GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAMINATION

2024



10831

LIFE SCIENCES

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(PAPER 1)

TIME: 2½ hours

MARKS: 150

LIFE SCIENCES: Paper 1

10831E

17 pages

X05

P.T.O.

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 of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, flow charts or tables 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 compass, where necessary.
11. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A – D) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 D.

1.1.1 Which structure protects the entrance to the vagina?

A Cervix
B Vulva
C Anus
D Urethra

1.1.2 In humans, fertilisation usually takes place in the …

A fallopian tubes.
B vagina.
C uterus.
D ovary.

1.1.3 Which part of the brain is responsible for voluntary movement?

A Cerebrum
B Cerebellum
C Medulla oblongata
D Hypothalamus

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1.1.4 Which disease occurs when blood sugar levels are too high?

A Hyperthyroidism
B Goitre
C Diabetes
D Rickets

1.1.5 The structure that joins the two hemispheres of the brain is called the ...

A corpus callosum.
B hypothalamus.
C medulla oblongata.
D pituitary.

1.1.6 The pupillary reflex is the ability of a typical human eye to adjust to different light intensities in the environment.

Which combination of processes will occur in a typical human eye when the light intensity changes from dark to bright light?

(i) Radial muscles contract
(ii) Circular muscles contract
(iii) Pupil constricts
(iv) Radial muscles relax
(v) Circular muscles relax
(vi) Pupil dilates

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

1.1.7 Which of the following can be used to treat a severe middle ear infection?

A Wax cleaner
B Grommets
C Hearing aid
D Cochlear implant

1.1.8 A person experiences the following symptoms:

- Loses weight easily
- Is always hungry
- Never feels cold

The most likely explanation for this combination of symptoms is that the person …

A secretes too much growth hormone.
B has an overactive thyroid gland.
C is diabetic and just had an insulin injection.
D has an underactive hypothalamus.

1.1.9 Secretions are released into a cavity or onto the surface through a duct in the body by …

A an endocrine gland.
B an exocrine gland.
C the nervous system.
D the circulatory system.

1.1.10 Which of the following occurs when the sympathetic nervous system is more active than the parasympathetic nervous system?

A Increased breathing rate
B Decreased heart rate
C Constriction of pupils
D Increase in digestion (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 numbers (1.2.1 to 1.2.6) in the ANSWER BOOK.

1.2.1 Sharp structures found in plants for protection from herbivores

1.2.2 Type of vision that results from having two eyes

1.2.3 A hormone produced by the pituitary gland that stimulates milk production in human females

1.2.4 A condition where the cornea is uneven, resulting in blurry vision

1.2.5 The response of stems towards a light stimulus

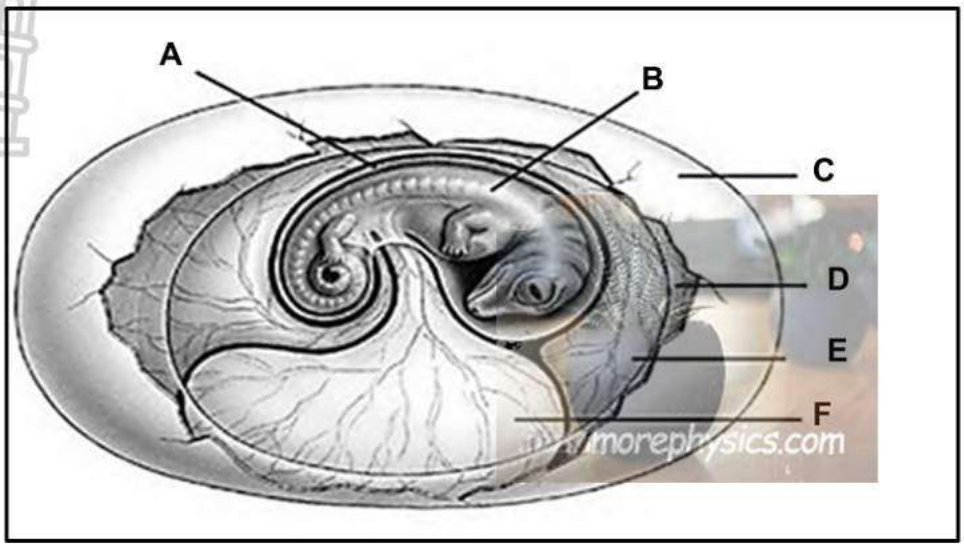
1.2.6 A hollow ball of cells formed from the zygote (6 x 1) **(6)**

1.3 Indicate whether each of the descriptions 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, A and B** or **none** next to the question numbers (1.3.1 to 1.3.3) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 The hormone that is in excess in an abnormally tall person	A: Lutenising hormone B: Growth hormone
1.3.2 Corrective lenses for long-sightedness	A: Convex B: Concave
1.3.3 A disease of the CNS	A: Multiple sclerosis B: Alzheimer's disease

