

**Hillcrest High School**

**Grade 11**

**Life Science Exam**

**June 2017**

**Examiner: Mr Mahabeer**

**Time : 2 ½ hours**

**Marks : 150**

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**Instructions:**

- 1. Write your Life Science Teachers name on all the booklets**
- 2. Number your answers exactly as the questions are numbered**
- 3. Write neatly and legibly**
- 4. Do all drawings in pencil and label in ink**
- 5. Only draw diagrams and flow charts when requested to do so**
- 6. This paper consists of 11 pages**

## SECTION A

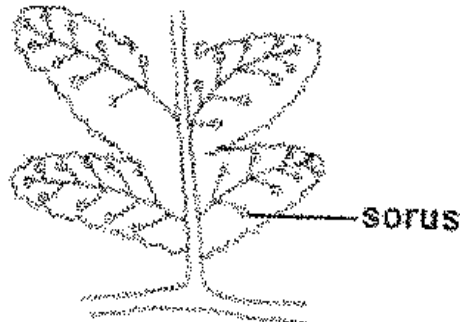
### Question 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the (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 Viruses consist of...

- A. RNA and a lipid coat
- B. RNA and a protein coat
- C. A nucleic acid and a protein coat
- D. DNA and a carbohydrate cell wall

1.1.2 The diagram below represents the reproductive structure of a plant group that you have studied.



Which plant group has the above reproductive structure?

- A. Bryophytes
- B. Pteridophytes
- C. Gymnosperms
- D. Angiosperms

1.1.3 Bacteria that cause disease are called...

- A. Heterotrophic bacteria
- B. Denitrifying bacteria
- C. Autotrophic bacteria
- D. Pathogenic bacteria

1.1.4 Study the list of characteristics below

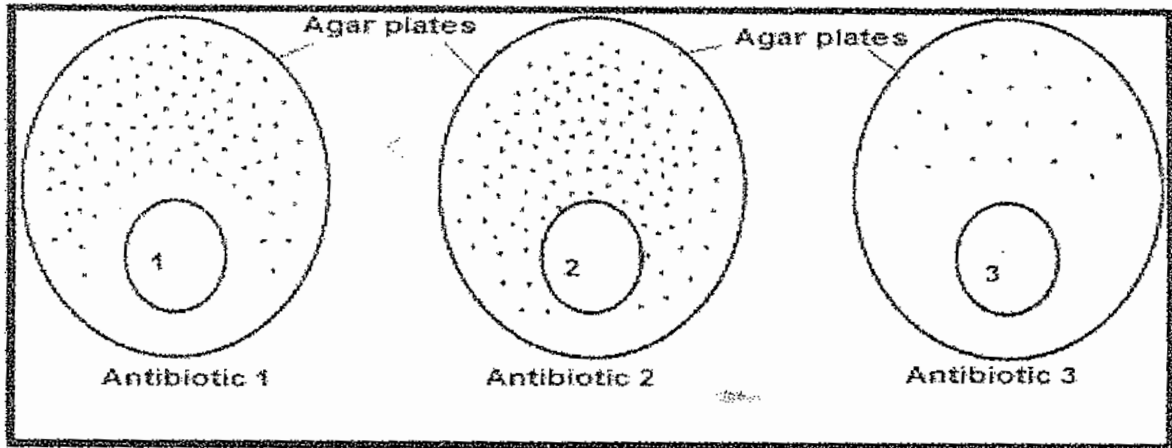
- i. Coelomate and triploblastic
- ii. Acoelomate
- iii. Diploblastic
- iv. Bilateral symmetrical
- v. Radially symmetrical

Which one of the following applied to the Cnidarians?

- A. (i), (ii) and (iv) only
- B. (ii), (iii) and (v) only
- C. (iv) and (v) only
- D. (iv) only

- 1.1.5 The grade 11 learners conducted an investigation to compare the effect of three antibiotics on the growth of bacteria. They set up agar plates containing nutrients and bacteria. Sterile discs (1, 2 and 3) containing three different antibiotics were then placed in each of the plates. The dots represent bacteria.

