



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2011

LIFE SCIENCES P2

MARKS: 150

TIME: 2½ hours



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 EACH question on 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 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. Non-programmable calculators, protractors and compasses may be used.
11. Write neatly and legibly.

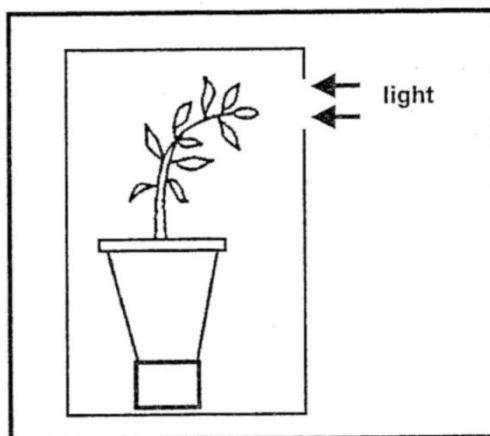
SECTION A**QUESTION 1**

- 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 – 1.1.5) in the ANSWER BOOK, for example 1.1.6 D.

1.1.1 Which part of the nervous system controls breathing?

- A medulla oblongata
- B cerebrum
- C cerebellum
- D meninges

1.1.2 Which phenomenon is demonstrated in the diagram?

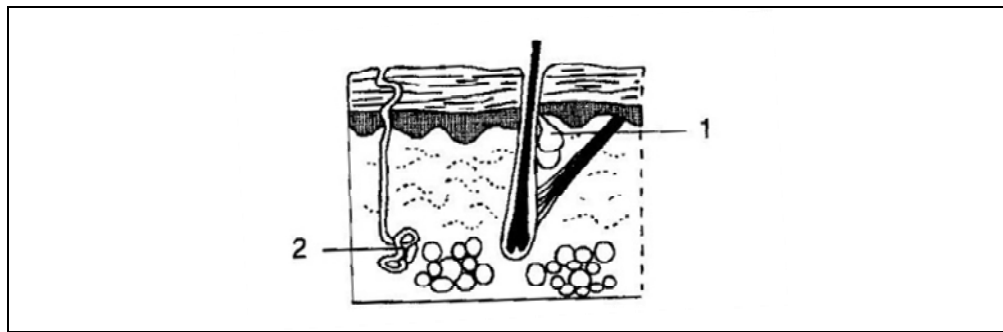


- A apical dominance
- B phototropism
- C geotropism
- D hydrotropism

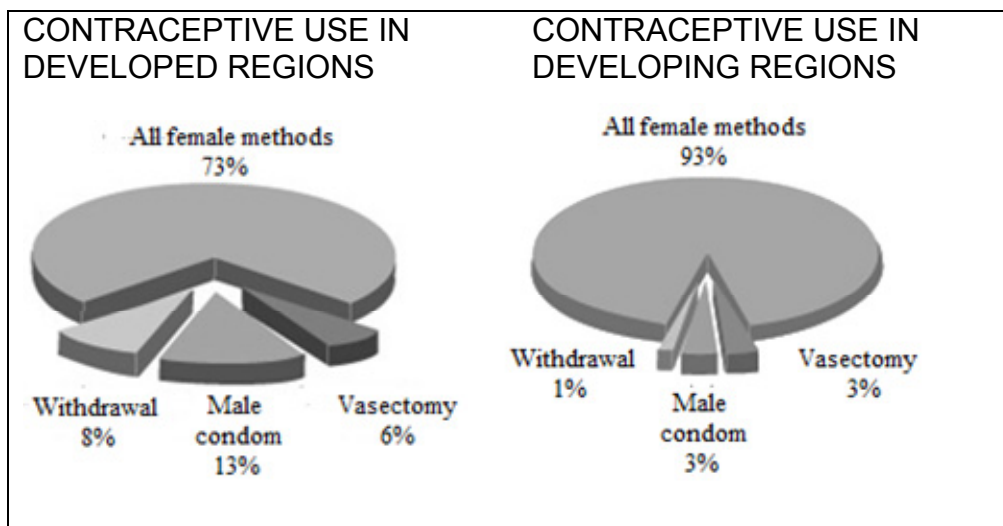
1.1.3 The cornea is the continuation of the ...

