LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

SEKHUKHUNE SOUTH DISTRICT

NATIONAL
SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES

TOPIC TEST 6: Endocrine system and Homeostasis

13 MAY 2024

MARKS: 50

TIME: 50 Minutes

This question paper consists of 9 pages including 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 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 thisquestion paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables 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,where necessary.
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 – D) next to the question number (1.1.1 – 1.1.3) in the ANSWER BOOK.

1.1.1 Which ONE of the following hormones prepares the body for an emergency?

A ADH
B Testosterone
C Adrenalin
D TSH

1.1.2 The following are the functions of different hormones:

(i) Regulates the blood sugar level
(ii) Regulates the water levels in the blood
(iii) Stimulate the growth of long bones
(iv) Stimulates milk production
(v) Regulates salt concentration

Which ONE of the following combinations is the correct function of aldosterone and prolactin respectively?

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

1.1.3 Which of the following correctly represents the events involved in the secretion and action of ADH?

	Water level in the blood relative to normal	Amount of ADH produced relative to normal	Amount of water re-absorbed by the kidneys
A	Decrease	Decrease	Decrease
B	Decrease	Increase	Increase
C	Increase	Decrease	Increase
D	Increase	Increase	Decrease

(3 x 2) **(6)**

1.2. Give the correct **biological term** for each of the following descriptions. Write only the term next to the question numbers (1.2.1 – 1.2.3) in the ANSWER BOOK.

1.2.1 The secretions that are produced in small quantities by the endocrine glands.

1.2.2 The homeostatic control of water levels in the blood.

1.2.3 The hormone that stimulates puberty in females.

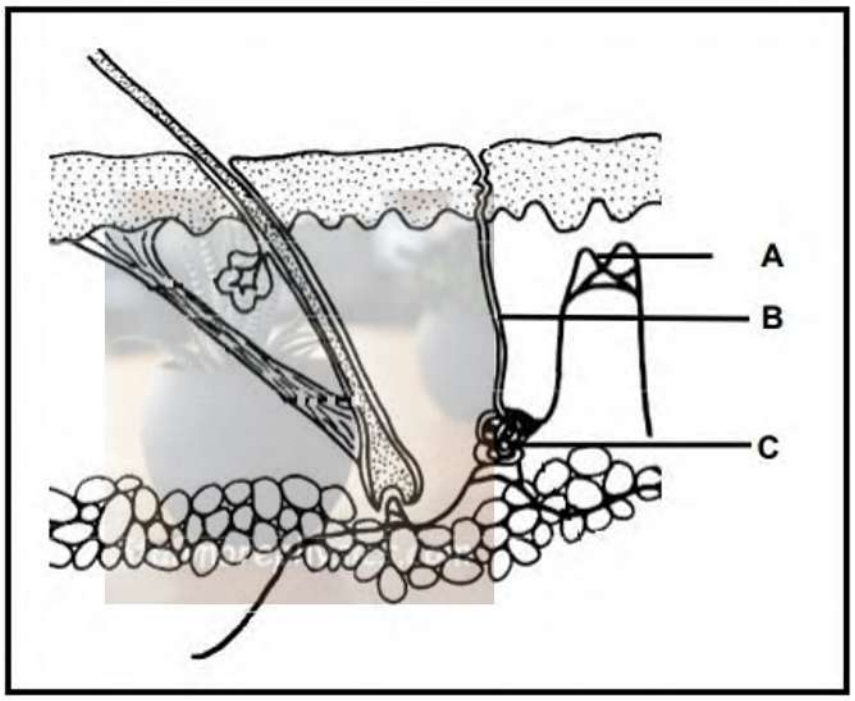
(3 x 1) **(3)**

1.3. Indicate whether each of the descriptions in **COLUMN I** apply 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) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1. Secretions are released into a cavity/duct of the body	A: Endocrine gland B: Exocrine gland

(1x2) **(2)**

1.4. The diagram below shows part of the human skin.



1.4.1. Write down the LETTER and NAME of the part that:

(a) Produces sweat. (2)

(b) Dilates when body temperature increases. (2)

