



# **Basic Education**

KwaZulu-Natal Department of Education  
REPUBLIC OF SOUTH AFRICA

**LIFE SCIENCES**

**COMMON TEST**

**JUNE 2015**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**MARKS: 150**

**TIME: 2½ hours**

**N.B. This question paper consists of 15 pages.**

**INSTRUCTIONS AND INFORMATION**

Read the following instructions carefully before answering the questions:

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answer 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.
8. Draw diagrams, flow charts or tables only when asked to do so.
9. The diagrams in this question paper are NOT necessarily drawn to scale.
10. Do NOT use graph paper.
11. You must use a non-programmable calculator, protractor and a compass where necessary.
12. Write neatly and legibly.

**SECTION A****QUESTION 1**

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

1.1.1 A scientist designed an experiment to test the effect of temperature on bacterial growth. He grew three different cultures of the bacterium *E. coli* under three heat lamps at different temperatures.

What was the independent variable in this experiment?

- A Length of the experiment
- B Number of bacteria
- C Reproduction rate
- D Temperature

1.1.2 Angiosperms are classified as spermatophytes because they ...

- A produce flowers.
- B produce seeds.
- C have seeds enclosed in fruit.
- D produce cones.

1.1.3 When testing a leaf for starch the leaf is placed in boiling alcohol to ...

- A dissolve the cytoplasm.
- B remove the starch.
- C absorb the chlorophyll.
- D stop metabolic processes.

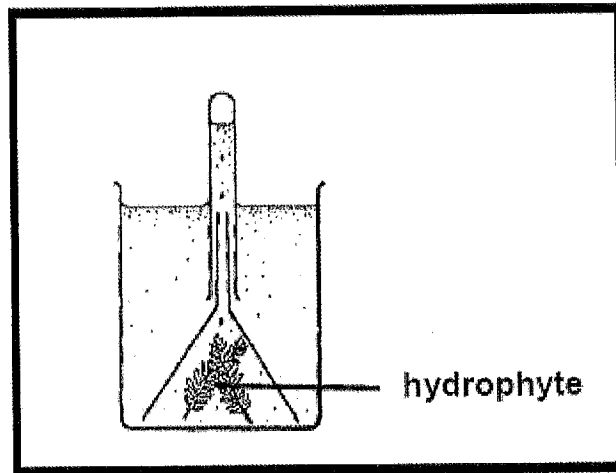
1.1.4 A high carbohydrate diet lacking in proteins is a characteristic of a nutritional disorder called ...

- A marasmus.
- B kwashiorkor.
- C anorexia.
- D bulimia.

1.1.5 Which ONE of the following is a function of the mitochondria?

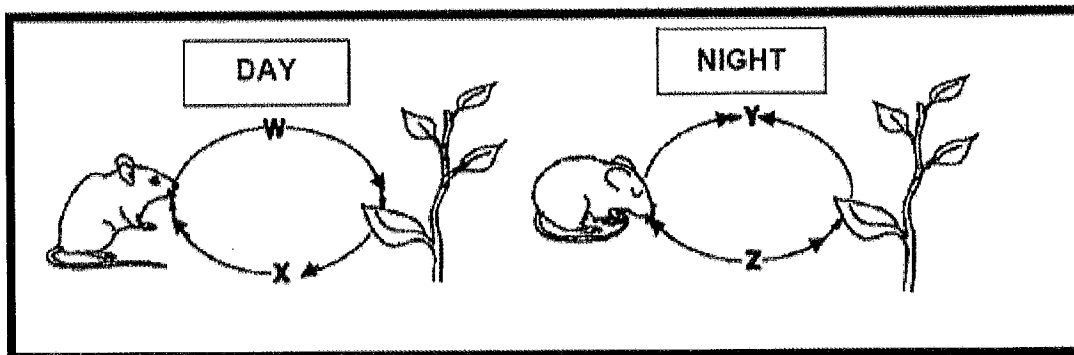
- A Deamination
- B Production of oxygen
- C Storage of glucose
- D Release of energy

- 1.1.6 In the investigation below, sodium bicarbonate is added to the water in the beaker.



Which ONE of the following is the reason for adding sodium bicarbonate to the water?