The results of the investigation are represented in the diagram below.



From the above it can be concluded that the bacteria are...

- A. Least resistant to antibiotic 1
  - B. Least resistant to antibiotic 2
  - C. Least resistant to antibiotic 3
  - D. Not affected by the antibiotics
- 1.1.6 Which one of the following are branching filaments that make up the mycelium of a fungus
- A. Hyphae
  - B. Cilia
  - C. Proteins
  - D. Flagella
- 1.1.7 Which of the following forms the outermost whorl of a flower
- A. Corolla
  - B. Stamens
  - C. Gynaecium
  - D. Calyx
- 1.1.8 The relationship that exists between a group of micro-organisms that fix nitrogen in the roots of some plants and obtain a nutrient in return?
- A. Mutualism
  - B. Predation
  - C. Commensalism
  - D. Parasitism
- 1.1.9 The elimination of undigested food and indigestible material from the body is known as...
- A. Ingestion
  - B. Absorption
  - C. Egestion
  - D. Assimilation

- 1.1.10 A condition of malnutrition resulting from eating too much of the high-energy foods such as carbohydrates and little or no protein.
- A. Bulimia
  - B. Anorexia
  - C. Obesity
  - D. Kwashiorkor

(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 to 1.2.10) in your answer book.

- 1.2.1 The type of respiration that occurs in the absence of oxygen.
- 1.2.2 The rhythmical contractions of the muscles of the alimentary canal causing food to move along the gut
- 1.2.3 The digestive juice which has no enzymes
- 1.2.4 Space in the mesoderm layer that accommodates internal organs
- 1.2.5 Concentration of sense organs anteriorly to form a definite head region
- 1.2.6 A method of asexual reproduction where unicellular organisms simply splits into two
- 1.2.7 The vector that carries malaria
- 1.2.8 A part of alimentary canal that serves as a passage for both air and food
- 1.2.9 Organisms that do not have a membrane bound nucleus
- 1.2.10 Regulation of the water content of an organism

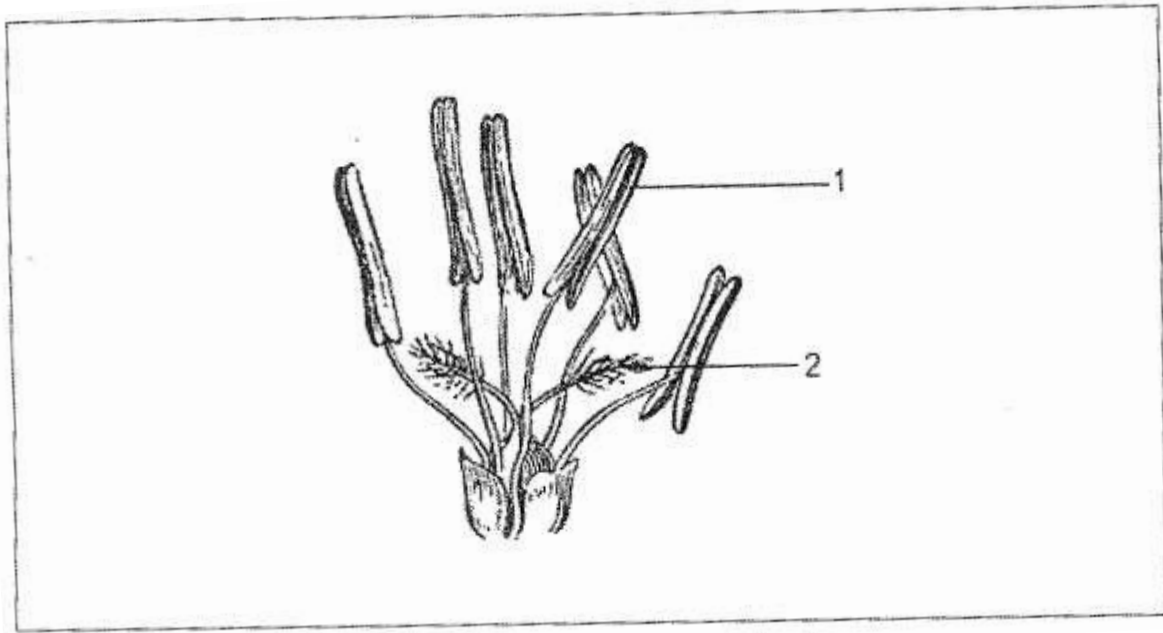
(10X1=10)

