Hillcrest High School

Grade 11

Life Science Exam

June 2016 **Time: 2½ hours**

Marks : 150

Instructions:

1. Write your Life Science Teacher's name on all booklets
2. Number the answers exactly as the questions are numbered
3. Write neatly and legibly
4. Do all drawings in pencil and label them in ink
5. Only draw diagrams and flow charts when requested to do so

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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-D) next to the question number (1.1.1 - 1.1.8),for example 1.1.9A

1.1.1 A seed and a spore differ in that...

A) Spores are diploid while seeds are haploid

B) Spores can withstand dehydration while seeds cannot

C) Spores require dispersal but seeds do not

D) Spores are unicellular

1.1.2 Triploblastic animals that lack a through-gut and coelom are classified as...

A) Cnidarians

B) Flatworms

C) Annelids

D) Arthropods

1.1.3 Each of the following factors increases the rate of photosynthesis, except an increase in...

A) Carbon dioxide

B) Light intensity

C) Oxygen

D) Temperature

1.1.4 A function of bile in the human alimentary canal is to ...

A) Convert glycogen into glucose

B) Create an acidic environment for enzyme action

C) Hydrolyse sucrose into glucose and fructose

D) Create an alkaline environment for enzyme action

1.1.5 All viruses...

A) Have DNA and RNA

B) Live on dead, decaying matter

C) Can only reproduce inside a living cell

D) Obtain food from the host

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 1.3.7) in the ANSWER BOOK.

1.3.1 A class of spermatophytes with a vascular system, seeds and no flowers	A. Gymnospermae B. Angiospermae
1.3.2 Phylum containing organisms that are triploblastic	A. Platyhelminthes B. Annelida
1.3.3Site of Krebs cycle	A. Ribosome B. Leucoplast
1.3.4 The digestive juice that enters the duodenum through the duct	A. Pancreatic juice B. Gastric juice
1.3.5 Some are autotrophic while others are heterotrophic	A. Bacteria B. Protists
1.3.6 A product which is formed during the making of beer	C. Alcohol D. Carbon Dioxide
1.3.7 Produced during anaerobic respiration in muscle cells	A. Oxygen B. Lactic acid

7 X 2 = (14)

1.1.6 Cellular respiration in a green leaf takes place...

A) during the day only

B) continuously

C) during the night only

D) in tissues without chlorophyll only

1.1.7 A bacterial cell...

A) Reproduces sexually

B) Is a prokaryote

C) Is a eukaryote

D) Contains mitochondria, vacuoles and plastids

1.1.8 A high carbohydrate diet lacking in proteins is a characteristic of a nutritional disorder called...

A) Marasmus

B) Kwashiorkor

C) Anorexia

D) Bulimia

8 X 2 = 16

1.2 Give the correct **Biological Term** for each of the following description. Write only the term next to the question number (1.2.1 – 1.2.10) in the ANSWER BOOK.

1.2.1 Arrangement of body structures in relation to some axis of the body

1.2.2 Animals that remain attached to a substrate for most of their lives

1.2.3 A type of reproduction that involves only one parent

1.2.4 The ability to produce antibodies to fight disease

1.2.5 Photosynthetic tissue in the leaf consisting of elongated cells

1.2.6 Small quantities of a micro-organism injected into the body to produce antibodies

1.2.7 A micro-organism used in the manufacturing of beer and bread

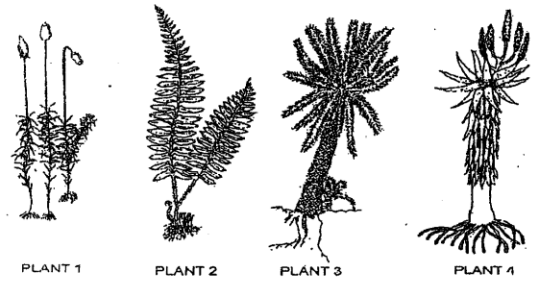
1.2.8 The group of organisms such as bacteria and fungi that recycle nutrients in dead plants and animals

1.2.9 The dominant generation in flowering plants

1.2.10 A group of sporangia on the pinna of a fern frond

10 x1 = 10

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



1.4.1 Identify the plant groups 1 to 4 shown above. (4)

1.4.2 The following table shows a comparison of various evolutionary developments of plants

(1-4) Complete the table by writing the missing characteristic next to the appropriate letter

