NAME ……..……INDEX NO……..…..……

SCHOOL……..…….

231/2
BIOLOGY
PAPER 2
THEORY
SEPTEMBER 2016
TIME: 2 HOURS

MAMA NGINA GIRLS HIGH SCHOOL
Kenya Certificate of Secondary Education 2016

231/2
BIOLOGY
PAPER 2
SEPTEMBER 2016

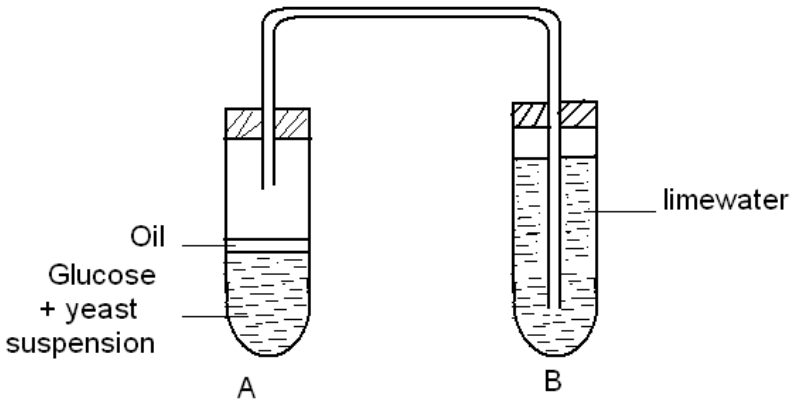
INSTRUCTIONS TO CANDIDATES

- *Write your name and index number in the spaces provided above.*
- *This paper consists of 2 sections A and B*
- *Answer all the questions in section A in the spaces provide.*
- *In section B, answer question 6 (Compulsory) and either question 7 or 8 in the spaces provided after question 8*

For Examiners Use Only

Section	Question	Maxi. Score	Candidates Score
A	1	8	
	2	8	
	3	7	
	4	9	
	5	8	
B	6	20	
	7	20	
	8	20	
	TOTAL	80	

1. A student set up the following apparatus for an experiment.



(a) The student boiled the yeast solution before the experiment. Explain. (1mk)

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(b) The mixture of yeast suspension and glucose solution was cooled to about 37^0 C. Explain. (1mk)

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(c) **Why** was a layer of oil added to the mixture of glucose and yeast? (1mk)

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(d) State the observations expected in

(i) Tube A (1mk)

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(ii) Tube B (1mk)

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(e) Account for the observations in d (i) and (ii) above. (1mk)

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(f) (i) Apart from carbon (IV) Oxide and energy, what other products can be found in tube A? (1mk)

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(ii) **Explain** how you can confirm this. (1mk)

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2. (a) **Explain** the role of enzymes in living cells. (1mk)

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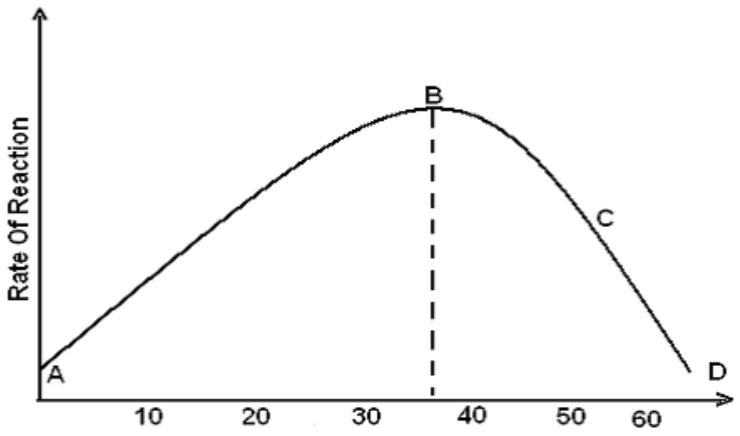
(b) The graph below shows the effects of temperature on the rate of reaction of the enzyme salivary emylase



(i) **Account** for the change in the curve between C and D. (1mk)

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(ii) **What** does the dotted line represent? (1mk)

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(c) **Explain** how the following factors affect the rate of enzyme activity:

(i) Temperature (2mks)

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(ii) Substrate concentration. (2mks)

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3. In cats, sex is determined by X and Y chromosomes in the same way as in humans. One gene for coat colour in cats is present on the X chromosome but not on the Y chromosome. This gene has two alleles Orange (B) and black (b) and X chromosome bearing the B allele is represented by X^B and one bearing the b allele by X^b.
Female cats that are homozygous for the X^b allele have black coats; female cats that are heterozygous have tortoise shell coats. (Orange with dark patches).

