Hillcrest High School

Grade 11

Life Science Exam

June 2019 | Examiner: Mr Mahabeer

Time : 2 ½ hours | Marks : 150

Instructions:

1. Answer ALL the questions.
2. Write All the answers in the 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. Make all drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables 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 where necessary.
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 A vector is an organism that...

A. Is affected by pathogens.
B. Carries a disease from one organism to another.
C. Is autotrophic
D. Improves immunity

1.1.2 Which of the following requires a host cell because they are NOT able to make their own proteins

A. Blue green algae
B. Protozoans
C. Viruses
D. Bacteria

1.1.3 The phylum of animals that has a rod of bone tissue to support the body with a nerve cord running through it...

A. Porifera
B. Annelida
C. Arthropoda
D. Chordata

1.1.4 The structure or body layer that forms the different internal organs in a triploblastic animal embryo is the

A. Coelem
B. Ectoderm
C. Mesoderm
D. Endoderm

1.1.5 Micro-organisms that have a cell wall, no chlorophyll and reproduce by spores belong to the kingdom of...

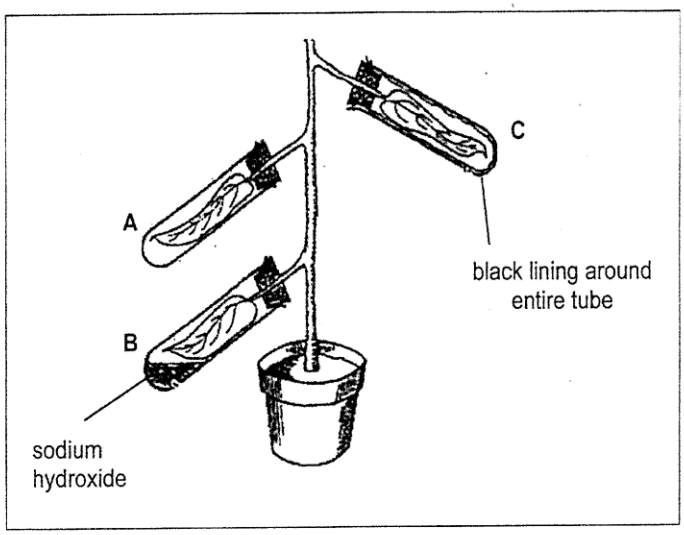
A. Fungi
B. Plantae
C. Protista
D. Morera

1.1.6 Fertilisation in angiosperms occurs when...

A. The pollen tube grows down the style.
B. Pollen moves from the anther to the stigma
C. The ovary enlarges into a fruit
D. A sperm cell unites with the ovum

QUESTION 1.1.7 AND 1.1.8 ARE BASED ON THE INFORAMTION AND APPARATUS BELOW.

The diagram below represents a part of a potted plant showing three leaves. Each leaf is treated differently. This apparatus is used to investigate the factors essential for photosynthesis.



1.1.7 After a few hours in the sun, which of the following will give a positive result with the iodine test?

A. A only
B. B only
C. A and B only
D. A, B and C

1.1.8 Which ONE of the following combinations of test tubes/s and aim of investigation is correct?

A. Test tube A – to show that oxygen is given off during photosynthesis
B. Test tube B – to show that carbon dioxide is given off during photosynthesis
C. Test tube C – to show that light is necessary for photosynthesis
D. Test tube A, B and C – to show that chlorophyll is necessary for photosynthesis.

1.1.9 Seeds are better suited for survival than spores because they...

A. Can remain dormant for long periods.
B. Are smaller
C. Have a limited food supply
D. Are dispersed by wind only

1.1.10 The condition of a muscle that has been subjected to extreme exhaustion has a...

A. Large amount of ATP, large amount of glucose and large amount of lactic acid.
B. Small amount of ATP, small amount of glucose and large amounts of lactic acid
C. Large amount of ATP, no glucose and small amount of lactic acid.
D. Small amount of ATP, no glucose and small amount of lactic acid.

(10x2)(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 – 1.2.10) in the ANSWER BOOK.

