



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

LIFE SCIENCES

ASSIGNMENT

20 August 2026

MARKS: 100

TIME: 2 HOURS

This question paper consists of 12 pages including the cover page

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 of 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 drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and a compass.
11. Write neatly and legibly.

SECTION A**QUESTION 1**

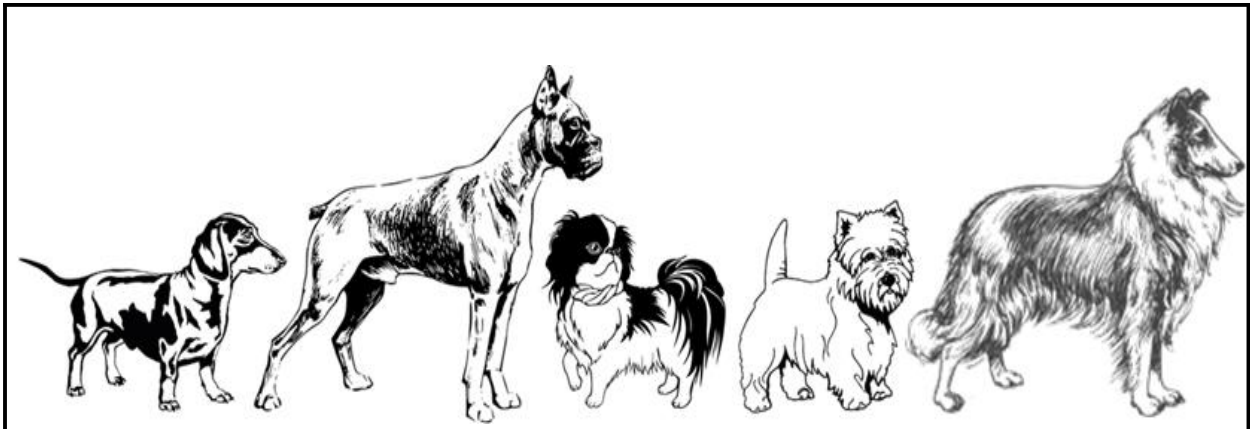
- 1.1 Bontebok are antelopes that are found in the Western Cape. Two main populations exist, one at the Bontebok National Park and the other at Table Mountain National Park. These two national parks are hundreds of kilometers apart. Scientists believe that due to geographical separation, new species **may be formed**.

1.1.1 Define the term 'Population'. (3)

1.1.2 Define the term 'Species'. (3)

(6)

- 1.2 Many dog breeds exist today as shown in the diagram below.



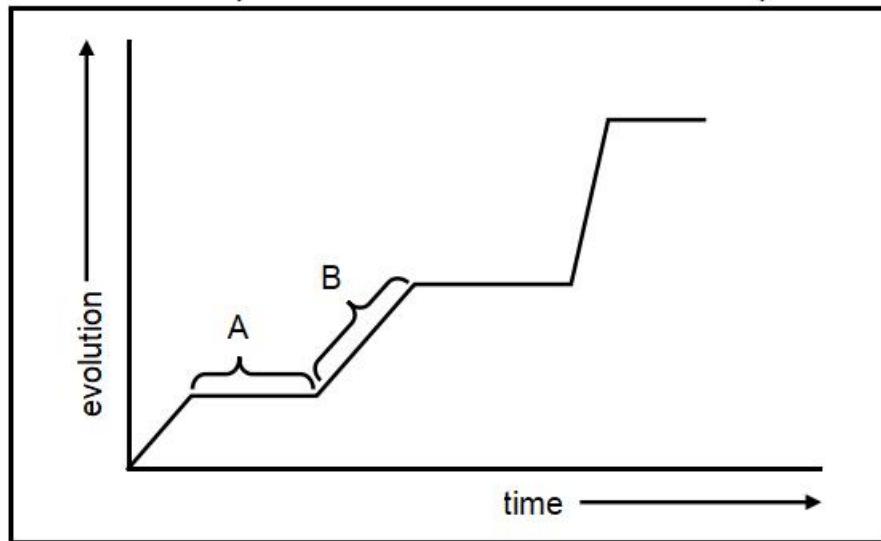
1.2.1 Name the process whereby the different breeds of dogs were produced. (1)