- A It helps to maintain a constant pH level
  - B It absorbs all carbon dioxide
  - C It produces a large amount of oxygen for photosynthesis
  - D It provides carbon dioxide necessary for photosynthesis
- 1.1.7 The diagram below shows the possible movement of two gases during the day and during the night.



Which letters represent carbon dioxide?

- A W and Y
- B W and Z
- C X and Y
- D X and Z

1.1.8 During anaerobic respiration in yeast cells ...

- A free oxygen is produced.
- B a large amount of energy is formed.
- C lactic acid is produced.
- D alcohol is formed.

1.1.9 A jellyfish belongs to the phylum Cnidaria because it has ...

- A an exoskeleton made of chitin.
- B a fluid-filled coelom that forms a hydrostatic skeleton.
- C a fluid-filled gut that forms a hydrostatic skeleton.
- D no skeleton.

1.1.10 A characteristic of the Chordata is that they ...

- A have bilateral symmetry.
- B have mammary glands.
- C are diploblastic.
- D have no coelom.

(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 – 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

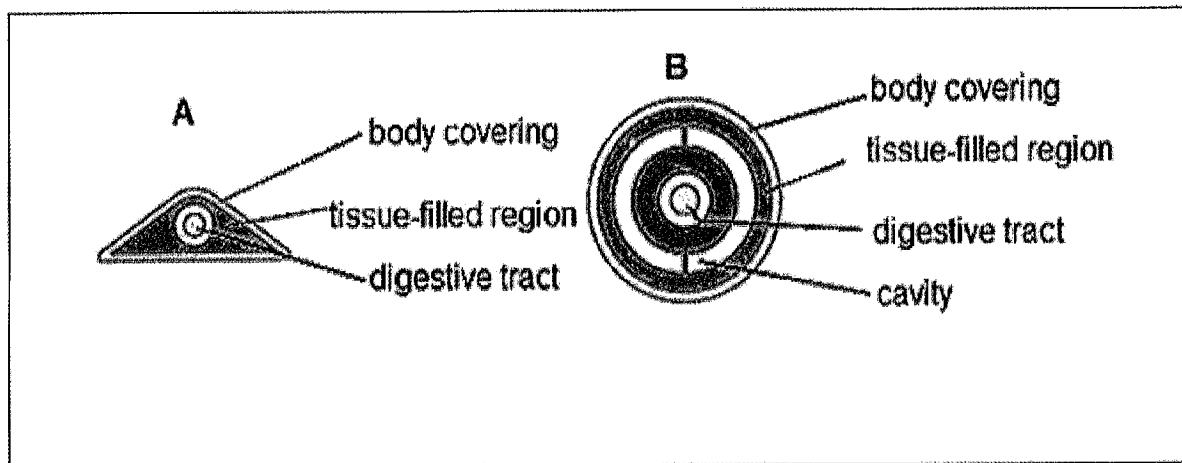
(10 x 1) (10)

- 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 1.3.6) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 Triploblastic organisms	A: Platyhelminthes B: Annelida
1.3.2 Plants that have naked seeds	A: Pteridophytes B: Bryophytes
1.3.3 The layer of cells in the embryo that will develop into the epidermis and nervous system	A: Ectoderm B: Endoderm
1.3.4 The digestive juice that enters the duodenum through a duct	A: Pancreatic juice B: Gastric juice
1.3.5 Disease caused by a virus	A: Malaria B: Cholera
1.3.6 Root-like structures in moss plants	A: Thallus B: Rhizoids

(6 x 2) (12)

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



1.4.1 Write the LETTER only of the diagram that represents:

(a) An acoelomate

(b) A coelomate

(2)

1.4.2 State TWO phyla that are represented by body plan **B**.

(2)

1.4.3 From which embryonic layer does the tissue-filled layer develop?

(1)

1.4.4 State the type of symmetry characteristic of organism **B**.

(1)