1.2.1 A type of diet that excludes all animal products, including eggs and dairy products

1.2.2 Organic molecules that control the dark phase of photosynthesis

1.2.3 The lymph vessels within the core of the villus

1.2.4 Micro-organisms that exist in coccus, bacillus and spirillum form.

1.2.5 A group of organisms composed of multinucleate, aseptate hyphae

1.2.6 Site of the light-independent phase of photosynthesis in the chloroplast

1.2.7 A leaf that has areas containing chlorophyll and areas without chlorophyll

1.2.8 Places where seeds are stored to help preserve biodiversity

1.2.9 The nutritional condition characterized by a swollen belly, puffyface and stick like arms and legs.

1.2.10 Plant structure that lacks true roots, stems and leaves

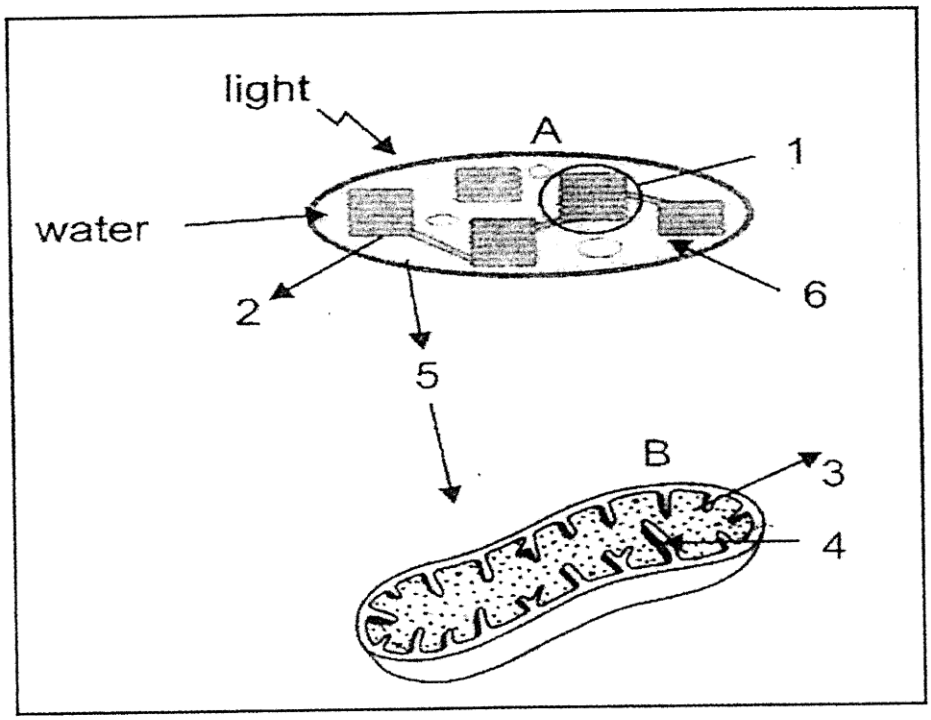
(10x1)(10)

1.3 Indicate whether each of the descriptions 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 1.3.5) in the ANSWER BOOK.

COLUMN I	**COLUMN II**
1.3.1 Characteristic of wind pollination	A. Large, showy anthers B. Brightly coloured flowers
1.3.2 Function of flowers	A. Attract pollinators B. Source of food
1.3.3 A class of spermatophytes with a vascular system, seeds and flowers	A. Gymnosperms B. Angiosperms
1.3.4 Some are autotrophic while others are heterotrophic	A. Protists B. Bacteria
1.3.5 Site of Krebs cycle	A. Nucleus B. Ribosome

(5x2)(10)

1.4 Study the diagrams below and answer the questions that follow.



1.4.1 identify:

a) organelle A (1)
b) organelle B (1)
c) part 1 (1)
d) gas 2 (1)
e) gas 3 (1)
f) part 4 (1)
g) compound 5 (1)
h) gas 6 (1)

1.4.2 Explain ONE way in which organelle A is adapted for its function. (2)

(10)

TOTAL SECTION A: 50 MARKS

SECTION B

QUESTION 2

2.1 Grade 11 learners investigated the effect of three different antibiotics (AB1, AB2 and AB3) on the growth of three different strains of disease-causing bacteria (X, Y and Z) the following procedure was followed.

