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Republic of Somaliland

Somaliland National Examination Board

Form Four

Biology Examination

June 2008

TIME 2 HOURS
Plus 10 minutes for reading through the paper

INSTRUCTIONS TO CANDIDATES

This paper consists of 20 printed pages

Count them now. Inform the invigilator if there are any missing

There are three parts:

PART 1:	20 Multiple Choice Questions	20 Marks
PART 2:	7 Structured Questions	70 Marks
PART 3:	1 Extended Question	10 Marks
	TOTAL	**100 Marks**

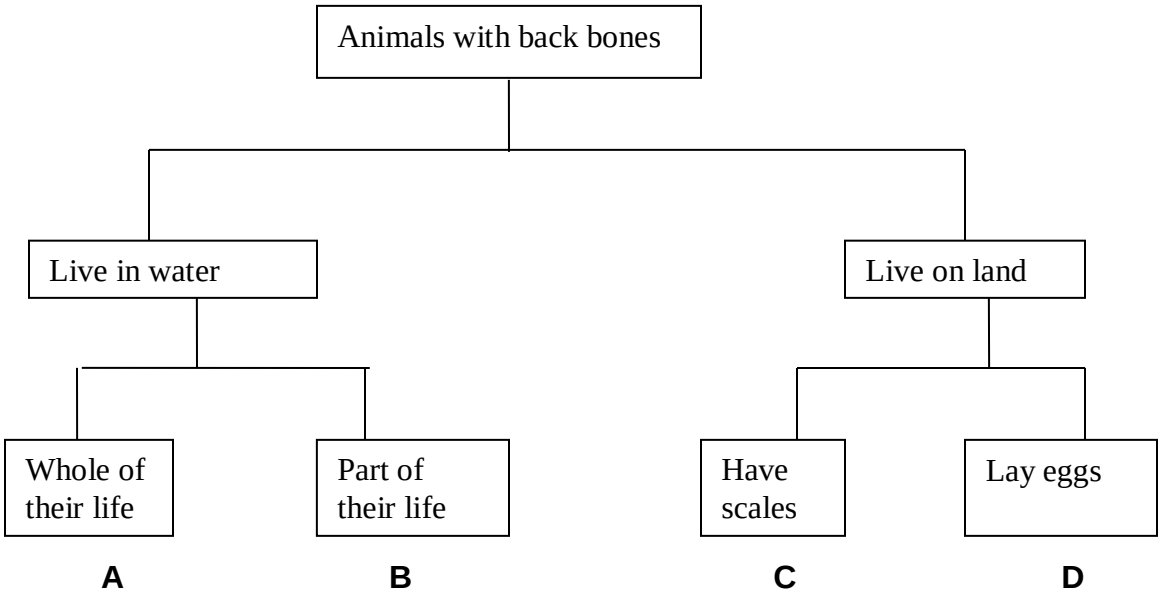
- Answer all questions in part 1 and 2 and one in part 3.
- No extra paper is allowed

Use this page for rough work. It will NOT be marked.

PART 1: MULTIPLE CHOICE QUESTIONS (20 MARKS)

Instructions for this section: Answer all questions in this section. For each question in this section, circle the correct answer

1. The classification chart below was used by some students to classify animals they had observed.



In which groups should they classify a frog?

2. The chart below shows the feeding relationship in a certain habitat

Grass ⟶ Insect ⟶ Lizards ⟶ Snakes

Note: The arrow points to the eater

If a disease killed all lizards, what be the immediate effects on the other elements?

