



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

LIFE SCIENCES P1

EXEMPLAR 2013

MARKS: 150

TIME: 2½ hours

This question paper consists of 16 pages.

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 for 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 all drawn to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator, protractor and compass, when needed.
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 the ANSWER BOOK, for example 1.1.11 D.

1.1.1 Air breathed out is different from air breathed in because it ...

- A contains less carbon dioxide.
- B is cooler.
- C is drier.
- D contains less oxygen.

1.1.2 The lungs of a long-term smoker will have ...

- A constricted bronchioles.
- B thinner walls.
- C a larger surface area.
- D an increased capacity for gaseous exchange.

1.1.3 Which ONE of the following statements is TRUE about the relationship between a predator and its prey?

- A There is interspecific competition.
- B The size of the predator population is density dependent and is controlled by the size of the prey population.
- C An increased number of predators leads to an increased number of prey.
- D A decreased number of predators leads to a decreased number of prey.

1.1.4 The following are involved in the process of cellular respiration:

1. Energy
2. Carbohydrates
3. Carbon dioxide
4. Water
5. Oxygen

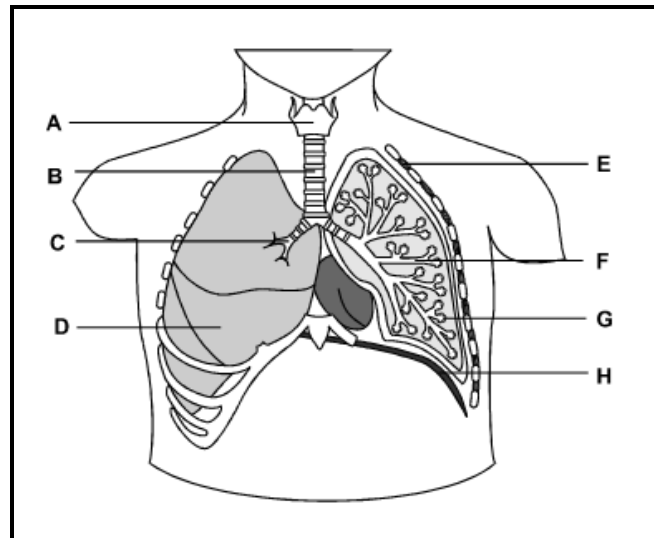
Which ONE of the following equations correctly represents their involvement in the process of cellular respiration?

- A $2 + 3 = 1 + 4 + 5$
- B $2 + 4 = 1 + 3 + 5$
- C $1 + 2 = 3 + 4 + 5$
- D $2 + 5 = 1 + 3 + 4$

1.1.5 A phase that forms part of cellular respiration is the ...

- A Krebs cycle.
- B dark phase.
- C light-independent phase.
- D light phase.

QUESTIONS 1.1.6 and 1.1.7 are based on the diagram below showing the human thorax.



1.1.6 Which of the following are represented by **A**, **D** and **G**?

- A Larynx, trachea, diaphragm
- B Intercostal muscle, bronchus, larynx
- C Larynx, lung, alveolus
- D Bronchiole, lung, alveolus

1.1.7 Which ONE of the following is a function of structure **H**?

- A During inhalation it contracts and during exhalation it relaxes.
- B During inhalation it relaxes and during exhalation it contracts.
- C During inhalation it is arched and during exhalation it relaxes.
- D During inhalation it contracts and during exhalation it is flattened.

1.1.8 Study the features listed below.

1. Lined by hair to remove dust
2. Has cartilage rings that are C-shaped to allow the oesophagus to stretch during swallowing
3. Lined by ciliated columnar tissue with goblet cells to secrete mucus to trap dust and germs

Which combination of features are adaptations of the trachea?

- A 1, 2 and 3
B 1 only
C 2 and 3 only
D 3 only

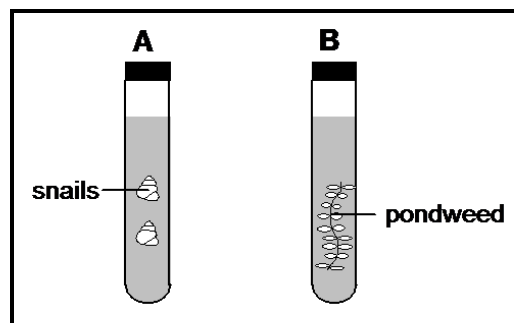
1.1.9 Several features are listed below.