- Nine identical agar plates (petri dish with the nutrient agar) were prepared.
- Bacteria X was cultured on the first three agar plates, bacteria Y on the next three agar plates and bacteria Z on the last 3 agar plates.
- The same amount of AB1 was placed in the centre of each of three agar plates, one with bacteria X, one with bacteria Y and one with bacteria Z
- This step was repeated using AB2 and then AB3.
- The nine petri dishes were incubated at the same temperature and at the same time.
- Bacterial growth was examined for each agar plate and the diameter of the area where no bacteria grew was measured.

The following results were obtained from the investigation.

	Diameter (mm) of area where no bacteria grew		
	AB1	**AB2**	**AB3**
Bacteria X	8	14	3
Bacteria Y	9	11	5
Bacteria Z	6	5	4

2.1.1 Identify the following in the investigation

A. The independent variable (1)
B. The dependent variable (1)

2.1.2 State the aim for this investigation (2)

2.1.3 Which antibiotic was the most effective in decreasing bacterial growth (2)

2.1.4 Which TWO variables did the learners keep constant to ensure the **validity** of their investigation? (2)

2.1.5 State TWO ways in which learners could improve the **reliability** of this investigation (2)
(10)

2.2 Read the extract below and answer the questions that follow.

Listeriosis outbreak in South Africa in 2017-2018

Listeriosis is an illness caused by the bacterium *Listeria monocytogenes*. *Listeria* bacteria can grow at cold temperatures.

The widespread outbreak of *Listeria monocytogenes* food poisoning in South Africa was a result of consuming contaminated processed meats.

This foodborne illness produces fever, muscle aches and diarrhoea. Severe infections can cause headaches, meningitis, convulsions and death. Older adults and people with weak immune systems, pregnant women and babies have a high risk of developing life threatening infections.

As at 12 March 2018, there had been 973 confirmed infections and 183 deaths from listeriosis in South Africa.

2.2.1 Name the bacterium that causes listeriosis. (1)

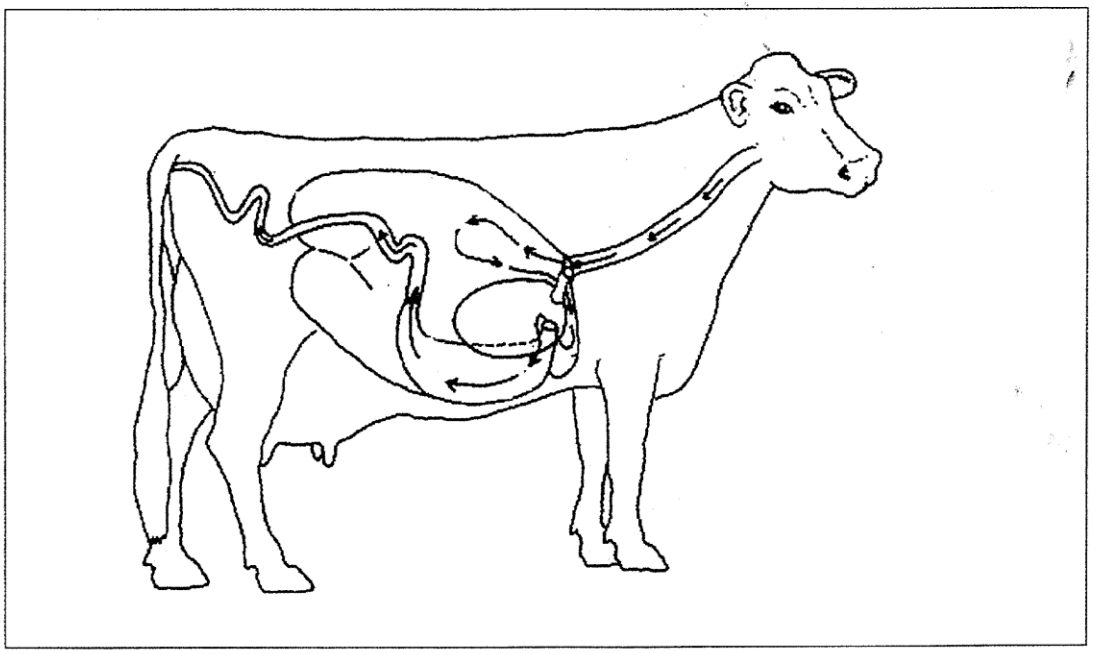
2.2.2 List TWO symptoms of listeriosis mentioned in the extract. (2)

