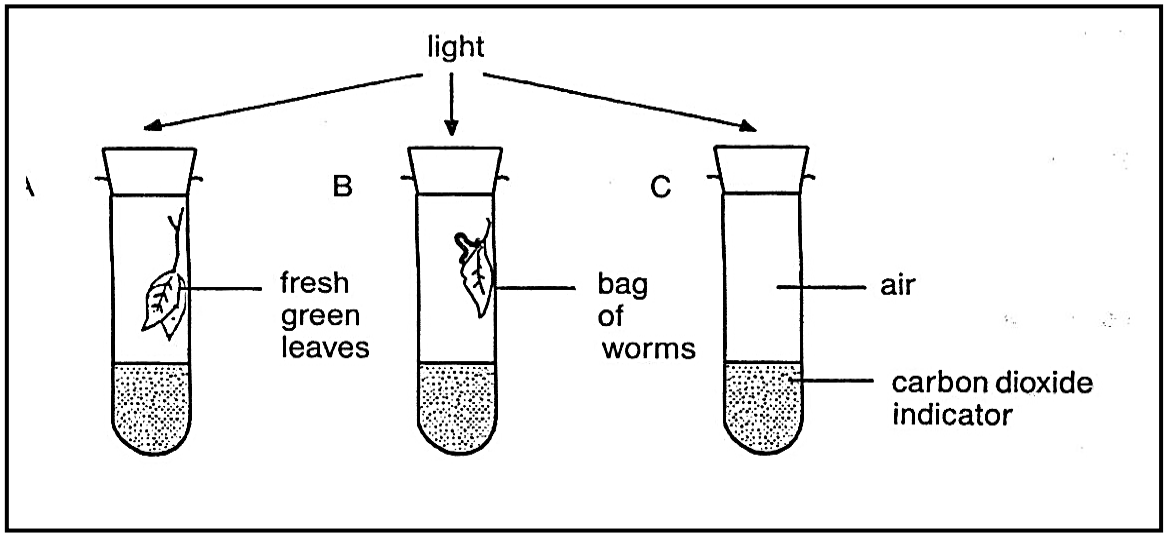
1.4.3 Identify the colour of the parts labelled:
(a) **A** (1)
(b) **B** (1)

1.4.4 In diagram **2** which labelled part did not react positively to the presence of starch? (1)

1.4.5 What conclusion can we make when looking at the colour reaction of the centre of the leaf in diagram **2**? (1)
(7)

1.5 Two learners set up the following experiment as shown in the

diagram.



All the test tubes were kept in light.

A change in the concentration of carbon dioxide in the test tube causes the indicator to change colour from orange to the colour shown in the table below:

Carbon dioxide levels	**Indicator colour change**
Normal	Orange
Low	Purple
High	Yellow

Results of the experiment:

	Test tube A	**Test tube B**	**Test tube C**
Colour of indicator in test tube at start of experiment	**S**	**T**	**W**
Colour of indictor in test tube after 3 hours	**X**	**Y**	**Z**

1.5.1 What is the role of test tube **C**? (1)

1.5.2 Using the information above state what the colour of the indicator would be at:

(a) **T** (1)
(b) **X** (1)
(c) **Y** (1)
(d) **Z** (1)

1.5.3 What gas other than CO_2 would be found in test tube **A**? (1)

1.5.4 Which test tube would have the highest level of CO_2 at the end of the investigation? (1)
(7)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Read the extract below and answer the following questions.

Double virus trouble: When COVID-19 meets the flu season

Influenza cases typically see a spike from June to August in the Southern Hemisphere – coinciding with cold weather conditions.

The World Health Organisation (WHO) has warned that the co-circulation of influenza and COVID-19 – both of which cause respiratory illness – could place an additional burden on vulnerable populations and healthcare systems.

To alleviate some of that strain, the UN health agency is urging countries to prioritise (schedule first) their influenza vaccination programmes this year, vaccinating those at high risk of developing complications – including pregnant women, the elderly, children, and people with underlying health issues.

If the flu vaccine is in short supply, two target groups – health workers and older people – should have the highest priority to get vaccinated.

