

NAME.....ADM NO.....CLASS.....

DATE.....SIGNATURE.....INDEX NUMBER.....

BIOLOGY
PAPER 2
TIME: 2 HOURS
TERM TWO 2021

MECS CLUSTER JOINT EXAMINATION
Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES

- This paper consists of **TWO** sections A and B.
- Answer **ALL** questions in section A in the spaces provided
- In section B answer **question 6(compulsory)** and either question 7 or 8 in the spaces provided after question 8
- Candidates should check the question paper to ascertain that all the pages are printed and that no questions are missing

SECTION A 40 MARKS

1. A potted plant was placed in each of the following conditions for a period of one hour in the order given and transpiration in each hour was measured. The air temperature was 18°C throughout the experiment.

CONDITIONS	RELATIVE HUMIDITY	TRANSPIRATION g/hr
A) Still air in sunlight and shade	70	1.2
B) Moving air only	70	1.6
C) Still air in bright sunlight	70	3.75
D) Still air in dark chamber	100	0.20

- a) Account for the rate of transpiration in

i) Condition C (3mks)

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ii) Condition D (3mks)

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b) Name the apparatus used to measure the rate of transpiration. (1mark)

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c) Give one modification in the stomata of xerophytes that reduce the rate of transpiration. (1 marks)

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2. **Sickle cell anaemia** is a disease in which people produce abnormal haemoglobin in their red blood cells. Letter **H** represents the gene for normal haemoglobin while letter **S** represent the gene for abnormal haemoglobin. Heterozygous individuals are said to have **sickle cell trait**.

a) If both parents have sickle cell trait, work out the proportion of their offspring that have sickle cell anemia. (5marks)

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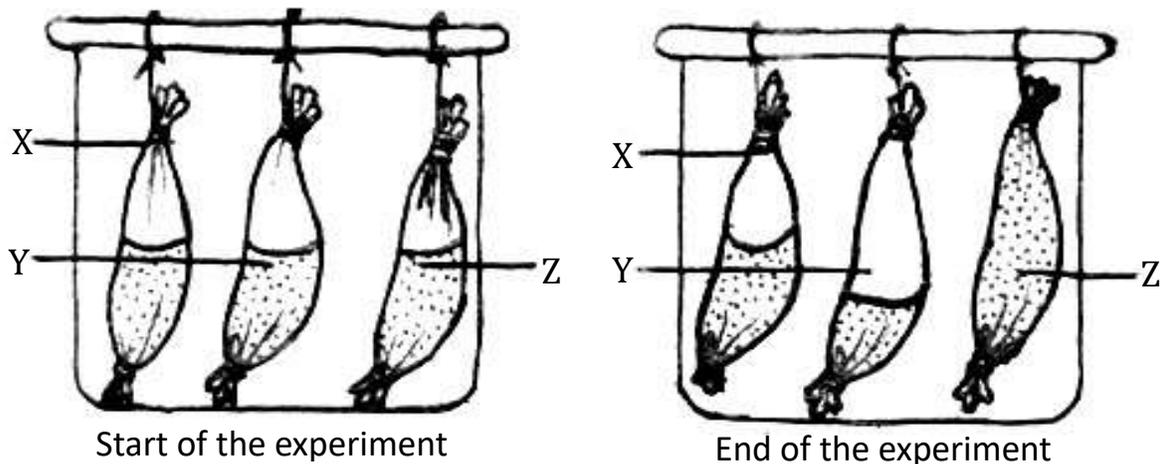
b) Explain why sickle cell trait is more prevalent in tropical countries than temperate countries. (2marks)

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(c) Name any other disease caused by gene mutation. (1mk)

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3. Equal volumes of three different sugar solutions were placed in visking tubings X, Y and Z. The tubings were placed in a beaker containing 5% sugar solution. The set up was left for two hours. The results were as shown in the diagram below.



a) Name the process being investigated (1mark)

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b) What is the significance of set up X in the experiment? (1mark)

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c) Account for the observations in set up Y and Z. (4mks)

Y.....