- A choroid
- B retina
- C sclera
- D conjunctiva

- 1.1.4 Which one of the following does NOT stimulates the working of part number 2?



- A Heat
B Intake of large amounts of water
C Low humidity
D Emotional stress
- 1.1.5 The following pie graphs show contraceptive use among men in developed regions versus developing regions in the world.



[From: United Nations Population Division World Contraceptive Use 2003.]

Which of the following statements is false with respect to the data provided?

- A Men in developed regions take more responsibility for contraception.
- B Twice as many men in developed regions use a more permanent method of contraception compared to men in developing regions.
- C Almost twice as many men in developed regions use contraception compared to men in developing regions.
- D There is an increase of 20% in the number of women using contraceptives in developing regions compared to men.

(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 – 1.2.5) in the ANSWER BOOK.

- 1.2.1 The relationship between two organisms of different species such that one benefits from the relationship without harming the other.
- 1.2.2 Receptors found in the cochlea of the ear which converts the stimulus of sound into an impulse.
- 1.2.3 Plant organism not defined into having true roots, stem and leaves.
- 1.2.4 A method of reproduction in which eggs are laid and the development of these eggs take place outside the mother's body.
- 1.2.5 Specialised cells found between the seminiferous tubules that produce the hormone testosterone. (5)

1.3 For each of the statements in COLUMN I, state whether it applies to A only, B only, both A and B, or none of the items in COLUMN II. Write down A only, B only, A and B, or none next to the question number (1.3.1 – 1.3.6) in your answer book.

	COLUMN I		COLUMN II
1.3.1	Doubling of the population size at regular intervals	A	Geometric growth
		B	Exponential growth
1.3.2	Outward movement of individuals from a defined area	A	Emigration
		B	Migration
1.3.3	The sum of the factors inhibiting population growth as a result of current conditions in a habitat	A	Carrying capacity
		B	Environmental resistance
1.3.4	Competition for resources between members of different species	A	Intraspecific competition
		B	Interspecific competition
1.3.5	Different organisms occupying the same habitat	A	Community
		B	Population
1.3.6	Determination of human population size	A	Indirect technique
		B	Direct technique

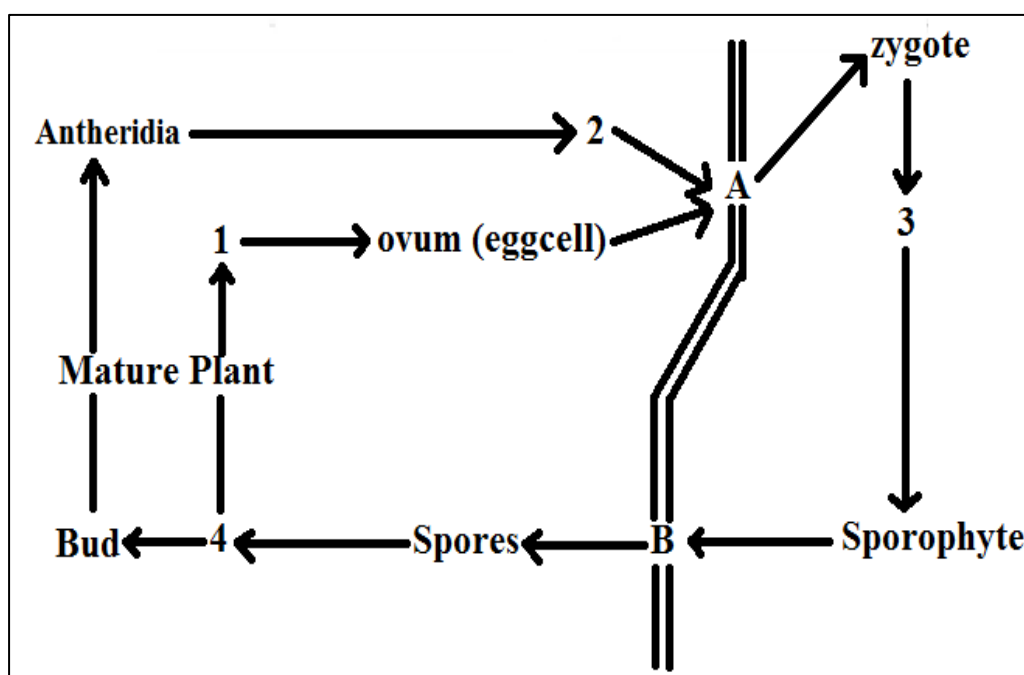
(6 x 2) (12)

- 1.4 Complete the following table by writing down the letters (A to H) and the correct answers next to the letters in your answer book.