2.1.1 Define the term *vaccine.* (2)

2.1.2 What causes COVID -19? (1)

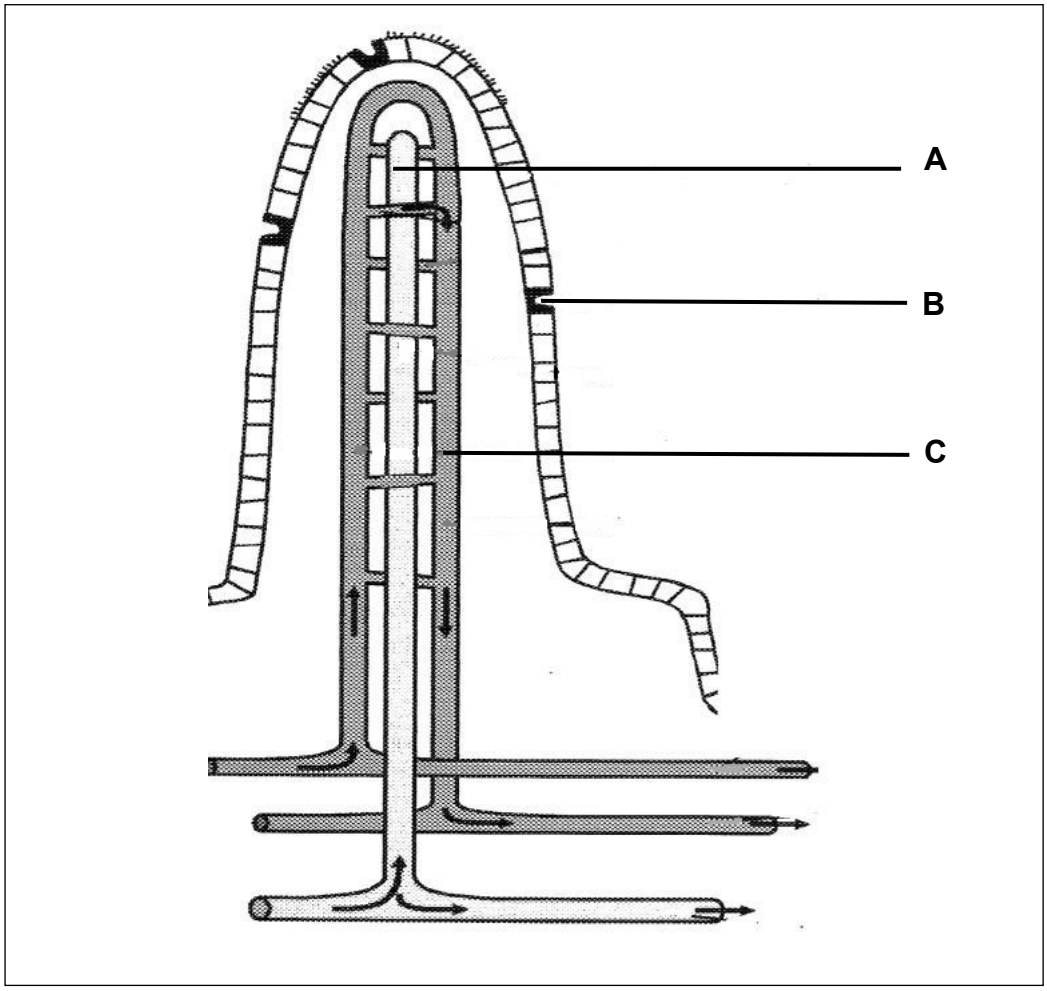
2.1.3 What warning has the WHO sent out about co-circulation of influenza and COVID - 19? (2)

2.1.4 Which high risk groups should countries prioritise if the flu vaccine is in short supply? (2)

2.1.5 State TWO ways in which someone could gain immunity against COVID -19. (2)

2.1.6 Explain your answer to QUESTION 2.1.5. (4)
(13)

2.2 The diagram below illustrates the microscopic structure of a villus.



2.2.1 Identify the parts labelled:

(a) **A** (1)

(b) **C** (1)

2.2.2 Which labelled part absorbs lipids (fats)? (1)

2.2.3 Which labelled part would contain blood that has high levels of glucose and amino acids? (1)

2.2.4 Explain how the villus is structurally suited as an exchange surface to absorb digested nutrients from the small intestine. (6)

(10)

2.3 The table below shows the number of deaths due to tuberculosis (TB) in the

various provinces reported per 100 000 people in 2005.