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Z.....

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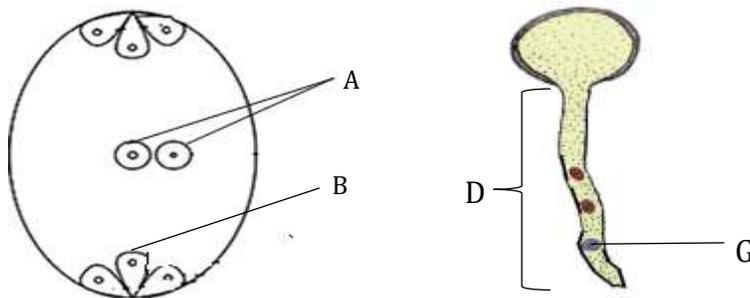
d) Name a structure in cells that can be compared to the visking tubing. (1mark)

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e) Explain how high temperature above 40°C will affect the process being investigated in the cells of organism. (1marks)

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4. The diagrams below show changes in the life cycle of a flowering plant.



a) Name the parts labelled A, B and G. (3marks)

A.....

B.....

G.....

b) State the function of the part labelled D. (1mark)

c) (i) What will part A develop into after fertilization? (1mark)

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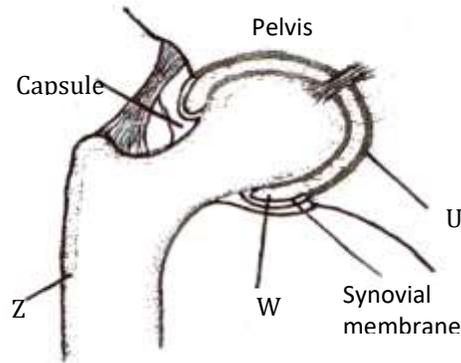
(ii) Define the term parthenocarpy.

(1mark)

d) Name two features in flowering plants that prevent self-fertilization

(2marks)

5. The diagram below represents one of the joints in the mammalian body.



a) Name the type of joint shown in the diagram.

(1mark)

b) Name each of the parts labeled Z and U.

(2marks)

Z-.....

U-.....

c) State two functions of the fluid found in W.

(2marks)

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d) Identify the type of muscle found attached to bone Z.

(1mark)

e) State two differences between the muscle identified in (d) above and those found in the gut.

(2marks)

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SECTION B (40MARKS)