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

1.4 Study the diagram below of an amniotic egg and answer the questions that follow.



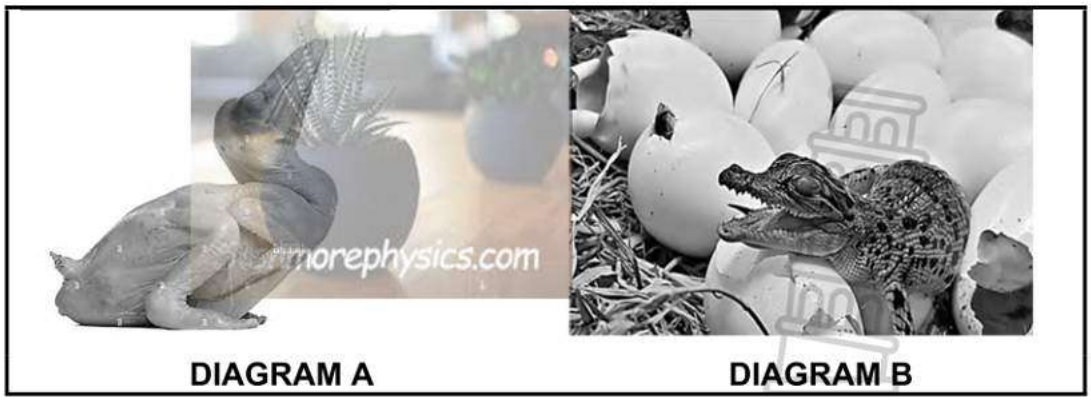
1.4.1 Give the LETTER and NAME of the part that:

(a) Protects the developing embryo from predators (2)

(b) Provides nutrients to the embryo during its development (2)

(c) Allows for the storage of waste products from the embryo (2)

1.4.2 The diagrams below show different stages of development.

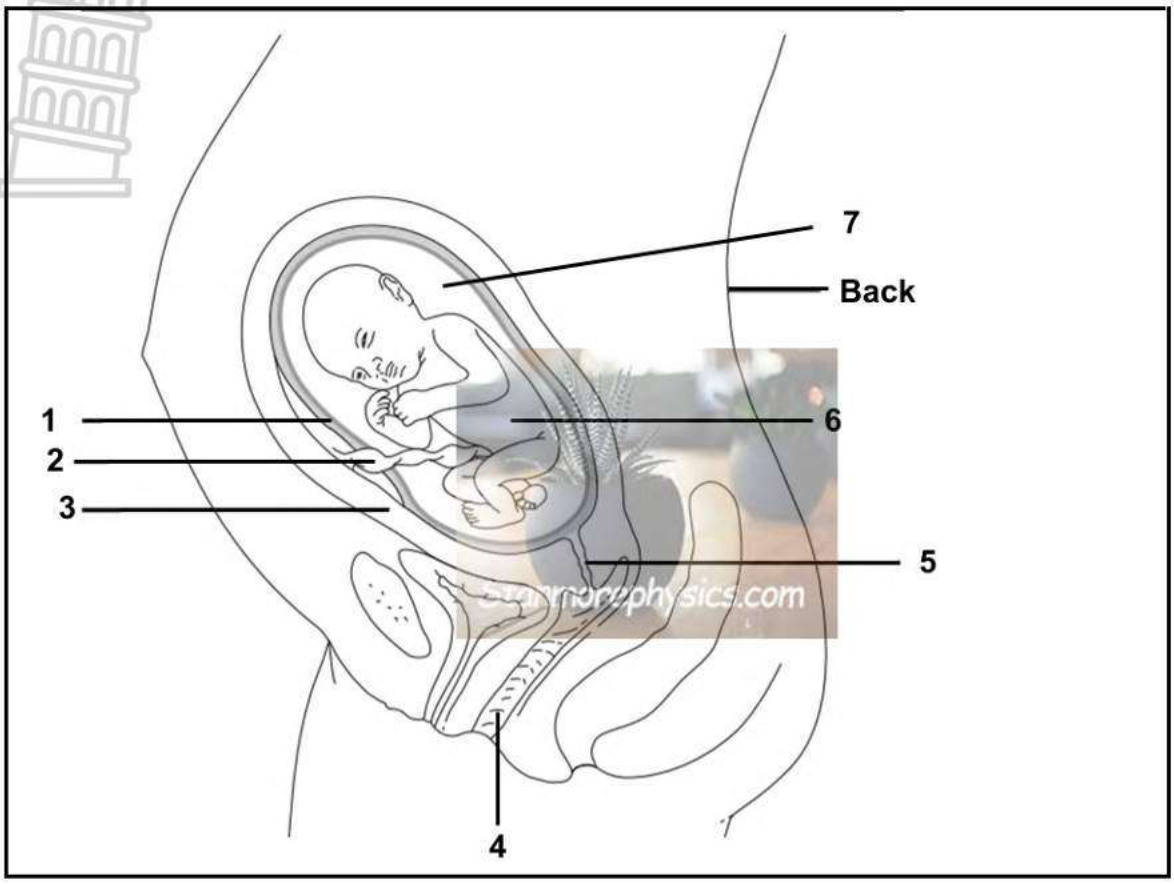


Name the diagram that represents:

(a) Altricial development (1)

(b) The type of development where a small amount of yolk was available to the embryo (1)
(8)

1.5 The diagram below shows the uterus of a pregnant woman.



1.5.1 Identify the structures numbered:

(a) **1** (1)
(b) **3** (1)
(c) **5** (1)
(d) **6** (1)

1.5.2 Name the structure that:

(a) Acts as the birthing canal (1)
(b) Secretes a hormone that maintains pregnancy (1)
(c) Transports oxygen and nutrients to the developing foetus (1)

1.5.3 Name the tissue of the uterus that contracts to enable the woman to "push" the baby out during birth. (1)

1.5.4 Several functions are listed below.

1. Acts as a microfilter
2. Allows for free movement of the foetus as it grows and develops
3. Gaseous exchange between mother and foetus
4. Protects the foetus against desiccation
5. Provides immunity to the foetus
6. Secretes a hormone
7. Shock absorber
8. Thermoregulation

Which of the above functions is/are applicable to the amniotic fluid?

Write only the NUMBER/S in your ANSWER BOOK. (2)

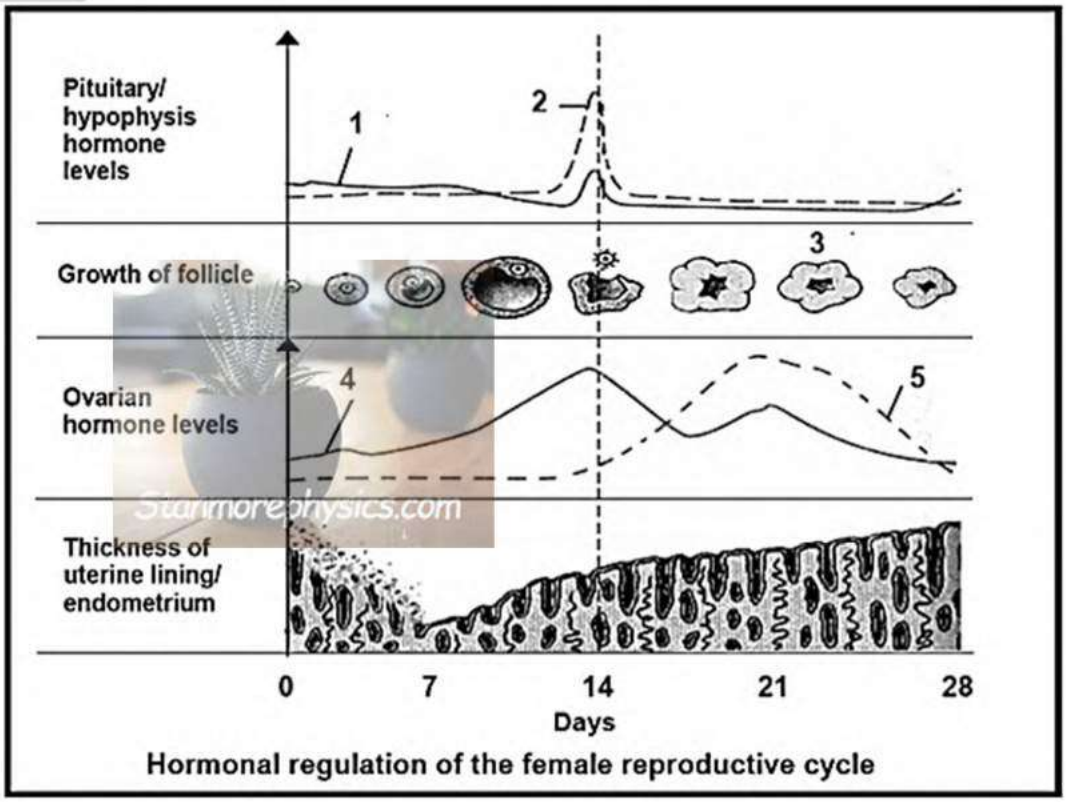
(10)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Study the diagrams and graphs below, which show the hormonal regulation of the female reproductive cycle.



Hormonal regulation of the female reproductive cycle

2.1.1 Give the NUMBER and NAME of the hormone that:

(a) Stimulates the development of a follicle (2)

(b) Maintains the endometrium between days 7 and 14 (2)