Province	TB death rate per 100 000
Eastern Cape	180
Free State	200
Gauteng	115
KwaZulu Natal	235
Limpopo	69
Mpumalanga	180
Northern Cape	195
North West	160
Western Cape	75

2.3.1 Which province has the highest number of reported deaths per 100 000 due to TB? (1)

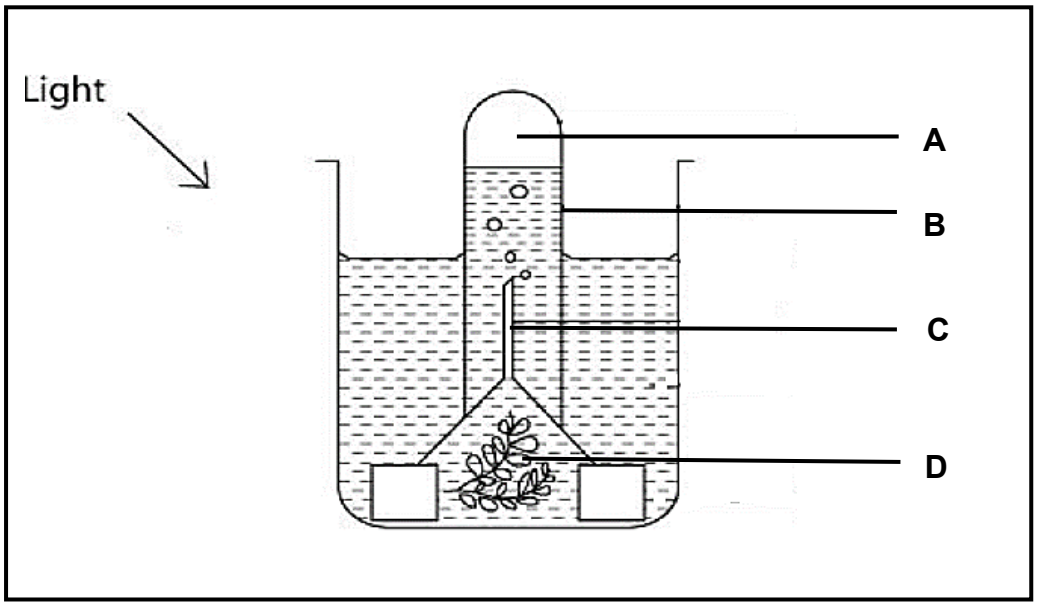
2.3.2 TB and HIV/AIDS have been referred to as the 'deathly duo'. Explain why. (2)

2.3.3 Draw a bar graph to illustrate the information listed in the table. (6)
(9)

2.4 When light shines on pondweed, *Elodea* sp, bubbles of gas are released. The rate at which bubbles of gas are produced can be used to measure the rate of photosynthesis.

An investigation was carried out to study the effect of different colours of light on the rate of photosynthesis in the pondweed.

- The pondweed was exposed to one colour of light and left for 5 minutes before measurements were taken .
- The time taken for the release of 20 bubbles was recorded
- The procedure was repeated using light of a different colour of equal intensity.



The results are given in the table below.

Colour of light	Time it takes for 20 bubbles to form (in seconds)
Violet	80
Blue	40
Green	160
Yellow	140
Red	70

2.4.1 Give the labels for:

(a) **A** (1)

(b) **B** (1)

(c) **C** (1)

2.4.2 Which colour light is the best for photosynthesis? (1)

2.4.3 Give a reason for your answer to QUESTION 2.4.2. (1)

2.4.4 Identify the:

(a) Independent variable. (1)

(b) Dependent variable. (1)

2.4.5 Identify TWO factors that should be kept constant during the investigation. (2)

2.4.6 Briefly explain why a water plant was used. (1)

2.4.7 Calculate the average time taken to release 20 bubbles for all the colours together. Show all your calculations. (2)

(12)

2.5

Health and Wellness: Lactose-Free Milk, a Growing Trend

The dairy industry is witnessing a massive transformation as the consumer preferences are gradually changing, owing to the increasing awareness toward health and wellness, and lactose intolerance of many consumers.