	Grass	**Insects**	**Snakes**
A.	Decrease	Increase	Decrease
B.	Increase	Increase	Decrease
C.	Decrease	Decrease	Decrease
D.	Increase	Decrease	Decrease

3. Which of the following has **ALL** the conditions necessary for germination of most seeds?

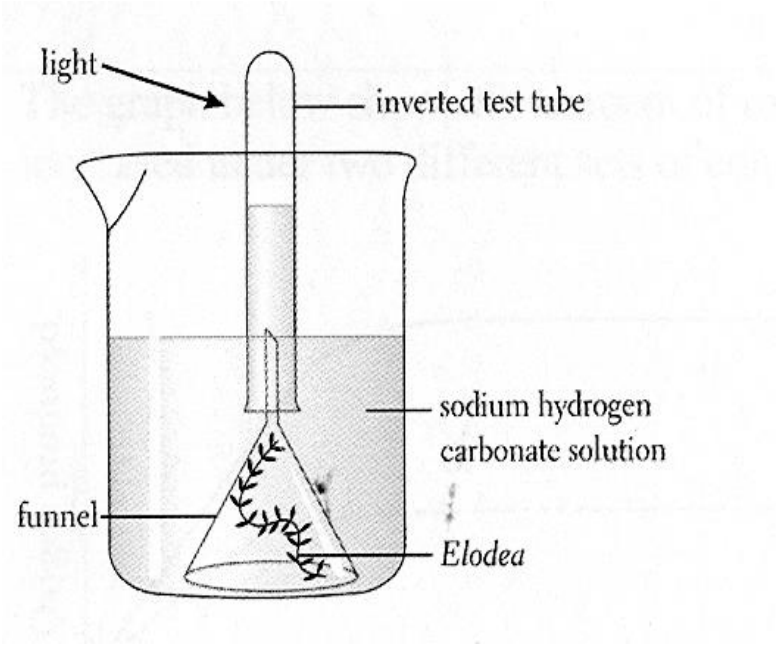
A. Soil, air and water

B. Air, warmth and water

C. Warmth, light and soil

D. Water, warmth and light

4. An experiment was conducted using the set-up shown below.



The volume of gas collected in the test tube after 2 hours would **not** be affected by the

A. Temperature of the solution

B. Mass of plant used

C. Intensity of the light source

D. Size of the test tube

5. What name is given to a sudden change in a gene or chromosome?

A. Allele

B. Genotype

C. Mutation

D. Phenotype

6. Which one of the following provides natural passive immunity?

A. Colostrum
B. Milk powder
C. Water with sugar
D. Vaccination

7. Fats differ from oils because

A. Fats have unsaturated fatty acids
B. Fats have unsaturated glycerol
C. Fats have saturated fatty acids
D. Both A and C

8. All the following are proteins **except**:

A. Haemoglobin
B. Keratin
C. Enzymes
D. Glycogen

9. Which mechanism requires ATP energy?

A. Facilitated diffusion
B. Active transport
C. Osmosis
D. Diffusion

10. A structure commonly found in animal cells, but rarely in plant cells, is the

A. Golgi apparatus
B. Nucleus
C. Centriole
D. Mitochondrion

11. Which of the following is thought to be the earliest human ancestor?

A. *Homo sapiens*
B. *Australopithecus afarensis*
C. *Homo neanderthalensis*
D. *Homo heidelbergensis*

12. Where does fertilization occur in the human female reproductive system?

A. Oviduct
B. Uterus
C. Cervix
D. Vulva

13. HIV/AIDS can NOT be transmitted

A. through a blood transfusion using contaminated blood
B. From an infected mother to baby during child birth
C. through sexual intercourse with an infected partner
D. sharing plates with an infected person

14. Respiration is a chemical reaction which

A occurs only in the body cells of animals.
B always has oxygen as a reactant.
C involves a sequence of reactions.
D is endothermic (absorbs energy).

15. Which of the following is an example of mutualism?

A. Tapeworms absorbing nutrients from its host
B. A bee getting nectar from a plant which it pollinates in the process
C. Flees feeding on the blood of a vertebrate host
D. Foxes depending on rabbits for a source of nutrients