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 1.3.5) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 The products of final digestion in the gut	A. Proteins B. Lipids
1.3.2 Animals without backbones	A. Invertebrates B. Vertebrates
1.3.3 A biological agent that can only reproduce inside the cell of a living organism	A. Protist B. Virus
1.3.4 Micro-organism used in medical biotechnology	A. Protista B. Bacteria
1.3.5 Organic molecules that control metabolic reactions	A. Glycerol B. Enzymes

(5X2=10)

1.4 The diagrams below represent the reproductive structures of a plant studied.



- 1.4.1 Provide labels for parts 1 and 2. (2)
- 1.4.2 What is the most likely pollinating agent for the above flower? (1)
- 1.4.3 Give ONE observable reason for your answer in question 1.4.2. (1)
- 1.4.4 After fertilization the ovule becomes the seed. Explain ONE advantage of seeds over spores (1)
- [5]**
- 1.5 Draw a fully labelled diagram of a mitochondria (use all your scientific drawing rules) (5)

**TOTAL SECTION A = 50**

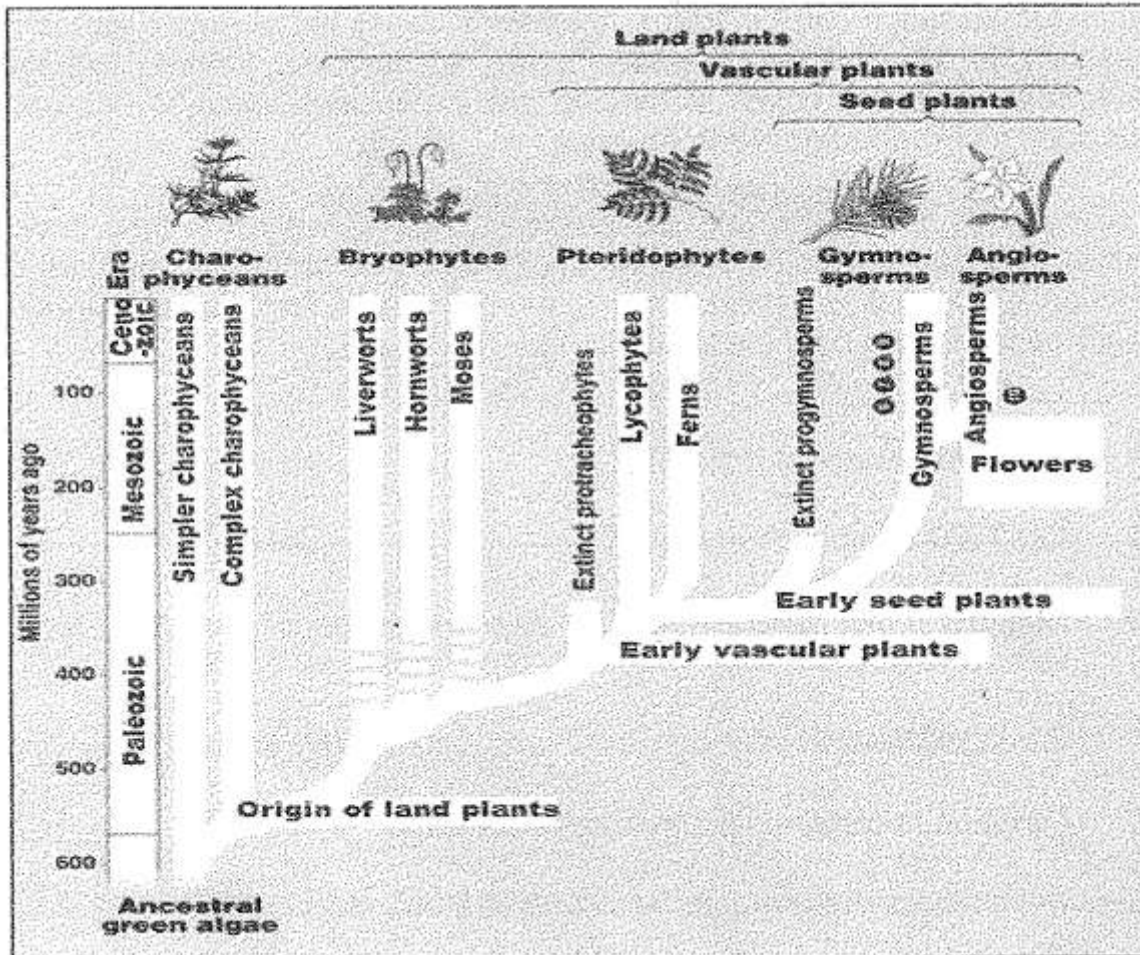
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**SECTION B**

