



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2

VERSION 2 (OLD CONTENT) FOR PART-TIME CANDIDATES

NOVEMBER 2011

MARKS: 150

TIME: 2½ hours

This question paper consists of 13 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 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 at each question.
6. Do ALL drawings in pencil and label them 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 all drawn to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator, a protractor and a compass.
11. Write neatly and legibly.

SECTION A**QUESTION 1**

- 1.1 Various options are given 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 1.1.5) in the ANSWER BOOK, for example 1.1.6 D.

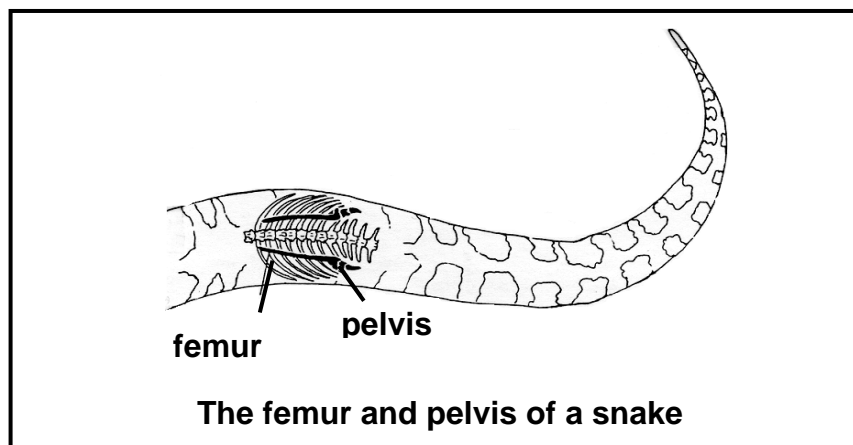
1.1.1 According to the theory of continental drift, all the land masses were joined together to form one supercontinent called ...

- A Gondwanaland.
- B Pangaea.
- C Eurasia.
- D Laurasia.

1.1.2 Which ONE of the following is an example of a pair of analogous structures?

- A A whale's flipper and a bat's wing
- B A bird's wing and an insect's wing
- C A hawk's wing and a sparrow's wing
- D A dog's leg and a horse's leg

1.1.3 Study the diagram below showing the pelvis and femur of a snake.



In humans, the pelvis and femur are involved in walking. In snakes, the pelvis and femur are regarded as ...

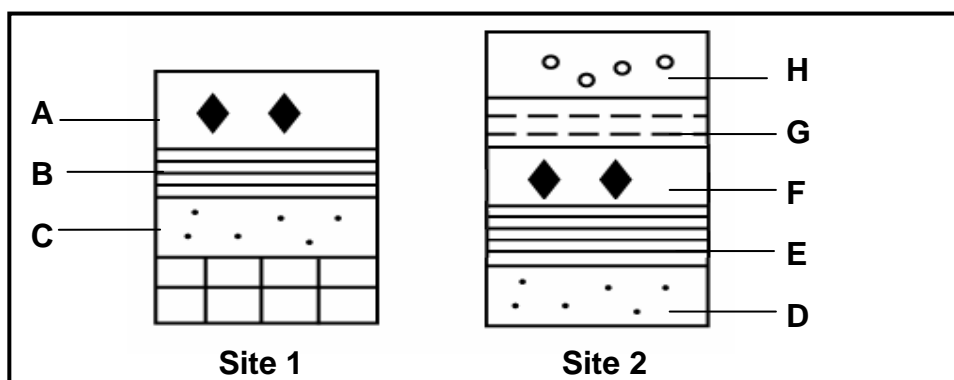
- A functional structures.
- B acquired traits.
- C vestigial structures.
- D analogous to the pelvis and femur in humans.

1.1.4 Which of the following are possible causes of extinction?

- (i) Diseases
- (ii) Ice ages
- (iii) Meteorite striking the earth
- (iv) Plate tectonics

- A Only (i), (ii) and (iii)
- B Only (i), (ii) and (iv)
- C Only (i), (iii) and (iv)
- D (i), (ii), (iii) and (iv)

1.1.5 The diagram below represents sedimentary rock strata from two different palaeontological sites.



From the diagram above we can conclude that fossils in ...