1. Large surface area
2. Thin surface
3. Moist surface
4. Many capillaries

Which of the above are features of an efficient gaseous exchange surface?

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

1.1.10 Test tubes **A** and **B** below were placed in bright light.



Which of the following is correct regarding the test tubes?

- A CO_2 will be used in test tube **A**.
B O_2 and CO_2 will be produced in test tube **B**.
C O_2 and CO_2 will be produced in test tubes **A** and **B**.
D CO_2 will be used in test tubes **A** and **B**.

(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 1.2.6) in the ANSWER BOOK, for example 1.2.7 oxygen.

1.2.1 The hunting of elephants in order to regulate their population size

1.2.2 A protective membrane surrounding the lungs

1.2.3 The process in plants during which radiant energy is converted into chemical energy

1.2.4 The inherent ability of a population to increase in size

1.2.5 The process of filtering the accumulated waste products of metabolism from the blood of a patient whose kidneys are not functioning properly

1.2.6 A chronic medical disorder of the lungs in which the air sacs are dilated or enlarged and lack flexibility

(6)

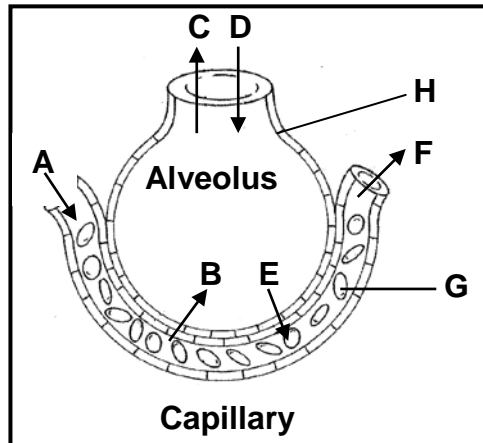
1.3 Indicate whether each of the statements in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 to 1.3.6) in the ANSWER BOOK, for example 1.3.7 B only.

COLUMN I		COLUMN II
1.3.1	Mouth-to-mouth respiration	A: artificial respiration B: resuscitation
1.3.2	The maximum number of individuals in a population that can be supported by the environment	A: carrying capacity B: limiting factor
1.3.3	A product of cellular respiration which supplies energy needed for metabolic reactions in cells	A: oxygen B: ATP
1.3.4	Breathing muscles	A: intercostal muscles B: diaphragm muscle
1.3.5	The series of changes in an ecosystem community from bare rock to a forest	A: succession B: resource partitioning
1.3.6	An example of social organisation that increases the chances of survival	A: division of labour in bees B: a herd of zebras

(6 x 2)

(12)

1.4 The diagram below represents an alveolus and its blood capillary.



Indicate the letter on the diagram which represents each of the following. Write only the letter (A to G) next to the question number (1.4.1 to 1.4.5) in the ANSWER BOOK, for example 1.4.6 H.

- | | | |
|-------|---|------------|
| 1.4.1 | Red blood corpuscle | (1) |
| 1.4.2 | Squamous epithelial cells of the alveolus | (1) |
| 1.4.3 | The direction in which most oxygen molecules will move between the alveolus and blood capillary | (1) |
| 1.4.4 | The area with the highest carbon dioxide concentration in the blood capillary | (1) |
| 1.4.5 | The area with the lowest oxygen concentration in the blood capillary | (1) |
| | | (5) |

1.5 Choose a term from the list below that matches each of the following examples of social behaviour. Write only the letter (A to F) next to the question number (1.5.1 to 1.5.7) in the ANSWER BOOK, for example 1.5.8 G.