SUBSTANCES	ORIGIN	TARGET ORGAN
Anti-diuretic hormone	A	B
Aldosterone	C	D
Adrenalin	E	F
Thyroxine	G	H

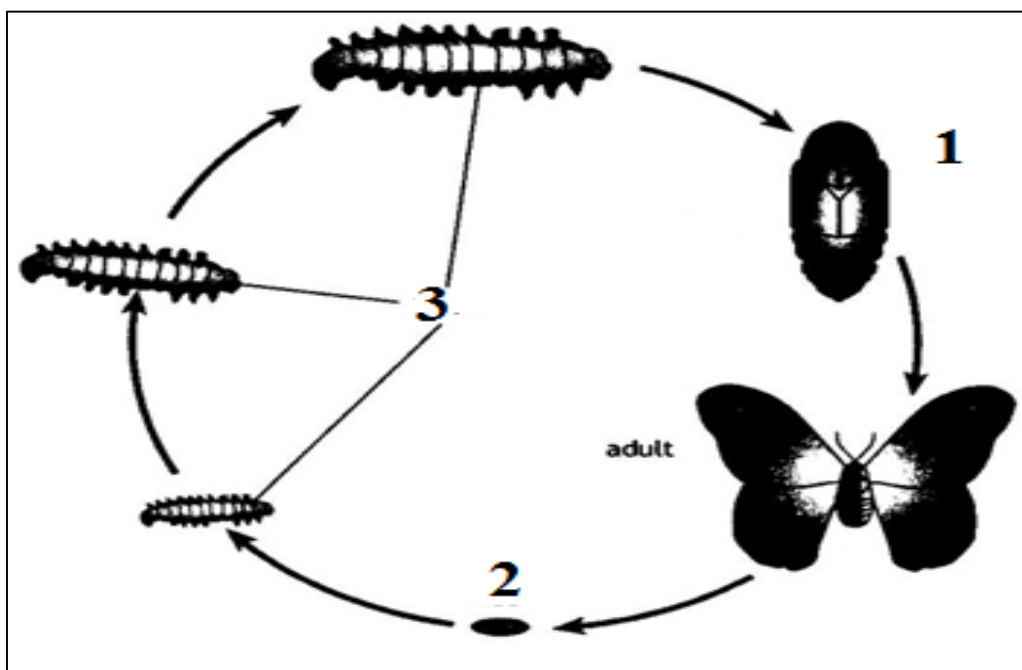
(8)

- 1.5 Study the diagram of the life cycle of a moss and answer the questions that follow.



- 1.5.1 Identify the parts numbered 1 to 4. (4)
- 1.5.2 Which processes occur in A and B respectively? (2)
- 1.5.3 Name the structure that represents the gametophyte and state whether it is haploid or diploid. (2)