16. Give an example of a sedative drug

A. Nicotine
B. Alcohol
C. Caffeine
D. Ecstasy

17. Photosynthesis is NOT affected by

A. Water
B. Temperature
C. Humidity
D. Amount of CO_2

18. Which organelle is responsible for the control of cell reproduction?

A. Nucleus
B. Mitochondria
C. Ribosomes
D. Golgi apparatus

19. What is the organ for gaseous exchange in a fish?

A. Spiracles
B. Gills
C. Mouth
D. Lungs

20. Name the bacteria found in the root nodules of leguminous plants

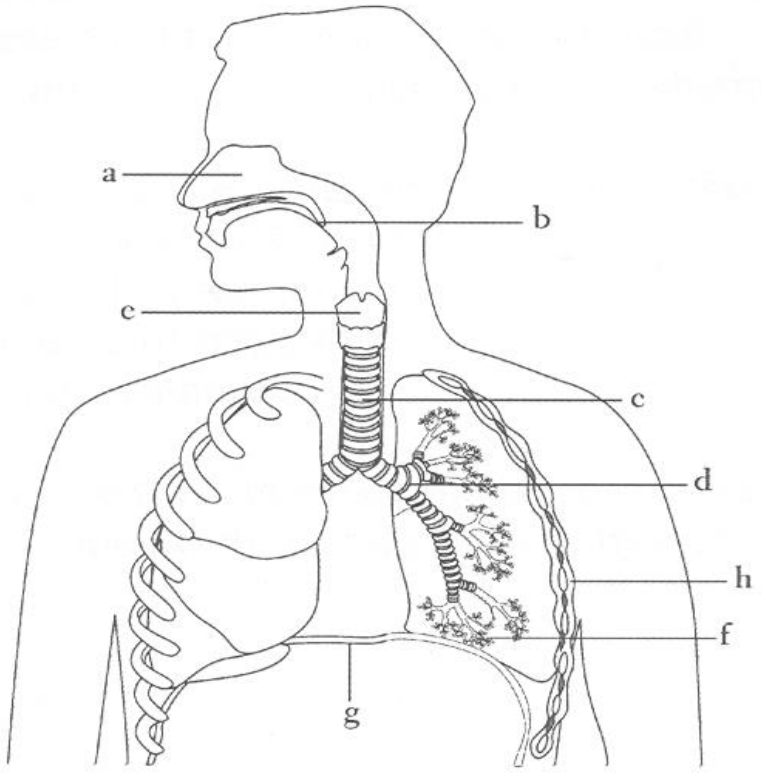
A. Bacterium
B. Monera
C. Fungi
D. Rhizobium

PART 2: STRUCTURED QUESTIONS (70 MARKS)

Answer all questions in this section

Question 1 (10 Marks)

Use the diagram below of the human respiratory system to answer the questions that follow



A) Which structures shown (use the letters **a** to **h** to answer)

i. Prevents food from entering the trachea? (1 mark)

……

ii. Contracts and flattens when you breathe in? (1 mark)

……

iii. Filters, warms and humidifies air? (1 mark)

……

iv. Contracts to raise the rib cage when you breathe in? (1 mark)

……

v. Is the site of gaseous exchange between the lungs and the bloodstream?

……. (1 mark)

vi. Is a bronchus? (1 mark)

……

B. i) Write a chemical equation for the process of aerobic respiration. (2 marks)

……

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ii) Is this reaction exothermic or endothermic? (1 mark)

……

iii) What does the word aerobic mean? (1 mark)

……..

Question 2 (8 Marks)

a) The formation of acid rain is a serious environmental concern today. Sulphuric acid is present in acid rain and has adverse effects on both plants and animals.

i) Name two acids other than sulphuric that can be found in acid rain.

(1 mark)

……

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ii) State two other effects of acid rain. (2 marks)

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III) State two ways of preventing acid rain. (2 marks)

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b) What effect is brought by the pollution of dust? 1 mark)

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c) Explain why plants shed their leaves during dry weather. (2 marks)

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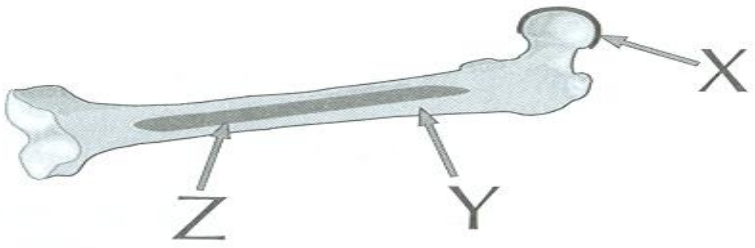
Question 3 (12 marks)

a) The diagram below shows the human thigh bone



i) Name the parts labeled

X …….. (1 mark)