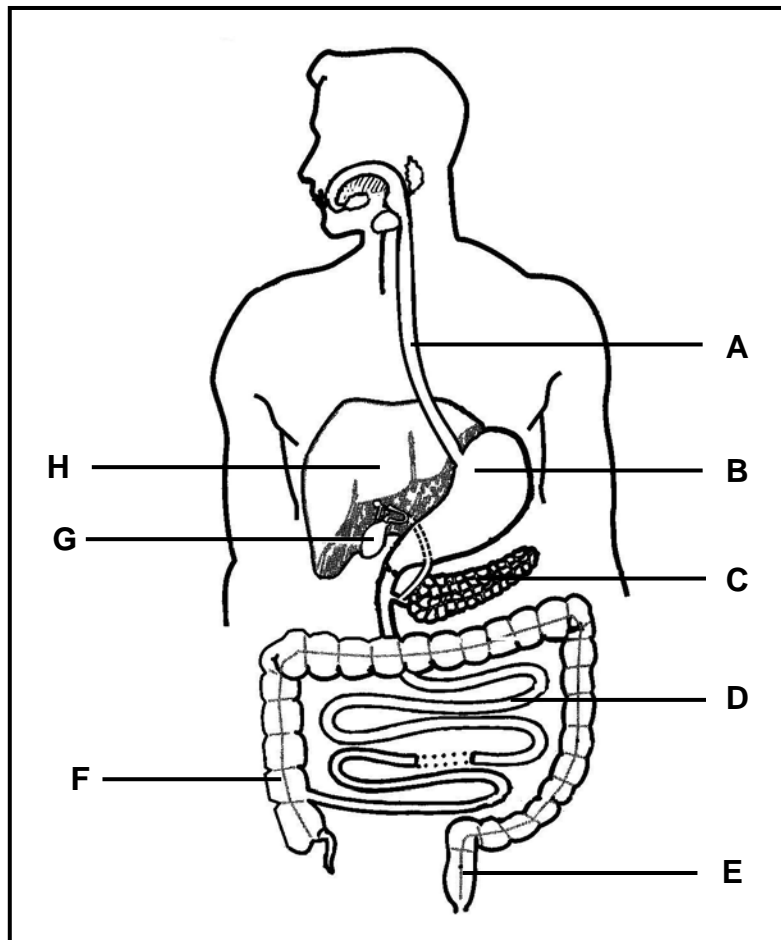
- A Resource partitioning
- B Intraspecific competition
- C Commensalism
- D Mutualism
- E Interspecific competition
- F Parasitism

- 1.5.1 Peacocks display the large, brightly-coloured feathers of their tails.
- 1.5.2 A hippopotamus deposits a mixture of dung and urine on the edge of a grazing area.
- 1.5.3 Vultures and crows feed on the same carcass.
- 1.5.4 A remora fish attached to a shark gets leftovers when the shark feeds.
- 1.5.5 Bees visit flowers to get nectar whilst pollen attaches to their bodies.
- 1.5.6 Different animals feed on different types of vegetation like grass, shrubs and trees.
- 1.5.7 Mosquitoes bite and deposit the malaria-causing organism into the blood of a human. (7)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

2.1 Study the diagram below which shows the human digestive system.



2.1.1 Label parts **A**, **C**, **E** and **H**. (4)

2.1.2 Write the LETTER only of the part:

(a) That stores bile (1)

(b) Where chemical digestion of protein begins (1)

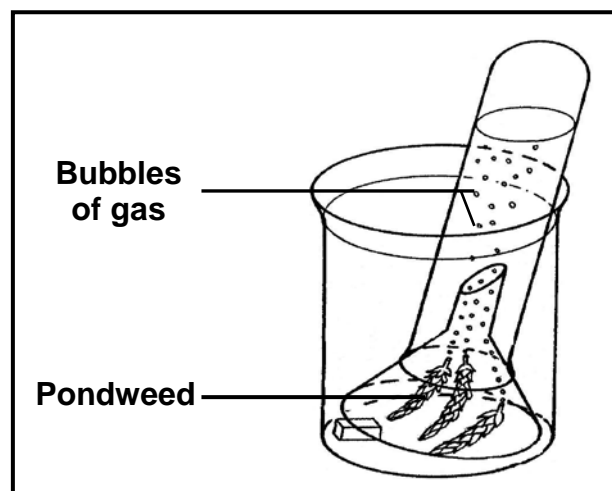
(c) Where most water and mineral salts are absorbed (1)

(7)

2.2 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 apparatus was set up as shown in the diagram below.



The results are shown in the table below.