1.2.2 Explain why all breeds of domestic dogs belong to the same species. (2)

1.2.3 Describe how artificial selection has led to different breeds of domestic dogs. (3)

(6)

1.3 The graph below shows the speed at which evolution occurs in a species of butterfly.



1.3.1 Name the type of evolution is represented by the graph? (1)

1.3.2 Identify the trend in evolution represented by:

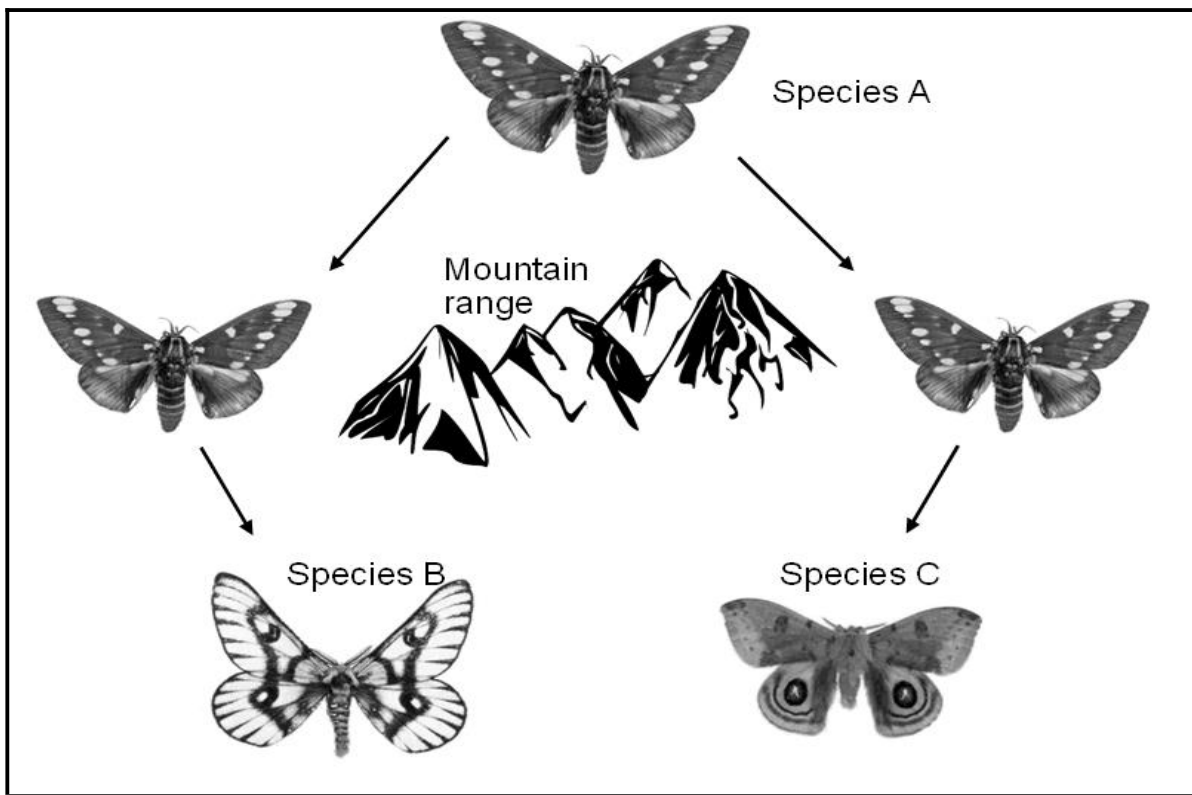
(a) Phase A (1)

(b) Phase B. (1)