Y …….. (1 mark)

Z …… (1 mark)

ii) Explain the advantage of the bone being hollow. (1 mark)

……..

b) A homozygous recessive red cow was mated with a homozygous dominant white bull. All the first generation (F1) were neither red nor white. Such individuals are said to be **roan**.

i) Using **r** to represent the gene for red colour and **R** to represent the gene for white colour, work out the genotypes of F1 offspring. (3 marks)

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ii) Suggest a reason why all the F 1 were roan. (1 mark)

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iii) If the calves were interbred (F 1 selfed), determine the phenotypic and genotypic ratios. (4 marks)

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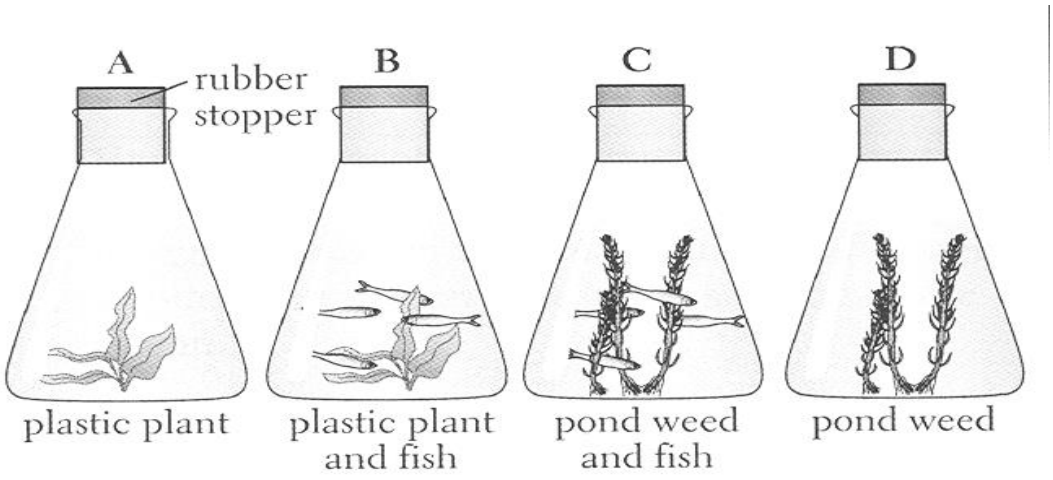
Question 4 (9 Marks)

a) An experiment was conducted using flasks shown below. All flasks contained water, were at the same temperature and were in sunlight.



After two hours the carbon dioxide level in each flask was measured.

i) In which flask **(A – D)** would the carbon dioxide level be lowest after two hours? …… (1 mark)

ii) Explain how you arrived at the choice you made above. (3 marks)

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b) An organism was found to have the dental formula:

incisors 1 ⁄ 1, *canines* 0 ⁄ 0, *premolars* 3 ⁄ 2, *molars* 4 ⁄ 4

i) Calculate the total number of teeth in the organism (2 marks)

……

ii) Suggest the mode of feeding of the organism from which the dental formula was obtained. (1mark)

……

iii) Give a reason for your answer in (ii) above (2 marks)

……

Question 5 (7 marks)

a) A student met a leopard along a forest path. Explain the effect of adrenaline on the:

i) Circulatory system (1 mark)

……

……

ii) Respiratory system (1 mark)