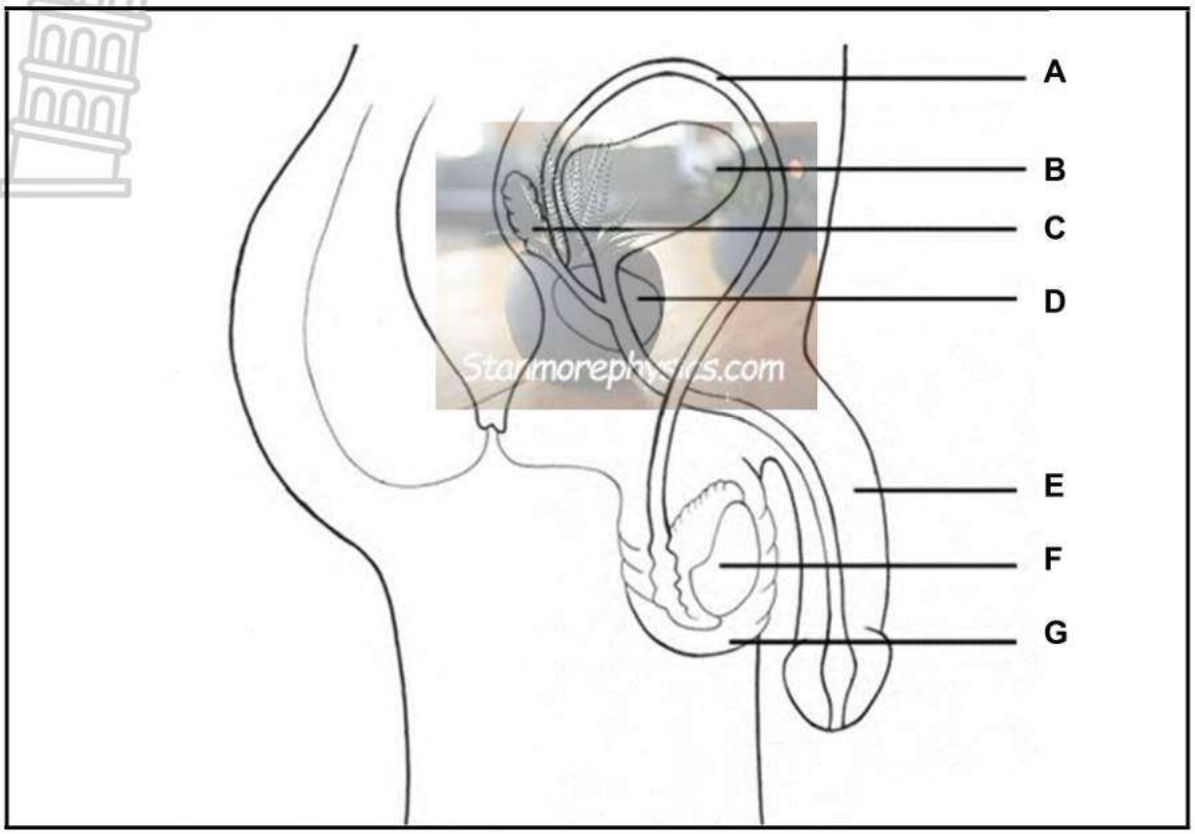
2.1.2 (a) Explain the function of the corpus luteum. (2)

(b) Describe how the corpus luteum is formed. (3)

2.1.3 Give TWO visible reasons, using the information from the diagrams and graphs above, to explain why the woman is not pregnant. (2)

(11)

2.2 The diagram below represents the human male reproductive system.



2.2.1 Identify the parts labelled:

(a) **A** (1)

(b) **E** (1)

2.2.2 Explain the function of structure **G**. (2)

2.2.3 Name and describe the process by which gametes are produced in part **F**. (4)

2.2.4 Draw a diagram of a gamete produced in part **F**. (5)

2.2.5 Draw a flow diagram showing the pathway of sperm cells during ejaculation. (2)

(15)

2.3 A student studied the effects of various plant hormones on the growth of corn seedlings.

- Corn seedlings of the same height and species were used.
- The student took four groups of 10 plants each.
- All initial heights of the seedlings were 1 cm.
- Each group received the same amount of water.
- She gave one group water only, while the other groups each received 1,00 micrograms of a different hormone mixed in with the water.
- After 15 days, she measured the height of each seedling from each group, calculated the average and recorded the information in the table below.

Various plant hormones mixed in water	Height of seedlings (cm)
Water only	21
Abscisic acid + water	19
Auxin + water	22
Gibberellins + water	48

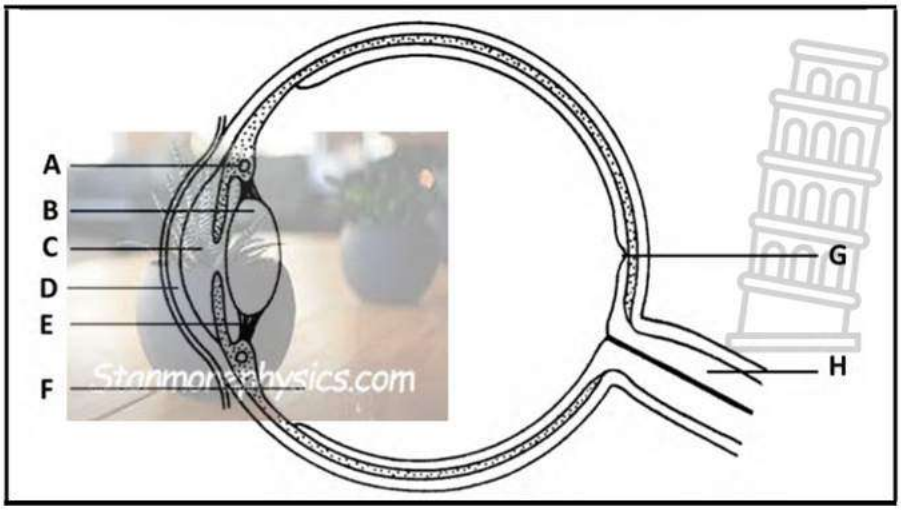
2.3.1 Which plant hormone produced the tallest plants? (1)

