

Name:

Index No.....

School:

Candidates' Signature:

Date:

231/2

BIOLOGY PAPER 2

(Theory)

December 2021

Time: 2 Hours

SAMIA SUB-COUNTY JOINT EXAMINATION

Kenya Certificate of Secondary Education (K.C.S.E)

BIOLOGY

Paper 2

(Theory)

Time: 2Hours

Instructions to Candidates

- Answer all questions in section A by filling in the spaces provided.
- In Section B, Answer Question 6 (Compulsory Question) and any other one question from the remaining two questions (i.e. 7 & 8)

FOR EXAMINER'S USE ONLY

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	80	

SECTION A. (40 MARKS)

Answer all questions in this section in the spaces provided.

1. The set up below show an experiment in which iodine solution and starch were separated by a semi permeable membrane.

Arm

- (a) Name the process that is being investigated. (1mk)

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- (b) (i) State the observations made in the two arms of the U-tube. (2mks)

Arm A

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.....

Arm B

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.....

- (ii) Account for your answer in (i) above. (2mks)

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- (c) (i) State two applications of the process in (a) above in animals. (2mks)

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- (ii) Name one factor that will affect the process named in (a) above. (1mk)

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2. (a) (i) Name the components of blood that are absent in the glomerula filtrate. (2mks)

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(ii) Give a reason for your answer above. (1mk)

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(b) (i) What would happen if a person produced less antidiuretic hormone. (1mk)

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(ii) Name the disease described in b (i) above? (1mk)

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(c) Explain what happens to excess amino acids in the liver of humans. (3mks)

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3. (a) (i) Premature baldness in a sex linked trait. A bald headed man marries a woman. Work out the genotype of the off springs. Use letter B to represent the gene for bald head. (4mks)

(ii) What is the probability that their daughter will have premature baldness? (1mk)

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(iii) Give a reason for the answer in 3 (ii) above. (1mk)

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.....

(b) The diagram below show the template strand of a Deoxyribonucleic acid molecule.

A	G	T	A	T	C	G
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(i) Draw a diagram to represent a complimentary RNA strand. (1mk)

(ii) State one advantage of polyploidy in plants. (1mk)

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4. The table below shows some of the components found in 100cm³ of cow's milk, breast milk and breast milk substitute (formula milk).

component	cow's milk	Breast milk	breast milk substitute
Protein/g	3.3.	1.2	1.3
Sugar/g	4.2	6.4	7.0
Fat/g	3.0	4.0	1.4
Calcium /mg	120.0	120.0	49.0
Iron/mg	0.1	0.1	0.5
vitamin C/mg	1.0	2.0	8.3
Vitamin D/ μ g	20.0	200.0	1.2

(a) Name two main components of a normal healthy diet that do not appear in the table.(2mks)

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(b) State which type of milk would be least likely to ensure the development of healthy bones and teeth, and explain your answer? (2mks)

Type of milk

Explanation.....

.....
(c) State which type of milk would provide a baby with the greatest amount of energy? Give your reasons (2mks)

Type of milk

Reasons.....

.....
(d) Suggest why babies fed on breast milk may have more resistance to diseases than those fed on any other type of milk. (2mks)

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5. (a) What is the difference between Darwinian and Lamackian theories of evolution? (2mks)

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(b) What is meant by the following terms? Give an example in each case.

(i) Homologous (1mk)

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Example (1mk)

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.....

(ii) Analogous (1mk)

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Example (1mk)

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(iii) Vestigial Structures (1mk)

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Example (1mk)

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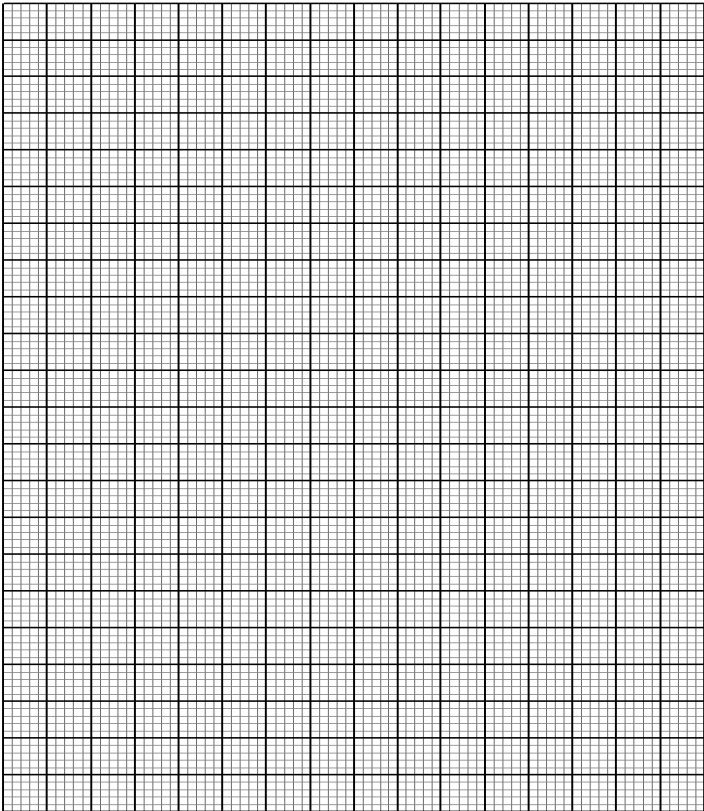
SECTION B

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

6. The menstrual cycle is a sequence of events repeated monthly in the female reproductive system. The table below shows the concentration of oestrogen and progesterone hormones and body temperatures of female against time.

