KASSUMEC-JET EXAMINATIONS

Kenya Certificate of Secondary Education

231/2

BIOLOGY -THEORY **Paper 2**

June 2024 **2hours**

Name …… Index Number…….

Candidates signature……Class……Adm.No……..

Instruction to candidate

(a) Write your name, index number and admission number in the spaces provided
(b) Sign and write the date of the examination in the spaces provided above.
(c) This paper consists of two sections; **A** and **B**.
(d) Answer all questions in sections in the spaces provided.
(e) In section B answer question **6** (***compulsory***) and either question **7** or **8** in the spaces provided after question **8**
(f) This paper consists of **14 printed pages.**
(g) Candidates should check the question paper to ascertain that all pages are printed as indicated and that no question is missing.
(h) Candidates should answer the questions in English

Section	Question	Maximum Score	Candidates score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
Total score		80	

For Examiner's use only

Section A

*Answer **all** questions in this section*

1. Haemophilia is a genetic disorder caused by a recessive sex-linked gene. A phenotypically normal couple got a hemophiliac son.

   (a) State the genotypes of the parents (2marks)

   Father ……...

   Mother …….

   (b) Using a genetic cross, determine the genotypes of the couple's children (4marks)

   (c) Explain why hemophilia is common in males than in females (2marks)

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2. Aplant physiologist studying the transport mechanisms in a particular plant species under different environmental conditions. He measured the rates of water uptake, nutrient absorption and sugar translocation in the xylem and phloem over 48 hours period. The data is summarized in the table below.

condition	Water uptake in mm/hr.	Nutrient absorption Mg/hr.	Sugar translocation Mg/hr.
Normal	15	8	12
High soil salinity	10	5	7
Drought condition	6	4	5

(a). Compare the rate of water uptake during normal conditions and during high salinity conditions (2marks)

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(b). Compare the rate of sugar translocation during normal conditions and during drought conditions (2marks)

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(c). suggest two physiological conditions that plants use to cope the drought conditions (2marks)

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(d)Name the physiological process involved in:

I. Water uptake (1mark)

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II.sugar translocation (1mark)

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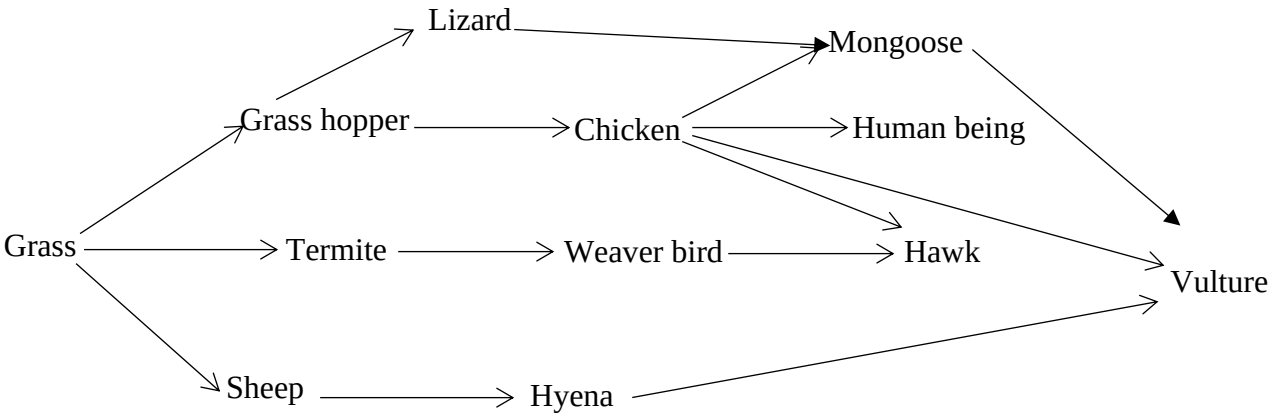
3. The diagram below shows a food web, study it and answer the questions that follow.