2.2.3 Name TWO groups of people, indicated in the extract, which are more likely to develop listeriosis. (2)

2.2.4 State why refrigeration does not prevent contamination of food by the listeriosis bacterium (1)

2.2.5 Antibiotics are currently being used as a treatment for listeriosis.
Explain TWO conditions under which the antibiotic prescribed may not be successful in the treating the bacterium. (4)
(10)

2.3 The diagram below shows the gut in an animal from one of the phyla you have studied.



2.3.1 State whether the animal has a blind gut or a through gut. (1)

2.3.2 Explain ONE advantage of the gut mentioned in 2.3.1 (2)

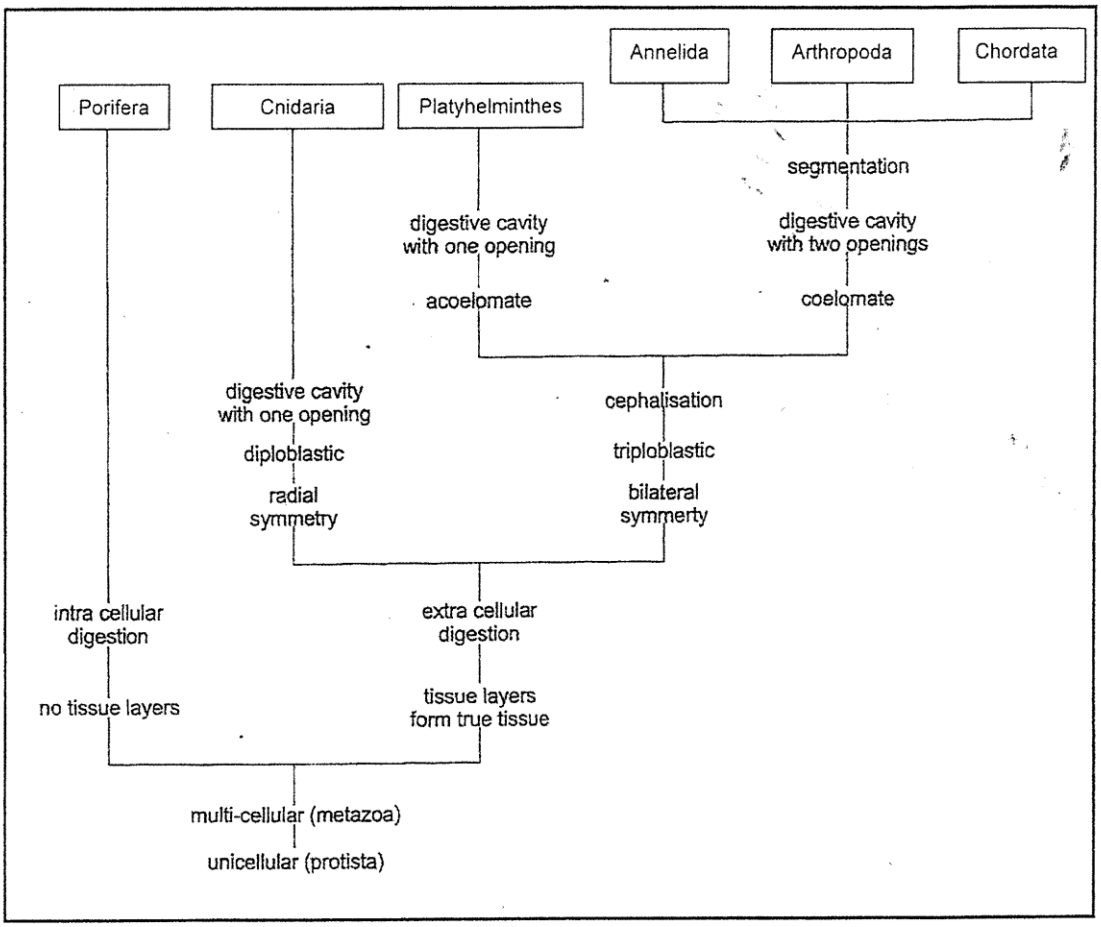
2.3.3 Name TWO phyla that have animals with a gut like the one in the diagram. (2)