2.3.2 Identify TWO ways that the student ensured the validity of the investigation. (2)

2.3.3 Give TWO functions of abscisic acid. (2)

2.3.4 Draw a bar graph to represent the data in the table above. (6)
(11)

2.4 The diagram below shows a longitudinal section through a human eye.



2.4.1 Give the NAME of the part that:

(a) Maintains the shape of the eye together with the sclera (1)

(b) Carries impulses to the cerebrum (1)

2.4.2 Explain ONE feature shared by parts **B** and **D** that makes them suited to the function for clear vision. (2)

2.4.3 Discuss how parts **G** and **H** work together for vision to occur. (4)

2.4.4 Tabulate TWO structural differences between a healthy eye when looking at an object closer than 6 m away and when looking at an object further than 6 m away. (5)

(13)
[50]

QUESTION 3

3.1 An investigation was conducted to observe the time taken for blood alcohol levels to return to normal after the consumption of various volumes of alcohol.

The investigator invited four people to participate in the investigation. Each participant was asked to read the following governmental warning label about the consumption of alcohol:

GOVERNMENTAL WARNING:

1. According to the Surgeon General, women should not drink alcoholic beverages during pregnancy because of the risk of birth defects.

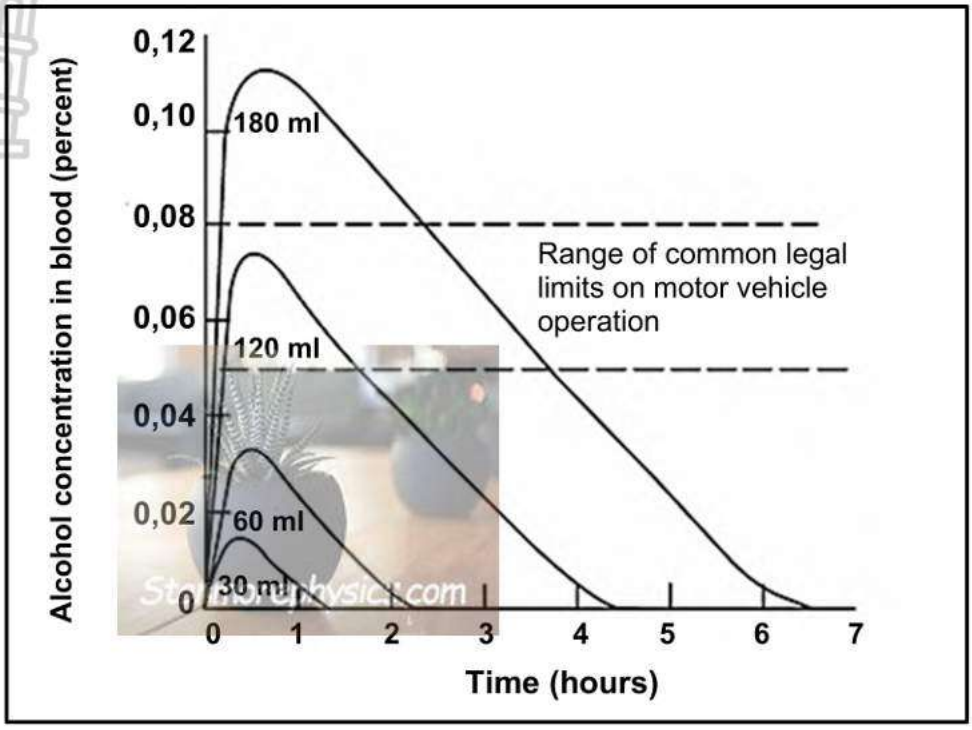
2. Consumption of alcoholic beverages impairs your ability to drive a car or operate machinery and may cause health problems.

Each participant was given a specific volume of alcohol to drink:

Participant	Volume of alcohol/ml
1	30
2	60
3	120
4	180

The blood alcohol concentration was measured before the participants drank the alcohol and every 30 minutes thereafter until the blood alcohol concentration returned to 0%.

The graph below shows the results of the investigation.



