Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2015

LIFE SCIENCES P2

MARKS: **150**

TIME: **2½ hours**

ILFSCE2

This question paper consists of 17 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. If answers are NOT presented according to the instructions of each question, candidates will lose marks.
6. All drawings should be done in pencil and labelled in blue or black ink.
7. Draw diagrams, tables and flow charts ONLY when requested to do so.
8. The diagrams in this question paper may NOT necessarily be drawn to scale.
9. The use of graph paper is NOT permitted.
10. You may use a non-programmable calculator, protractor, and compass.
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–D) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 The group(s) of plants that are dependent on water for reproduction are:

A Pteridophytes and Bryophytes
B Bryophytes only
C Gymnosperms only
D Angiosperms and Gymnosperms

1.1.2 Gynaecium (pistil) consists of the …

A stigma, style and ovary.
B stigma, petal and ovary.
C style, perigone and stamen.
D style, petals and stamen.

1.1.3 An ovary would be found in ...

A gymnosperms.
B angiosperms.
C bryophytes.
D pteridophytes.

1.1.4 Saprophytic fungi derive nutrients from …

A living organisms.
B the atmosphere.
C non-living organic matter.
D both a and b.

1.1.5 Which of the following is NOT found in Pteridophytes?

A Sori
B Spores
C Sporangia
D Seeds

1.1.6 Study the following statements about eukaryotic cells and answer the question that follow.

Eukaryotic cells:

(i) Are more complex than prokaryotic cells
(ii) Have a membrane-bound nucleus
(iii) Are believed to have evolved more recently than prokaryotic cells
(iv) Are usually smaller than viruses

Which of the following statements is true about eukaryotic cells?

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

1.1.7 Which part of a flower produces male gametes?

A Petal
B Ovary
C Pollen
D Ovule

1.1.8 Study the statements about sexual reproduction in plants and answer the question that follow.

(i) It generates variation in unstable environments
(ii) Seeds facilitate dispersal of offspring to more distant locations
(iii) Seed dormancy allows growth to be suspended until hostile environmental conditions are reversed
(iv) Offspring can be reproduced very rapidly

Which statement is an advantage of sexual reproduction in plants?

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

1.1.9 Antibodies are proteins that...

A break down pathogens.
B catalyse biochemical reactions.
C are produced by T-cells that kill disease-causing viruses.
D bind with specific antigens.

1.1.10 Vaccination can control the spread of a(n) ...

A genetic disorder.
B infectious disease.
C nutritional deficiency.
D environmental disease. (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 The body plan of organisms, in which parts of matching size and shape are arranged on either side or around an axis

