

NAME _____ INDEX NO. _____

CANDIDATES SIGNATURE _____

DATE _____

**231/1
BIOLOGY
PAPER 1
(THEORY)
JULY/AUGUST 2011
2 HOURS**

**NZAU/MUKAA FORM 4 CLUSTER EXAMS 2011
Kenya Certificate of Secondary Education
BOIOLOGY
PAPER 1
THEORY
2 HOURS**

INSTRUCTIONS TO CANDIDATES

- (a) Write your name and index number in the spaces provided above
- (b) Answer all questions in the spaces provided

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1 – 28	80	

This paper consists of 10 printed pages

Turn Over

1. State one role of water in germination of seed (1mk)

2. Name the part of the flower that develops into
(a) The seed coat (1mk)

(b) The pericarp (1mk)

3. What is the role of the following organelles in a cell
(a) Centrioles (1mk)

(b) Mitochondria (1mk)

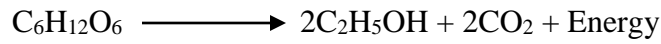
4. State one function for each of the following
(a) Cornified layer (1mk)

(b) Erector pilli muscle (1mk)

5. Below is a nucleotide strand
A – A – T – G – T – C
(a) Is it a DNA or RNA strand? (1mk)

(b) Give a reason for your answer in 5 (a) above (1mk)

6. A process that occurs in plants is represented by the equation below



(a) Name the process (1mk)

(b) State the economic importance of the process (2mks)

7. Study the diagram below and answer the questions that follow

(a) Name the specialized animal cell above (1mk)

(b) State two ways in which the above cell is adapted to the function (2mks)

(i)

(ii)

8. Explain four characteristics which make the buccal cavity of a frog suitable for gaseous exchange (4mks)

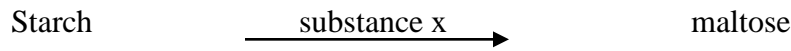
(i) _____

(ii) _____

(iii) _____

(iv) _____

9. Study the following equation and answer the questions that follow



(a) Name substance x (1mk)

(b) Name one region in the alimentary canal where the above reaction takes place (1mk)

(c) What is the role of bile salts in digestion (2mks)

10. (a) Name the type of circulatory system found in the phylum arthropoda (1mk)

(b) State two disadvantages of the circulatory system named in 10 (a) above (2mks)

11. What is meant by the following terms? Give an example in each case

(a) (i) Homologous structures (1mk)

(ii) Example (1mk)

(b) (i) Vestigial organ (1mk)

(ii) Example

(1mk)

12. The diagram below represents a plant cell after being placed in a solution for 40 minutes
S

(a) Name the part labelled as S

(1mk)

(b) Give the terms used to describe

(i) The solution in which the plant tissue was placed

(1mk)

(ii) The cell condition after the experiment

(1mk)

13. The diagram below shows a bone found in a mammalian skeleton
M

(a) Identify the bone

(1mk)

(b) Name the bone which articulates at part labelled M

(1mk)

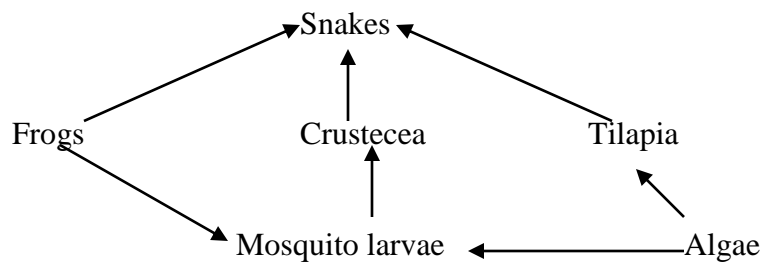
(c) State the type of joint at the articulation in (b) above

(1mk)

14. Weight of endosperm in a germinating seedlings decreases as the weight of the shoot increases. Explain

(2mks)

15. The diagram below represents an aquatic food web. Study it and answer the questions that follow



(a) Name the producer in the above food web

(1mk)

(b) Write a food chain in which the snake is a secondary consumer

(1mk)

16. Name the parts of the mammalian ear which carry out the following functions

(i) Balance and posture

(1mk)

(ii) Hearing

(1mk)

17. State the biological importance of the following

(a) Lignification of the xylem vessels

(1mk)

(b) Presence of mitochondria in companion cells in of phloem

(1mk)

(c) Thin leaves in green plants

(1mk)

18. Study the illustration shown below and answer the questions that follow

A B light

(a) Account for the results obtained in seedlings A and B

(i) Seedling A

(2mks)

(ii) Seedling B

(2mks)

(b) Why is seedling A included in the experiment (1mk)

(c) Name the plant hormone that is influenced by light (1mk)

19. Study the diagram below and answer the questions that follow

(a) Name the class in which it belongs (1mk)