- A C are the same age as the fossils in H.
- B A are older than the fossils in D.
- C E are older than the fossils in B.
- D B are older than the fossils in F.

(5 x 2) (10)

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 1.2.5) in the ANSWER BOOK.

- 1.2.1 An explanation for something that has been observed in nature and which can be supported by facts, laws and tested hypotheses
- 1.2.2 An increase in the level of nutrients in dams and lakes that leads to increased micro-organism activity and a decrease in the availability of oxygen
- 1.2.3 The variety of living organisms on Earth
- 1.2.4 The study of fossils
- 1.2.5 Species living in a habitat in which they do not naturally occur

(5 x 1) (5)

- 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.

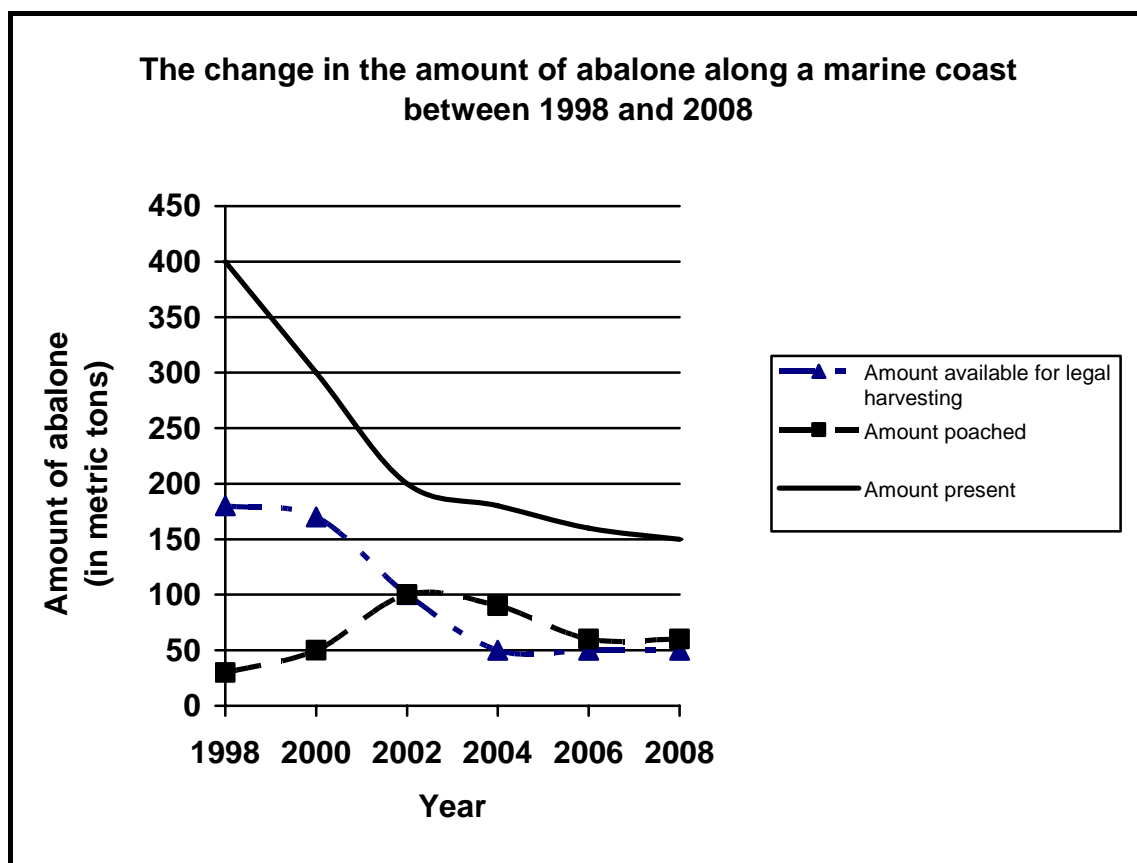
COLUMN I	COLUMN II
1.3.1 Renewable energy sources	A: Coal B: Oil
1.3.2 Evidence for evolution	A: Comparative anatomy B: Fossil records
1.3.3 Forms acid rain	A: Carbon dioxide B: Sulphur dioxide
1.3.4 The appearance of new taxa, such as genera, families and orders	A: Macro-evolution B: Micro-evolution
1.3.5 May lead to overexploitation of resources	A: Poverty B: Lack of food