1.3.3 Explain why the chances of speciation are great during phase B (3)

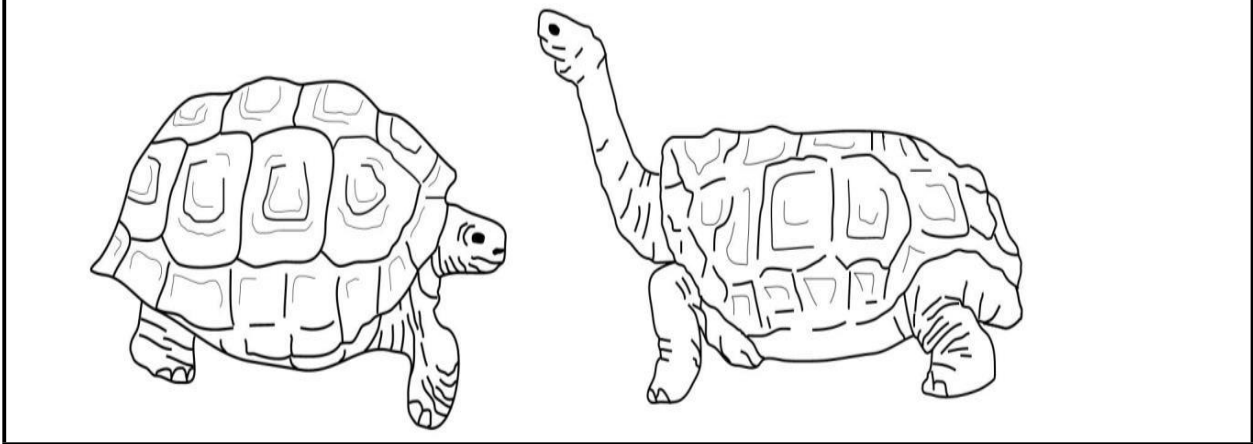
(6)

- 1.4 Study the diagram below showing a moth species that originally formed a single population but was later divided into two groups by the formation of a mountain.



- 1.4.1 Name the process which is illustrated in the diagram above. (1)
- 1.4.2 Explain the importance of the process you identified in question 1.4.1 above. (2)
- 1.4.3 Why is species A regarded as the ancestor of species B and C? (2)
- 1.4.4 Explain the above illustrated process in relation to the three species indicated in the diagram. (5)
- (10)

- 1.5 Darwin discovered two different species of tortoises on two different islands in the Galapagos. One had a domed shell and short neck, the other had an elongated shell and a longer neck. The two islands had very different vegetation. One of the islands (island X) was rather barren, dry and arid. It had no grass but rather short tree-like cactus plants. On the other island (island Y), there were no cactus plants, but it had a good supply of water and grass grew freely. The diagram below shows the two main species of tortoise.



- 1.5.1 Which tortoise (1 or 2) would have been found on:

(a) Island X (1)

(b) Island Y (1)

- 1.5.2 Scientists believe that the variation in populations leads to the formation of new species.

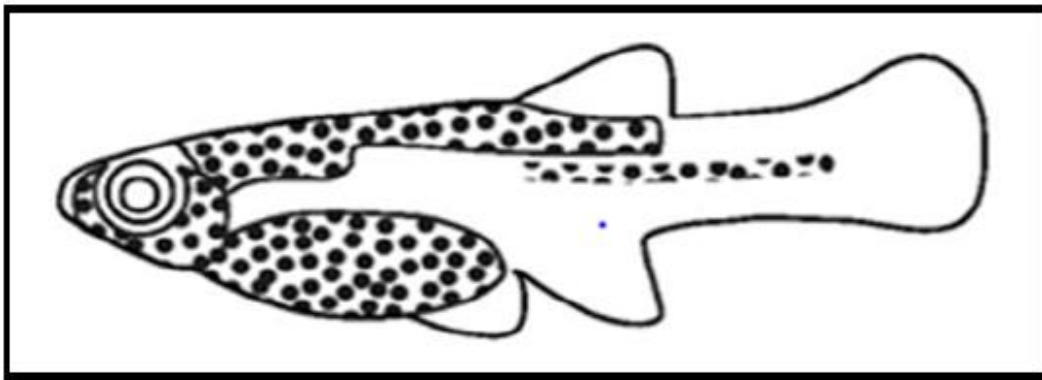
List two sources of variation in populations. (2)

(4)

TOTAL SECTION A: [34]

SECTION B**QUESTION 2**

- 2.1 A scientist used guppies (*Poecilia reticulata*) in an investigation to test Darwin's theory of natural selection. Male guppies have brightly coloured spots to attract females, but these spots also attract predators. It was previously observed that males living in streams where there were many predatory fish tended to have fewer spots. This reduced their risk of being eaten. Those males living in streams with fewer predators had more spots.