(b) Give two reasons for your answer in (a) above (2mks)

20. Name the causative agent of the following diseases in humans

(a) Syphilis (1mk)

(b) Malaria (1mk)

21. (a) Name two types of muscles found in a human body (2mks)

(i)

(ii)

(b) Name the connective tissues that connect muscles to bones (1mk)

22. The diagram below represents a specialized cell
C D E

(a) Name the type of neurone shown above (1mk)

(b) Name the part labelled E (1mk)

(c) What is the function of the parts labelled as C and D (2mks)

C _____

D _____

23. (a) Why is glucose absent in the urine of a healthy person (1mk)

(b) Explain why a increase in an adult daily intake of protein would cause an increase in the amount of urea produced (1mk)

(c) Why blood from the alimentary canal pass through the liver before entering the general body circulation (1mk)

24. State two differences between the stigma of a wind pollinated flower and that of an insect pollinated flower (2mks)

Wind pollinated	Insect pollinated

25. State three effects of dumping untreated sewage into a river (3mks)

26. Explain how the following factors determine the daily energy requirement in humans (1mk)

(a) Age

(b) Occupation (1mk)

(c) Sex (1mk)

27. State the function of the following vitamins in humans (2mks)

(a) Vitamin C

(b) Vitamin K

(1mk)

28. Describe the significance of photosynthesis

(3mks)

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BOIOLOGY
PAPER 1
THEORY
MARKING SCHEME

1. - Activates enzymes for germination;
- Softens the seed coat to allow easy emergence of the radicle;
- Used in the hydrolysis of the stored food in the endosperm/cotyledon into soluble substances;
- Transportation of the hydrolysed food to the growing regions of the embryo; (1mk)

2. (a) Integument;
(b) Fruit wall; (2mks)

3. (a) Formation of spindle fibres/cillia/flagella; (1mk)
(b) Forms site for respiration to yield energy for the cell; (1mk)

4. (a) – Protects the skin from mechanical damage;
- Prevents water loss by evaporation;
- Protects inner delicate tissues against bacterial attack; (1st 1mk)
(b) – Contracts to raise the hair/relaxes to lower the hair (1mk)

5. (a) DNA strand; (1mk)
(b) Presence of Thyamine base; (1mk)

6. (a) Anaerobic respiration/fermentation; (1mk)
(b) – Used in the brewing industry to make alcohol;
- Used in baking industry; (any 2 mks)

7. (a) Sperm cell; (1mk)
(b) - Has acrosome which contains lytic enzyme to digest vitelline membrane for easy penetration into the ovum;
- Has numerous mitochondria to generate energy needed during swimming;
- Has large nucleus with more food reserves in the head (which fuses with the ova)
- Has a tail for swimming towards the ova;
(any 2mks)

8. - Thin epithelium for faster diffusion of gases;
- Moist to dissolve gases/oxygen/respiratory gases;
- Large surface area for maximum diffusion of gases;
- Highly vascularised/well supplied with blood capillaries for transport of gases; /to maintain steep diffusion gradient; (4mks)

This paper consists of 4 printed pages

Turn Over

9. (a) Amylase/ptyalin enzyme; (1mk)
 (b) – Mouth;
 - Duodenum; (any 1mk)
 (c) – They emulsify fats into tiny fat droplets for easy digestion;
 - They neutralize the acidic chyme/provides alkaline medium for best enzyme action;
 - Increases surface area for fats to be digested easily; (any 2mks)
10. (a) Open circulatory system; (1mk)
 (b) Transport fluid in body cavity/haemoceal is under low pressure; leads to low supply of nutrients/removal of waste products;
 - Organisms are less active; (2mks)
11. (a) (i) Structures with common embryonic origin but are modified to perform different functions; (1mk)
 (ii) Beaks of birds/feet of birds/pentadactly limbs in vertebrates/fore limbs of vertebrates; Any 1 mk
 (b) (i) Structures which have ceased to be functional over period of time hence reduced in size or rudimentary; (1mk)
 (ii) - Appendix in human beings
 - Coccxxy;
 - Wings of flightless birds
 - Nictating membrane in birds eyes
 - Reduced ear muscle
 - Body hair any 1mk
12. (a) Vacoule; 1mk
 (b) (i) Hypertonic solution; 1mk
 (ii) Plasmolysed/flaccid; 1mk
13. (a) Scapular; 1mk
 (b) Humerus; 1mk
 (c) Ball and socket joint; 1mk
14. Food stored in the endosperm/cotyledon is hydrolysed into soluble substances thus decreases in weight;
 - The shoot starts photosynthesizing food and leaves increases in number thus increases in weight; 2mks
15. (a) Algae; 1mk
 (b) Algae → Tilapia → Snakes; 1mk
16. (a) Semi – circular canals; 1mk
 (b) Cochlea; 1mk
17. (a) Strengthens xylem vessels/prevents lumen from collapsing; 1mk
 (b) Provides energy/ATP for translocation; 1mk
 (c) Allows quicker diffusion of carbon iv oxide and light into the leaf cells; 1mk