(5 x 2)

(10)

1.4 The graph below shows the change in the amount of abalone along a marine coast between 1998 and 2008. The graph provides information on the amount of abalone that is:

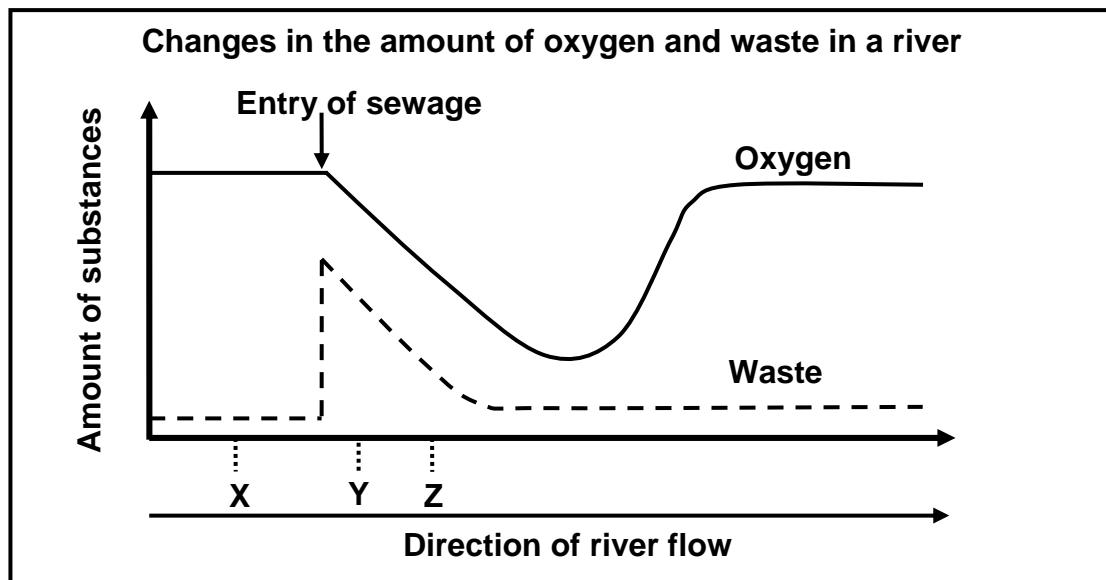
- Available for legal harvesting
- Poached illegally
- Present in the ocean



- 1.4.1 In what year did poachers harvest the same amount of abalone as that which was allowed for legal harvesting? (1)
- 1.4.2 State ONE conclusion about the future population size of abalone if the current trend continues. (2)
- 1.4.3 Name THREE possible impacts on the environment if humans continue overexploiting marine resources, such as abalone. (3)
- 1.4.4 Name TWO possible strategies to prevent overexploitation of resources, such as abalone. (2)
- (8)**

- 1.5 A group of learners collected water samples at different places (X, Y and Z) along the same river to compare the level of substances (oxygen and waste), as well as the organisms present.

The graph below shows the changes in the amount of substances (oxygen and waste) in the water along the course of the river. The point at which sewage enters the river is indicated.



The presence or absence of certain animal species can be used as indicators of the degree of water pollution in a river, as shown below.

ORGANISM PRESENT	DEGREE OF WATER POLLUTION
Mayfly nymph	Unpolluted
Leeches	Moderately polluted
Sludge worms	Severely polluted

- 1.5.1 Which organism (listed in the table above) would most likely have been present at:

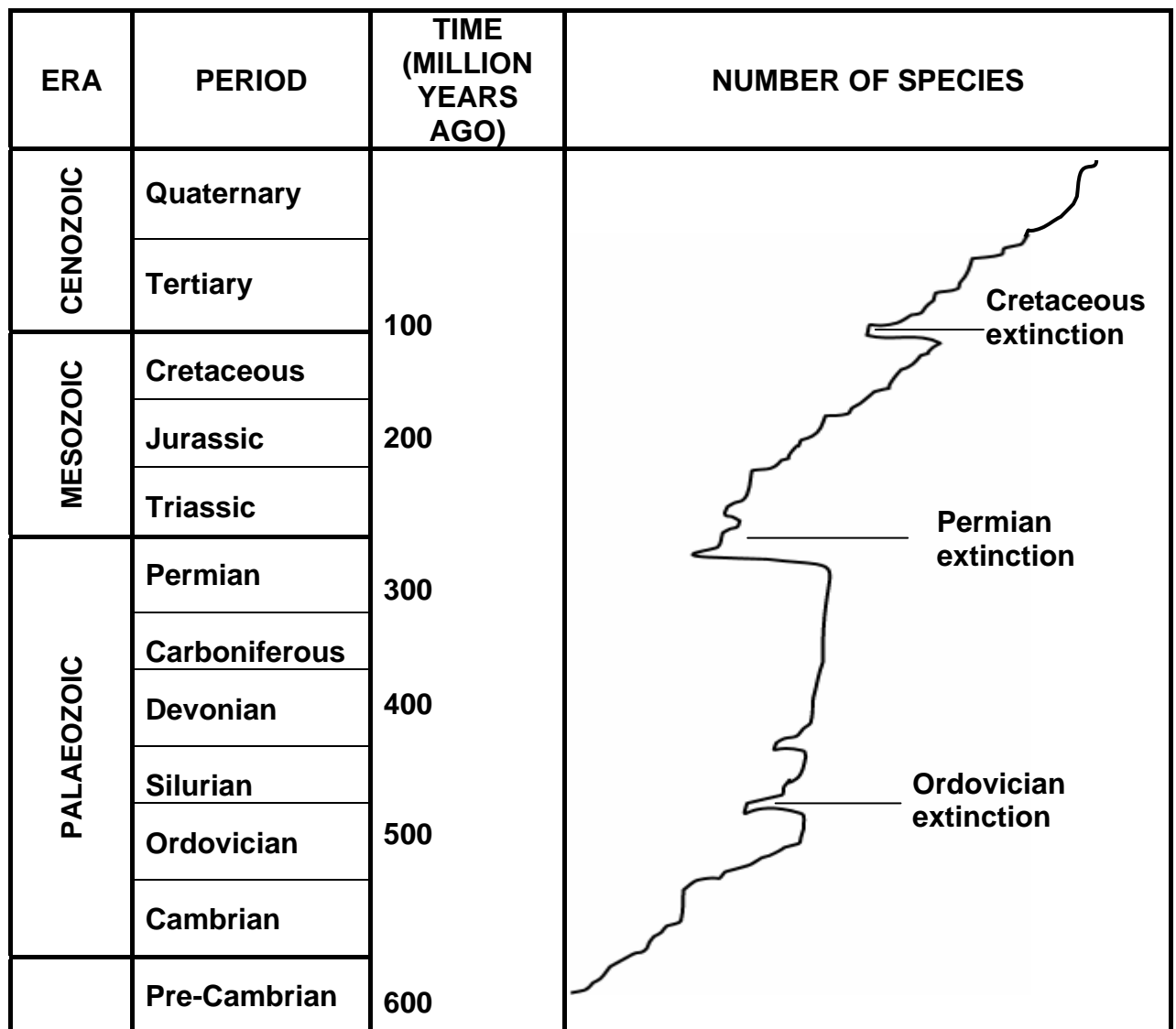
- (a) X (1)
 (b) Y (1)
 (c) Z (1)

- 1.5.2 Name TWO factors that should be kept constant while collecting the water samples. (2)

- 1.5.3 Explain TWO precautions that the learners should take to ensure their own safety while collecting the samples. (4)

- 1.5.4 Use the graph to describe the relationship between the amount of oxygen and the amount of waste from the point at which the sewage enters the river. (4)
(13)

- 1.6 Study the diagram below which shows some geological periods of the three eras. Answer the questions that follow.