2.3.4 State what is meant by cephalisation (2)

2.3.5 Give one advantage of cephalisation (1)

(8)

2.4 The phylogenetic tree below shows different groups of animals.



2.4.1 Name the ancestral form of all groups of animals shown. (1)

2.4.2 List THREE evolutionary features, from the phylogenetic tree, that Cnidaria and Platyhelminthes have in common. (3)

2.4.3 **Tabulate** any TWO structural differences from the phylogenetic tree, between Cnidaria and Platyhelminthes. (5)

2.4.4 State why annelids are more closely related to arthropods than to Platyhelminthes. (2)

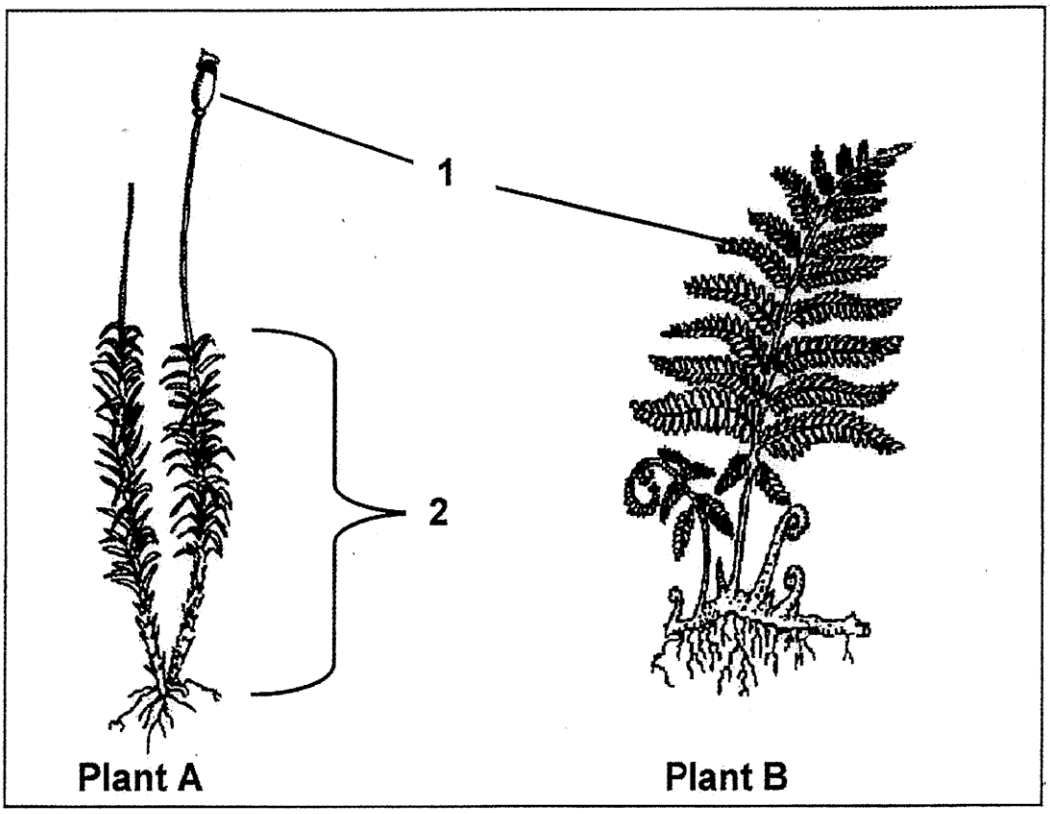
2.4.5 Identify a feature of cnidarians, from the phylogenetic tree, that suits a sedentary mode of life (1)