1.4.2. State what happens to part **C** on a cold day. (1)

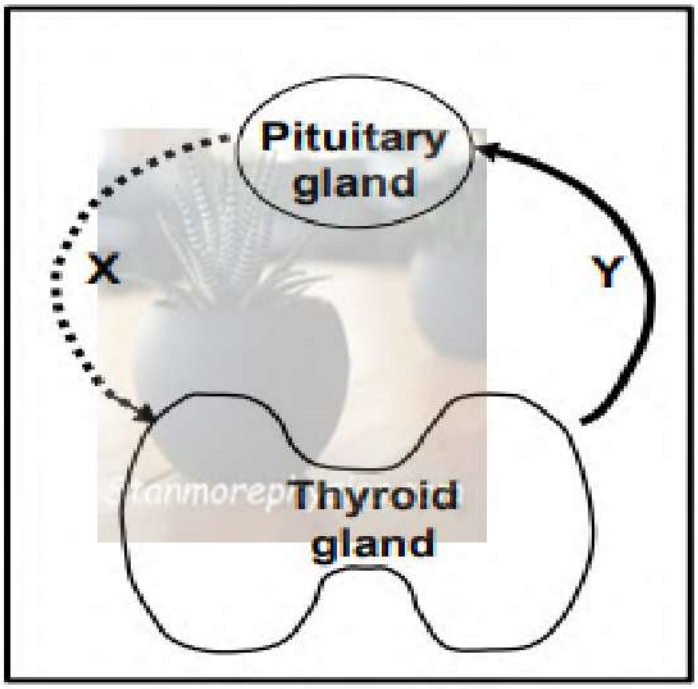
(5)

TOTAL SECTION A: 16

SECTION B

QUESTION 2

2.1 The diagram below represents a negative feedback mechanism. **X** and **Y** represents hormones secreted by the respective glands.



2.1.1. What is the role of any negative feedback mechanism in the human body (1)

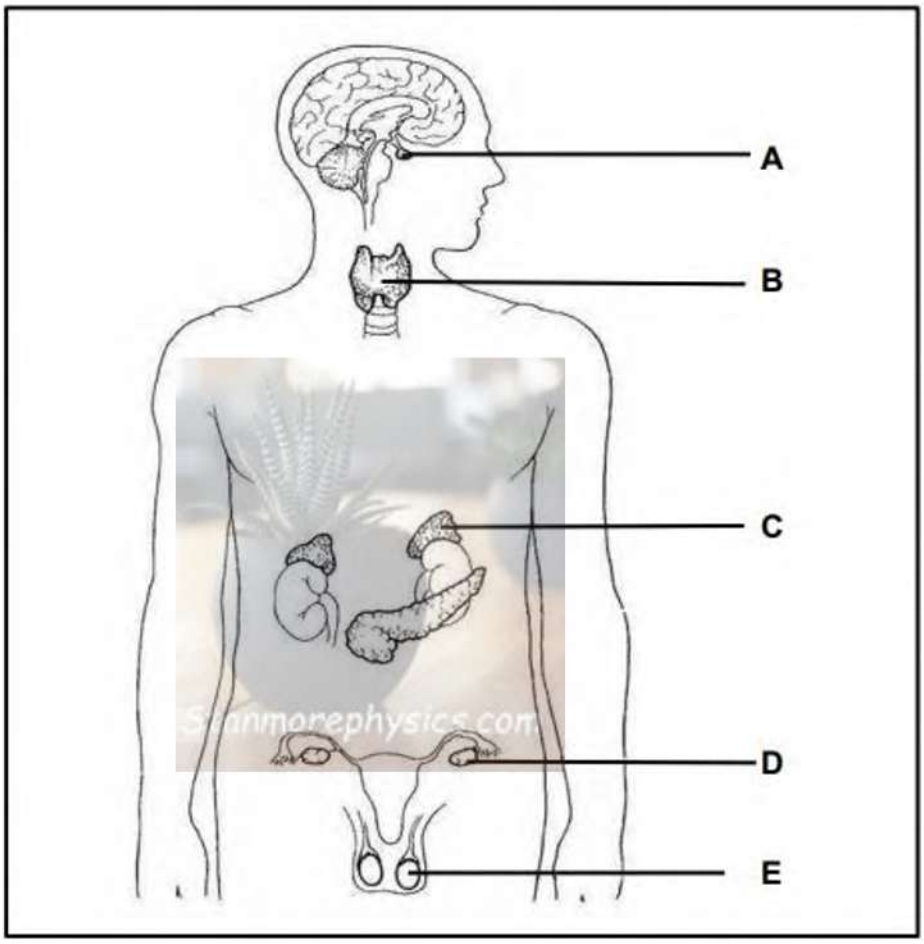
2.1.2. Identify hormone **X.** (1)