Consumers globally have lately realized that traditional dairy is unsuitable for their consumption due to the high lactose levels in the dairy products, thus paving the way for the future of lactose-free dairy products.

The lactose-free dairy products available in the market and covered in the study include milk, cheese, yogurt, ice-cream, and others. Lactose-free milk is the most popular lactose-free dairy product. Consumers who want to switch to lactose-free dairy products first test and adopt the most basic dairy product, i.e., milk.

https://www.reportlinker.com/insight/health-wellness-lactose-free-milk-growing-trend.html

2.5.1 Name ONE lactose-free product that makes use of the fermentation process in its manufacture. (1)

2.5.2 Why is there a growing change in people's preference to consume lactose-free products instead of traditional dairy products? (2)

2.5.3 What does lactose intolerant mean? (2)

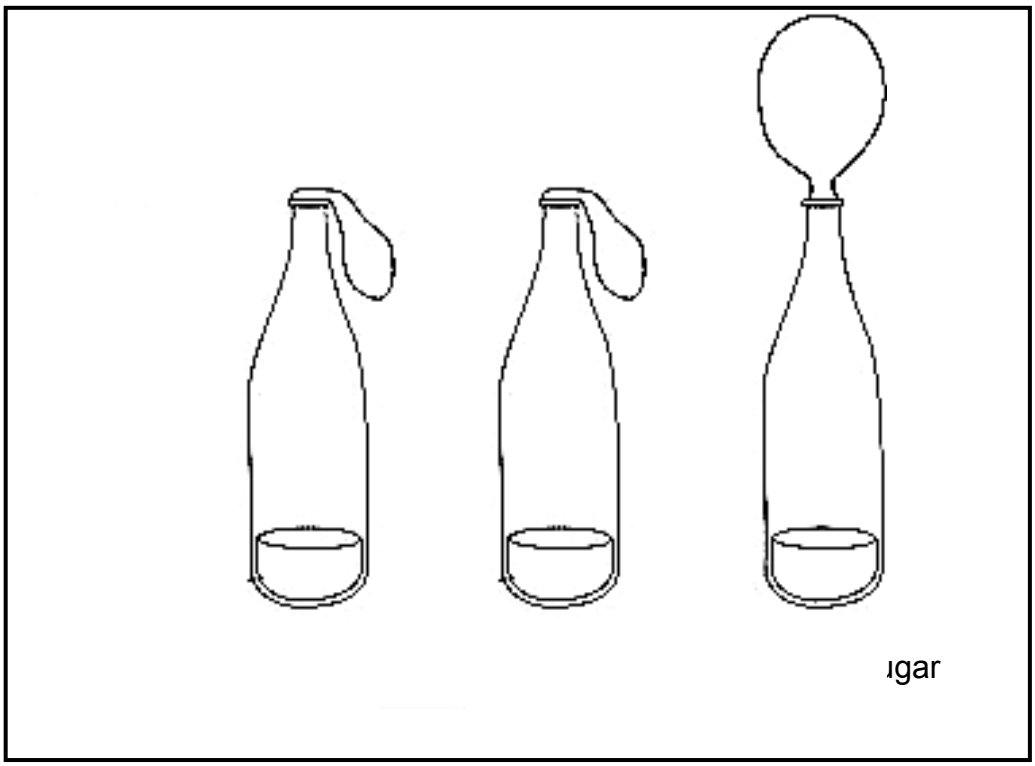
2.5.4 Where in the human digestive system should lactose be completely digested? (1)

(6)

[50]

QUESTION 3

3.1 An investigation was carried out to demonstrate anaerobic respiration. The investigators used the apparatus as shown below.