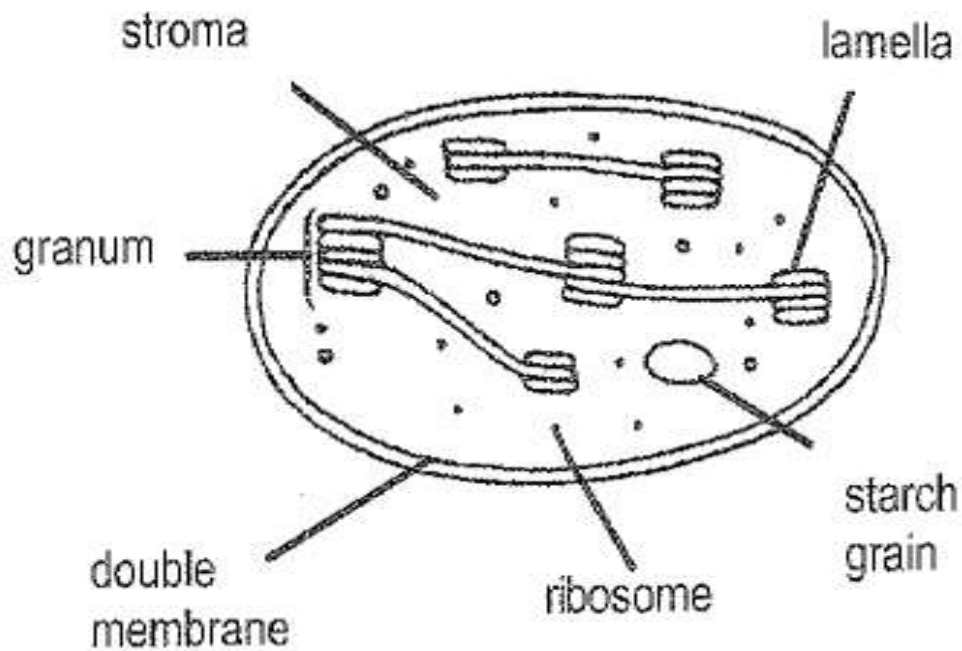
**Question 2**

2.1 The diagram below represents by a phylogenetic tree of different groups of plants.



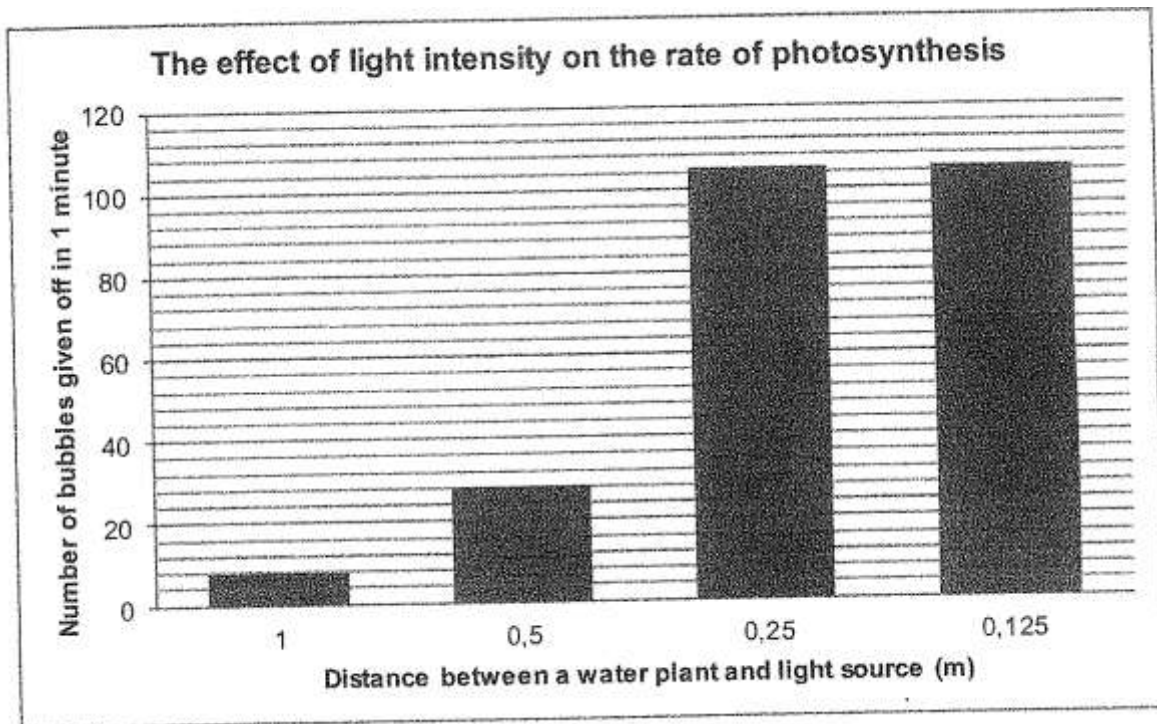
- 2.1.1 According to the phylogenetic tree, which group gave rise to the all the other groups. (1)
  - 2.1.2 In which era did the angiosperms first appear? (1)
  - 2.1.3 Which characteristics separates the bryophytes from the charophyceans? (1)
  - 2.1.4 How long ago did the progymnosperms become extinct? (2)
  - 2.1.5 Tabulate any TWO differences between the gymnosperms and the angiosperms with regard to reproduction. (5)
  - 2.1.6 Are the mosses or angiosperms more closely related to the gymnosperms? (1)
  - 2.1.7 Explain your answer in QUESTION 2.1.6. (2)
  - 2.1.8 Angiosperm plants undergo sexual and asexual reproduction  
 Explain TWO advantages of sexual reproduction for the survival of plants (2)
- (15)**

2.2 The following drawing shows an organelle found in certain plant cells.



- 2.2.1 Identify the organelle (1)
- 2.2.2 Name TWO types of plant cells in which this organelle occurs in relatively large numbers (2)
- 2.2.3 Identify the structures labelled A and B. (2)
- 2.2.4 Supply the location (A or B) for
- a) Dark phase
  - b) Light phase
- Of photosynthesis. (2)
- 2.2.5 Describe TWO ways in which this organelle is structurally suited to its function (2)
- 2.2.6 Describe the part of the bio-chemical process that takes place in B (6)
- (15)**

2.3 The graph below shows the results of an investigation to determine the effect of light intensity on the rate of photosynthesis.