2.1.3. Name the disorder that results when thyroid gland becomes enlarged due to a shortage in iodine. (1)

2.1.4. Explain the consequence for a person if hormone **Y** remained abnormal high for extended periods of time. (3)

(6)

2.2. The diagram below represents the human endocrine system.



2.2.1. Write down the LETTER and the NAME of the gland that produces a hormone that controls the growth of long bones. (2)

2.2.2. Gland **E** is only found in males.

explain the consequences if gland **E** cannot secrete it's hormone. (2)

2.2.3. Describe the homeostatic control if salt levels in the blood are low. (5)

2.2.4. Name TWO other substances or factors, except salt, that should be kept constant in the internal environment of the tissue fluids. (2)

(11)

[17]

QUESTION 3

3.1

An investigation was conducted to compare the glucose concentration in the blood of two people, Mo and Thabiso, before and after ingesting glucose.

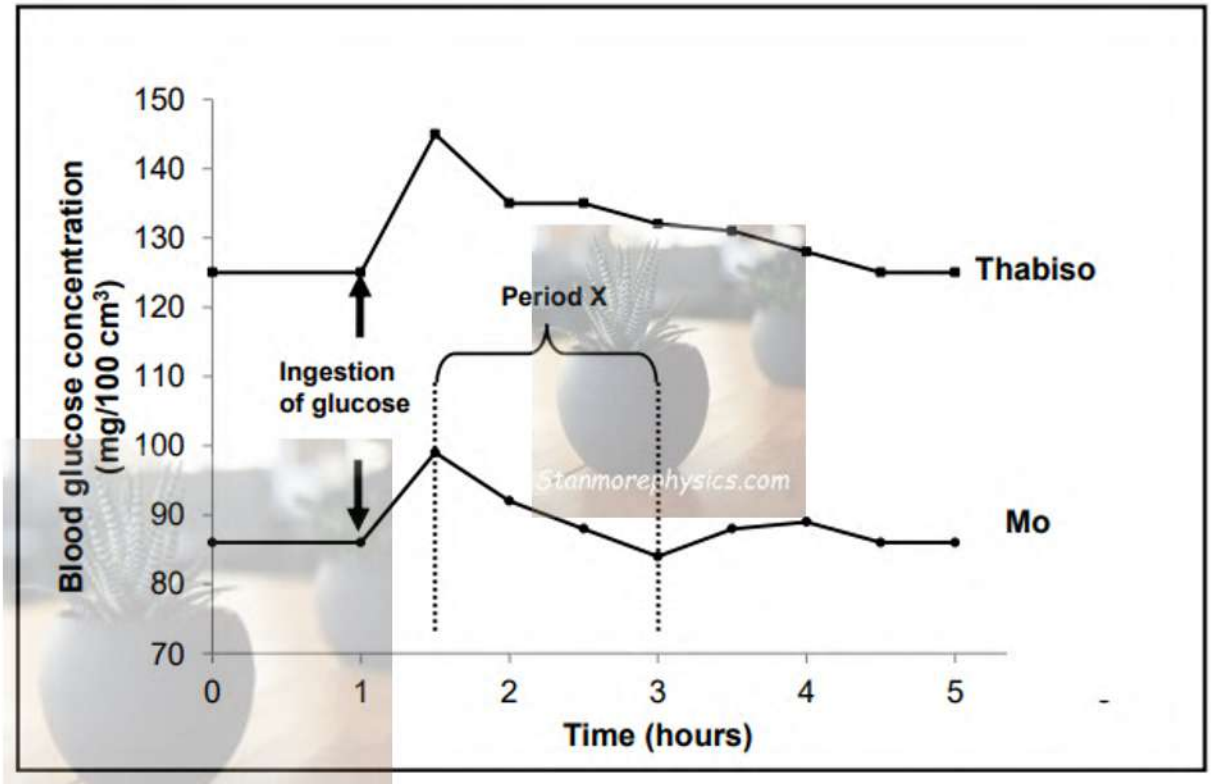
The following procedure was followed:

- The glucose concentration in their blood was measured at the start of the investigation and again 1 hour into the investigation.
- One hour into the investigation each of them was given 50 mℓ of a glucose solution to drink.
- For the next 4 hours after ingesting the glucose solution the glucose concentration in their blood was measured every 30 minutes.

The results are shown in the graph below.

The **arrows** indicate when they drank the glucose solution.

NOTE: The normal glucose concentration in blood is between 80 and 120 mg/100 cm^3.



3.1.1. Provide a suitable title for this graph. (1)

3.1.2. By how much did Thabiso's blood glucose concentration level increase (in mg/100 cm^3) after drinking the glucose solution? (2)

3.1.3 How long did it take Mo's blood glucose concentration level to return to it's original level after ingesting a glucose solution? (1)

3.1.4. Who (Thabiso or Mo) has diabetes mellitus? (1)

(5)

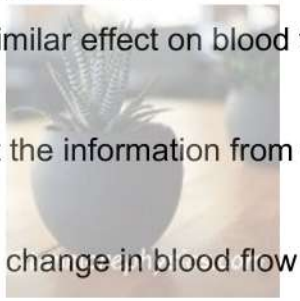
3.2. The table below shows the amount of blood flow to the heart muscles of a man after taking an injection of adrenalin.

Time(minutes)	Blood flow (ml/min.)
0	25
15	56
30	60
45	50
60	45

3.2.1. Name:

(a) The gland that produces adrenalin. (1)

(b) The hormone that has similar effect on blood flow to the heart. (1)



3.2.2. Draw a bar graph to represent the information from the table. (6)

3.2.3. Explain the significance of the change in blood flow observed on the table. (4)

(12)

[17]

TOTAL SECTION B: 34

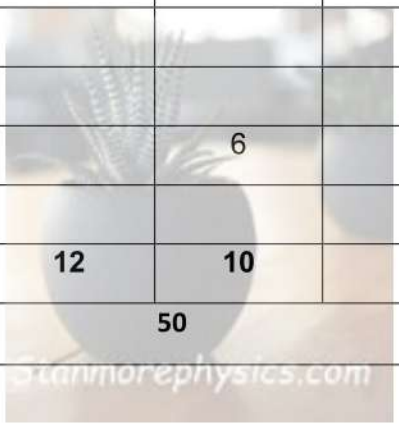
GRAND TOTAL: 50

NSC

WEIGHTING GRID

LIFE SCIENCES GRADE 12 TEST NO 6: ENDOCRINE SYSTEM AND HOMEOSTASIS WEIGHTING GRID					
	Cognitive Levels				
	A	**B**	**C**	**D**	
	Basic knowledge	**UNDERSTANDING**	**Application**	**Analysis, Synthesis & Evaluation**	**Total**
NORM	**20**	**13**	**10**	**7**	**50**
1.1.1	2				**2**
1.1.2	2				**2**
1.1.3		2			**2**
1.2.1	1				**1**
1.2.2	1				**1**
1.2.3	1				**1**
1.3.1		2			**2**
1.4.1 (a)	2				**2**
1.4.1 (b)	2				**2**
1.4.2		1			**1**
2.1.1	1				**1**
2.1.2	1				**1**
2.1.3	1				**1**
2.1.4				3	**3**
2.2.1	2				**2**
2.2.2		2			**2**

2.2.3		5			**5**
2.2.4	2				**2**
3.1.1				1	**1**
3.1.2			2		**2**
3.1.3			1		**1**
3.1.4			1		**1**
3.2.1 (a)	1				**1**
3.2.1(b)	1				**1**
3.2.2			6		**6**
3.2.3				4	**4**
Total	**20**	**12**	**10**	**8**	**50**
TOTAL	**50**				



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13 MAY 2024

TOPIC TEST 6: Endocrine System and Homeostasis

MARKING GUIDELINES

MARKS: 50

These marking guidelines consists of 8 pages including the cover page

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. If more information than marks allocated is given
   Stop marking when maximum marks is reached and put a wavy line and 'max' in the right hand margin.

