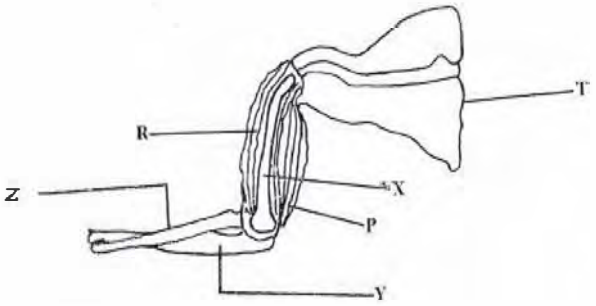
CENTRAL KENYA NATIONAL SCHOOLS JOINT MOCK - 2016

231/2
BIOLOGY
PAPER 2
(THEORY)
JULY/AUGUST, 2016
TIME: 2 HOURS

SECTION A: (40 MARKS)
Answer all the questions in this section in the spaces provided:

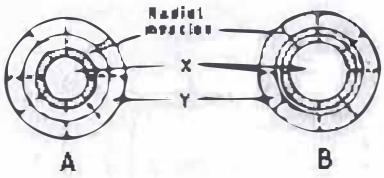
1. In a certain plant species which is normally green, a recessive gene for colour (n) causes the plant to be white when present in homozygous state such plants die at an early stage; The plants are pale green in colour when in heterozygous state and grow to maturity.
(a) Give a reason for the early death of plants with homozygous recessive gene. (1mk)
(b) If a normal green plant was crossed with the pale green plant, what would be the genotypes of the F_1 generation (use punnet square to work out the answer) (3mks)
(c) If seeds from the heterozygous plants were planted and the resulting seeds planted, work out the phenotypic ratio of plants that would grow to maturity. (3mks)
(d) Explain the occurrence of the pale green colour in the heterozygous plants. (1mk)

2. Below is a diagram showing the forearm bones and muscles covering them?



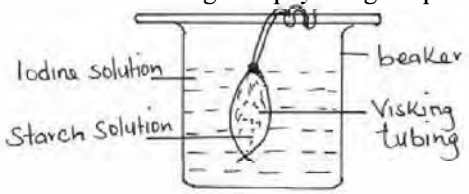
(a) Name the bones represented by **T**, **X**, **Y** and **Z**. (2mks)
(b) Name the joint formed between:
(i) **T** and **X**. (1mk)
(ii) **Y** and **X**. (1mk)
(c) Name the muscles labelled **P** and **R**. (1mk)
(d) What happens to each muscle as the arm is straightened. (1mk)
(e) Name **two** strengthening tissues in woody stems. (2mks)

3. The diagram below shows how the iris and pupil of a human eye appear under different conditions.



(a) Name the structures labelled **X** and **Y**. (2mks)
(b) State the condition that leads to the change in appearance shown in the diagram labelled **B**. (1mk)
(c) Describe changes that lead to the appearance of iris and pupil as shown in the diagram labelled **B**. (4mks)
(d) What is the significance of the changes described in **C** above? (1mk)

4. The following set up was used to investigate a physiological process in life.



(a) (i) Name the physiological process that was being investigated. (1mk)
(ii) What is the representative of the visking tubing in life? (1mk)
(b) (i) State the observation that would be made in the visking tubing after few minutes. (1mk)
(ii) Explain why similar results were not obtained inside the beaker. (2mks)
(c) State the roles of the process being investigated in mammals. (3mks)

5. The table below compares the approximate concentration of certain substances in plasma glomerula filtrate and urine.

Substance	% in plasma	Glomerular filtrate	% urine
Water	90	90	94
Protein	6.5	●	●
Urea	0.03	0.03	1.8
Glucose	0.1	0.1	●

(a) Account for the absence of
(i) Glucose in urine. (1mk)
(ii) Protein in glomerular filtrate. (1mk)
(b) Why is percentage of urea highest in urine? Give **two** reasons. (2mks)
(c) How would the composition of urine differ from the one given above in case of:
(i) High protein diet. (2mks)
(ii) Streneous exercise. (2mks)

SECTION B: (40 MARKS)

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

6. In an experiment to investigate the effect of heat on germination of seeds, eleven bags each containing 50 bean seeds were placed in a water-bath maintained at 90°C. After 2 minutes, a bag was removed and the seeds contained in it planted. The number that germinated was recorded. The procedure used for the beans was repeated for acacia seeds. The results obtained were as shown in the table below.

Times (minutes)	Number of seeds that germinated	
	Beans seeds	Acacia seeds
●	50	●
2	50	●
4	46	1
6	35	2
8	10	28
10	1	36
12	●	41
14	●	44
16	●	47
18	●	48
20	●	50

(a) Using a suitable scale and on the same axes, draw graph of time in hot water against number of seeds that germinated for each plant. (8mks)
(b) (i) After how many minutes would you expect 50% of acacia seeds exposed to the hot water to germinate. (1mk)
(ii) What was the minimum number of minutes after exposure of bean seeds to hot water was there no germination? (1mk)
(c) From the graphs, which one of the two types of seeds was more sensitive to heat influence on germination? (1mk)
Give a reason for your answer. (1mk)
(d) Explain why the ability for the,
(i) bean seeds to germinate decline with time of exposure to heat. (2mks)
(ii) acacia seeds to germinate improved with time of exposure to heat. (3mks)
(e) What results would be expected if the temperature of water was maintained at:-
(i) 100°C. (2mks)
(ii) 5°C. (2mks)
7. (a) Describe the photosynthetic theory of opening and closing of the stomata. (10mks)
(b) Describe the regulation of blood sugar level in man. (10mks)
8. Describe the nitrogen cycle. (20mks)