Guppy showing spots (adapted from www.decodedscience.org)

The **procedure** for the investigation was as follows:

- Equal numbers of male and female guppies were put into two ponds (pond 1 and pond 2).
- In pond 1, predatory fish that prey on guppies were introduced.
- In pond 2, predatory fish that do not feed on guppies were introduced.
- The guppies were allowed to breed for 20 months, representing several generations of guppies. (Guppies reproduce when they are about three months old.)

The **result** of the investigation:

The male guppies in pond 2 had significantly more spots than the male guppies in pond 1.

- 2.1.1 State THREE planning steps to consider when conducting this investigation (3)
- 2.1.2 How could the validity of this investigation be increased? (2)
- 2.1.3 Identify the:
- (a) Independent variable (1)
 - (b) Dependent variable (1)
- 2.1.4 Explain why the scientist included pond 2 in this investigation. (3)
- 2.1.5 Describe how Darwin's theory of natural selection can be used to explain why the guppies in pond 1 had fewer spots. (5)
- (15)**
- 2.2 Study the extract below which describes the evolution of the snake.

How snakes lost their limbs has long been a mystery to scientists: New research on a 90-million-year-old snake fossil suggests that snakes evolved to live and hunt in burrows as many snakes still do today. It is generally accepted that snakes and lizards are closely related, although very few transitional fossils have been found to support this generalization.

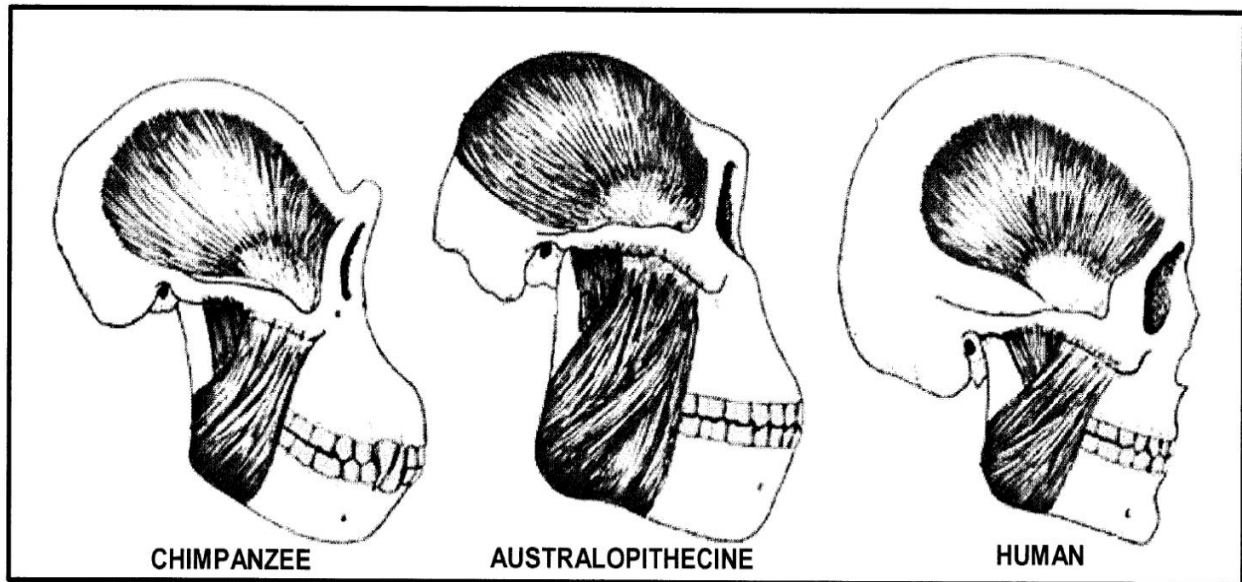
- (a) Explain one characteristic that you would expect a transitional snake fossil to have. (1)
- (b) Describe how Jean Baptiste de Lamarck would have explained the loss of limbs in snakes? (4)

(5)

TOTAL QUESTION 2: [20]