2.3.1 Formulate a hypothesis for this investigation. (2)

2.3.2 How was the rate of photosynthesis measured in this investigation? (1)

2.3.3 Identify the gas released in this investigation. (1)

2.3.4 How many bubbles were released per minute when the light source was 0,5 m from the water plant? (1)

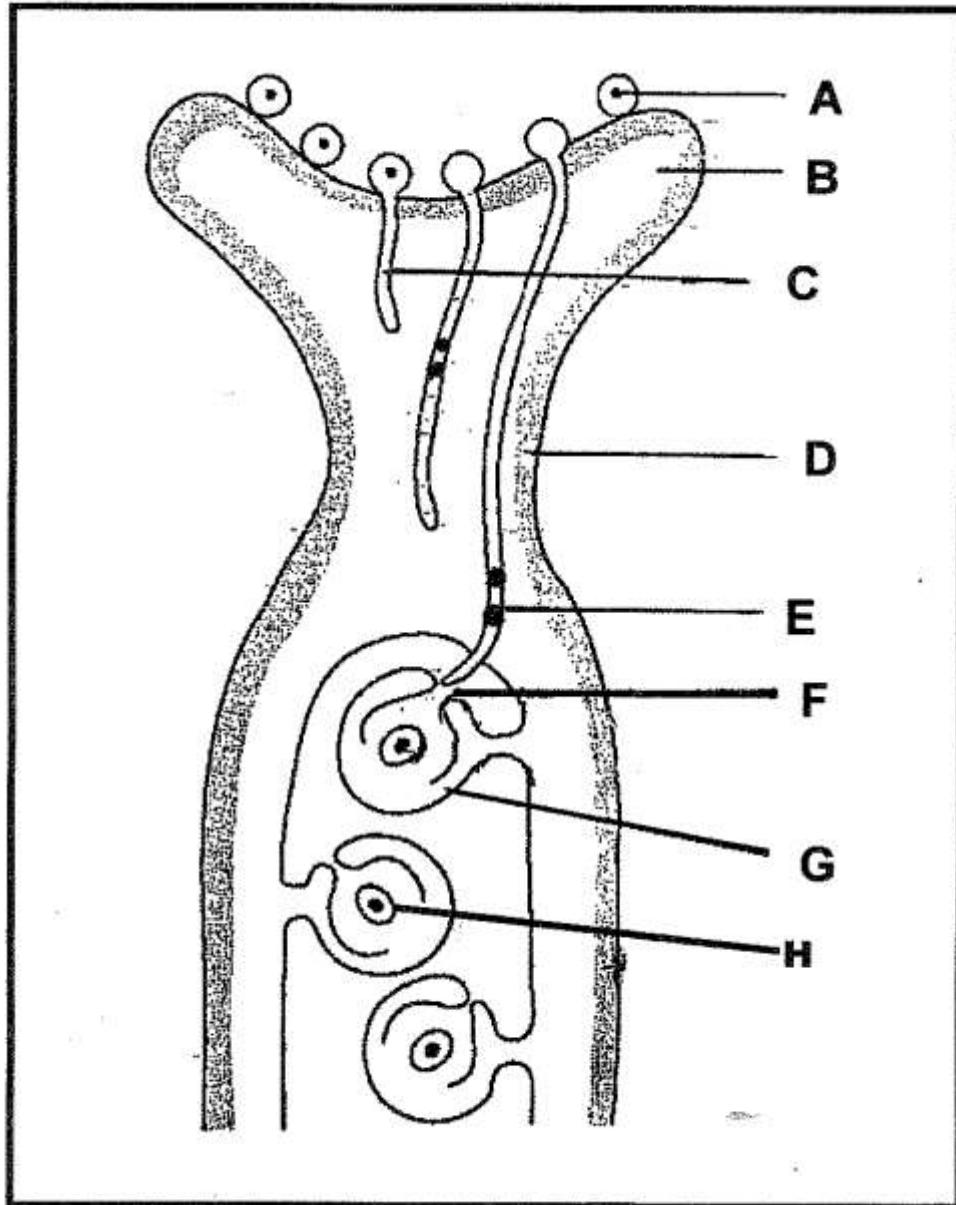
2.3.5 The number of bubbles given off remained the same even though the light intensity increased when the light was moved from 0,25m to 0,125m. Provide an explanation for the above observation. (2)