(a) Give the genotype of

(i) A female cat with tortoise shell coat (1mk)

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(ii) A male cat with an orange coat. (1mk)

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(iii) A male cat with a black coat. (1mk)

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(b) A black coated male cat is mated with a tortoiseshell coated female cat. Use a genetic diagram to explain what would be the expected ratios of the genotypes and the phenotypes of the kittens that could be produced by this cross. (5mks)

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4. (a) What is meant by the term homeostasis? (1mk)

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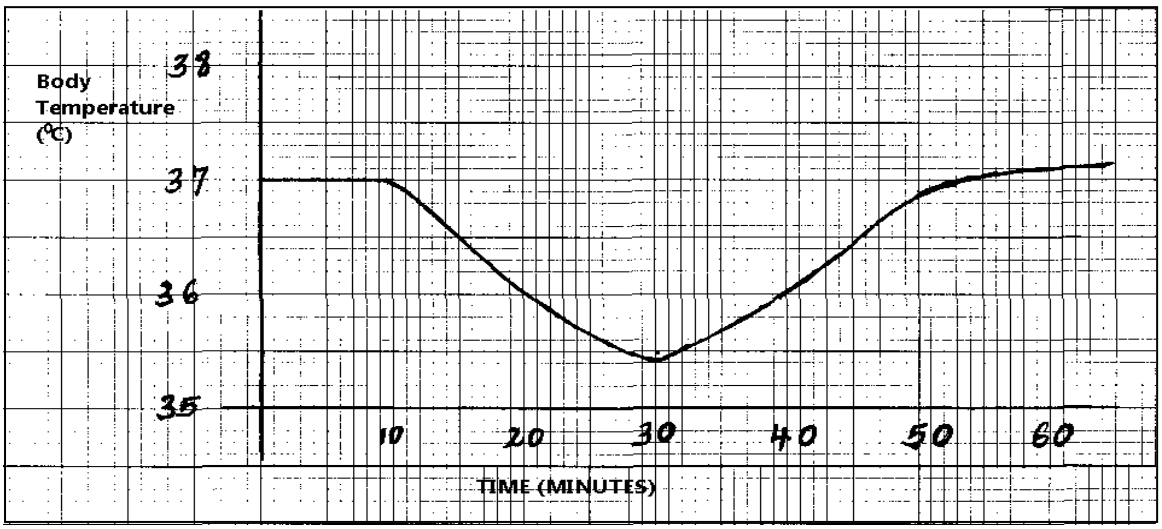
The figure below shows the body temperature of a person before, during and after taking a cold bath. The temperature of the bath water is 22^0C



(b) For how long was the person in the bath? (1mk)

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(c) **Explain** why the person's body temperature fell. (1mk)

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(d) **Explain** the role played by the following in helping to return the body temperature to normal.

(i) The liver (2mks)

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(ii) Blood vessels in the skin. (2mks)

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(iii) Muscle of the body. (2mks)

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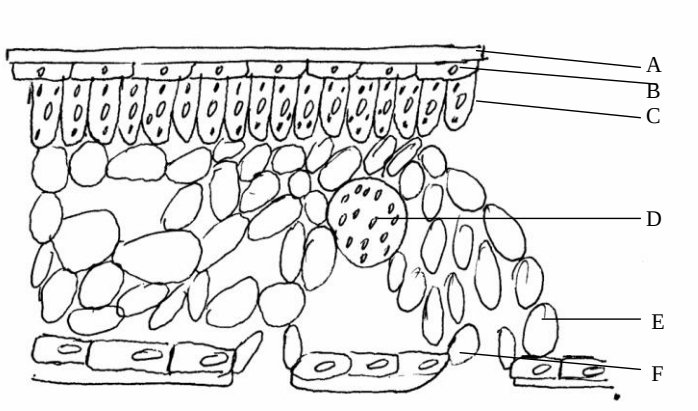
5. The diagram shows the internal structure of a leaf



(a) Name the parts labeled **A, B, C, D, & F** **(2mks)**

A ……

B ……

D ……

F ……

(b) State the functions of the parts labeled **A, C, D** and **F** **(4mks)**

A

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C

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D

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F

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(c) **State two** structural differences between guard cells and other epidermal cells. (2mks)

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6. In an experiment to investigate the effect of light intensity on the rate of photosynthesis, a shoot of elodea (water weed) was used. The shoot was immersed in 2% sodium hydrogen carbonate solution maintained at 15^0C in an apparatus which allowed for collection of a gas evolved from the shoot. The gas given off was collected for five minutes at each light intensity and its volume recorded as shown in the table below.

Light intensity (arbitrary units)	**Gas evolved (cm^3 per 5 mins)**
1	0.45
2	0.70
4	0.95
7	1.40
12	1.75
18	1.82
26	1.90
37	1.90
46	1.90

a) Using the data given in the table, plot a suitable graph of gas evolved against light intensity (6mks)

b) Account for the rate of gas evolved between;

(i) 1 and 18 arbitrary units (3 mks)

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(ii) 26 – 46 arbitrary units (2 mks)

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c) Explain why a green leaf is normally tested for presence of starch instead of glucose. (2mks)

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d) How is the dry mass of a leaf determined (3 mks)

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e) Describe how the chloroplast is adapted to its functions. (4 mks)

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7. a) State the meaning of the following terms as used in biology;

   (i) Secretion (1 mk)

   (ii) Excretion (1 mk)

   (iii) Egestion (1 mk)

   b) Explain how the mammalian kidney is adapted to its functions. (17 mks)

8. **Describe** how the mammalian ear is adapted to perform its functions. (20mks)

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