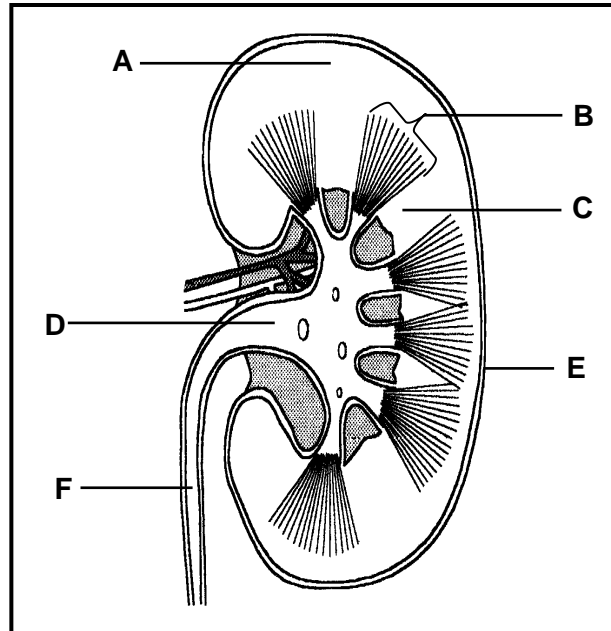
COLOUR OF LIGHT	TIME TAKEN TO RELEASE 20 BUBBLES (SECONDS)
Violet	80
Blue	40
Green	160
Yellow	140
Red	70

- 2.2.1 Which colour light is the best for photosynthesis? (1)
- 2.2.2 State the:
- (a) Independent variable (1)
- (b) Dependent variable (1)
- 2.2.3 Calculate the average time taken for the release of 20 bubbles for all colours. Show all working. (3)
- 2.2.4 Express bubble production under violet, blue and green light as a ratio. (2)

- 2.2.5 Explain why the apparatus is left for 5 minutes under each colour of light before taking measurements. (2)
- 2.2.6 Without modifying the apparatus, how could the reliability of the results be increased? (1)
- 2.2.7 Using the results, explain how, when white light shines on the plant, the leaves appear to be green. (2)
- 2.2.8 Draw a bar graph of the results shown in the table. (8)
- (21)**
- 2.3 Draw a labelled diagram of an organelle present in the leaves of plants to show where photosynthesis takes place. (5)
- 2.4 Tabulate THREE differences between aerobic and anaerobic respiration. (7)
- [40]**