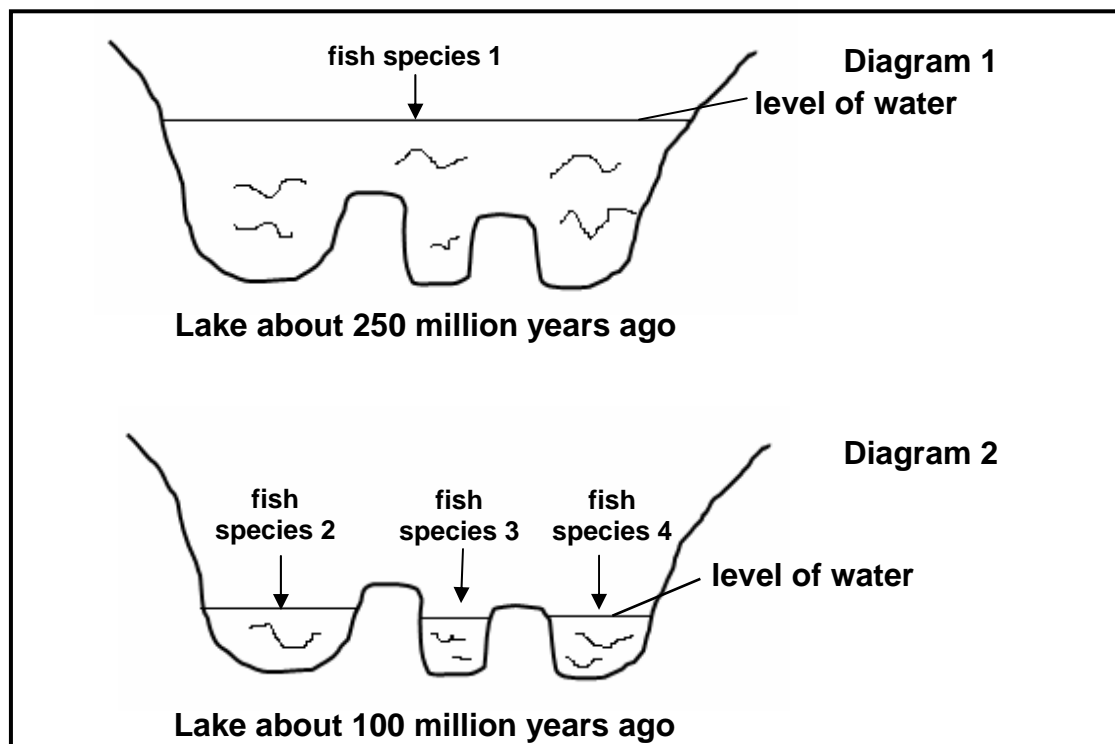
A simplified geological timescale

- 1.6.1 Which ONE of the three eras had the longest duration? (1)
- 1.6.2 The biggest mass extinction took place 280 million years ago.
- (a) In which era did this occur? (1)
- (b) In which period did this occur? (1)
- 1.6.3 Name the mass extinction that took place 100 million years ago. (1)
- (4)**