3.1.1 How many hours does it take for a person to be legally able to drive after consuming 180 ml of alcohol? (2)

3.1.2 For this investigation, identify the dependent variable. (1)

3.1.3 Suggest TWO reasons why the investigator would ask the participants not to consume alcohol for 48 hours before the investigation. (2)

3.1.4 For this investigation, describe:

(a) TWO safety precautions (2)

(b) TWO planning steps (2)

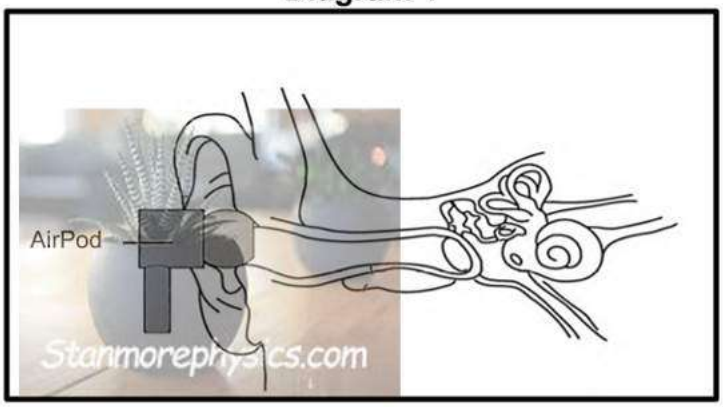
3.1.5 (a) Based on the table above, are the investigation results reliable? (1)

(b) Give a reason for your answer to QUESTION 3.1.5 (a). (2)

3.1.6 Write a suitable conclusion for this investigation. (2)
(14)

3.2 AirPods are wireless listening devices that fit into the ear and direct sound, allowing users to listen to music from their phones privately without disturbing others.

Diagram 1



A smartphone has a feature that can monitor the volume of music being played through the AirPods and give warning notifications if the volume exceeds 80 dB (decibels).

Fred and Tebogo are listening to the same music. Diagrams **2** and **3** below show their phone displays.

Diagram 2



Diagram 3



3.2.1 Name the part of the ear that:

(a) Vibrates due to the direct effect of sound waves (1)

(b) Contains receptor cells which detect the sound stimulus (1)

(c) Equalises pressure in the middle ear (1)

(d) Channels sound waves to the middle ear (1)

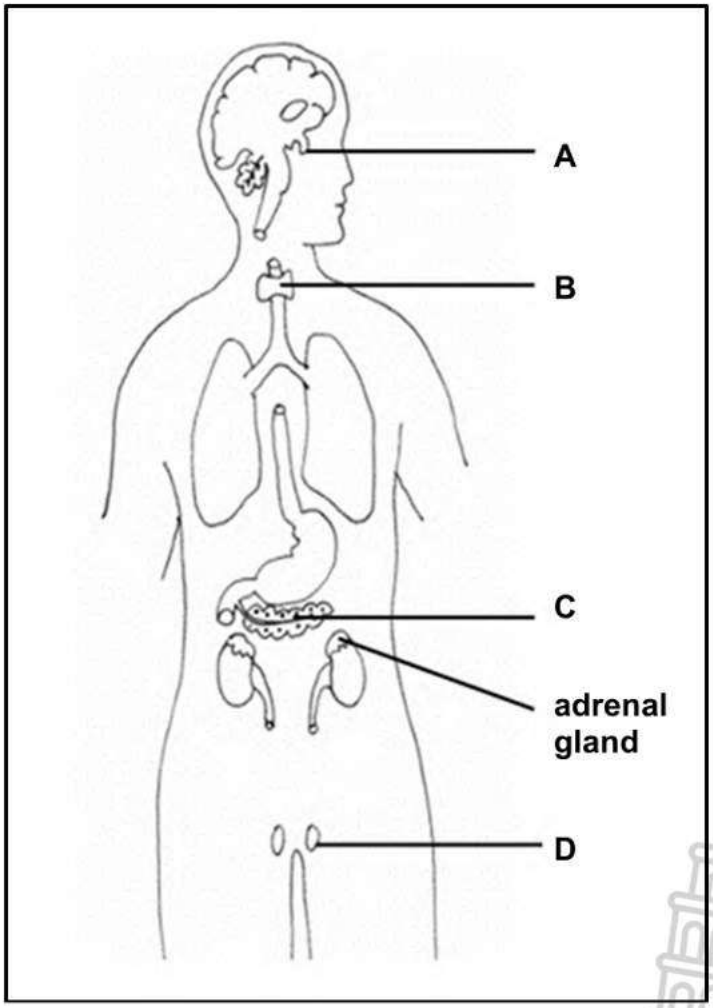
3.2.2 Explain TWO ways in which AirPods could prevent a person from hearing other environmental noise. (4)

3.2.3 Use diagrams **2** and **3** and answer the following questions.

(a) Who is more at risk for damage to their sound receptor cells? (1)

(b) Explain your answer to QUESTION 3.2.3 (a). (2)
(11)

