

BIOLOGY PAPER 2

KAGONDO SECONDARY SCHOOL

PRE MID YEAR EXAM 2017

SECTION A

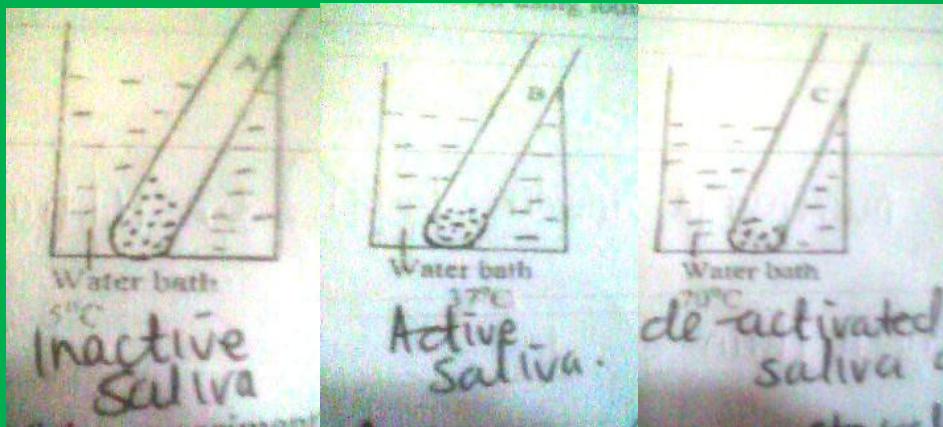
Answer all the questions in this section in the spaces provided

1. Sickle cell anemia is a hereditary disease due to a recessive gene which changes normal hemoglobin (Hb-A) to abnormal hemoglobin (Hb-S). The red blood cells of people with sickle cell anemia are sickle shaped.

a) What are the possible phenotypes of the offspring of a man who is heterozygous and a woman who is also heterozygous? Show your working (5mks)

b) Sickle cell trait is more prevalent in tropical countries than in temperate countries. Give an explanation for this observation (3mks)

2. Three tubes each containing 1ml saliva and 1ml water were incubated in water baths at different temperatures as shown in the diagram below for 30 minutes. Another one tube containing 1ml starch solution was incubated for the same length of time in each water bath. The contents of the two tubes in each water bath were then mixed and incubated for a further 30 minutes. The contents of each tube were then tested for starch using iodine solution.



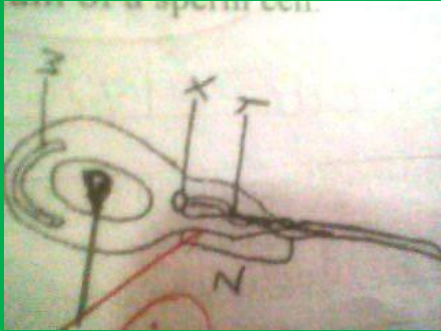
a) What was the main aim of the investigation (1mk)

b) Why was it necessary to incubate the tubes for 30 minutes before mixing their contents (1mk)

c) State the colour changes you would expect to observe after adding iodine solution (3mks)

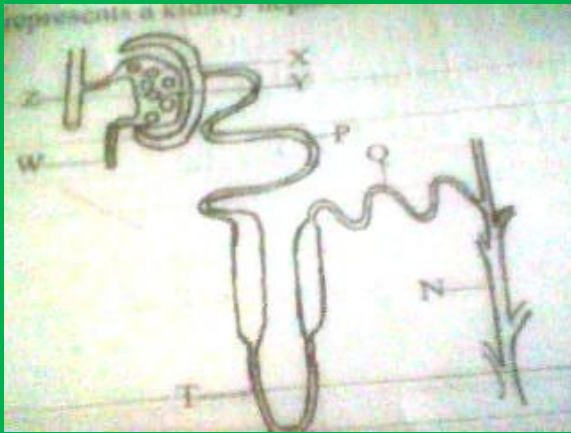
d) Account for the expected observation (3mks)

3. Below is a diagram of a sperm cell



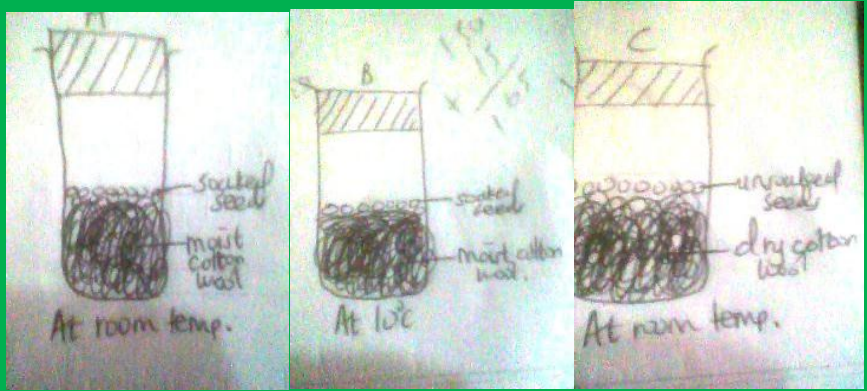
- a) Identify parts labeled X and Y (2mks)
- b) Explain how the parts W and Z adapt the cell to its function (4mks)
- c) Using letter P to identify or label on the diagram the part of the cell rich in DNA (1mk)
- d) State the function of part X (1mk)

4. The figure below represents a kidney nephron. Use it to answer the questions that follow



- a) i) X is made up of a tuft of capillaries. How do they differ from other capillaries in the body (1mk)
- ii) What structural difference exist between W and Z (1mk)
- iii) State the significance of the difference stated in (a) (ii) above (1mk)
- b) State three adaptations that enable P to perform its function (3mks)
- c) What is counter flow and in which part of the nephron does it occur (2mks)

5. The diagrams below represent a set up to investigate the conditions necessary for seed germination



The set was left for 7 days

- a) What conditions were being investigated in the experiment (2mks)
- b) State three reasons for soaking seeds in set up A and B (3mks)
- c) What were the expected results after seven days (3mks)

Step A.....

Step B.....

Step C.....

SECTION B : (40 MKS)

Answer question 6 (compulsory) and either question 7 or 8 in this section

6. An experiment was carried out to investigate the effect of hormones on growth of lateral buds of three pea plants. The shoots were treated as follows

- a) Shoot A- Apical bud was removed
- b) Shoot B- Apical bud was removed and gibberellic acid placed on the cut shoot
- c) Shoot C- Apical bud was left intact

The length of the branches was developing from the lateral buds were determined at regular intervals. The results are shown in the table below

Time in days	Length of branches in millimeters		
	Shoot A	Shoot B	Shoot C
0	3	3	3
2	10	12	3
4	28	48	8
6	50	90	14
8	80	120	20

10	118	152	26
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i) Using the same axes, draw graphs to show the lengths of branches against time (8mks)

ii)a) What was the length of the branch in shoot B on the 7th day (1mk)

b) What could be the expected length of the branch developing from shoot B on the 11th day? (1mk)

iii) Account for the results obtained in the experiment (6mks)

iv) Why was shoot C included in the experiment (1mk)

v) What is the importance of gibberellic acid in agriculture (1mk)

State two physiological processes that are brought about by the application of gibberellic acid on plants (2mks)

7. Describe the role of hormones in mammalian female reproductive cycle (20mks)

8. Explain how the human heart is adapted to its functions (20mks)