2.3.6 State THREE factors that should be kept constant in this investigation. (3)

**(10)**

**Question 3**

3.1 The diagram below represents fertilization in a flower. Answer the questions based on the diagram.



- 3.1.1 Provide labels for parts labelled B and D. (2)
- 3.1.2 What is the function of the part labelled F? (1)
- 3.1.3 Why do we refer to fertilization in the above diagram as “double fertilization”? (2)
- 3.1.4 What do each of the following parts become after fertilization:
- a) G (2)
  - b) H (7)

3.2 Tabulate two differences between a monocot flower and dicot flower (5)

3.3 The table below is a comparative analysis of 3 animal phyla. Complete the table by writing down the number and the answer.

PHYLA	SYMMETRY	TISSUE LAYERS	COECOM	THROUGH GUT
CYNIDARIA	3.3.1	3.3.2	3.3.3	3.3.4
PLATHYEMINTHES	3.3.5	3.3.6	3.3.7	3.3.8
CHORDATA	3.3.9	3.3.10	3.3.11	3.3.12

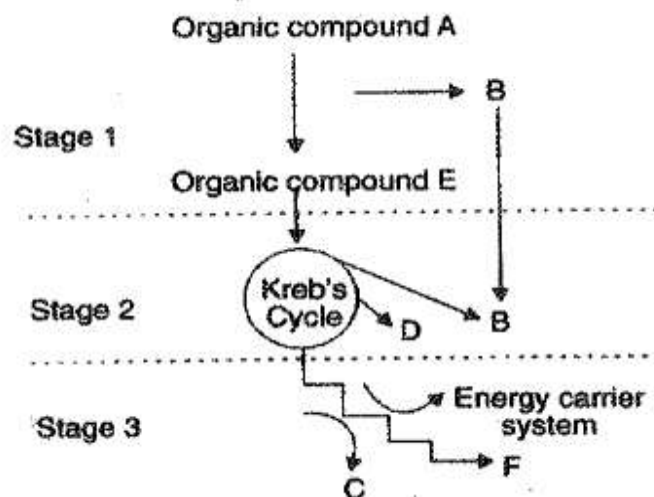
(12)

3.4 The following table shows how effective POST EXPOSURE PROPHYLACTIC (PEP) drugs are if taken after different periods of exposure to the HI virus.

PERIOD OF EXPOSURE(HOURS)	0	24	72	84	96
EFFECTIVENESS (DRUG 1%)	100	100	52	0	0
EFFECTIVENESS (DRUG 2%)	100	80	60	30	20

Draw a simple line graph to show the above information (6)

3.5 The stages in cellular respiration in an animal cell are shown below.



3.5.1 Identify

- Stage 1
- Stage 2
- The organic compound A
- The energy-rich atoms B
- The energy-rich compound C
- The gas D

(6)

3.5.2 In which organelle do stages 2 and 3 occur? (1)

3.5.3 Where in a cell does stage 1 occur? (1)

3.5.4 Name a hormone which influences the process of respiration in man and explain its function (2)

(10)

**TOTAL SECTION B = 80**

**SECTION C**

**QUESTION 4: Essay**

The digestive system of a man is a highly specialised structure. Describe the pathway followed by a piece of bread which is purely STARCH from the time it is eaten until the digested food first reaches the liver.

**CONTENT: (17)**

**SYNTHESIS: (3)**

**TOTAL: (20)**

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

**TOTAL SECTION C = 20**

**GRAND TOTAL: 150 MARKS**