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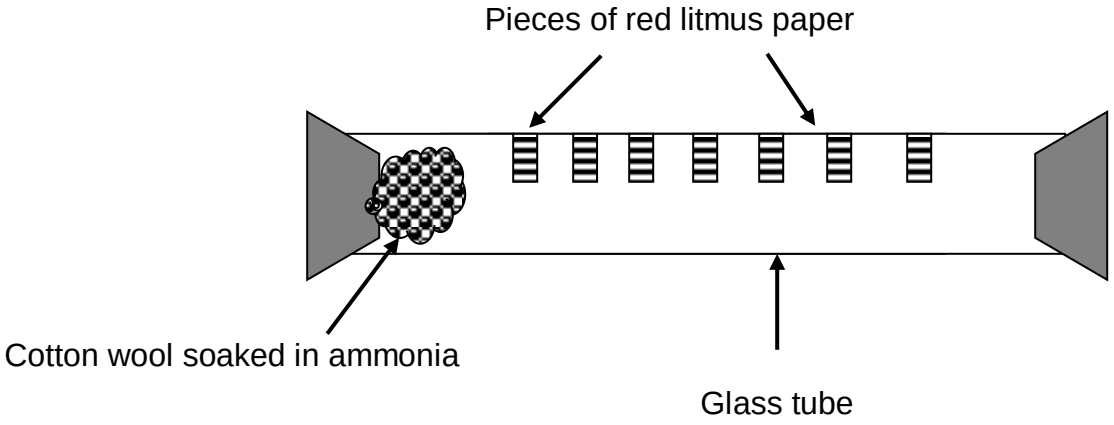
b) Some cotton wool was soaked in ammonia. The cotton wool was placed at one end of a glass tube. The ammonia turns the pieces of red litmus paper blue.



i) Write number 1 on pieces of litmus paper that changes colour first. (1Mark)

ii) Write number 7 on the piece of litmus paper that changes last. (1Mark)

iii) Draw an arrow on the diagram to show which way the particles move. (1Mark)

iv) What do we call the process that spreads out particles in this way?

…… (2Marks)

Question 6 (11 marks)

a) In a range of temperature between 0-35°C, the rate of reaction of an enzyme is proportional to the temperature. Above 35°C and below 0°C, enzyme activity slows down and eventually stops. **Explain why.** (2 marks)

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b) Explain why the donkey and the horse are placed in different species but the same genus yet they can interbreed. (2 marks)

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c) The table below shows the concentrations of different substances in fluid in the Bowman's capsule and in the collecting duct of the kidney.

Substance	Conc. in Bowman's Capsule (g/100ml)	Conc. in urine (g/100 ml
Water	99	96
Protein	0	0
Glucose	0.10	0
Urea	0.04	2.0
Salt	0.70	0.30

i) Explain why there is a difference in the concentrations of glucose. (2 marks)

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ii) Explain why the liquid in the Bowman's capsule does not contain any proteins. (2 marks)

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d) A person whose blood group is O requires blood transfusion. Name the blood group(s) of the possible donor(s).

…….. (1 mark)

e) A rhinoceros in a national park was found to be infected with ticks. State the trophic level occupied by the:

i) Rhinoceros

…… (1 mark)

ii) Ticks

…… (1 mark)

Question 7 (13 marks)

i) a) The following table shows information on common human diseases. Complete it by filling in the missing information.

Disease	Pathogen	Mode of transmission	Symptoms
	Mycobacterium		Dry cough
Cough		Air and food borne	
Malaria			Anemia

(3 marks)

b) Match the terms in column **A** with the statements in column **B** (5 marks)

*Column **A***	*Column **B***
1. Plumule	A – attaches plumule to cotyledon stalk
2. Radicle	B – attaches radicle to cotyledon
3. Hypocotyls	C – develops to form the root
4. Epicotyl	D – stores food for the seeds

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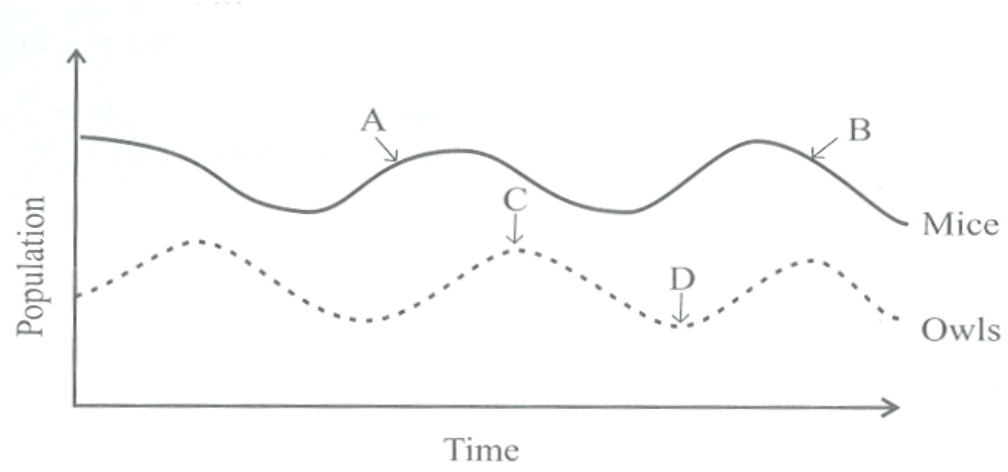
ii) The graph below shows the changes in a population of owls and in a population of mice over a number of years in an area.