1.6 Study the diagram of the life cycle of a butterfly.



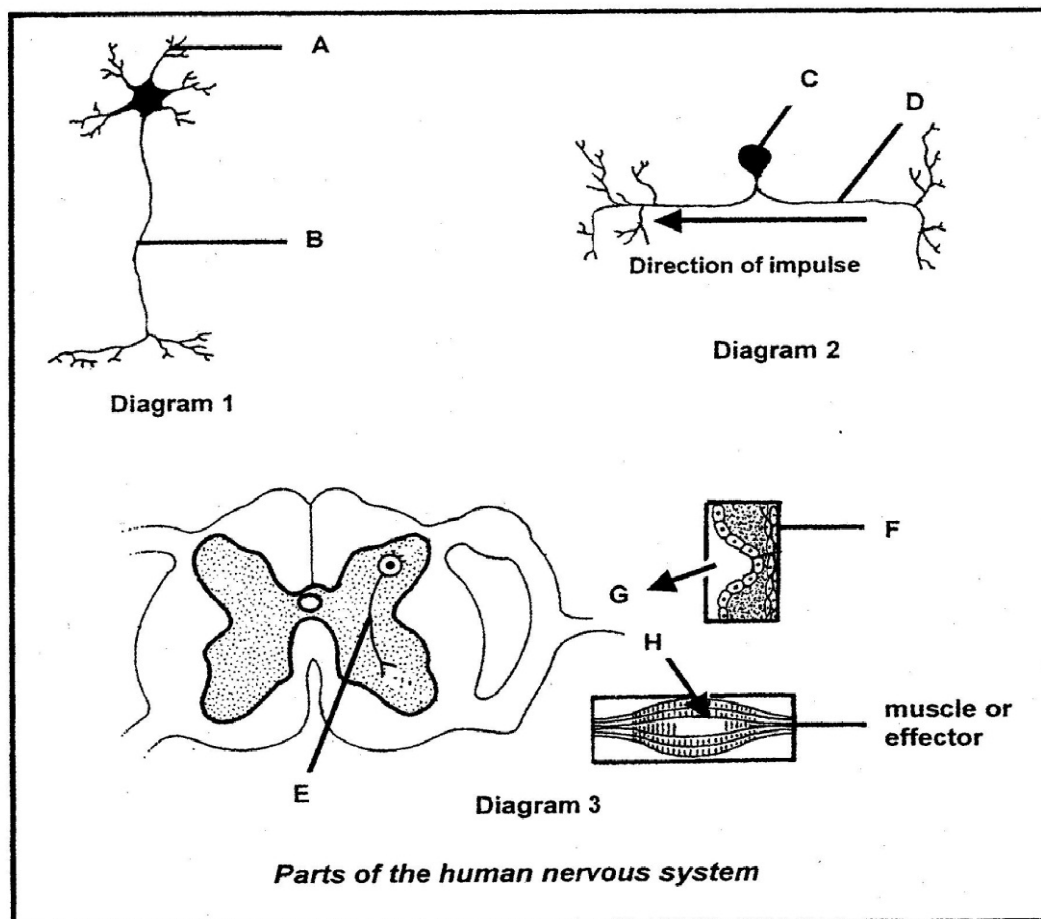
- 1.6.1 What do we call the different stages of development that animals undergo while they develop and grow? (1)
- 1.6.2 Do the stages in the above diagram depict/show a 'complete' or 'incomplete' life cycle of a butterfly? (1)
- 1.6.3 Give a reason for your answer in QUESTION 1.6.2. (1)
- 1.6.4 Identify parts numbered 1 to 3. (3)
- 1.6.5 What is the structure which forms around number 3 called? (1)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Study the following diagrams and answer the questions that follow.



2.1.1 Identify parts A, B, C and E. (4)

2.1.2 Write the name and diagram number (1 or 2), of the neurons which are represented by each of the following arrows in Diagram 3.

- (a) G (2)
 (b) H (2)