1.4.5 Give TWO advantages of an exoskeleton in arthropods.

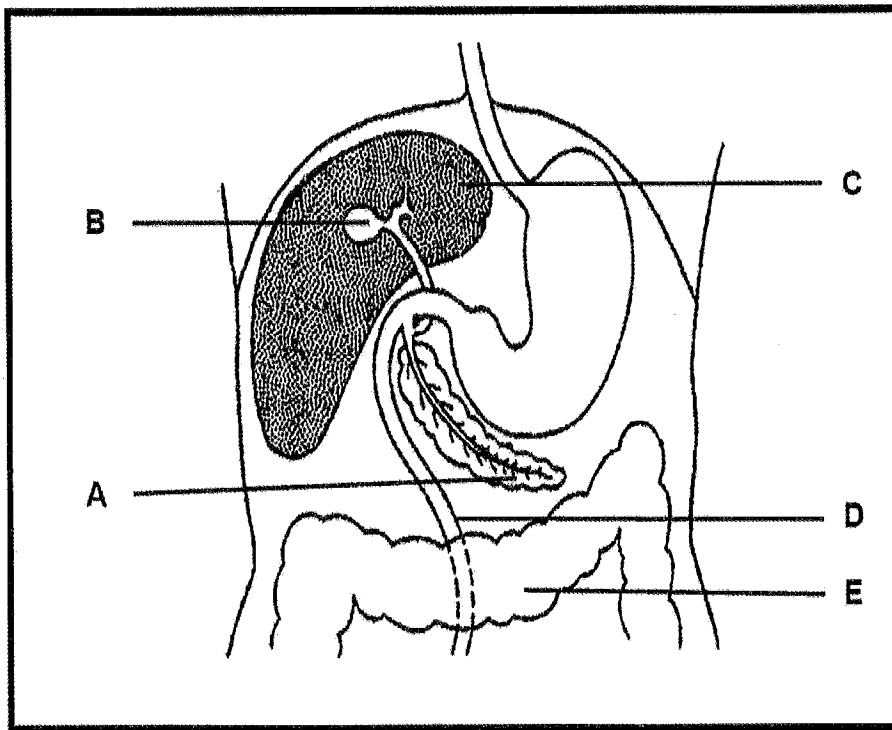
(2)

(8)

**Total Marks: 50**

**SECTION B****QUESTION 2**

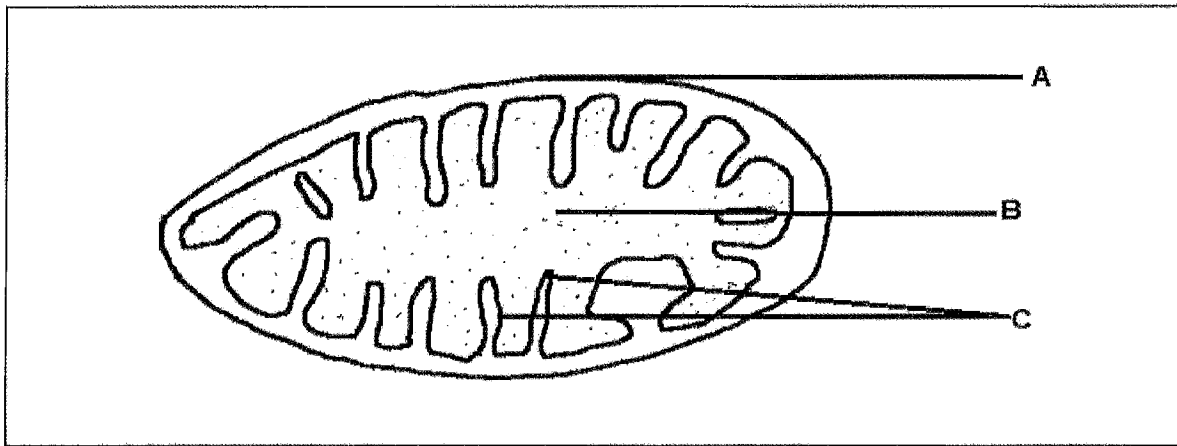
- 2.1 Study the diagram below that shows a part of the human digestive system and answer the questions that follow.



- 2.1.1 Identify parts **A**, **B** and **E**. (3)
- 2.1.2 State TWO functions of the juice secreted by **B**. (2)
- 2.1.3 Explain the significance of mechanical digestion taking place before chemical digestion. (2)
- 2.1.4 Describe how part **C** plays a role after a person consumes a meal rich in carbohydrates. (3)
- (10)**



2.2 The questions that follow are based on the drawing of a cell organelle.



2.2.1 Identify the cell organelle. (1)

2.2.2 Give labels for parts **A** and **B**. (2)

2.2.3 Explain the significance of the folded nature of part **C**. (2)

2.2.4 When cells of living organisms carry out aerobic respiration without taking in or producing food, the organism loses mass.