1.2.2 Swelling at tip of the vertical hypha of Rhizopus in which spores develop

1.2.3 Jelly-like layer between the ectoderm and endoderm

1.2.4 The removal of large quantities of trees so that conditions become desert-like

1.2.5 Molecules consisting of three oxygen atoms

1.2.6 The term used to describe the concentration of nerve cells or sense organs at the anterior end of the body

1.2.7 Type of asexual reproduction in which a bacteria splits in to two, as in mitosis

1.2.8 The germ layer that gives rise to muscles and internal organs, other than the gut

1.2.9 Substances that can be broken down naturally by micro organisms

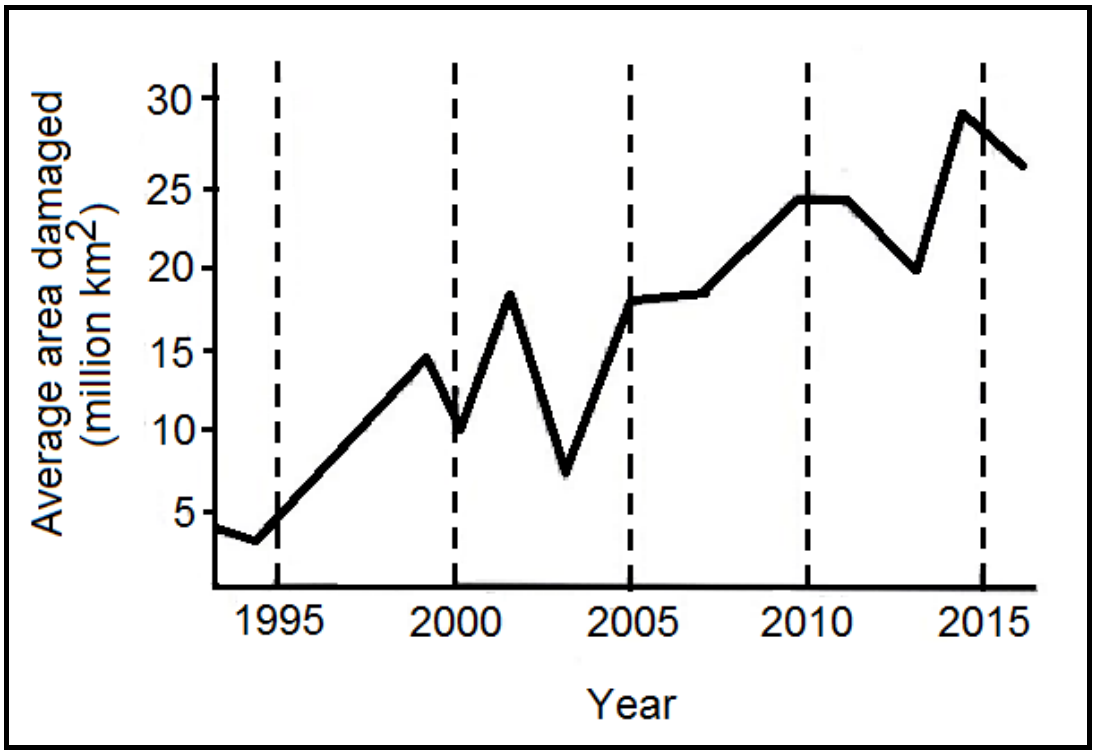
1.2.10 The removal of soil by water or by wind (10 x 1) (10)

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 in the ANSWER BOOK.

	COLUMN I		COLUMN II
1.3.1	Ectoderm, mesoglea and endoderm	A. B.	Triploblastic Diploblastic
1.3.2	Carbon footprint can be reduced by	A. B.	Recycling Reusing
1.3.3	Site constructed to dispose of waste	A. B.	Reservoir Land fill
1.3.4	Factors decreasing water availability	A. B.	Destruction of wetlands Exotic plants
1.3.5	The division of the body into a series of similar units	A. B.	Cephalisation Segmentation
1.3.6	Animals that have a true body cavity	A. B.	Coelomate Acoelomate
1.3.7	A circulatory system where blood flows in blood vessels	A. B.	Closed blood system Open blood system
1.3.8	A process to exploit shale gas reserves in underground rock formation	A. B.	Fracking Leaching

(8 x 2) (16)

1.4 Chloroflurocarbon (CFC) has unfortunately caused considerable damage to the ozone layer, resulting in the formation of big 'holes'. Study the graph below showing the extent of damage (area of the 'hole') in the Antarctic ozone layer and answer the questions that follow.



1.4.1 During which year was the 'hole' in Antarctic area the:

(a) Largest? (1)

(b) Smallest? (1)

1.4.2 What was the area of the 'hole' (millions km^2) in the years:

(a) 2000 and (1)