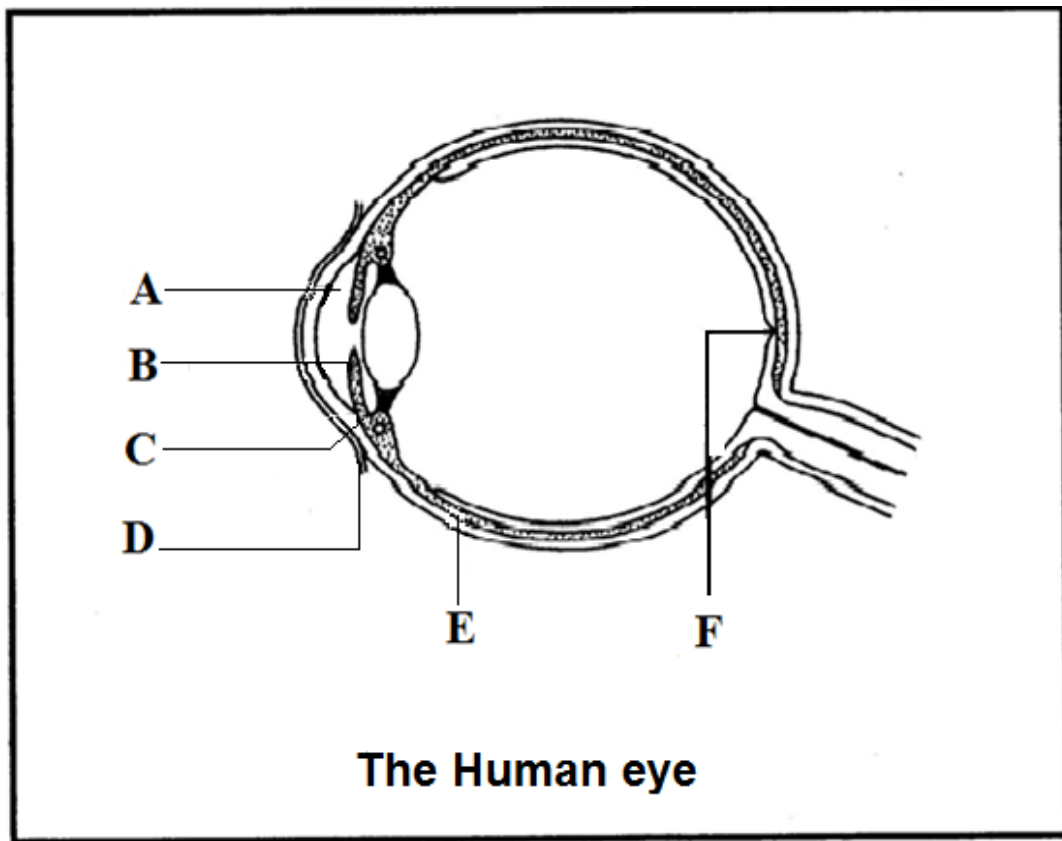
2.1.3 State ONE function of the neuron represented by:

- (a) Diagram 1 (2)
 (b) Diagram 2 (2)

2.1.4 What is a synapse? (2)

2.1.5 What is the functional unit of the nervous system? (1)

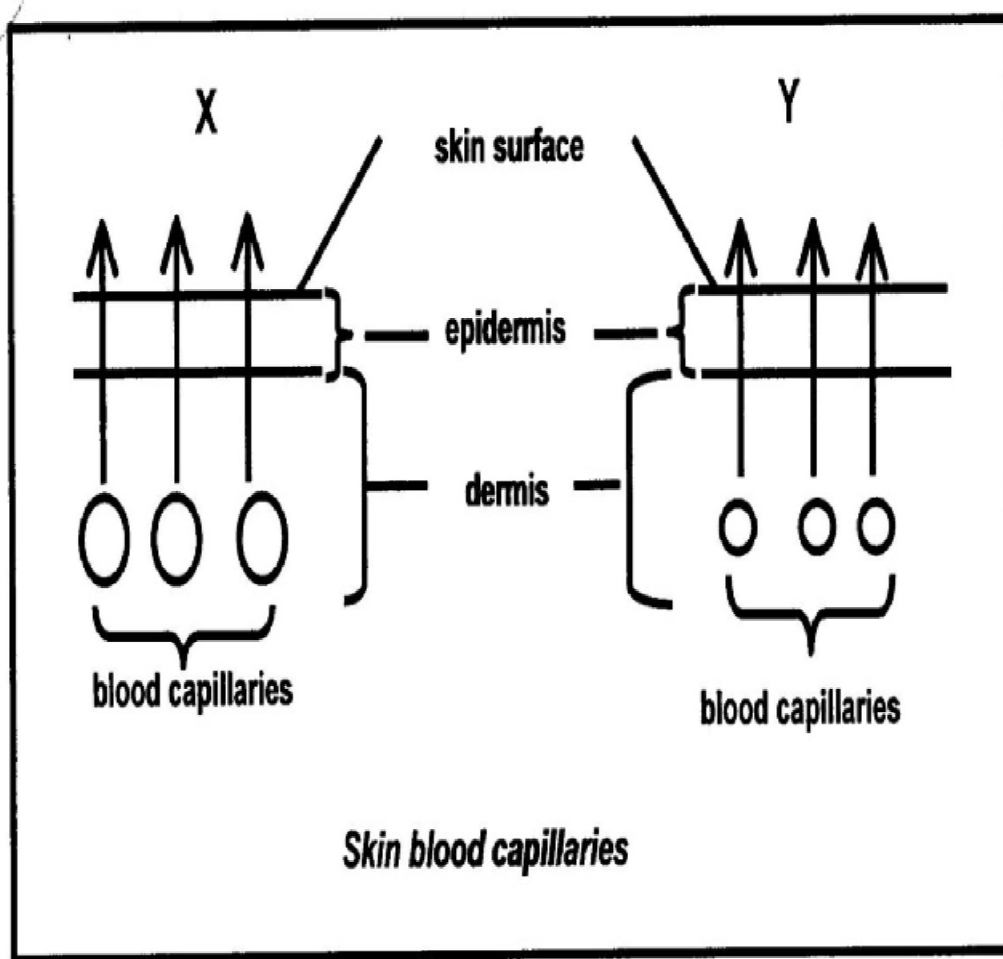
- 2.2 Study the diagram that represents the human eye and answer the questions that follow.