(12)

[40]

QUESTION 3

3.1 Study the diagram below and answer the questions that follow.



3.1.1 Identify the plant group to which each of plants A and B belong. (2)

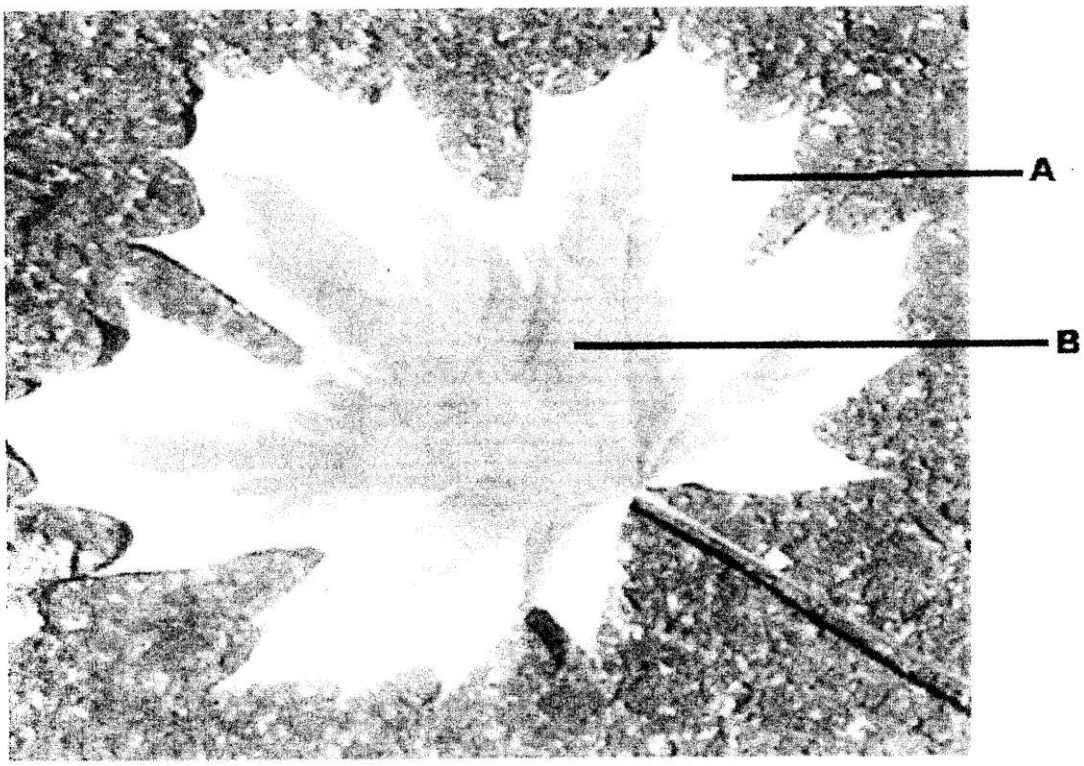
3.1.2 Which numbered structure in plant A is haploid? (1)

3.1.3 Give the name of the structure that produces spores in plant B? (1)

3.1.4 Explain briefly why both plants A and B above require cool, damp conditions as an ideal environment to live in. (2)

3.1.5 List FOUR features that appeared during the evolution of plants that were adaptions to a **terrestrial mode** of life. (4)
(10)

3.2 A grade 11 learner conducted an investigation to determine whether chlorophyll is necessary for photosynthesis in the leaf below. Part A is white and part B is green.