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

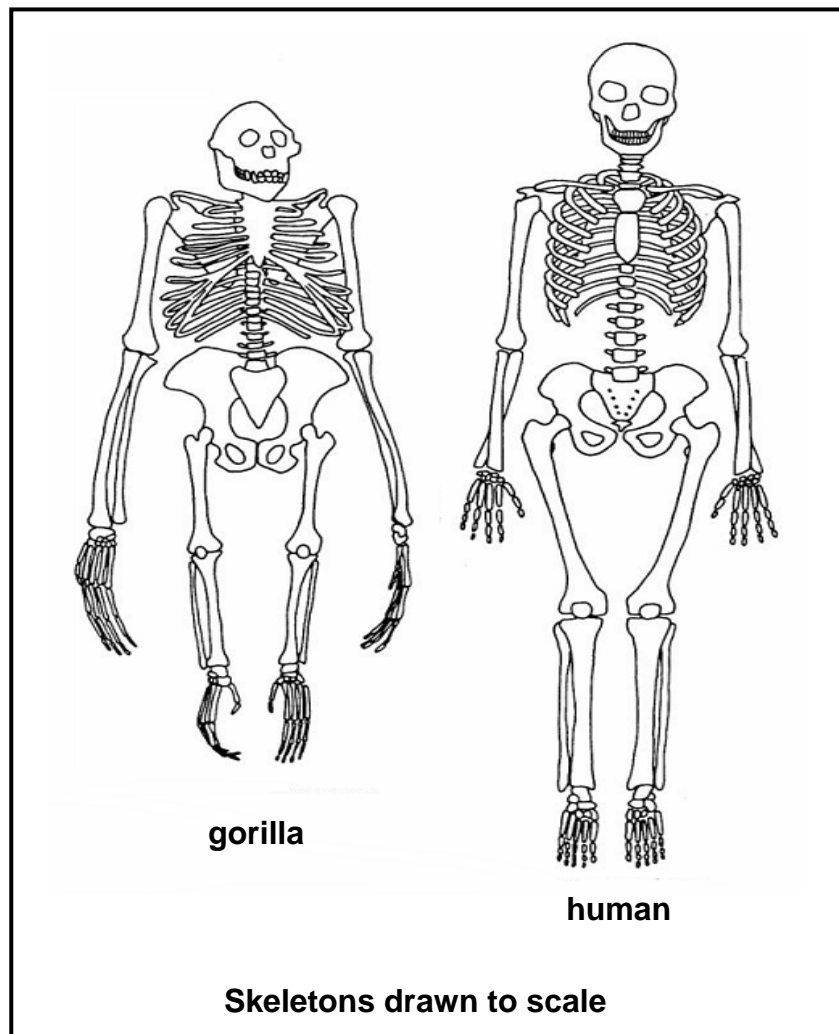
- 2.1 The diagrams below show the change in fish species in a lake from 250 million years ago to 100 million years ago. The water level in the lake had dropped and formed three smaller lakes during this period.



- 2.1.1 Which process is illustrated in the diagrams above? (1)
- 2.1.2 Describe the process named in QUESTION 2.1.1 as it occurred in the lake shown above. (7)
(8)
- 2.2 Describe how the following contributes to genotypic variation within a species:
- 2.2.1 Meiosis (6)
- 2.2.2 Sexual reproduction (4)
(10)
- 2.3 State TWO differences between *Lamarck's theory* and *Darwin's theory*. (4)
- 2.4 Name THREE features that are used in comparative embryology to show similarities and differences between vertebrate embryos. (3)
- 2.5 2.5.1 Explain ONE advantage of inbreeding. (2)
- 2.5.2 List THREE disadvantages of inbreeding. (3)
(5)
[30]