Write down the letter and name of each of the following.

- | | | |
|-------|--|-----|
| 2.2.1 | Liquid that helps to keep the shape of the cornea. | (2) |
| 2.2.2 | Area where the clearest image is formed. | (2) |
| 2.2.3 | Part of the eye responsible for the colour of the eye. | (2) |
| 2.2.4 | Layer consisting of bloodvessels and a brown pigment. | (2) |

2.3 Study the diagrams below and answer the following questions.



- 2.3.1 Which environmental conditions would cause the skin blood capillaries to appear as in diagram Y? (1)
- 2.3.2 Explain your answer in QUESTION 2.3.1. (2)
- 2.3.3 Which process is shown by the arrows? (1)
- 2.3.4 In which skin (X or Y) will the erector muscle be contracted? (1)
- 2.3.5 The term which describe organisms like humans, which are capable of maintaining a more or less constant body temperature irrespective of the temperature of the environment. (2)

[30]

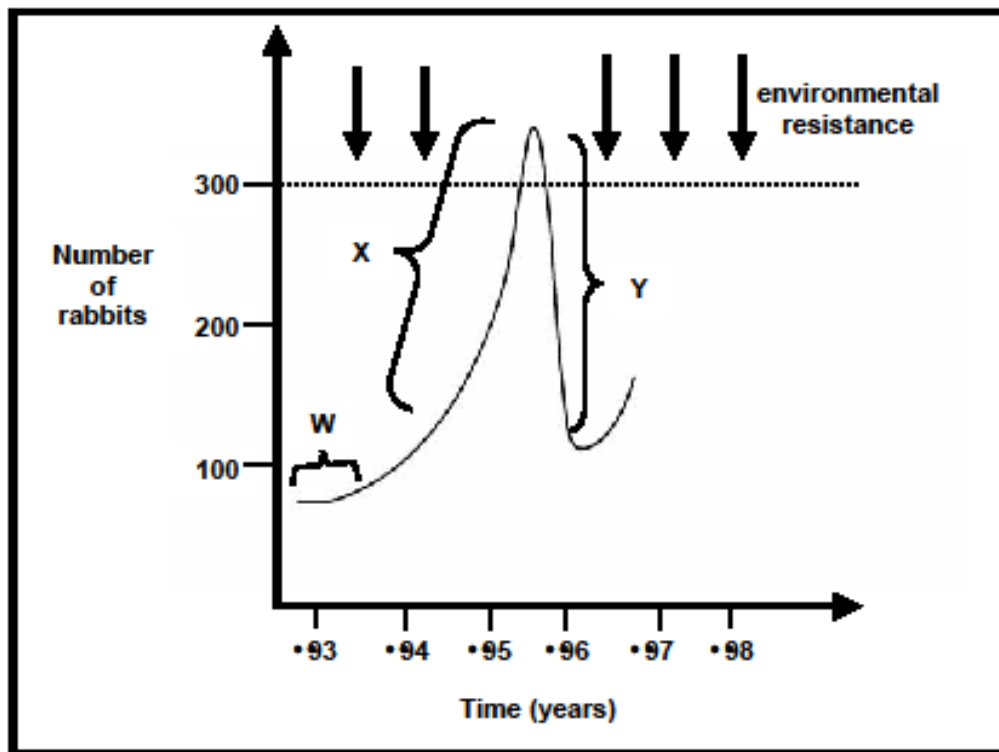
QUESTION 3

- 3.1 A certain bird species was introduced to two habitats of different sizes. The following population counts were obtained in the two habitats over a period of eight years. Study the table and answer the questions that follow.