2. If, for example, three reasons are required and five are given
   Mark the first three irrespective of whether all or some are correct/incorrect.

3. If whole process is given when only part of it is required
   Read all and credit relevant part.

4. If comparisons are asked for and descriptions are given
   Accept if differences / similarities are clear.

5. If tabulation is required but paragraphs are given
   Candidates will lose marks for not tabulating.

6. If diagrams are given with annotations when descriptions are required
   Candidates will lose marks

7. If flow charts are given instead of descriptions
   Candidates will lose marks.

8. If sequence is muddled and links do not make sense
   Where sequence and links are correct, credit. Where sequence and links is incorrect, do not credit. If sequence and links becomes correct again, resume credit.

9. Non-recognized abbreviations
   Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of answer if correct.

10. Wrong numbering
    If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.

11. If language used changes the intended meaning
    Do not accept.

12. Spelling errors

If recognizable accept provided it does not mean something else in Life Sciences or if it is out of context.

13. If common names given in terminology
Accept provided it was accepted at the National memo discussion meeting.

14. If only letter is asked for and only name is given (and vice versa)
No credit

15. If units are not given in measurements
Candidates will lose marks. Memorandum will allocate marks for units separately

16. Be sensitive to the **sense of an answer, which may be stated in a different way**.

17. Caption
All illustrations (diagrams, graphs, tables, etc.) must have a caption

18. Code-switching of official languages (terms and concepts)
A single word or two that appears in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official language.

SECTION A

QUESTION 1

1.1

1.1.1. C✓✓

1.1.2. D✓✓

1.1.3. B ✓✓ (3 x 2) **(6)**

1.2.

1.2.1. Hormones✓

1.2.2. Osmoregulation✓

1.2.3. Oestrogen ✓ (3 x 1) **(3)**

1.3.

1.3.1. B only✓✓ (1 x 2) **(2)**

1.4.

1.4.1. a) C – Sweat gland ✓ (2)

b) A – Capillary/blood vessel✓ (2)

1.4.2. It becomes less active✓ / produces less sweat (1)

(5)

TOTAL SECTION A: 16

SECTION B

QUESTION 2

2.1

2.1.1. To maintain an internal balance ✓/set point/homeostasis/regulate metabolism (1)

2.1.2. TSH✓ / thyroid-stimulating hormone (1)

2.1.3. Goitre ✓ (1)

2.1.4. When Y/ thyroxin is released at higher levels than normal:

- Metabolism will be higher than normal✓/cellular respiration increases
- Heart rate increases✓
- thus all the energy from food eaten will be used✓
- leaving nothing to be utilised for storage✓/therefore could lead to a person being underweight
- can also lead to anxiety✓ (Any 3) (3)

(6)

2.2

2.2.1. A✓ – Pituitary gland✓/ hypophysis (2)

2.2.2 No development of male secondary features ✓/Any example

- No sperm will develop ✓/ Sperm count will be low (2)

2.2.3. The adrenal glands are stimulated ✓

- to secrete more aldosterone ✓
- More sodium ions are reabsorbed ✓
- from the distal convoluted tubules ✓/ collecting duct
- into the surrounding blood capillaries ✓
- Salt levels in the blood return back to normal ✓

(Any 5) (5)

2.2.4 Water ✓

PH ✓

Carbon dioxide ✓

Temperature ✓

Glucose ✓ (Any 2) (2)

(Mark first TWO only)

(11)

[17]

QUESTION 3

3.1

3.1.1. Comparison of the blood glucose level of two people ✓ over 5 hours ✓ /before and after ingesting glucose. (1)

3.1.2. (145 – 125) ✓

(Accept numbers in range 144 – 146 for the first value and 124 – 126 for the second value)