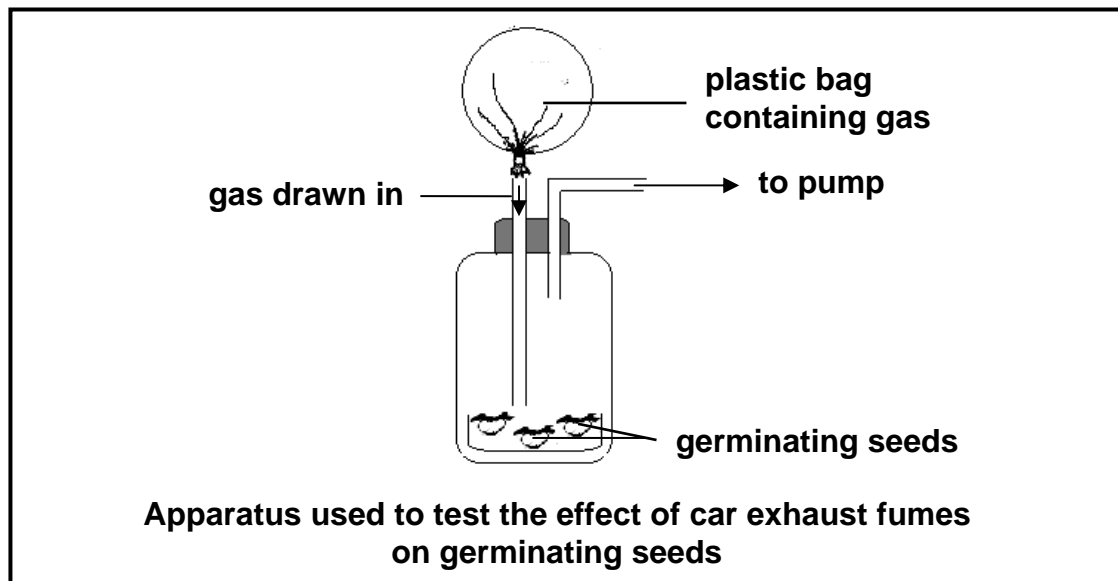
QUESTION 3

3.1 Study the two skeletons below and answer the questions that follow.



- 3.1.1 Tabulate THREE visible differences between the skeleton of a gorilla and that of a human. (7)
- 3.1.2 List THREE characteristics that we share with other primates. (3)
(10)
- 3.2 The following questions are based on mutations:
- 3.2.1 Define a *gene mutation*. (2)
- 3.2.2 Name TWO factors that can cause mutations. (2)
- 3.2.3 Differentiate between *neutral mutations* and *lethal mutations*. (4)
(8)

- 3.3 Thandiwe carried out an investigation to test the effects of car exhaust fumes on germinating seeds. She set up the apparatus below.



Thandiwe repeated the investigation three times under each of the following air conditions:

- A – Exposed to normal atmospheric air
B – Exposed to exhaust fumes

The percentage of seeds that germinated under each of these conditions over a period was recorded in the table below:

REPETITIONS	GERMINATING SEEDS (%)	
	CONDITION A: NORMAL ATMOSPHERIC AIR	CONDITION B: EXHAUST FUMES
1	80	27
2	74	31
3	91	45

- 3.3.1 Name the independent variable in this investigation. (1)
- 3.3.2 Formulate a possible hypothesis for Thandiwe's investigation. (3)
- 3.3.3 Describe ONE way in which Thandiwe ensured reliable results in her investigation. (2)
- 3.3.4 Explain why the percentage of germinating seeds differs under conditions A and B. (2)
- 3.3.5 What was the average percentage of seeds that germinated when they were exposed to exhaust fumes? Show ALL working. (2)
- 3.3.6 Name TWO strategies to reduce air pollution. (2)

(12)
[30]

TOTAL SECTION B: 60

SECTION C**QUESTION 4**

- 4.1 The table below shows the population size of the dark-coloured peppered moth as a percentage of the total peppered-moth population and the amount of pollution in an industrial area over time.

YEAR	POPULATION SIZE (%)	AMOUNT OF POLLUTION (g/m ³)
1750	35	15
1760	37	20
1770	40	30
1780	55	65
1790	60	85
1800	80	100
1810	95	135
1820	100	145

- 4.1.1 Give the table above a heading. (2)
- 4.1.2 Name the dependent variable in this investigation. (1)
- 4.1.3 Make a general conclusion about the relationship between the population size and the amount of pollution. (2)
- 4.1.4 Plot TWO line graphs on the same set of axes to represent the data above. (12)
- (17)**

- 4.2 The table below shows the amount of waste generated from different products and the time taken for each product to break down (decompose).

PRODUCT	AMOUNT OF WASTE (TONS)	TIME TO BREAK DOWN WASTE (YEARS)
Batteries	20	100
Aluminium cans	50	75
Plastic bags	200	300
Nylon fibre	100	50
Leather shoes	30	20

- 4.2.1 Define *biodegradable products* and *non-biodegradable products* and give an example of each. (4)
- 4.2.2 Calculate the percentage contribution of plastic bags to the total amount of waste generated from the products listed. Show ALL working. (2)
- 4.2.3 How many MORE years do plastic bags take to break down than leather shoes? (1)
- 4.2.4 State ONE consequence of dumping waste into the environment. (1)
- (8)**
- 4.3 Explain FOUR management strategies to improve the quality of drinking water. Your description must also include TWO sources of water pollution and TWO effects of water pollution on human health. Content (12)
Synthesis (3)
(15)

TOTAL SECTION C: 40
GRAND TOTAL: 150