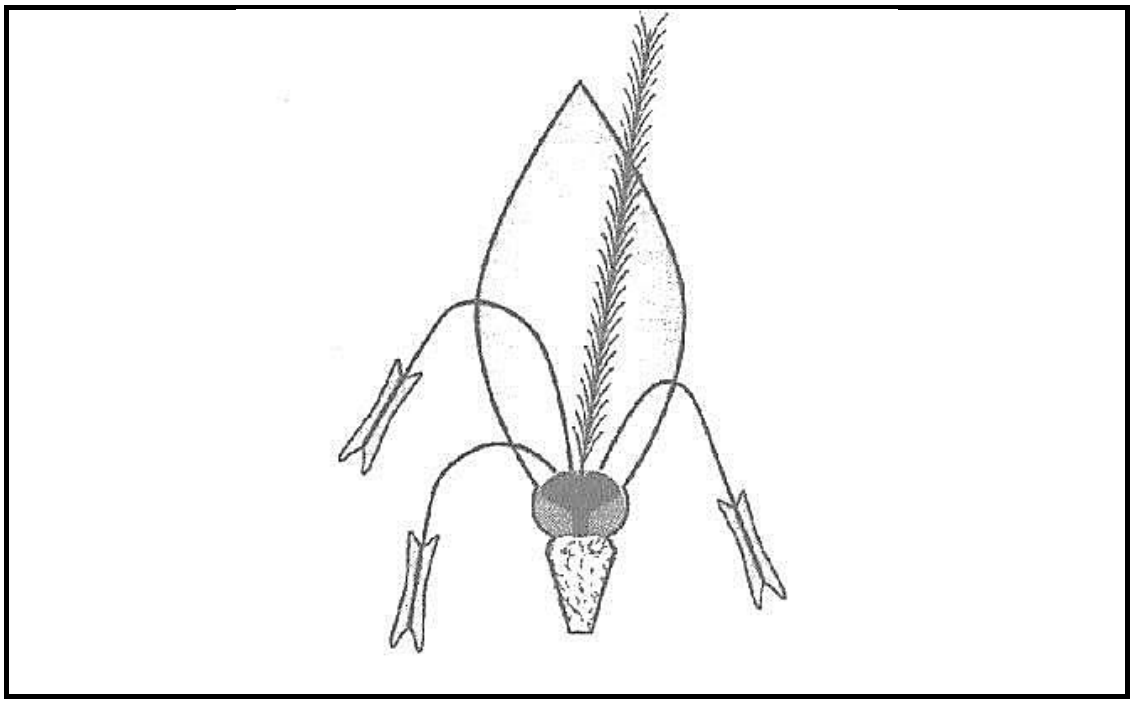
(b) 2005? (1)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Flowers are reproductive structures used for sexual reproduction in angiosperm plants. Study the diagram below and answer the questions that follow.



2.1.1 Is this flower insect, wind, or bird pollinated? (1)

2.1.2 List THREE characteristics of this flower that make it well adapted for your answer given in QUESTION 2.1.1. (3)

2.2 Angiosperms are a group of plants that produce seeds by means of sexual reproduction.

2.2.1 What is the main advantage of sexual reproduction to plants? (1)

2.2.2 A seed bank in Norway has been storing seeds of a rare and endangered plant. To keep the seeds fresh, 120 of the seeds of this plant were selected to be grown. Out of these 120 seeds, only 90 germinated.