= 20 ✓ mg/100 cm^3 (2)

(Accept answers according to the value given by the learner)

3.1.3. Accept answers from 1,7 to 1,9 hours✓ / 102 – 114 minutes/ 1h 42min – 1h54min (1)

3.1.4. Thabiso ✓ (1)

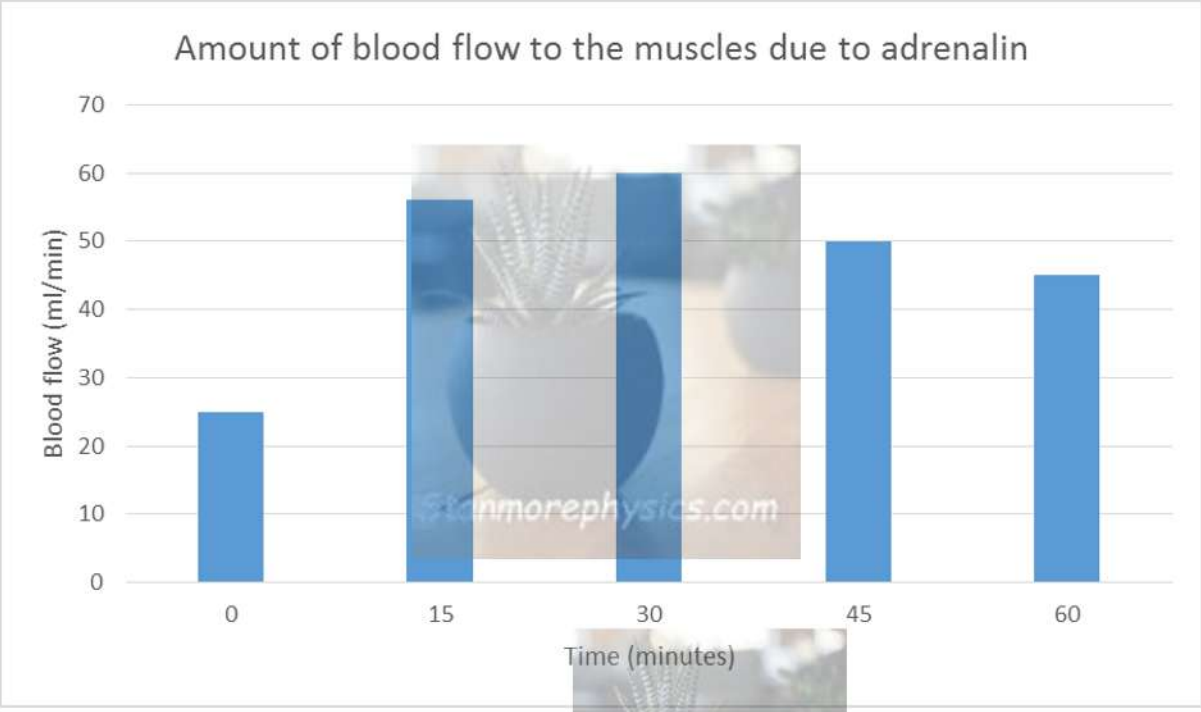
(5)

3.2.

3.2.1. a) Adrenal✓ gland (1)

b) Thyroxin ✓ (1)

3.2.2.



Criteria	Elaboration	Marks
Caption of graphs (**C**)	Both variables included	1
Correct type of graph (**T**)	Bar graph drawn	1
Axes labels (**L**)	X – and y-axis correctly labelled with units	1
Scale for x – and y-axis (**S**)	Correct scale for x - axis and for y- axis	1
Plotting of graph (**P**)	1-4 points plotted correctly. All points plotted correctly	1 2

(6)

3.2.3. There is an increase in the blood flow to the heart✓
- which supplies more oxygen and glucose to the cells ✓
- to increase energy production in the cells✓/ increase cellular respiration
- to deal with emergency✓ (4)

(12)

[17]

TOTAL SECTION B: 34

GRAND TOTAL: 50