3.3 The diagram below shows the male body with the position of various glands.

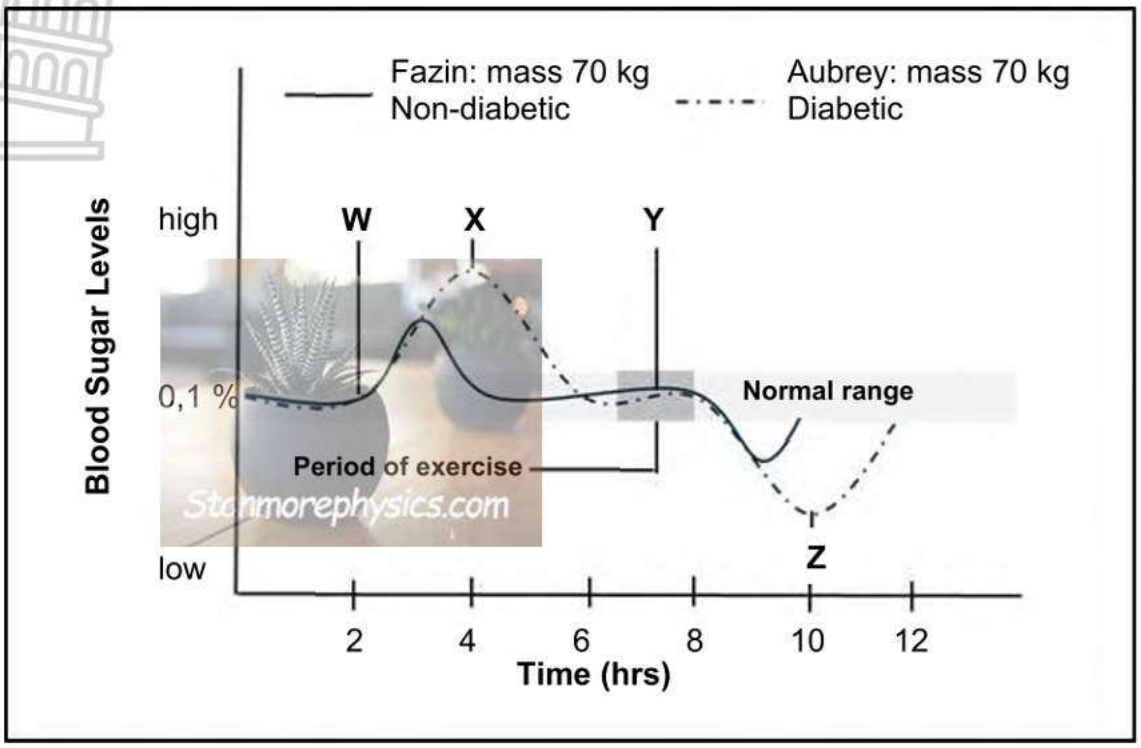


3.3.1 (a) Name TWO hormones secreted by the adrenal gland. (2)

(b) Name the hormone secreted by gland **D**. (1)

3.3.2 Name and describe the role of gland **A** when the hormone secreted by gland **B** increases above the normal level. (5)
(8)

3.4 Study the graph below and answer the questions that follow.



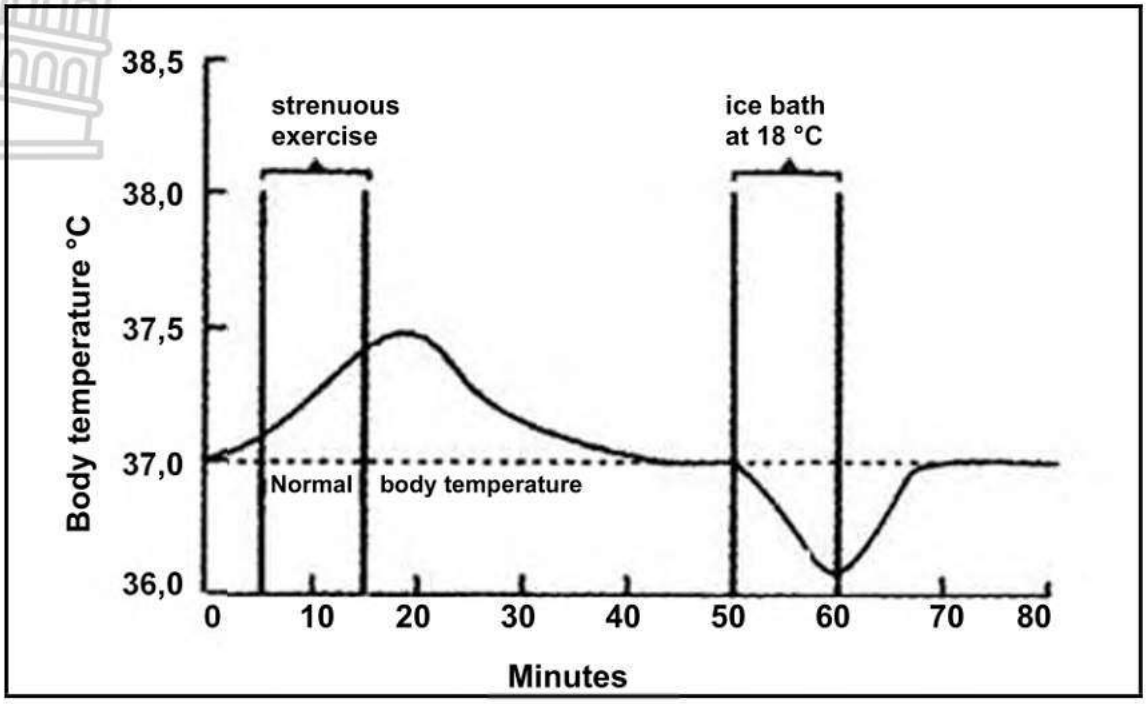
3.4.1 (a) Name the hormone Aubrey received at **X** on the graph. (1)