(A-F) in the answer book

	Vascular Tissue	**Roots, stem and leaves**	**Reproductive structures**	**Water in reproduction**
PLANT 1	A	C	Spores	Water needed for reproduction
PLANT 2	Xylem and phloem present	True roots, stems and leaves	D	Water needed for reproduction
PLANT 3	Xylem and phloem present	True roots, stem and leaves	E	No water needed for reproduction
PLANT 4	B	True roots, stem and leaves	Stamens and pistils found in flowers; seed enclosed in a fruit	F

(6)
[10]

Total Question One = [50]

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 dishes 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 three 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 (1)

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

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

(9)

2.3.3 Give **ONE** example of the energy-rich organic compound Q (1)

2.3.4 In what form does the useable energy Z occur in cells? (1)

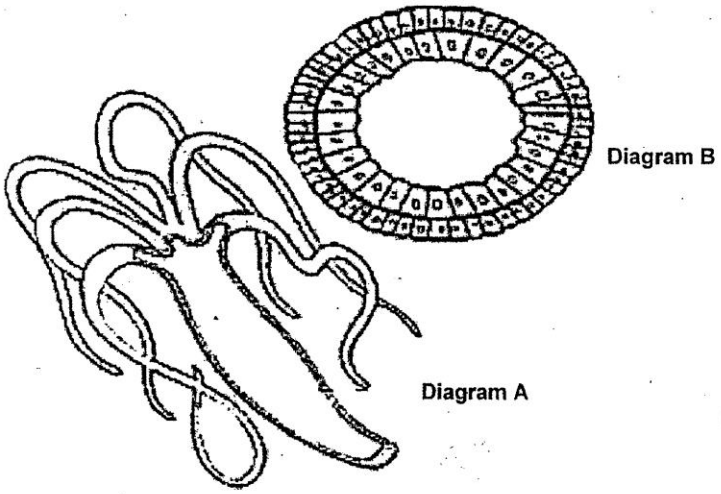
2.3.5 Explain why an increase in the concentration of Gas X may not necessarily lead to an increase in the process that takes place in organelle A (2)

2.3.6 Explain how the processes taking place in organelles A and B help to maintain a constant composition of gases in the atmosphere (2)

2.3.7 Draw a fully labelled diagram of structure B (5)

[15]

2.4 **Diagram A** shows a complete animal while **Diagram B** shows a cross section through the body of the same animal



2.4.1 Identify the phylum to which the organism belongs. (1)

2.4.2 What type of gut does the organism have (1)

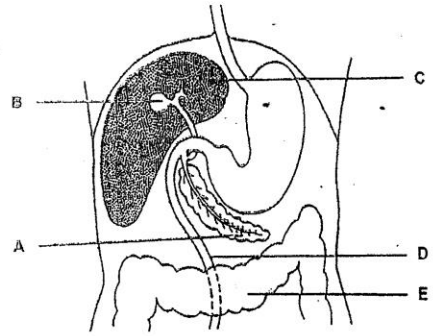
2.4.3 Explain **ONE** disadvantage of the type of gut named in Question 2.2.2. (2)

2.4.4 Explain ONE importance of the development of a coelom. (2)

[6]

Total Question 2 = [40]

2.2 Study the diagram below that shows a part of the human digestive system and answer the questions that follow.



2.2.1 Identify parts A,B and E (3)

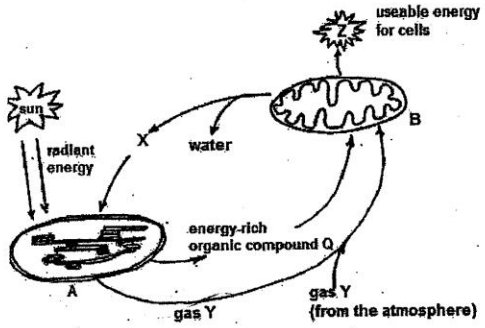
2.2.2. State **TWO** functions of the juice secreted by B (2)

2.2.3 Explain the significance of mechanical digestion taking place before chemical digestion (2)

2.2.4 Describe how part C plays a role after a person consumes a meal rich in carbohydrates (3) 2

(10)

2.3 The diagram below represents the physiological processes that place in the leaf of a green plant. Study the diagram and answer the questions that follow.