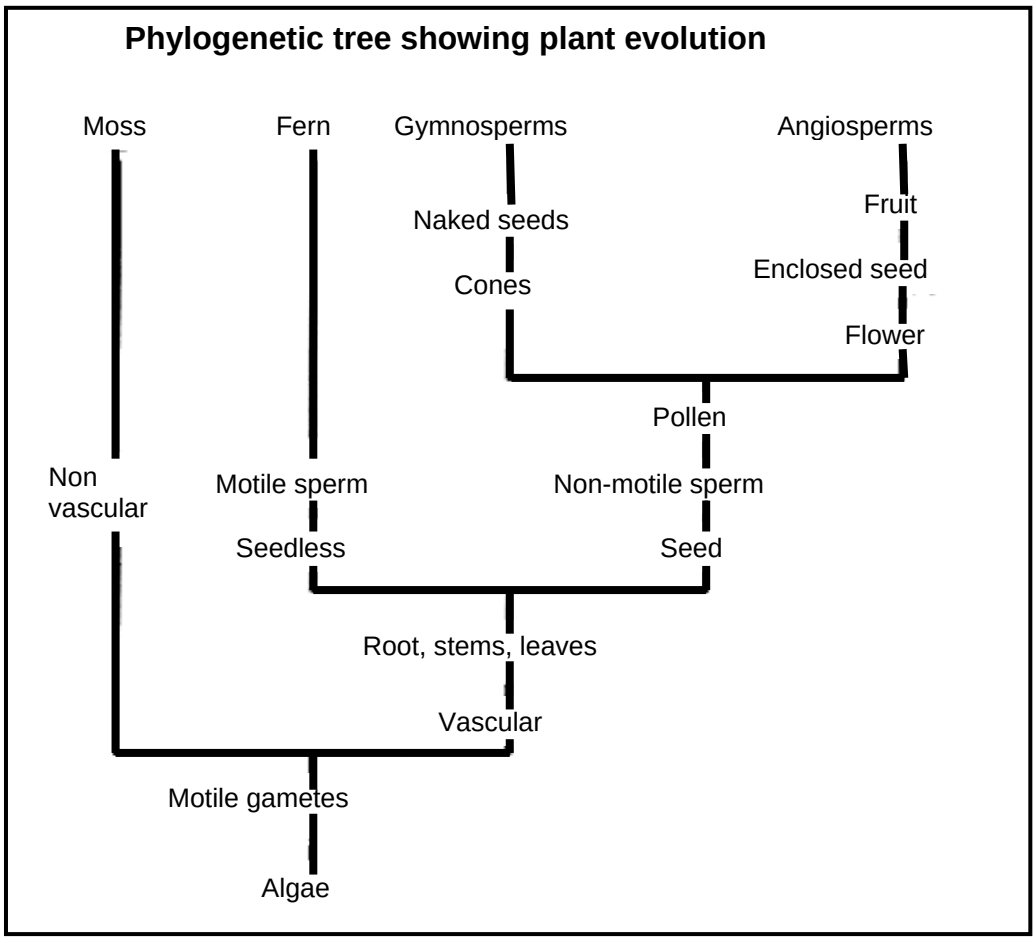
What percentage of the seeds was not fertile? Show all your working. (2)

2.2.3 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. (1)

(b) Some seeds contain endosperm tissue (1)

2.3 Study the phylogenetic tree below, taking note of how the four plant divisions have evolved and answer the questions that follow.



2.3.1 What is the ancestral form of all the plant divisions shown? (1)

2.3.2 Which plant division is the best adapted to life on land? (1)

2.3.3 Which plants are the most closely related? (2)

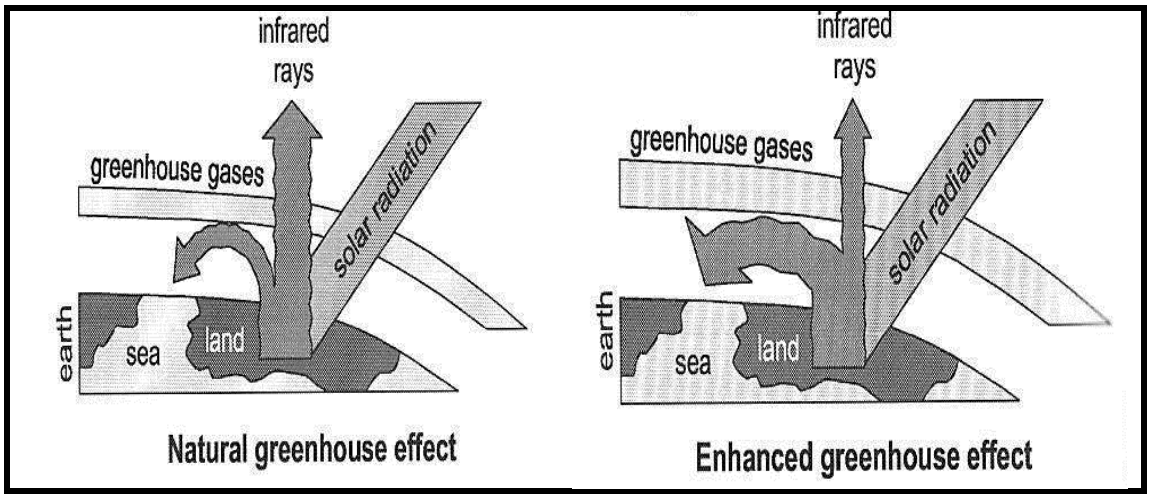
2.4 The World Health Organisation (WHO) collects data about diseases worldwide. The table below shows data published by the WHO about the incidence of tuberculosis (TB) in the years 2000 and 2008, for four different income groups. Study the table and answer the questions that follow.