	Large habitat (100 km ²)		Small habitat (2 km ²)	
Year	Spring	Autumn	Spring	Autumn
1994	30	100	30	68
1995	81	426	59	299
1996	282	844	101	307
1997	705	1540	21	30
1998	1325	1898	18	24
1999	1129	1402	12	17
2000	1037	1463	6	7
2001	1087	1377	-	-

- 3.1.1 In which year did the bird population reach its peak in the large habitat? (1)
- 3.1.2 Suggest a reason for the rapid decrease in the number of birds in the small habitat. (2)
- 3.1.3 What generalisation can be made about population size and habitat size? (2)
- 3.1.4 On the same axis draw two line graphs, indicating both seasons of the small habitat. (11)

- 3.2 Study the following graph which illustrates the changing patterns in the growth of a rabbit population in a particular habitat over a period of time.



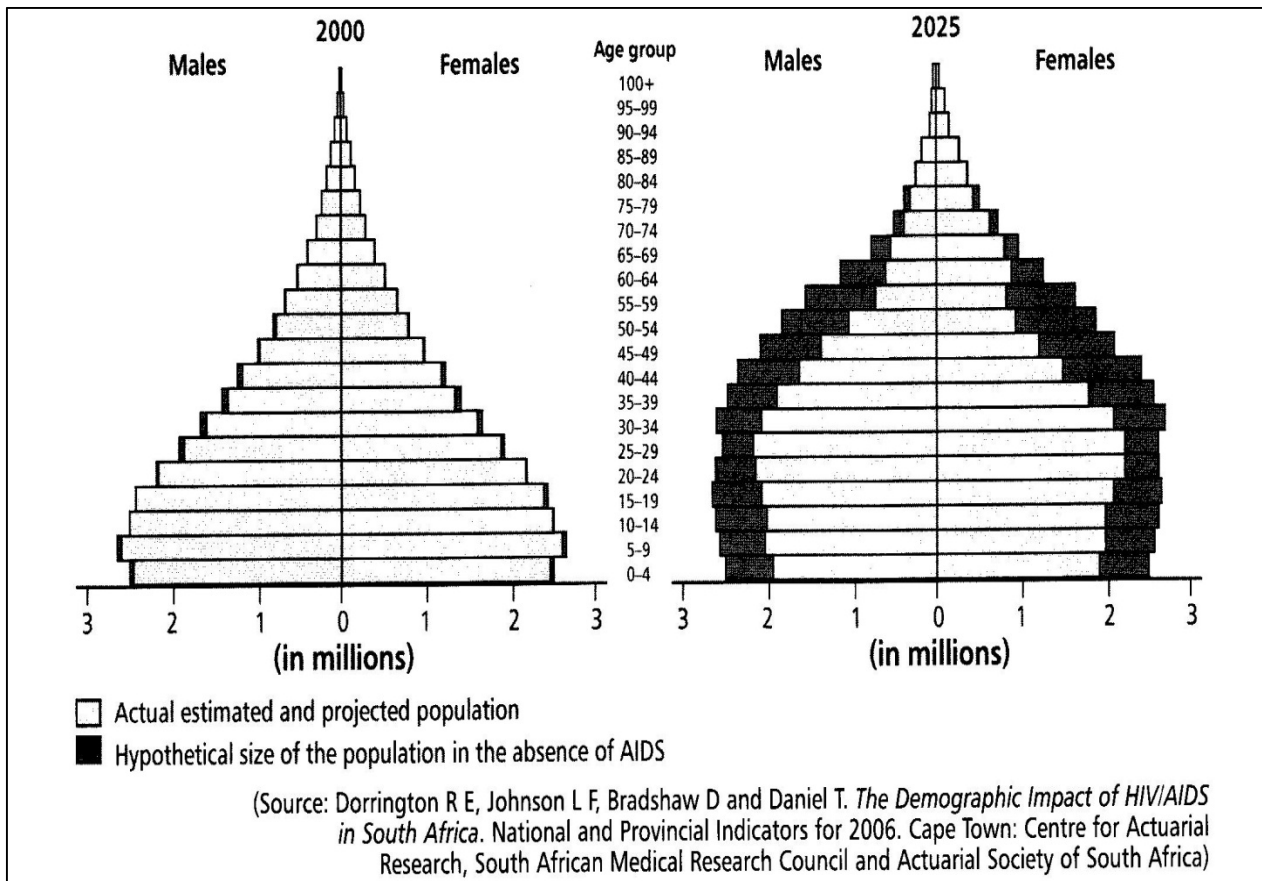
- 3.2.1 What is the carrying capacity of this habitat? (1)
- 3.2.2 How many rabbits were present in 1995? (2)
- 3.2.3 Name the phases, W and X. (2)
- 3.2.4 Suggest a reason for the shape of the curve at each of the following: (2)
- (a) W (2)
 - (b) X (2)
 - (c) Y (2)
- 3.2.5 Explain the advantage for the rabbit population if their natural predators were introduced into this habitat at phase X. (3)