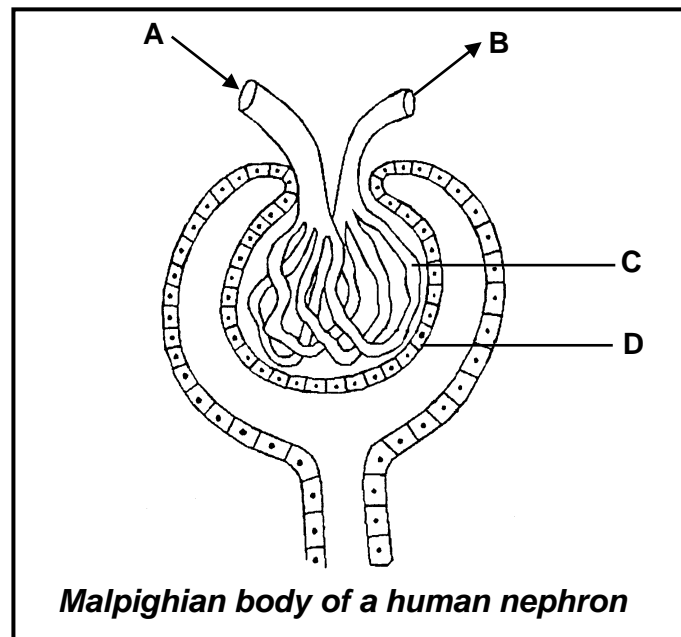
QUESTION 3

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



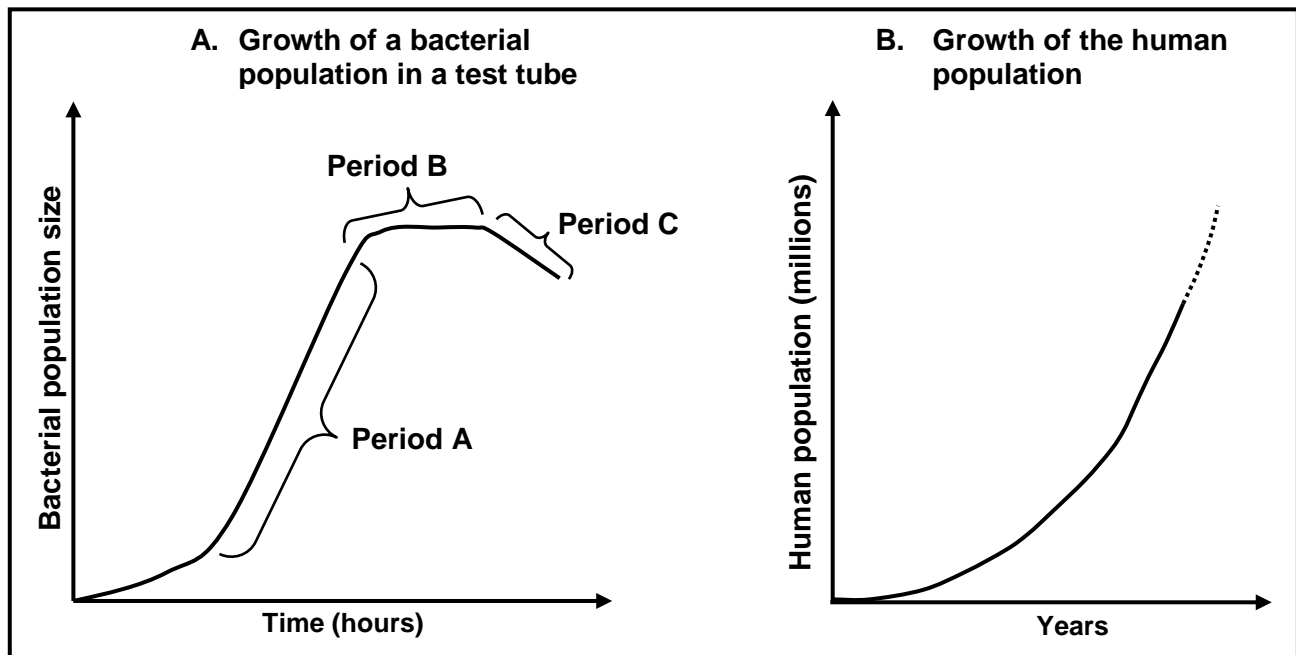
- 3.1.1 Name the organ represented in the diagram. (1)
- 3.1.2 Identify region **A** and parts **B** and **D**. (3)
- 3.1.3 Give the function of each of the following parts:
- (a) E (1)
- (b) F (1)
- 3.1.4 Give **THREE** functions of the organ named in QUESTION 3.1.1. (3)
- (9)**

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



- 3.2.1 In which region of the kidney would you find this structure? (1)
- 3.2.2 Name the process in urine formation that occurs in this structure. (1)
- 3.2.3 Identify part **C**. (1)
- 3.2.4 Describe TWO structural adaptations of part **C** for the process in QUESTION 3.2.2 above. (4)
- 3.2.5 Part **A** is wider than part **B**. What is the importance of this? (2)
- 3.2.6 Name the hormone secreted when there is a shortage of water in **A**. (1)
- 3.2.7 Describe how the hormone named in QUESTION 3.2.6 plays its role under such conditions. (3)
- (13)**

- 3.3 GRAPH A below represents the number of bacteria in a growth culture over a period of time. GRAPH B shows changes in the human population size over a period of time.