	INCIDENCE OF TB PER 1 000 000 POPULATION	
Income Group	**In 2000**	**In 2008**
Low	280	280
Lower middle	150	150
Upper middle	100	110
High	17	14

2.4.1 Using the information above, compare the data for 2000 and 2008 in the four income groups. (4)

2.4.2 The highest incidence of TB is associated with the low-income group. Suggest THREE reasons why the incidence of TB is higher in the low-income group. (3)

2.5 The diagrams below show the natural greenhouse effect and enhanced greenhouse effect. Study the diagrams and answer the questions that follow.



2.5.1 Name TWO main greenhouse gases. (2)

2.5.2 Why is it necessary for the natural greenhouse effect to be maintained? (2)

2.5.3 Name ONE human activity that causes an enhanced greenhouse effect. (1)

2.5.4 Explain ONE difference between the TWO diagrams above. (2)

2.6 Read the passage below, study the table, and answer the questions that follow.

An environmental health officer from a local municipality received complaints from residents living along a river, that there were dead fish floating in the river. The officer noticed a waste water treatment plant and a mine in the local area and that both released their waste into the same section of the river. The officer took SAMPLE A and SAMPLE B of the river water, from a point before and after the waste water treatment plant and mine released their waste into the river. The water samples were analysed in a laboratory. The table shows the results of the analysis.

TABLE: RESULTS OF ANALYSIS OF WATER.

Substances/factors found in samples	**SAMPLE A (Taken before waste was released into river)**	**SAMPLE B (Taken after waste was released into river)**
Faecal coliforms (count/100ml)	500	130 000
Nitrate (mg/l)	1,6	5,2
Phosphate (mg/l)	0,1	0,9
Sodium (mg/l)	25	175
Chlorides (mg/l)	15	180
pH	6,7	3,5

2.6.1 Which THREE of the substances are most likely from the waste water treatment works? (3)

2.6.2 Comparing the levels of faecal coliforms in **SAMPLE A** and **SAMPLE B**, how well do you think the waste water treatment works are functioning? Give a reason for your answer. (3)

2.6.3 Name TWO waterborne diseases that are spread by untreated waste water. (2)

2.6.4 Is the water in **SAMPLE B** more acidic, or more alkaline than the water in **SAMPLE A**? (1)

2.6.5 Explain what is meant by *acid mine drainage*. (2)

2.6.6 Give TWO possible causes for the fish deaths in the river based on the data in the table. (2)

[40]

QUESTION 3

3.1 A student investigated the number of bacteria on the skin of people's hands after they washed and dried it. The same washing method was employed, but hands were dried either by using hot air from a hot air blower or by using paper towels. Swabs were used to take samples from the dried skin and bacteria were cultured from the swabs. The table below shows the number of bacteria that was cultured. Study the table and answer the questions that follow.

SAMPLES	**NUMBER OF BACTERIA ($x10^8$) PER SQUARE CENTIMETRE (CM^2) ON HAND SKIN FOLLOWING WASHING AND DRYING.**	
	Air-dried skin	Towel-dried skin
1	8,91	1,11
2	9,75	0,98
3	6,14	0,42
4	8,72	1,02

