

NAME.....INDEX NO.....

ADM NO.....CLASS.....DATE.....SIGNATURE.....

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

**MOKASA EXAMINATIONS**  
**KENYA CERTIFICATE OF SECONDARY EDUCATION**

231/2  
PAPER 2  
BIOLOGY

**Instructions To Candidates**

- a) Write your name and index number in the spaces provided above.
- b) Sign and write the date of the examination in the spaces provided above.
- c) This paper consists of two sections; A and B.
- d) Answer all the questions in section A in the spaces provided.
- e) In section B answer questions 6(compulsory) and either question 7 or 8 in the spaces provided after question 8.
- f) This paper consists of 10 printed pages.
- g) Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.
- h) Candidates should answer questions in English.

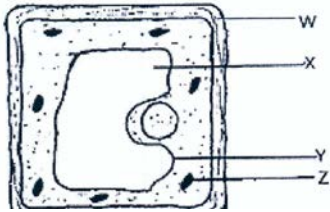
**For examiners use only**

Section	Question	Maximum Score	Candidate's Score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7 or 8	20	
	<b>Total</b>	80	

**SECTION A (40 MARKS)**

*Answer all the questions in this section.*

1. Examine the diagram below carefully and use it to answer the questions that follow.



(a) Name the parts X, Y and Z. (3 marks)

(b) State the main substance which make-up the part labeled W. (1 mark)

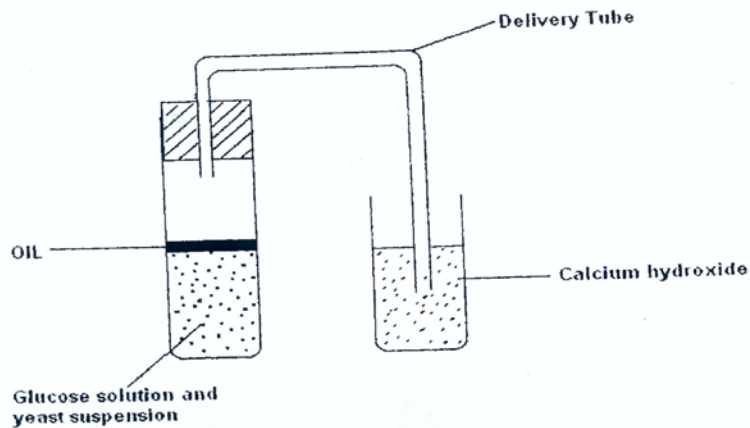
(c) Name the process through which mineral salts move into the structure labeled X. (1 mark)

(d) Explain what happens to a red blood cell when placed in distilled water. (3 marks)

2. (a) What is meant by natural selection? (4 marks)

(b) State four sources of evidences that support the theory of organic evolution. (4 marks)

3. The diagram below shows a set up that was used to demonstrate a certain physiological process.



The glucose solution was boiled and oil added on top of it. The glucose solution was then allowed to cool before adding yeast suspension.

- (a) Identify the physiological process that was being investigated using the above set up. (1 mark)
- (b) Why was glucose boiled during the experiment? (1 mark)
- (c) What was the importance of cooling the glucose before adding the yeast suspension? (1 mark)
- (d) What observation would be made in test tube at the end of the experiment? (1 mark)
- (e) How would the observation made in (d) above be affected if oil was not added on top of the yeast suspension during the experiment? (1 mark)
- (f) In another investigation, a bird was found to use 10 litres of oxygen to give a respiratory quotient of 0.7 during period of flight. Name the type of food that was being respired by the bird and determine the amount of carbon (IV) oxide produced during the same flight.
- Type of food :- (1 mark)
- Volume of carbon (IV) oxide produced. (2 marks)