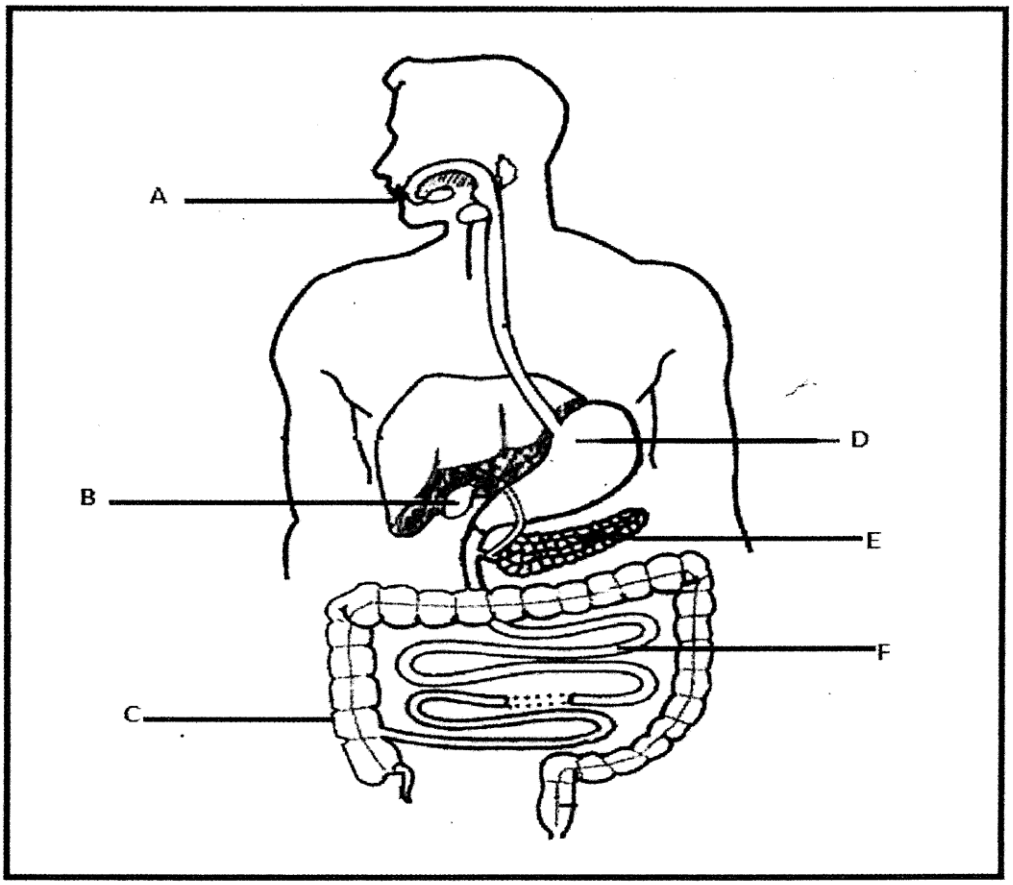
3.2.1 Why should the plant be placed in sunlight before a leaf can be tested for starch. (2)

3.2.2 State the colour of part A after the starch test. (1)

3.2.3 Explain the various steps the learner will follow when testing for starch in the leaf of the plant (6)

3.2.4 Draw a labelled diagram of a chloroplast. (4)
(13)

3.3 The diagram below represents the human digestive system.



3.3.1 Give the LETTER/S and the NAME/S of the part/s which:

a) Contain or secrete enzymes which act upon carbohydrates (4)

b) Secrete hydrochloric acid (2)

3.3.2 State TWO functions of the liquid stored in part B (2)

3.3.3 Explain TWO structural adaptions of a villus found in part F. (4)

3.3.4 State why gland E is regarded as both endocrine and exocrine. (2)

3.3.5 Describe how the hormone secreted by the pancreas regulates the blood glucose level when it drops below normal. (3)

(17)

[40]

TOTAL SECTION B: 80 MARKS

SECTION C : ESSAY

QUESTION 4

Carbon dioxide is required in the dark phase of photosynthesis but is released during the Kreb's cycle of cellular respiration. Describe the dark phase of photosynthesis AND the Kreb's cycle of respiration AND then explain the structural adaptions of the mitochondria for respiration.

NOTE: NO marks will be awarded for answers in the form of flow charts, tables or diagrams.

TOTAL SECTION C: 20 MARKS
GRAND TOTAL: 150 MARKS