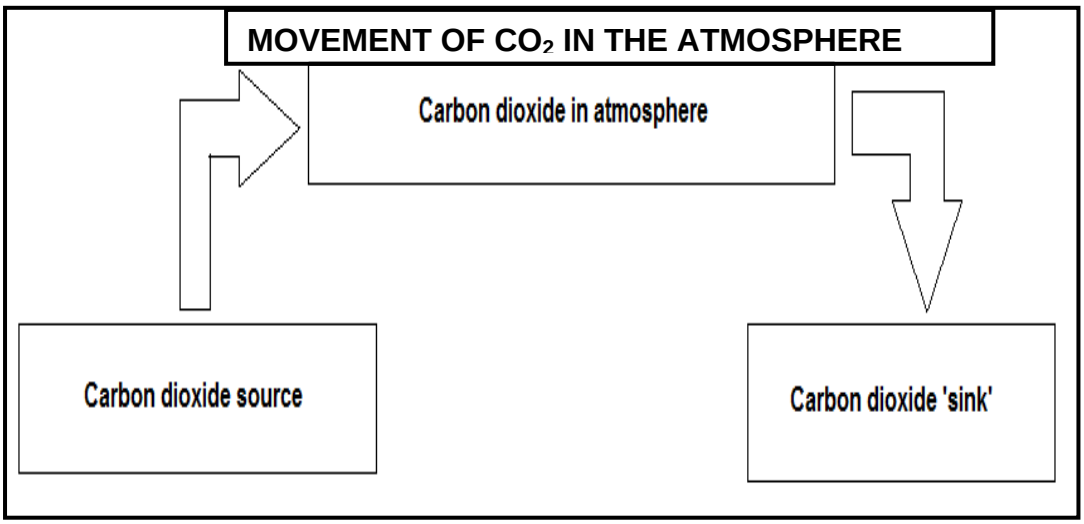
3.1.1 State the aim of the student's investigation. (1)

3.1.2 Suggest THREE factors that must be controlled in this investigation to make this a fair test. (3)

3.1.3 Write down the conclusion that the student could make, based on the results of the investigation. (1)

3.1.4 Draw a bar graph to show the number of bacteria on four samples of skin after they have been towel dried. (6)

3.2 The diagram below shows the movement of carbon dioxide into and out of the atmosphere. Study the diagram and answer the questions that follow.



3.2.1 Name a life process that:

(a) Takes in carbon dioxide and (1)

(b) Releases carbon dioxide (1)

3.2.2 What effect do increased levels of carbon dioxide in the atmosphere have on the temperature of the atmosphere? (1)

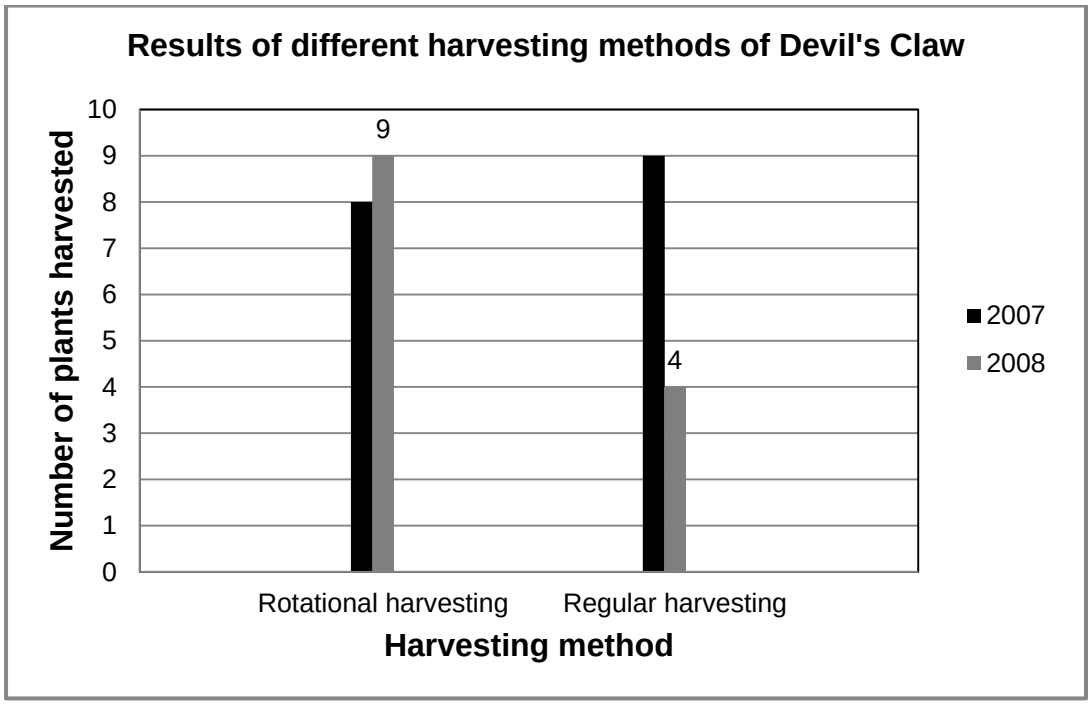
3.2.3 Name the effect mentioned in QUESTION 3.2.2. (1)