(a) Will a person who is not eating lose weight quicker if she/he is *resting* or *doing exercise*? (1)

(b) Explain your answer in QUESTION 2.2.4 (a) (2)  
(8)

2.3 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

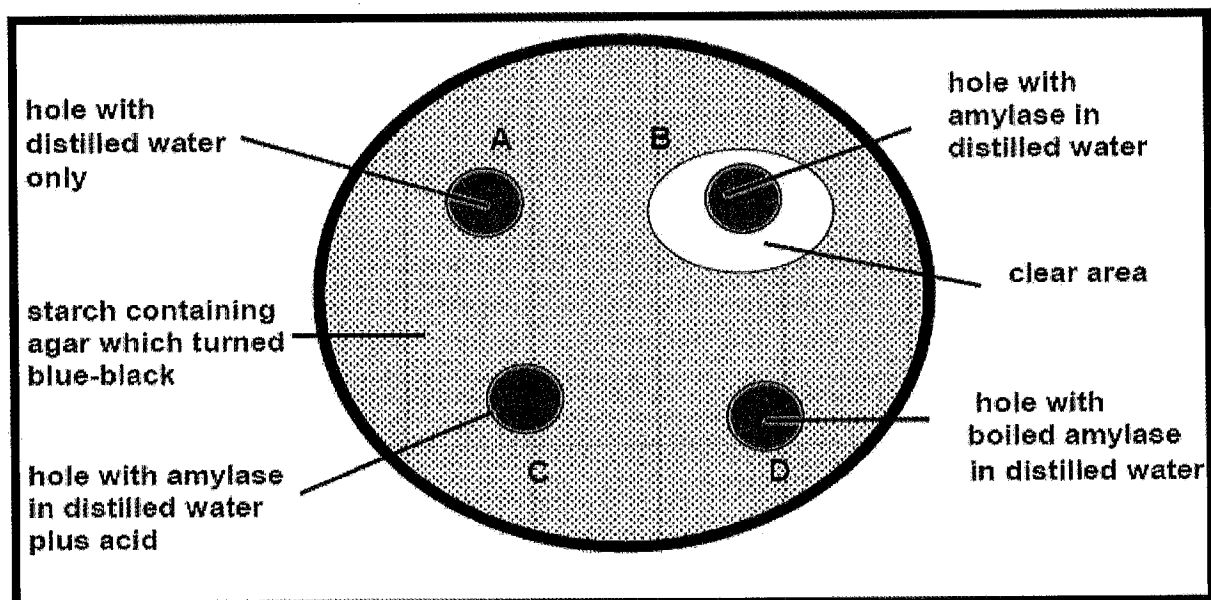
Draw a bar graph to represent the data shown in the table. (6)

- 2.4 In an investigation to determine the action of the enzyme amylase on starch, a group of learners used a shallow dish with agar (a jelly-like growth medium), which contained starch.

Four holes were cut into the agar and each was filled with a different liquid as indicated in the diagram below. The dish was covered and incubated at 37 °C for 24 hours.

After 24 hours, iodine solution was poured over the surface of the agar.

The results are indicated below.