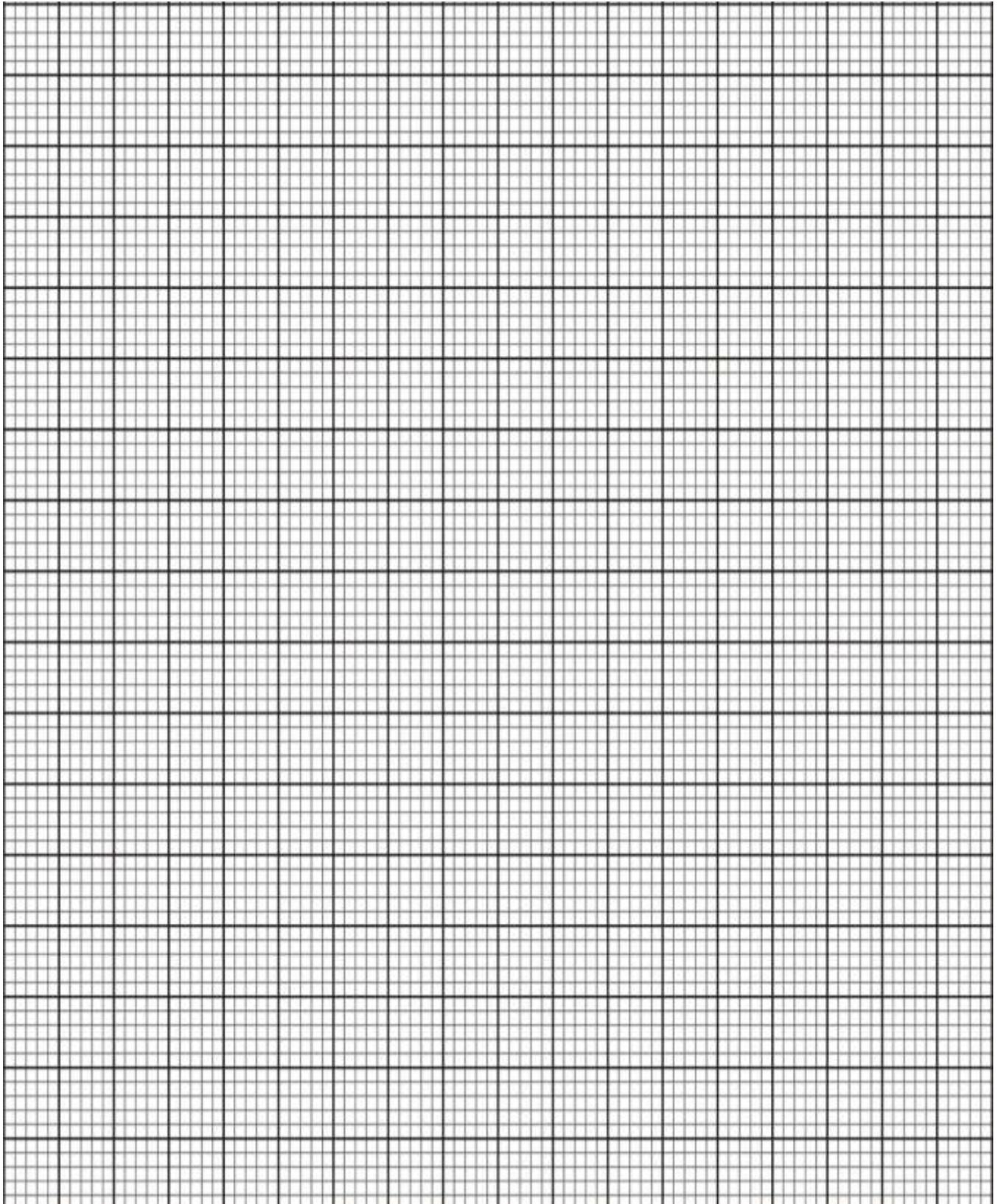
Answer question 6 (compulsory) and either question 7 or 8 in the spaces provided after question 8.

6. In an experiment to investigate a certain process in a given plant species, the rate of carbon (IV) oxide consumption and the rate of carbon (IV) oxide released were measured over a period of time of the day. The results of the investigation are shown in the table below.

Time of day	6am	8am	10am	12pm	2pm	4pm	6pm	8pm	10pm	12am
CO ₂ consumption (mm ³ /min)	0	43	69	91	91	50	18	0	0	0
CO ₂ release (mm ³ /min)	38	22	10	3	3	6	31	48	48	48

(a) On the same axis, plot graphs of volume carbon (IV) oxide against time

(7mk)



b) Name the biochemical process represented by:

i) Carbon (IV) oxide consumption (1 mark)

ii) Carbon (IV) oxide released (1 mark)

c) Account for the shape of the curve for:

i) Carbon (IV) oxide consumption (3 marks)

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ii) Carbon (IV) oxide released (3marks)

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d) (i) What is meant by the term compensation point? (1marks)

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(ii) From the graph state the time of the day when the plant attains compensation point

(2 mark)

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e) Explain how temperature affects the rate of CO₂ consumption in a plant. (2 marks)

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7. a) Explain how the villi in the small intestines are adapted to their functions. (10 marks)

b) Describe the photosynthetic theory as a mechanism of opening and closing of the stomata.

(10marks)

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Handwriting practice lines consisting of 30 horizontal dotted lines.