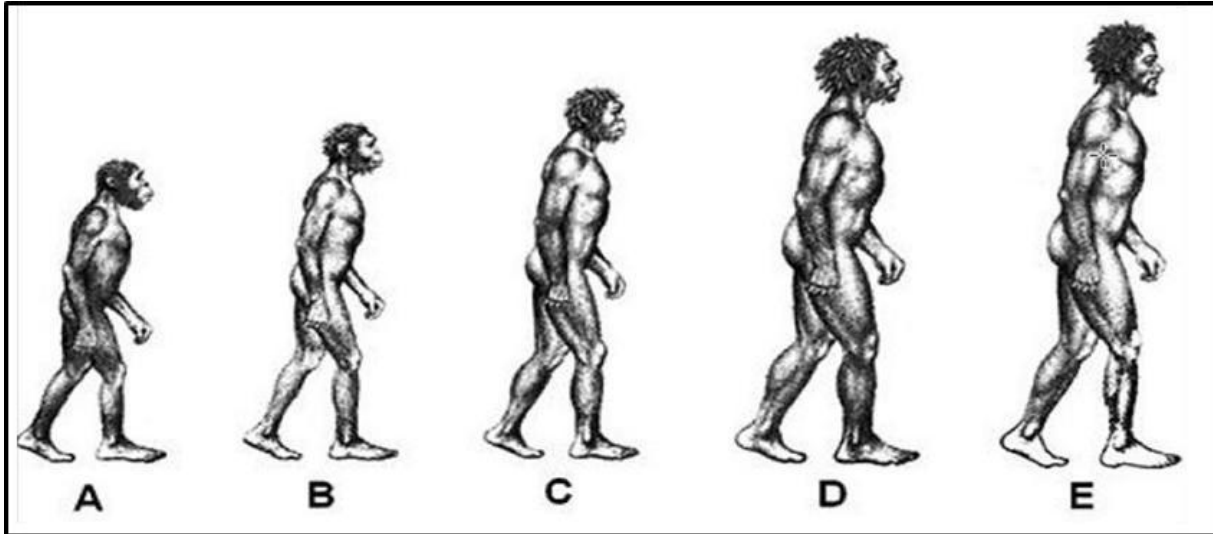
QUESTION 3**HUMAN EVOLUTION: 46 MARKS**

- 3.1 Study the following diagrams of the skull of a chimpanzee, an Australopithecine and a modern human.



- 3.1.1 Using the diagram above, give the sequence in which the genus and organisms appeared on earth. (2)
- 3.1.2 Tabulate two observable differences between the skull of Chimpanzee and human. (5)
- 3.1.3 Humans and Apes share many characteristics, yet each is distinct species. Name three characteristics that Apes share with humans. (3)
- (10)

- 3.2 The diagram above shows the progression of human evolution. Study the diagram of some early hominin A, B, C, D and E which represent Homo erectus, Homo sapiens, Australopithecus, Homo habilis and Homo Neanderthalensis, in no order.



- 3.2.1 Name the family the above group belongs to and the collective name for these members. (1)
- 3.2.2 Identify each of the above hominid members (A – E) correctly from the list given above. (5)
- 3.2.3 Name and explain the THREE skeletal structures that contributed to bipedalism in humans. (9)
- (15)**