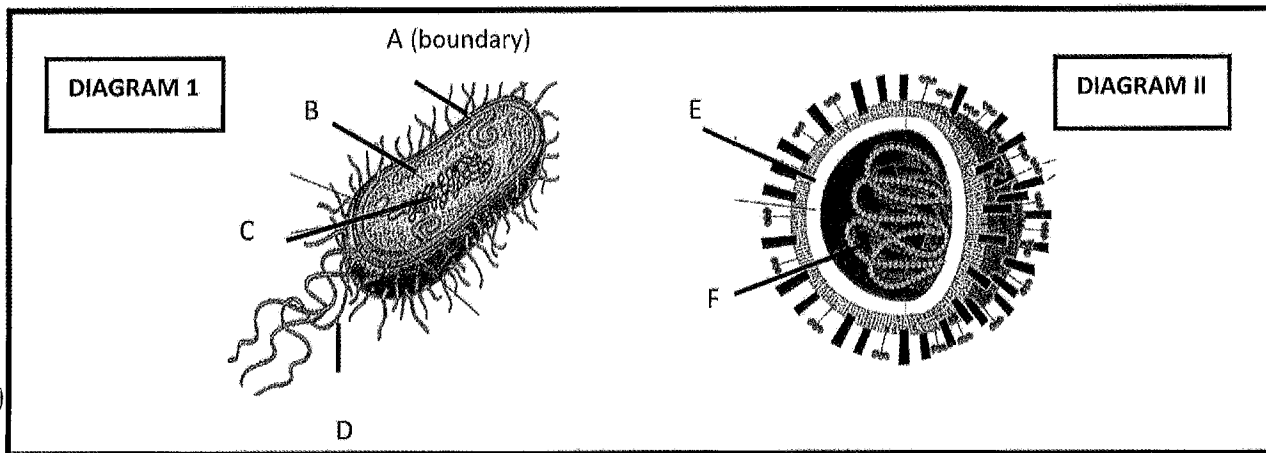
- 2.4.1 Explain the purpose of set-up A? (2)
- 2.4.2 Explain the results at:
- B (3)
  - C (3)
  - D (3)
- 2.4.3 List TWO factors that learners needed to keep the same in order to make a valid comparison. (2)
- 2.4.4 Explain why the incubating dish was kept at 37 °C? (2)
- 2.4.5 State ONE way in which the learners could increase the reliability of their results. (1)

(16)

**Total Question 2: [40]**

**QUESTION 3**

- 3.1 Study the diagram showing two micro-organisms and answer the questions that follow.



- 3.1.1 Write the LETTER only of the part representing the:

- (a) DNA material  
(b) Protein coat (2)

- 3.1.2 Explain the role played part by **F** in the reproduction of the organism in Diagram II. (2)

- 3.1.3 State the type of reproduction that takes place in the organism in Diagram I. (1)

- 3.1.4 List TWO ways in which the organism in Diagram II differs from living cells. (2)

- 3.1.5 Which Diagram (I or II) shows an organism that could cause tuberculosis? (1)

- 3.1.6 Name the type of medication that is used to destroy organisms represented by Diagram I in the human body. (1)

- 3.1.7 Medication mentioned in QUESTION 3.1.6 is ineffective against diseases caused by the organisms in Diagram II.

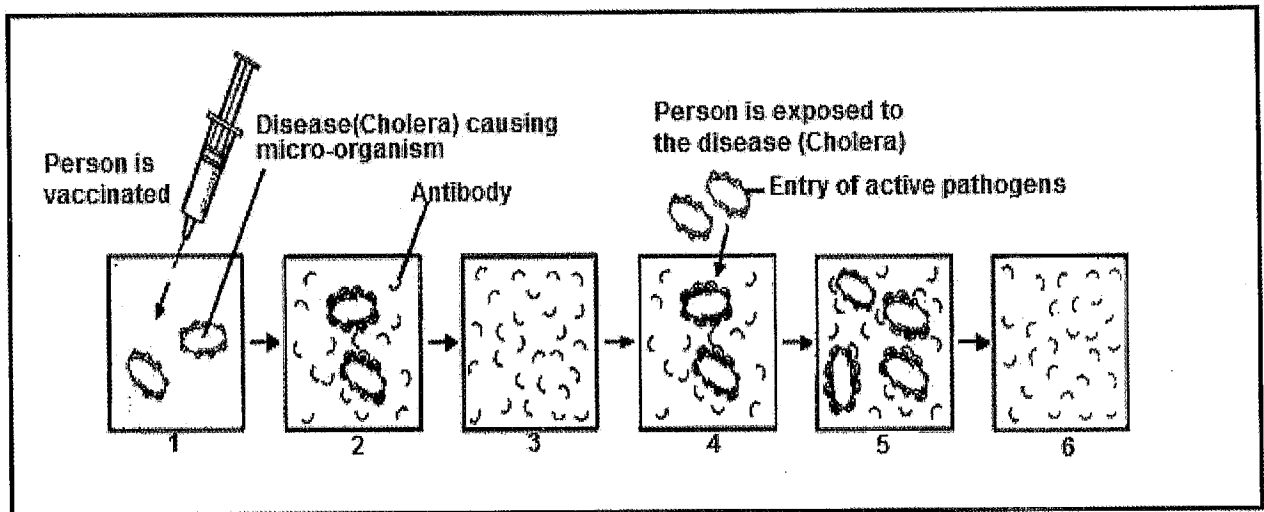
Explain why this medication is still given to people suffering from diseases caused by organisms in Diagram II. (2)