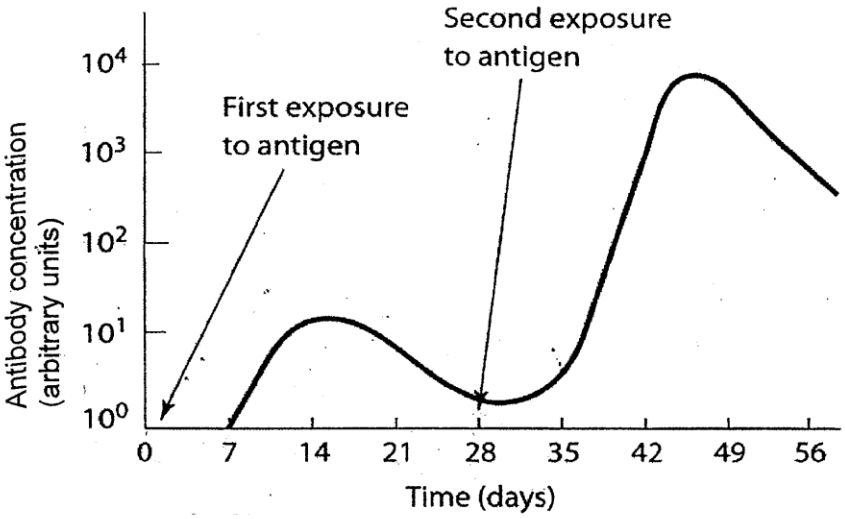


2.3.1 Name the organelles represented by A and B (2)

2.3.2 Identify gases X and Y (2)

QUESTION THREE

3.1 The graph below shows changes in the concentration of antibodies during two exposures to an antigen (a substance that stimulates the production of an antibody when introduced into the body) over time.



3.1.1 Which type of immunity **(passive or active)** is represented by the graph? (1) I

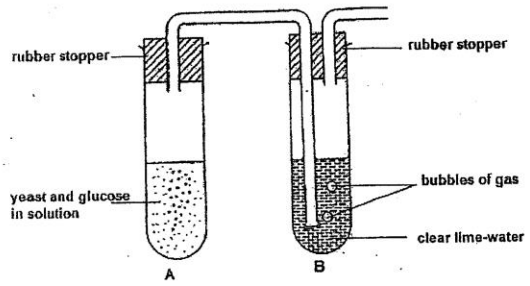
3.1.2 Name the substance produced by the body that destroys harmful bacteria. (1) \

3.1.3 Describe ONE difference in the response to the first exposure and the second exposure to the antigen. (2)

3.1.4 After how many weeks did the antibody concentration reach 10^4 arbitrary units? (2) 2

[6]

3.2 Study the diagram below showing an investigation carried out at room temperature.



Apparatus used to investigate a biochemical process

3.2.1 What is the aim of the above investigation? (2)

3.2.2 Name:

I. The biochemical process that is taking place in tube A (1)

II. The gas in tube B in the form of bubbles (1)

3.2.3 State ONE function of the rubber stopper in tube A (1)

3.2.4 Suggest a suitable control for the above investigation (1) /

3.2.5 Name the group of micro-organisms to which the yeast belongs (1)

3.2.6 List TWO ways in which the process illustrated in the diagram is economically important (2)

3.2.7 Explain how the results in the above investigation would differ if the apparatus were to be kept at a temperature a few degrees higher (2) 2

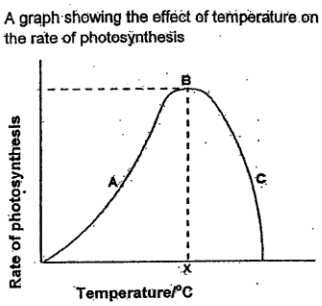
[11]

3.3 A boy runs up a small hill at **12km/h** and **lactic acid accumulates in the blood and muscles** while the boy is running. When the boy stops running, most of the **lactic acid is removed** from the blood and muscles and is eventually **converted into various other substances**

Various Substances	Amount of converted lactic acid %
Glycogen	20
Carbon dioxide	60
Glucose	4
Protein	8

Draw a bar graph to represent the data shown in the table (6)

3.4 Study the graph below



3.4.1 Name the tissue in the leaf that is mainly responsible for photosynthesis. (1)

3.4.2 Use the information in the graph to state a general trend about the effect of temperature on the rate of photosynthesis . (3)

3.4.3 Name **THREE** other environmental factors apart from temperature that can affect the rate of photosynthesis (3) 1

3.4.4 State **TWO** reasons why the process of photosynthesis is biologically important. (2)

3.4.5 One of the ways to determine if photosynthesis has occurred in a plant is to test for the presence of starch in the leaves of the plant. Describe the procedure used to test the leaves for the presence of starch.

(5)

3.4.6 "The dark phase of photosynthesis is dependent on the light phase"

Explain the above statement . (3) 1

[17]

Total Question 3 = [40]

SECTION C

QUESTION 4

Describe the digestion, absorption and assimilation of food that contains only carbohydrates

Content : (17)

Synthesis : (3)

(20) 6

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

Total Question 4 = [20]

Grand Total: 150

Good Luck !!!