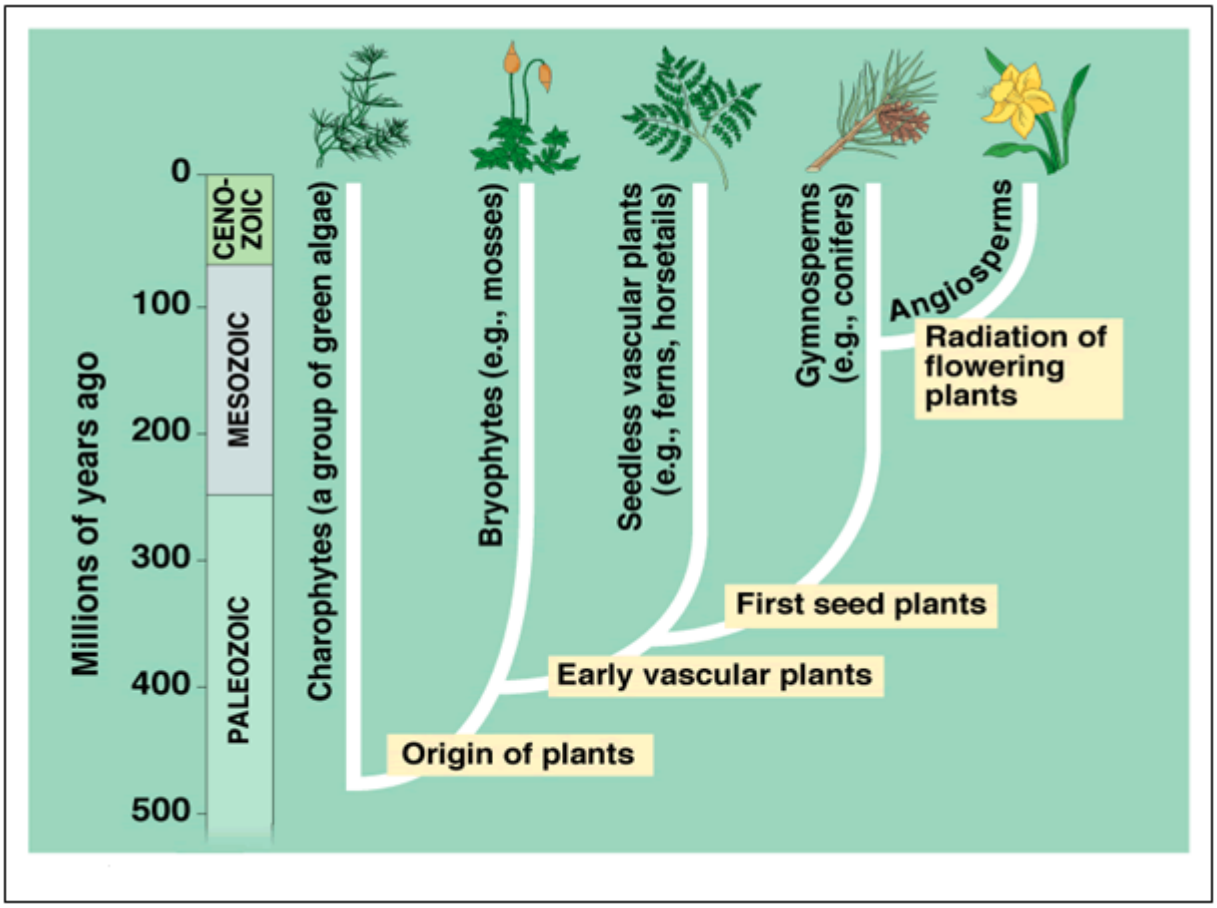
3.1.1 To which group of organisms, you have studied, does yeast belong? (1)

3.1.2 Briefly explain what anaerobic respiration is. (2)

3.1.3 In FIVE steps write out the method used to carry out this investigation. (5)

3.1.4 State TWO ways in which the scientists could increase the reliability of the investigation. (2)
(10)

3.2 Below is a common phylogenetic tree showing the evolutionary development of plants.



3.2.1 What is a *phylogenetic tree*? (1)

3.2.2 Which are the …

(a) youngest vascular plants? (1)

(b) oldest vascular plants? (1)