3.2.4 What is a '*carbon sink"*? (1)

3.2.5 Give an example of a 'carbon sink'. (1)

3.2.6 What would happen to the levels of carbon dioxide in the atmosphere if 'carbon sinks' were reduced? (1)

3.3 A group of Grade 11 learners carried out an investigation to determine the impact that rotational harvesting would have on the long-term yield of Devil's Claw plant. They compared Devil's Claw densities over time for two different sites A and B. At site A, traditional healers divided the region into smaller areas. A different area was harvested each time. At site B, harvesters collected Devil's Claw from any region (regular harvesting). Quadrats were thrown randomly in both areas to determine the density of Devil's Claw for two consecutive years. The results are shown in the bar graph below. Study the graph and answer the questions that follow.



3.3.1 What is *rotational harvesting*? (1)

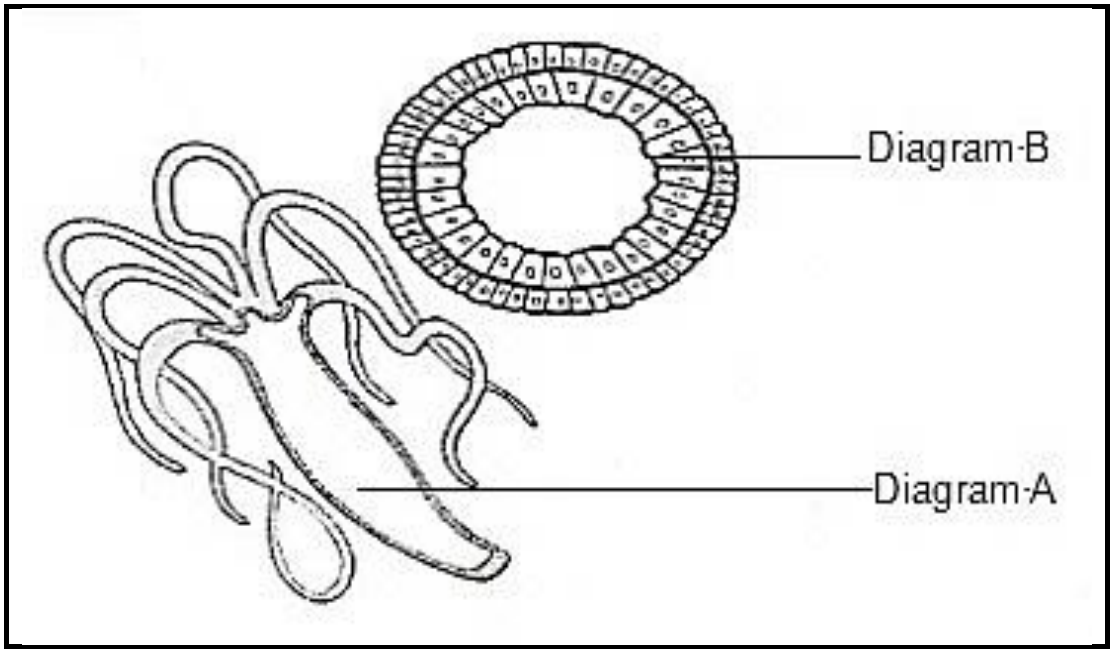
3.3.2 State ONE advantage of rotational harvesting. (1)

3.3.3 Write a hypothesis for this investigation. (2)

3.3.4 Present the results of the survey in a table format. (4)

3.3.5 What can you conclude from this study? (2)

3.4 The diagram **A** below shows a complete animal while diagram **B** shows a cross section through the main body stalk. Study the diagrams below and answer the questions that follow.