a) At which point, A, B, C or D, are there fewest owls? (1 mark)

……..

b) Suggest why the number of owls fall after point C. (2 marks)

……

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c) Suggest what might happen to the owl population if another species is introduced that also eats mice as its main food source. (2 marks)

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……..……...

PART 3: EXTENDED QUESTION (10 MARKS)

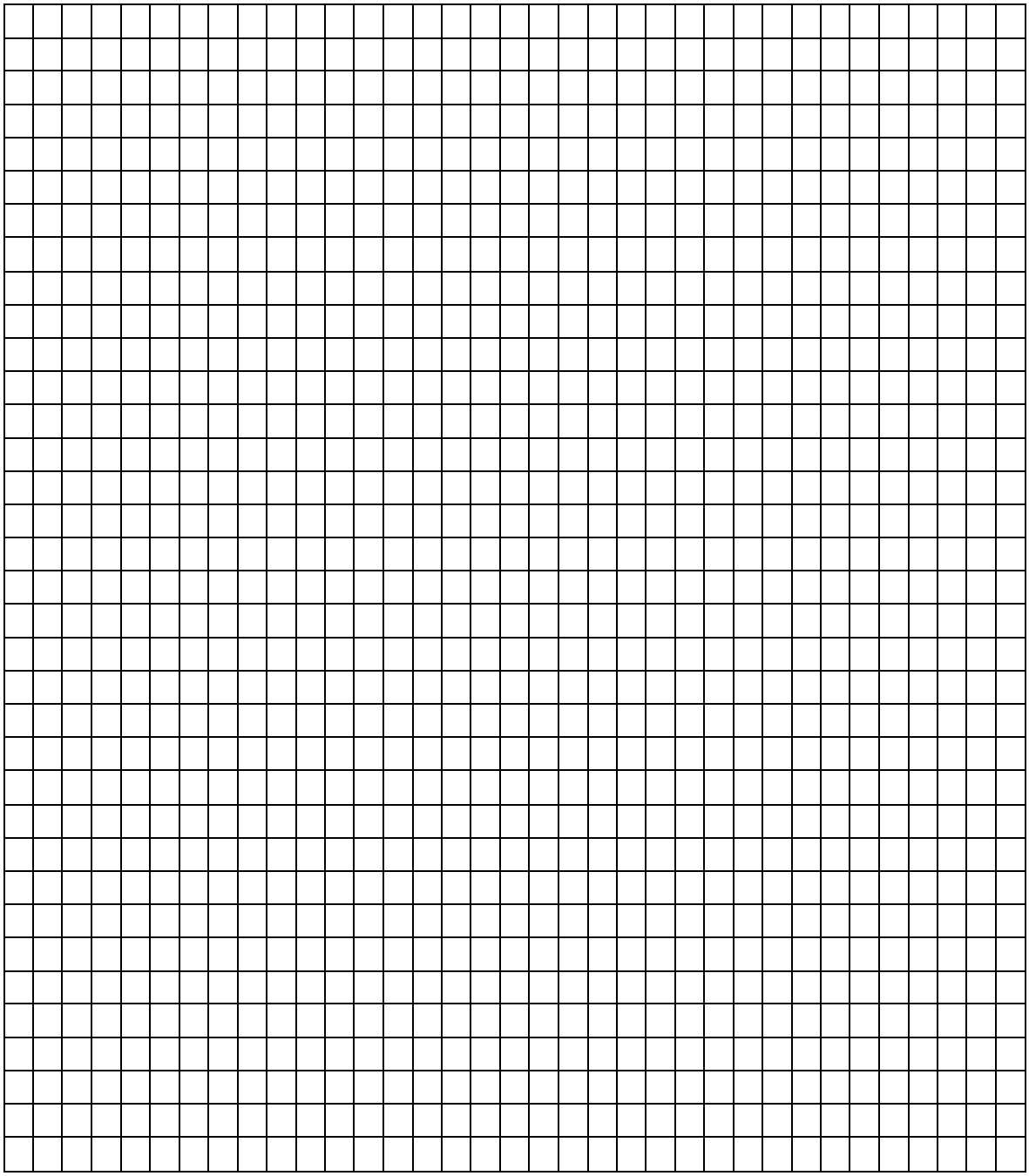
Answer one question only

Question 1

Research was carried out to determine the trend of growth boys and girls. Their average mass in kilograms was taken separately for a period of 20 years and tabulated as shown in the table below.

Age	Average mass of boys (kg)	Average mass of girls (kg)
0	2.5	2.5
2	11.1	11.5
4	15.0	16.0
6	18.5	19.3
8	22.1	27.1
10	25.1	27.1
12	27.5	30.5
14	37.0	35.5
16	44.0	44.0
18	46.9	52.5
20	48.5	55.0

a) On the same axis, draw a graph of the average mass of the girls and of boys against the age. (4 marks)



b) From the graph, determine the mass for boys at the age of 11 years (1mark)

……..

c) Account for the change in the mass of girls during the ages of 13 – 15 (1 mark)

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d) Explain the trend observed in the curves for both boys and girls. (1mark)