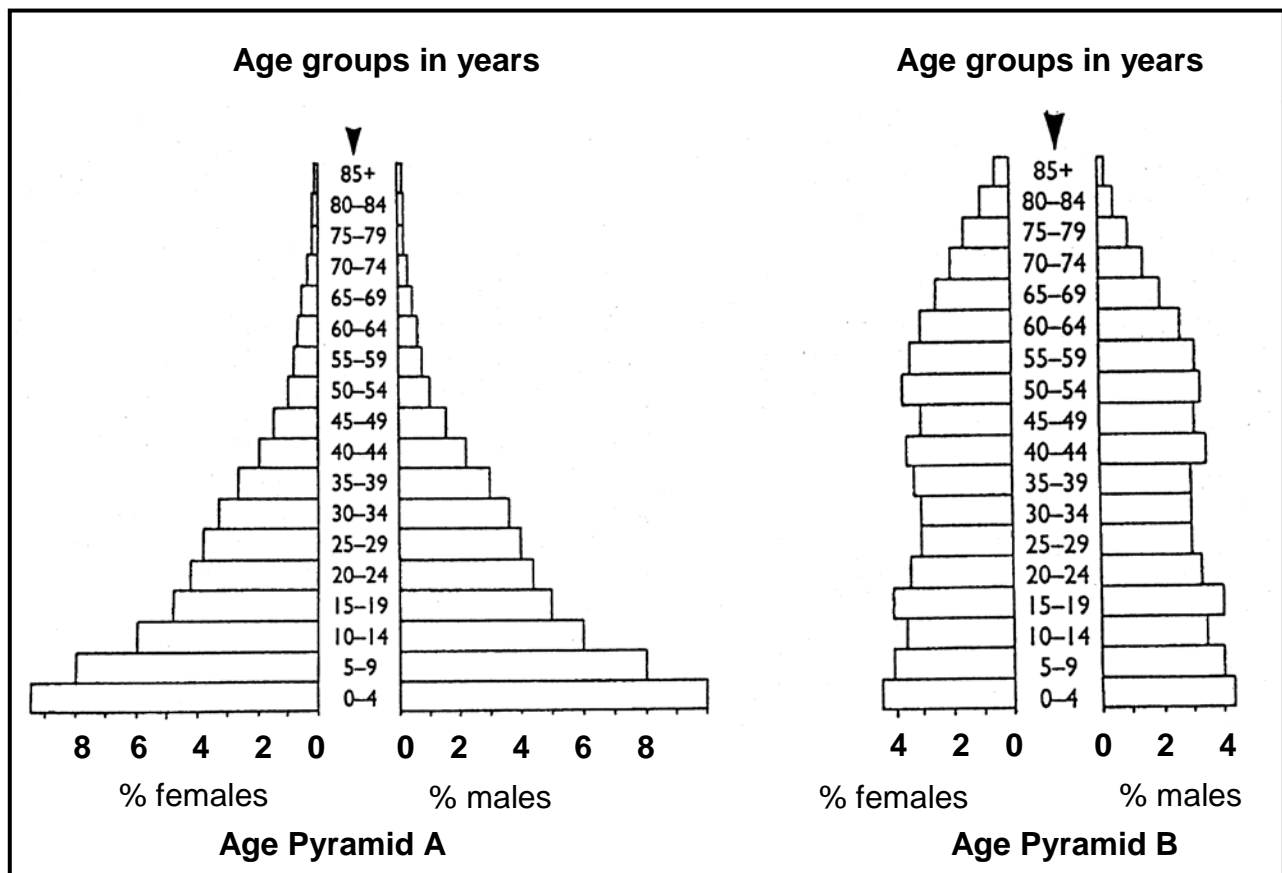
Use GRAPH A to answer the following questions.

- 3.3.1 During which period (**A**, **B** or **C**) did natality exceed mortality for many hours? (1)
- 3.3.2 Account for the pattern of growth during Period B. (3)

Use GRAPH B to answer the following questions.

- 3.3.3 In what way is the growth of the human population similar to that of the bacterial population? (1)
- 3.3.4 Explain why it may take the human population longer to reach the type of growth shown by the bacteria population in Period B. (4)
- 3.3.5 State TWO precautionary measures which may be implemented in South Africa to slow down the growth in the population. (2)
- (11)**

3.4 The diagrams below represent the age distribution of the human population of a developed country and a developing country in one year at a certain time.



- 3.4.1 What percentage of the female population is aged between 5 and 9 years in Pyramid A? (1)
- 3.4.2 Which age group makes up exactly 5% percent of the male population in Pyramid A? (1)
- 3.4.3 What percentage of the female population are aged 65 to 69 years in Pyramid B? (1)
- 3.4.4 Which group (male or female) has the larger percentage reaching old age in Pyramid B? (1)
- 3.4.5 Which pyramid represents the population distribution of a developed country? (1)
- 3.4.6 Give TWO reasons for your answer to QUESTION 3.4.5. (2)

(7)
[40]

TOTAL SECTION B: 80

SECTION C**QUESTION 4**

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

Content: **(17)**
Synthesis: **(3)**

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

TOTAL SECTION C: 20
GRAND TOTAL: 150