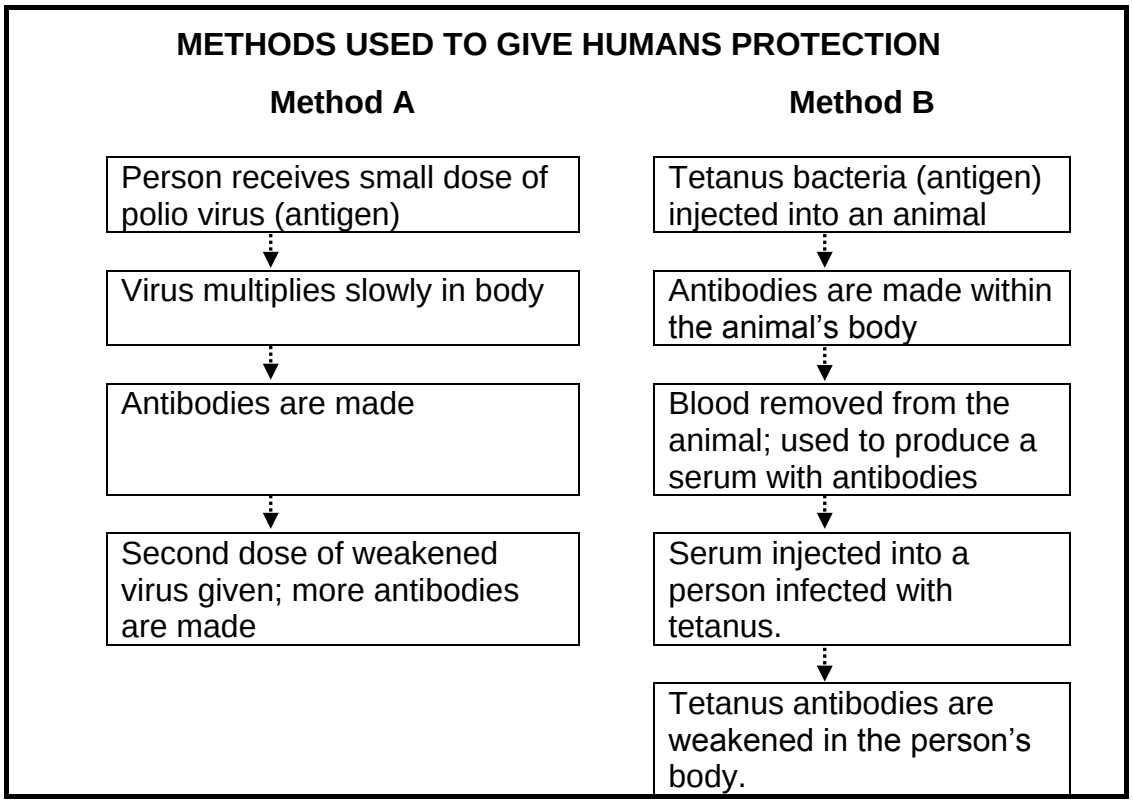
3.4.1 Identify the phylum to which this organism belongs. (1)

3.4.2 Name the kind of symmetry shown in this organism. (1)

3.4.3 Explain the advantage this symmetry has for the mode of living of this organism. (2)

3.4.4 Name THREE phyla that you have studied, which have a coelom. (3)

3.5 The diagram below shows two methods, which are used to give humans protection against diseases. Method **A** shows active immunity and Method **B** shows passive immunity. Method **A** can be used against polio. Method **B** is often used against tetanus.



3.5.1 Name the substances that are produced by the body, which destroy harmful viruses and bacteria. (1)

3.5.2 Why does **Method A** give long-lasting protection against polio? (1)

3.5.3 **Method B** does not give long-lasting protection against tetanus. Why? (1)

3.5.4 In immunisation against polio, a second dose of the weakened virus is given (known as a booster). Suggest why this booster is necessary. (1)

3.5.5 Why is **Method B** very good for dealing quickly with an infection like tetanus? (1)

TOTAL SECTION B: 80

SECTION C

QUESTION 4

4.1 Write an essay in which you explain what is meant by the concept of food security. Describe also the ways in which poor crop farming practices pose a threat to food security in South Africa. Finally mention how genetically modified food may help to address the problem of food shortage.

Content (17)
Synthesis (3)
(20)

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

TOTAL SECTION C: 20
GRAND TOTAL: 150