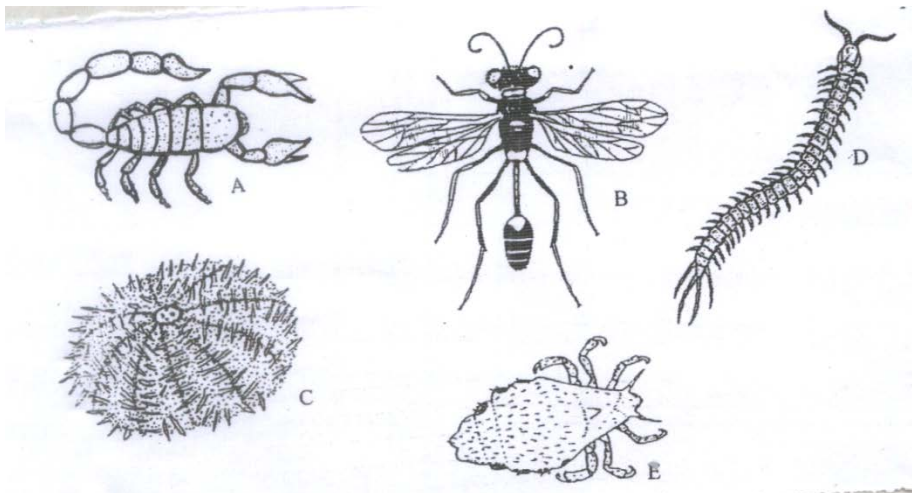
4. Pure breed of red cows and pure breed of white bulls were crossed to give F<sub>1</sub> calves which had a mixture of red and white coat known as roan. The F<sub>1</sub> were selfed.

(a) Using letter R to represent gene for red colour and W to represent gene for white colour work out the phenotypic ratio of F<sub>2</sub>. (4 marks)

(b) Work out the genotypic ratio of a cross between F<sub>1</sub> offspring and white bull. (3mks)

(c) Comment on the gene(s) controlling the colour of coats in cattle mentioned above. (1mk)

5. You are provided with photographs of animals. Study the photographs and the dichotomous key below to enable you identify the taxonomic group to which each animal belongs.



**KEY**

1. a) Jointed legs present .....go to 2  
 b) Jointed legs absent.....go to 7
2. a) Three pairs of legs .....go to 3  
 b) More than 3 pairs of legs.....go to 5
3. a) Wings present .....go to 4  
 b) Wings absent.....Anoplura
4. a) One pair of wings.....Diptera  
 b) Two pairs of wings.....Hymenoptera
5. a) Four pairs of legs ..... Arachnida  
 b) More than ten pairs of legs ..... go to 6
6. a) One pair of legs in each body segment..... Chilopoda  
 b) Two pairs of legs in each body segment ..... Diplopoda
7. a) Body partially enclosed in a shell..... Mollusca  
 b) Body surface has spiny projection.....Echinodermata

a) Using the key, identify the following organisms to their taxonomic groups. In each case, give the sequence of steps which you followed in identifying them. (4 marks)

Animal	Identity	Steps followed
A		
B		
D		
E		

b) i) Using observable features only, state the class to which the animal labeled A and B on the photographs above belong (2 marks)

State two observable features on B, that enabled you to arrive at that answer in (b (i) above).(2mks)

**SECTION B (40 MARKS)**

*Answer question six (6) in the spaces provided (compulsory). Choose either question 7 or 8 and answer in the space provided after question 8.*

6. During an ecological study of a lake, a group of students recorded the following observations.

- (i) Planktonic crustaceans feed on planktonic algae;
- (ii) Small fish feed on planktonic crustaceans, worms and insect larvae;
- (iii) Worms feed on insect larvae;
- (iv) A bird species feeds on small fish, planktonic crustaceans, worms and large fish;
- (v) Insect larvae feed on planktonic algae;
- (vi) Large fish feed on small fish.

(a) From this record of observations, construct a food web. (4 marks)

(b) From the food web, isolate and write down a food chain that ends with:-

(i) Bird species as a secondary consumer. (1 mark)

(ii) Large fish as a tertiary consumer. (1 mark)

(c) The biomass of the producers in the lake was found to be greater than that of primary consumers.

Explain this observation. (2 marks)

(d) Using the food web, identify three pairs of organisms that compete for food in the lake and for

each case, name the food being competed for. (6 marks)

(e) (i) State three ways by which human beings may interfere with this lake ecosystem. (3 marks)

(i) Explain how each of the ways stated in (e) (i) above may affect life in the lake. (3 marks)