3.2.3 In which era, did most of the plant groups evolve? (1)

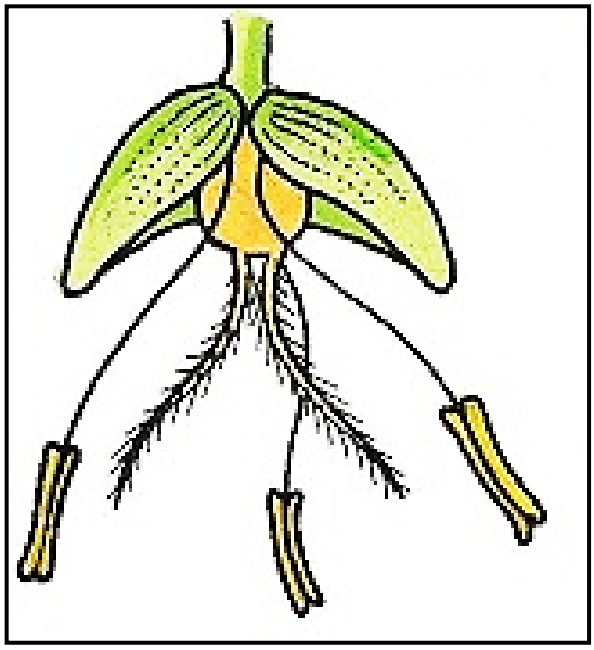
3.2.4 Which characteristic gave gymnosperms and angiosperms an evolutionary advantage over other land plants? (1)

3.2.5 Which of these groups require water for reproduction? (2)

3.2.6 Explain why the groups mentioned in QUESTION 3.2.5 need water for reproduction. (4)

(11)

3.3 Study the diagram of a flower below



3.3.1 Name the agent of pollination of this type of flower. (1)

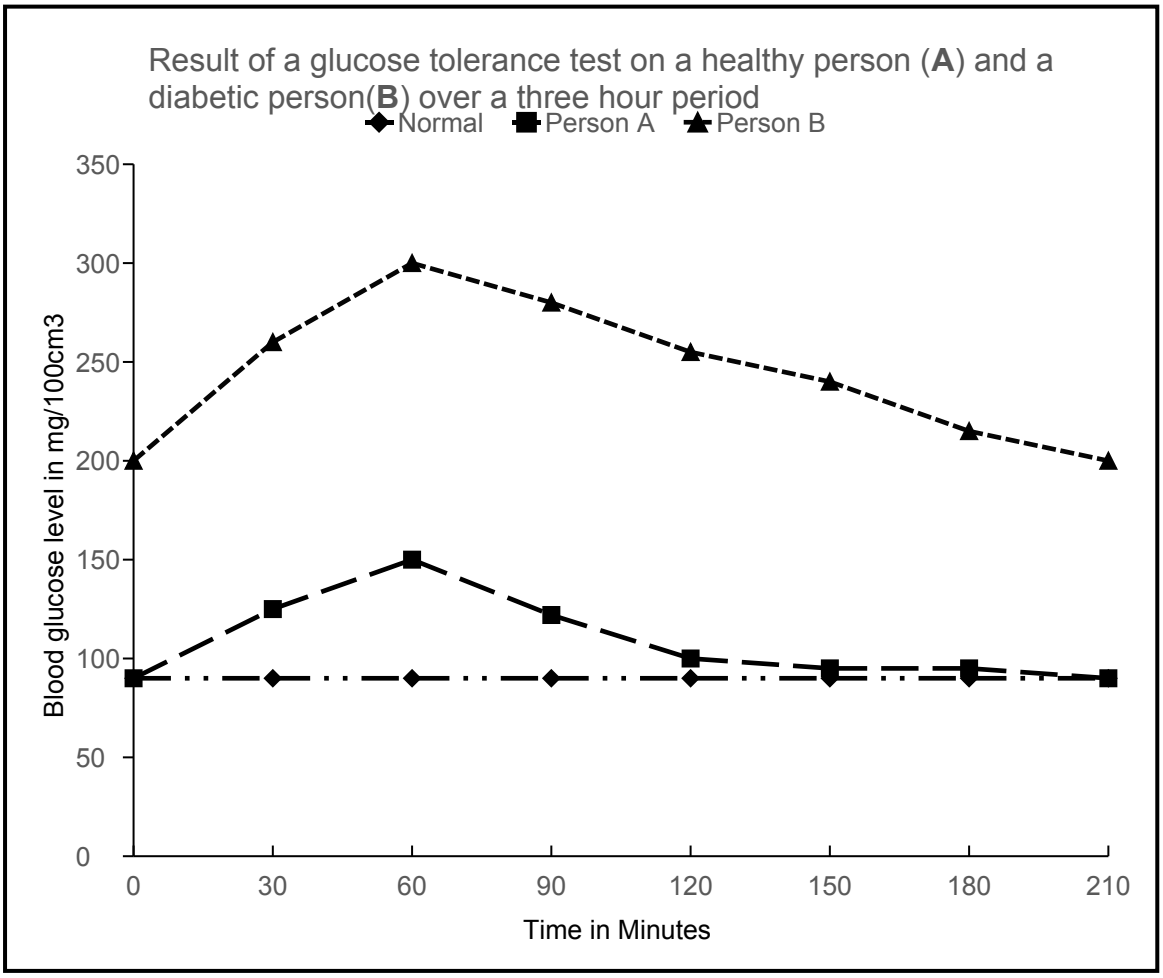
3.3.2 List any TWO visible structural features that support your answer to QUESTION 3.3.1. (2)