18. A – Grows upright and straight since alluminium foil prevents light from reaching the auxins; hence they are evenly distributed in the shoot tip; 2mks
 B – Grows bending towards the light since light poralises auxins; to the dark side increasing auxin concentration hence there is faster cell division and faster cell elongation; 2mks
 (b) Act as a control experiment; 1mk
 (c) Auxins; (1mk)
19. (a) Arachnida; 1mk
 (b) Has two body parts; 2mks
 Has four pairs of legs;
20. (a) Treponema pallidum 1mk
 (b) Plasmodium spp acc. Plasmodium alone
 Plasmodium ovale
 Plasmodium malariae 1mk
 Plasmodium falaparum
21. (a) Skeletal muscles; any 2mks
 - Smooth muscles;
 - Cardiac muscles;
 (b) Ligaments; 1mk
22. (a) Motor neurone; 1mk
 (b) Myelin sheath; 1mk
 (c) (i) To link with adjacent neurone/conducts impulse to the next neurone; 1mk
 (ii) Transmission of impulses; 1mk
23. (a) It is reabsorbed into the blood stream by the kidney tubules; 1mk
 (b) Excess proteins are deaminated by the liver hence production of more urea; 1mk
 (c) For the liver to convert and store excess food products/glucose; 1mk
24.

Wind pollinated	Insect pollinated
- Feathery in nature - Large in size - Hangs outside the flower	- Sticky; - Smaller in size; - Enclosed within corollal tube;

 Any 2mks
25. - Kill organisms in water;
 - Reduces amount of oxygen in the water;
 - Reduces quality of water for consumption/changes water PH;
 - Interferes with food chains/trophic levels
 - leads to autotrophication/algae bloom
 - Causes water borne diseases e.g. cholera, typhoid, amoebic dysentery; any 3 mks
26. (a) Young people are actively/rapidly growing hence needs more energy than older people; 1mk
 (b) Manual workers requires more energy than sedentary/office workers; 1mk
 (c) Males are more muscular hence requires more energy than females; 1mk

27. (a) – Prevent body against infection/disease resistance
- Prevents bleeding of gum
 - Prevents scurvy
 - Quick healing of wounds/ worn out tissues;
- any 2
- (b) – Blood clotting;
- 1mk
28. - Manufacture of organic food / sugars consumed by animals;
- Produces oxygen as a by – product used in respiration by animals;
- Utilises carbon IV oxide in atmosphere which may act as a pollutant;
- 3mks

231/2
BIOLOGY
PAPER 2
(THEORY)
JULY/AUGUST 2011
2 HOURS

NZAU/MUKAA FORM 4 CLUSTER EXAMS 2011
Kenya Certificate of Secondary Education
BOIOLOGY
PAPER 2
THEORY
2 HOURS

INSTRUCTIONS TO CANDIDATES

- (a) Write your name and index number in the spaces provided above
- (b) The paper consists of two sections A and B
- (c) Answer all questions in section A in spaces provided.
- (d) In section B answer question 6 compulsory and either 7 or 8 in space provided

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
A	1	8
	2	8
	3	8
	4	8
	5	8
B	6	20
	7	20
	8	20
TOTAL SCORE		80

SECTION A (40 MARKS)

Answer ALL the questions in this section in the spaces provided

1. (a) What is meant by the term sex – linkage? (1mk)

- (b) Name two sex – linked traits in humans (2mks)

- (c) In *Drosophila melanogaster*, the inheritance of eye colour is sex linked. The gene for red eyed is dominant. A cross was made between a homozygous red – eyed female and a white – eyed male. Work out the genotypic ratio of F1 generation.
(Use R to represent the gene for red eyes) (5mks)

2. The set up below was used by a student to investigate an aspect of photosynthesis. Study it and answer the questions that follow
Sunlight Gas Canadian pondweed Water

(a) State the aim of the experiment (1mk)

(b) Name the gas collected (1mk)

© State the roles of each of the following parts of the apparatus (2mks)

(i) The funnel

(ii) The wooden block

(d) What was the role of sodium hydrogen carbonate in the experiment? (1mk)

(e) Suggest two ways of increasing the rate of evolution of the gas (2mks)

(f) Explain why only aquatic plants like the Canadian pondweed are used instead of terrestrial plants like black jack in this experiment (1mk)

3. The diagram below shows a bone of the vertebral column. Use it to answer the questions that follow

A B Facet D C

(a) Identify the bone. (1mk)

(b) Give a reason for your answer above (1mk)