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……...

e) Why do girls above 10 years require an intake of food that is richer in iron than boys of the same age? (1 mark)

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f) Describe two other factors, apart from the diet, that affect the rate of growth in boys and girls. (2 marks)

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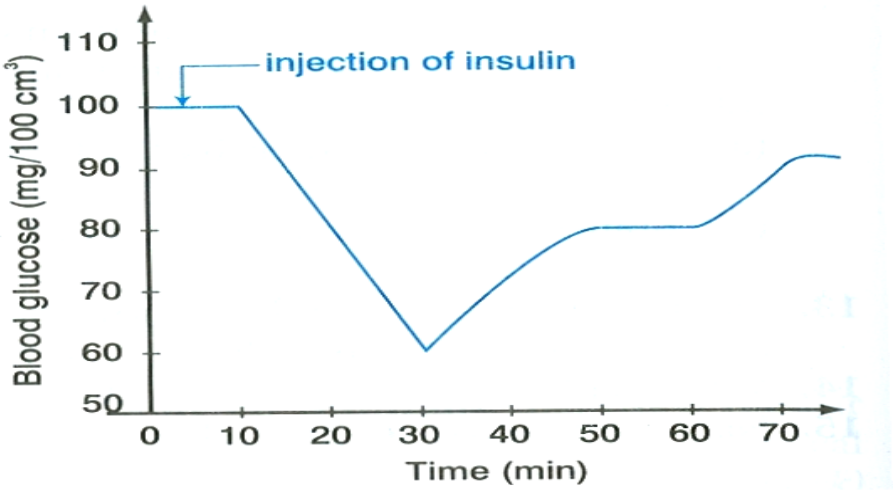
Question 2

The graph below shows the effect of injecting one unit of insulin into a person. The concentration of glucose in the blood is measured at regular intervals.



a) State the lowest value of blood glucose observed and the time it was recorded. (2 marks)

……

b) Explain the fall in blood glucose level. (2 marks)

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c) Name the mechanism that led to the increase in blood glucose level after it had been falling. (1 mark)

……

d) Name the hormone responsible for the conversion of glycogen to glucose.

……. (1 mark)

e) State the effects of each of the following in human beings:

i) too much glucose in the blood (2 marks)

……

……

ii) very little glucose in the blood (2 marks)

……

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END