(b) Provide a suitable reason for your answer to QUESTION 3.4.1 (a). (1)

3.4.2 Define the term *homeostasis*. (2)

3.4.3 Describe the negative feedback mechanism that occurs between points **Y** and **Z**. (5)
(9)

3.5 The graph below shows the effect of strenuous exercise on an athlete's body temperature, followed by an ice bath.



3.5.1 Which part of the brain responds to changes in the body's temperature? (1)

3.5.2 Describe the changes in the athlete's body between 20 and 40 minutes, as illustrated in the graph. (5)

3.5.3 Explain the cause of the increase in body temperature during strenuous exercise. (2)

(8)

[50]

TOTAL SECTION B: 100

TOTAL: 150

END

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

AMENDMENT TO MARKING GUIDELINES

PREPARATORY EXAMINATIONS – 2024

ATTENTION: THE CHIEF INVIGILATOR

SUBJECT / *VAK*	**LIFE SCIENCES / *LEWENSWETENSKAPPE***
PAPER / *VRAESTEL*	**1**
DATE OF EXAMINATION / *DATUM VAN EKSAMEN*	**6 SEPTEMBER 2024**

The errata for the Marking Guidelines of LIFE SCIENCES P1 has reference.
There was an anomaly in the manner in which **Question 3.4.3** was presented on both the English and Afrikaans versions of the question paper. This matter was addressed at the Marking Standardisation Meeting.
To ensure that candidates are not disadvantaged and prejudiced in way, you are advised to please ask your Life Sciences educator(s) to **ignore Question 3.4.3** when marking.

In other words, the paper must be marked out of a total of 145 instead of 150 and then the learners' marks must be converted to a mark out of 150. E.g., Should a learner attain 85/145 then that mark is recalculated as 88/150.

Use the formula: $\frac{a}{145} \times 100 = b.$ *Then,* $\frac{b}{100} \times 150 = c$

C is the mark that is entered into SASAMS ***out of 150****.*

Please ensure that BOTH marks ($\frac{\mathbf{85}}{\mathbf{145}}$ **AND** $\frac{\mathbf{88}}{\mathbf{150}}$) are reflected on the cover page of candidates' answer scripts.

Mr. Jonathan Williams

DIRECTOR: EXAMINATIONS MANAGEMENT

6 SEPTEMBER 2024

Please note, the paper is to be marked out of 145 not 150.

USE THE CONVERSION TABLE BELOW

145 – 150

145	150	145	150	145	150	145	150	145	150
1	**1**	30	**31**	59	**61**	88	**91**	117	**121**
2	**2**	31	**32**	60	**62**	89	**92**	118	**122**
3	**3**	32	**33**	61	**63**	90	**93**	119	**123**
4	**4**	33	**34**	62	**64**	91	**94**	120	**124**
5	**5**	34	**35**	63	**65**	92	**95**	121	**125**
6	**6**	35	**36**	64	**66**	93	**96**	122	**126**
7	**7**	36	**37**	65	**67**	94	**97**	123	**127**
8	**8**	37	**38**	66	**68**	95	**98**	124	**128**
9	**9**	38	**39**	67	**69**	96	**99**	125	**129**
10	**10**	39	**40**	68	**70**	97	**100**	126	**130**
11	**11**	40	**41**	69	**71**	98	**101**	127	**131**
12	**12**	41	**42**	70	**72**	99	**102**	128	**132**
13	**13**	42	**43**	71	**73**	100	**103**	129	**133**
14	**14**	43	**44**	72	**74**	101	**104**	130	**134**
15	**15**	44	**45**	73	**75**	102	**105**	131	**135**
15	**16**	44	**46**	73	**76**	102	**106**	131	**136**
16	**17**	45	**47**	74	**77**	103	**107**	132	**137**
17	**18**	46	**48**	75	**78**	104	**108**	133	**138**
18	**19**	47	**49**	76	**79**	105	**109**	134	**139**
19	**20**	48	**50**	77	**80**	106	**110**	135	**140**
20	**21**	49	**51**	78	**81**	107	**111**	136	**141**
21	**22**	50	**52**	79	**82**	108	**112**	137	**142**
22	**23**	51	**53**	80	**83**	109	**113**	138	**143**
23	**24**	52	**54**	81	**84**	110	**114**	139	**144**
24	**25**	53	**55**	82	**85**	111	**115**	140	**145**
25	**26**	54	**56**	83	**86**	112	**116**	141	**146**
26	**27**	55	**57**	84	**87**	113	**117**	142	**147**
27	**28**	56	**58**	85	**88**	114	**118**	143	**148**
28	**29**	57	**59**	86	**89**	115	**119**	144	**149**
29	**30**	58	**60**	87	**90**	116	**120**	145	**150**