- 3.1.8 List TWO ways in which the government could improve public health and prevent deaths due to diseases like tuberculosis. (2)

**(13)**

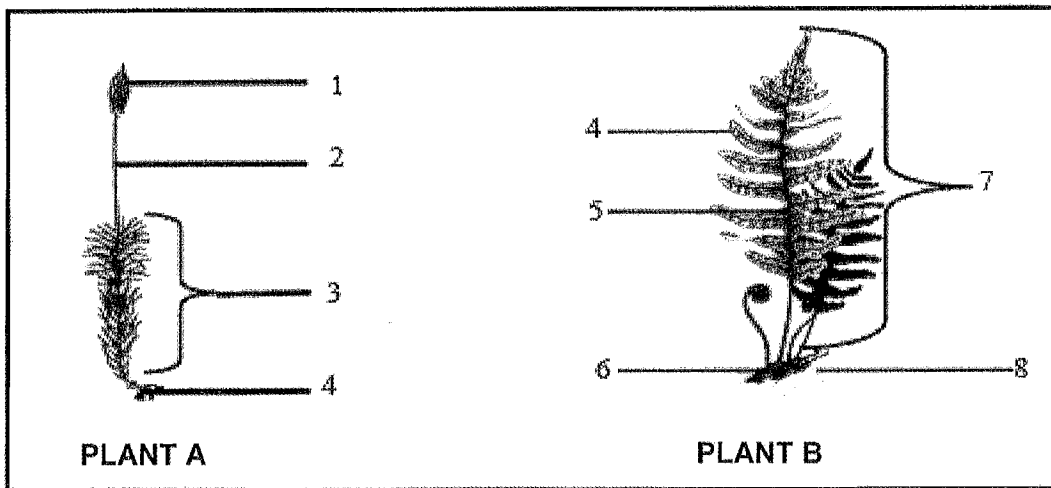
- 3.2 Cholera is caused by exposure to water that is contaminated by pollutants such as sewage.

The following diagrams show how the cholera vaccine works in the human body.



- 3.2.1 What is contained in the vaccine that is injected into the human body? (1)
- 3.2.2 Explain the significance of the process shown in Diagram 2. (2)
- 3.2.3 Explain what happens when a person is later exposed to cholera bacteria as shown in Diagram 4. (2)
- 3.2.4 Name the type of immunity obtained through vaccination. (1)
- 3.2.5 Suggest THREE strategies to prevent a cholera outbreak in rural villages of our country. (3)
- (9)

- 3.3 Study the two plants **A** and **B** from different groups and answer the questions that follow.