(a) Name the tropic level occupied by the following organisms. (2marks)

(i) Human being

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(ii) Grass

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(b) (i) Identify the organism with the least biomass in this ecosystem. (1mark)

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(ii) Explain your answer in b(i) above. (2marks)

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(c) Name two ways a scientist would use to identify the type of food eaten by the various organisms in order to design the food web (2marks)

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(d) Extract a food chain with a quaternary consumer (1mark)

4. An experiment was carried out to examine the rate of respiration (breaths per minute). The data was collected from infants, children and adults and the data summarized in the table below

Age group in years	Rate of respiration (breaths /min)
Infants (0-1)	30-60
Children (5-10)	20-30
Adults20-30	12-20

a). Account for the trend in respiration rates from infancy to adulthood (2marks)

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b). Apart from age name two other factors that affect the rate of respiration (2marks)

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c) Explain how anaerobic respiration can be applied in making dairy products (2marks)

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d). Name the part of the brain that controls the rate of breathing (1mark)

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(e) Under what condition are proteins utilized as respiratory substrate (1mark)

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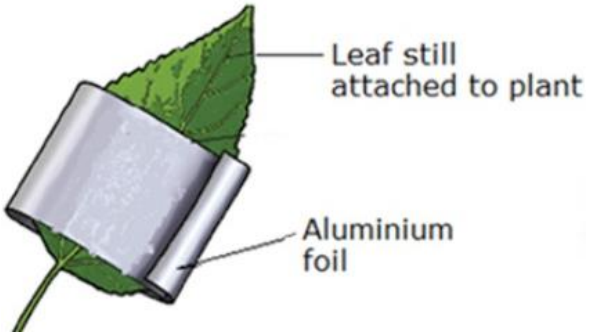
5. In an experiment to investigate a factor affecting photosynthesis, a leaf of a potted plant which had been kept in the dark overnight was covered with aluminum foil as shown in the diagram below. The set up was kept in sunlight for three hours after which a food test was carried out on the leaf



(a) Explain the purpose of this experiment? (1mark)

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b) What food test was carried out? (1mark)

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c)(i) State the results of the food test (2marks)

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(ii) Other than the factor being investigated above, State two other factors that increase the rate of the process studied (2marks)

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SECTION B

Answer Question 6(compulsory) and either question 7 or 8 in the spaces provide after question 8

The following results were obtained from a study of germination and early growth of cowpeas (***Vigna unguiculata***). The grains were sown in soil in a greenhouse and at two days intervals. Samples were taken, oven-dried and weighed. Graph is shown below.

Time after sowing (days)	0	2	4	6	8	10	12
Dry mass of embryo (g)	0.02	0.02	0.08	0.16	0.24	0.34	0.35

a) Using a suitable scale, plot a graph of dry mass of embryo against time (6 marks)

b) Give the name of the type of curve you have obtained in 6 (a) above? (1mark)

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c) Explain why the rate of increase is low between day one and day three? (2 marks)

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d) State t**hree** reasons for the limited rate of increase between day nine and day eleven. (3 marks)

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e) Name a phylum whose growth does not take the shape of the curve drawn above. (1mark)

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f) What name is given to the curve exhibited by organisms in the phylum you have named in (e) (i) above? (1mark)

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g) What causes the behavior of the curve mentioned in (e) (ii) above? (1mark)

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h) State **one** advantage of using dry mass instead of fresh weight in estimating growth of an organism. (1 marks)

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i) State the role of the following growth hormones in plant growth and development

i. Abscisic Acid (ABA*)* (2marks)

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ii. Florigens (1 marks)

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7 (a). Describe the mechanism of inhalation in bony fish (10 marks)

(b). Describe the response of a young herbaceous plant to each of the following unidirectional external stimuli and for each give one significance. (10 marks)

(i) Light
(ii) Contact

8. (a) Explain the role of the liver and pancreas in blood sugar regulation (10 marks)

(b) Describe the adaptations of halophytes to their habitats (10 marks)

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