Time in days	Oestrogen mg/100cm³	progesterone mg/100cm³ of blood	Temperature in 0°C
1	20	0	36.4
3	25	0	36.7
5	30	0	36.7
7	35	0	36.8
9	48	0	36.6
11	64	0	36.7
13	80	0	36.4
15	140	50	36.6
17	70	130	37.2
19	60	160	37.1
21	130	130	37.2
23	130	90	37.0
25	80	50	37.2
27	20	0	36.4

(a) Using the same axes draw graphs of oestrogen and progesterone against time. (8mks)



(b) State the possible event taking place in the uterus during the first week. (1mk)

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(c) State the events taking place in the ovary between day 1 and day 13. (2mks)

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(d) Account for the sudden increase in the progesterone concentration between day 14 and day 18. (2mks)

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(e) Account for the change in temperature between day 14 and 17. (1mk)

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(f) Account for the change of the curve of progesterone between day 19 and 27. (2mks)

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(g) State the function of the following:

(i) Testes. (2mks)

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(ii) Sertoli cells (1mk)

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7. (a) State four industrial applications of anaerobic respiration. (4mks)

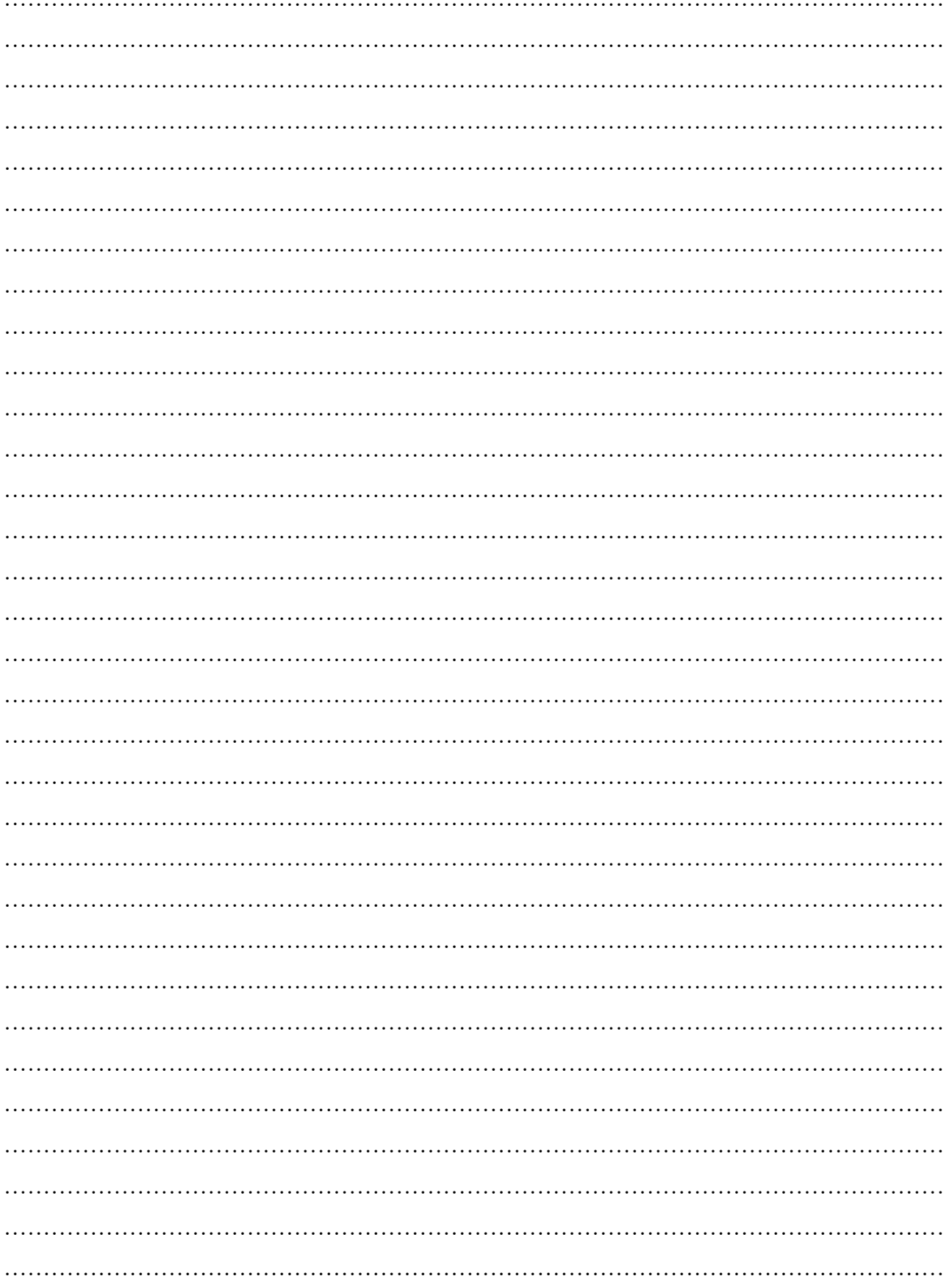
(b) Describe the mechanism of gaseous exchange in humans. (16mks)

8. (a) Describe biological nitrogen fixation in leguminous plants. (5mks)

(b) Explain how abiotic factors affect plants. (15mks)

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