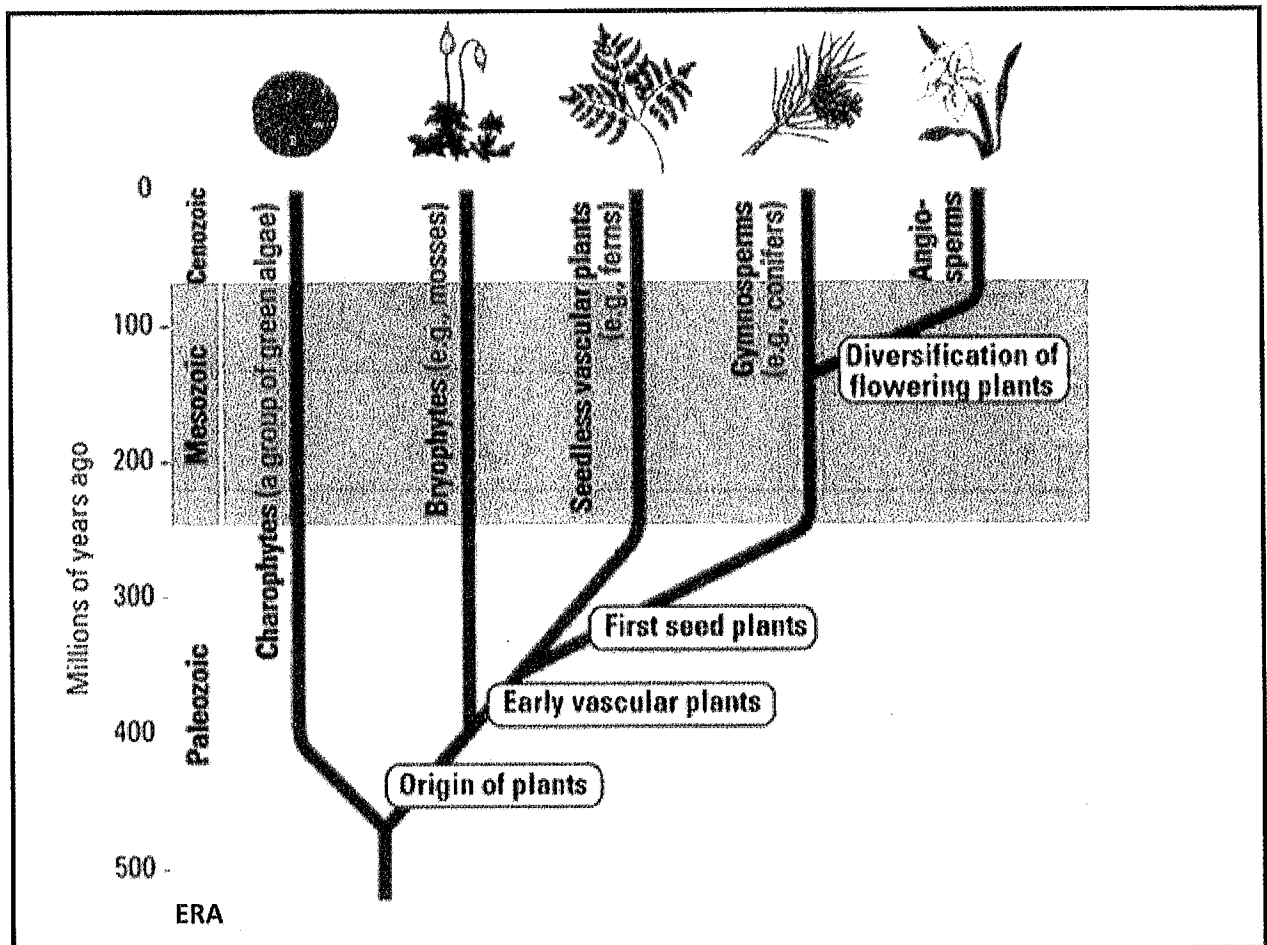


- 3.3.1 Identify the groups to which each of the plants **A** and **B** belong. (2)
- 3.3.2 Name the reproductive structures formed inside the part numbered 1. (1)
- 3.3.3 Is the gametophyte generation of these plants haploid or diploid? (1)
- 3.3.4 Which plant (**A** or **B**) is a thallus? (1)
- 3.3.5 Explain why the plant identified in QUESTION 3.3.4 is a thallus. (1)
- (6)**

- 3.4 Evolution of seeds is one of the most important events in the rise of seed plants.

- 3.4.1 Explain how each of the following features of seeds is important for the plant's survival:
- (a) Seeds can remain dormant for long periods of time (2)
- (b) Some seeds contain endosperm tissue (2)
- 3.4.2 State ONE reason why seed banks are important. (1)
- (5)**

3.5 Study the phylogenetic tree below and answer the questions that follow.



- 3.5.1 In which era did the first land plants appear? (1)
- 3.5.2 According to the diagram, what characteristic is shared by the ferns and conifers but not by the mosses? (2)
- 3.5.3 How long after the appearance of the bryophytes did the flowering plants appear? (2)
- 3.5.4 Explain how the presence of flowers have allowed for greater diversity and abundance of angiosperms. (2)

(7)

**Total Question 3: 40**

**SECTION C****QUESTION 4**

Describe the process of photosynthesis and explain how this process may be influenced by temperature.

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

**Content:** (17)

**Synthesis:** (03)

**(20)**

**GRAND TOTAL: [150]**