3.3.3 Explain why gymnosperms and grasses produce more pollen than most angiosperms. (4)

3.3.4 A seed bank in Norway has been storing seeds of a rare and endangered plant. 120 of the seeds of the plant were selected to be grown. Out of the 120 seeds, only 90 germinated.

What percentage of the seeds was not fertile? Show all your calculations. (2)
(9)

3.4 The graph below shows the results of a glucose tolerance test on a healthy person (**A**) and a diabetic person (**B**). After fasting for ten hours they were each given a drink of glucose solution containing 50g glucose. The amount of glucose in their blood was measured every 30 minutes for the next three hours.



3.4.1 What was the highest concentration of glucose in person **B**'s blood? (1)

3.4.2 How long did it take the blood glucose level to return to where it was when the glucose solution was first given to: (1)

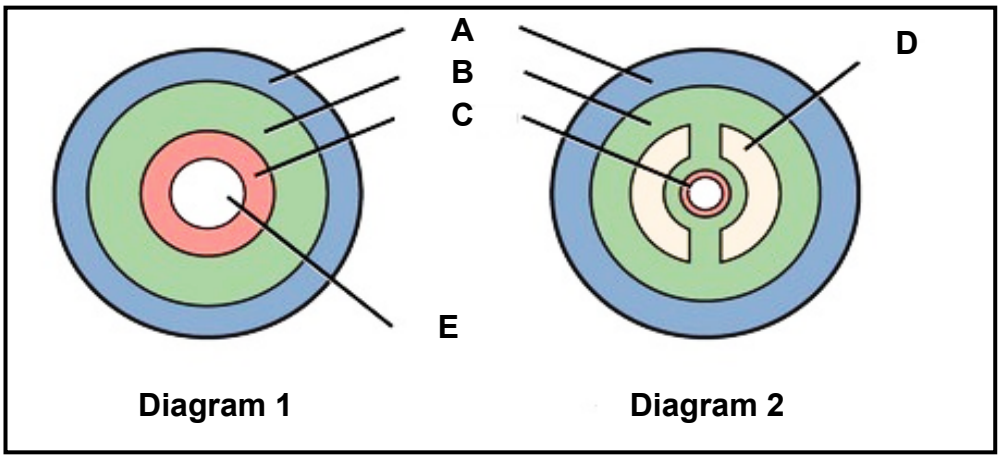
(a) Person **A**? (1)

(b) Person **B**?

3.4.3 What effect would injecting insulin into person **B** have had on the results of the test? (2)

3.4.4 Briefly explain the role of insulin in the regulation of blood glucose immediately after the glucose concentration was administered to person **A**. (4) **(9)**

3.5 The diagrams below show the body plans of two types of animals.



3.5.1 Provide labels for: (1)
(a) **A** (1)
(b) **B** (1)
(c) **E**

3.5.2 Name ONE animal phylum represented by diagram **1** and diagram **2** respectively. (2)

3.5.3 Give ONE difference between the body plan represented by diagram **1** and **2**. (2)

3.5.4 Describe TWO advantages of structure **D**. (2)

3.5.5 Explain ONE advantage of a through gut. (2)
(11)
[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150