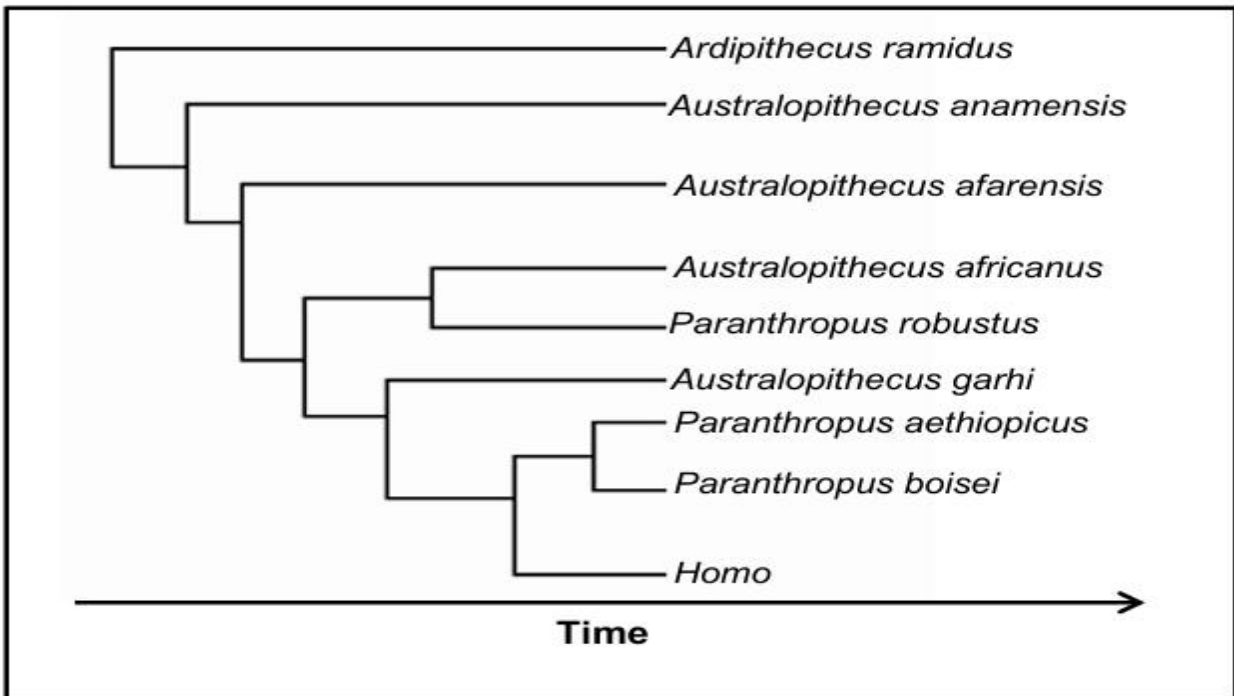
- 3.3 A larger brain size is often associated with greater intelligence. Accordingly, Homo neanderthalensis, with a larger brain than Homo sapiens, should have been more intelligent, and thus better able to adapt to climate changes. Yet H. neanderthalensis is extinct, while H. sapiens flourishes.

- 3.3.1 What is meant by the term extinction? (2)
- 3.3.2 What other factors related to the brain could the above statement explain? (2)
- (4)**

TOTAL QUESTION 3: [29]

QUESTION 4

4.1 The diagram below shows possible evolutionary relationships between hominids.



[Source: <http://tolweb.org/tree>]

- 4.1.1 Identify the type of diagram above. (1)
- 4.1.2 According to this diagram, which ... (1)
- (a) Genus is most recently evolved? (1)
 - (b) Genus of hominin the oldest? (1)
 - (c) Hominin species shares a common ancestor with *Australopithecus africanus*? (1)
- 4.1.3 Give THREE examples of an *Australopithecus africanus* fossil found in South Africa. (3)
- (7)

- 4.2 Scientists use fossils as evidence for human evolution. The brain volume of some extinct primates has been estimated from their fossils and has been compared to the brain volumes of living primates. The results are shown in the table below (figures in brackets give mid-point of existence).

Hominid	Period of Existence (million years ago)	Average Brain Volume (mL)
Ardipithecus ramidus	5,8 to 4,4 (5,1)	400
Australopithecus afarensis	4 to 2,7 (3,4)	450
Australopithecus africanus	3 to 2 (2,5)	450
Homo habilis	2,2 to 1,6 (1,9)	750
Homo erectus	2 to 0,4 (1,2)	1 000
Homo neanderthalensis	0,3 to 0,23 (0,27)	1 500
Homo sapiens	0,2 to present (0,1)	1 400
Modern apes	0,2 to present (0,1)	500

- 4.2.1 Calculate the difference in brain volume (in mL) between the two living primates. Show all calculations. (3)
- 4.2.2 Indicate the name of the fossil with highest cranial capacity. (1)
- 4.2.3 Draw a line graph to show the evolution of brain size across all hominin species listed in the table. Use the mid-point of the period of existence on one axis. (6)
- (10)

TOTAL QUESTION 4: [17]

TOTAL SECTION B: 66

GRAND TOTAL: 100