[30]

SECTION C

QUESTION 4

- 4.1 It is estimated that 71% of all deaths in South Africa are caused by AIDS. The diagram below compares the South African population demographics in 2000 with those projected for 2025. The population pyramid for 2025 shows the hypothetical population size with and without AIDS.



- 4.1.1 How many females are there in the 20 to 24 year old category in 2000? (1)
- 4.1.2 How many males are there in the 25 to 29 year old category in 2000? (1)
- 4.1.3 Calculate the total number of females in their twenties for 2000. (2)
- 4.1.4 How many females, in their twenties, would be there in 2025 if AIDS was not a factor? (2)

- 4.2 The populations of two species of *Tribolium*, a flour beetle, were kept in a laboratory in each of six bottles of flour, which serves as food and a habitat for them.
- Each bottle, containing one hundred (100) of each species, were kept at different temperature and humidity conditions.
- After a period of time the number of each species surviving in each of the bottles was determined. The results are shown below.

Bottle	Temp (°C)	Relative humidity	No. of <i>T.castaneum</i> surviving	No. of <i>T.confusum</i> surviving
1	34	70%	100	0
2	34	30%	10	90
3	29	70%	86	14
4	29	30%	13	87
5	24	70%	29	70
6	24	30%	0	100

- 4.2.1 What species, *T. castaneum* or *T. confusum* is more tolerant to low temperature and low humidity? State a reason for your answer. (2)
- 4.2.2 Which of the factors, density-dependent or density-independent, are being investigated? (1)
- 4.2.3 If a seventh bottle was set up at 39 °C and with a relative humidity of 50%, what would you expect the number of survivors of each of the two species to be? (2)
- 4.2.4 What kind of competition do the above results indicate? State a reason for your answer. (2)

4.3 Read the article and answer the questions that follow.

The Millennium Seed Bank Project (MSBP) is one of the largest conservation projects ever conceived. Its partners will have banked seeds from 10% of the world's wild plant species by the end of 2010. These will not just be any plants, but will include the rarest, most threatened and most useful species known to people. The seed banks are located in several places in the world including Pretoria.

All life on earth depends on plants. Plants are the basis of ecosystems in which all animals, including humans, live, survive and grow. By saving seeds we can conserve plants and ensure biodiversity.

Despite our reliance on plants, we are at a crisis point. It is thought that 60 000 to 1000 000 plant species are under threat. Direct threats to plant survival are climate change, habitat loss, invasive alien species and over-exploitation. The root causes of these threats are difficult to control and include human population growth and socio-economic factors.

Seed banks provide an insurance policy against the extinction of plants in the wild and provide options for their future use. They complement other conservation methods which aim to conserve plants and animals directly in the wild. The Millennium Seed Bank already holds seeds from species thought to be extinct in the wild. In addition, seed banks provide a controlled source of plant material for research, provide skills and knowledge that support wider plant conservation aims and contribute to education and public awareness about plant conservation.

[Source: Adapted from <http://www.kew.org/msbp/why/index.htm>]

- 4.3.1 'All life on Earth depends on plants.' What do you think this means? (2)
- 4.3.2 Give THREE direct threats to plant survival. (3)
- 4.3.3 Why is it necessary to have seed banks? (2)

4.4 Write a mini-essay on the following:

Discuss the concept "fight or flight" by referring to the role played by adrenalin in preparing a person to respond to a dangerous situation s/he finds himself/herself in. (17)

Synthesis (3)

TOTAL SECTION C: 40

GRAND TOTAL: 150