(c) State the view of the bone by which the diagram has been drawn (1mk)

(d) Name the parts labeled A, B and C (3mks)

(e) State the function of part labeled C and D

C

1mk

D

1mk

4. The diagram below represents a mature bread mould (Rhizopus)
P Q R

(a) Name the structures P, Q and R (3mks)

P _____

Q _____

R _____

(b) What is the function of the structure P? (1mk)

(c) State two economic importance of moulds (2mks)

(d) (i) Name the kingdom to which bread mould belong (1mk)

(ii) List down one general characteristic of member of the kingdom named in d (i) above (1mk)

5. (a) Name two sites where gaseous exchange takes place in an aquatic plant (2mks)

(b) The diagram below represents the gill of a bony fish. Study it and answer the questions that follows
A B C

(i) Name the parts labelled A, B and C (3mks)

A _____

B _____

C _____

(ii) State the function of the part labelled A (1mk)

(iii) Explain how the part labelled C is adapted to perform its function (2mks)

SECTION B (40 MARKS)

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

6. An experiment was carried out to investigate the effect of heat on germination of seeds. Ten bags each containing 60 pea seeds were placed in water maintained at 85°C. After an interval of two minutes a bag was removed and seeds planted. The number that germinated was recorded. The procedure used for pea seeds was repeated for wattle seeds. The results were tabulated as in the table below.

Time (minutes)	Number of seeds that germinated	
	Garden pea seed	Wattle seeds
0 – 2	60	0
2 – 4	60	0
4 – 6	44	1
6 – 8	40	2
8 – 10	36	28
10 – 12	11	36
12 – 14	2	41
14 – 16	1	44
16 – 18	1	47
18 – 20	0	49
20 – 22	0	49

- (a) Using a suitable scale and on the same axes, draw graphs of time in hot water against number of seeds that germinated for each plant (7mks)

- (b) (i) After how many minutes would you expect 50% of wattle seeds exposed in hot water to germinate (1mk)

- (ii) What was the minimum number of minutes after exposure of garden pea seeds to hot water was there no germination? (1mk)

- (c) From the graph, which of the two types of seeds was more sensitive to heat influence on germination? Why? (1mk)

(d) Explain why the ability for the:

(i) Garden pea seeds to germinate declined with the time of exposure to heat (3mks)

(ii) Wattle seeds to germinate increased with time of exposure to heat (2mks)

(e) What results would be expected if the temperature of water was maintained at temperatures

(i) Above 85⁰C (1mk)

(ii) At 5⁰C (1mk)

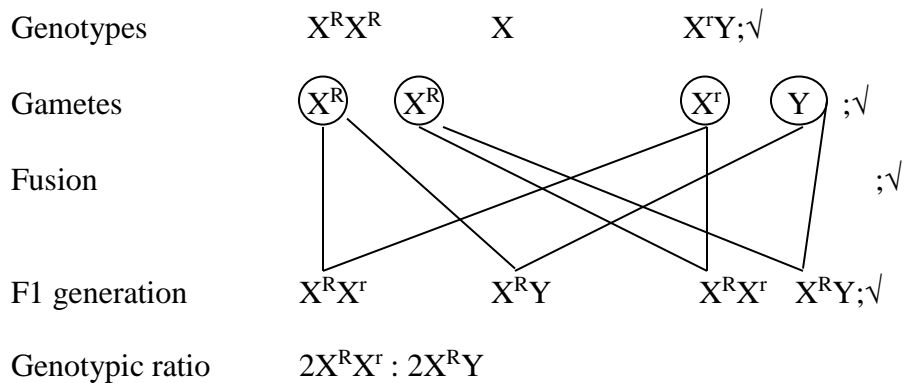
(f) Apart from temperature state three internal factors necessary for seed germination (3mks)

231/2
BIOLOGY
PAPER 2
(THEORY)
JULY/AUGUST 2011
2 HOURS

NZAI/MUKAA FORM 4 CLUSTER EXAMS 2011
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BOIOLOGY
PAPER 2
THEORY
2 HOURS
MARKING SCHEME

1. (a) genes are located on the sex – chromosomes; they are transmitted along with those determining sex; ✓ 1mk
 (b) – Colour blindness; ✓
 - Haemophilia; ✓
 Acc: hairy ears/pinna; Baldness;
 Mark 1st two 2mks

(c)



$1X^R X^r : 1X^R Y$; ✓ 5mks
 (If ratio is not simplified reject)
 (If genotypes are not sex – linked award 1 mark for correct fusion)

Or

Accept punnett square

Genotypes $X^R X^R$ x $X^r Y$; ✓

♂	X^r	Y
♀ X^R ✓	$X^R X^r$	$X^R Y$
X^R	$X^R X^r$ ✓	$X^R Y$ ✓

2. (a) To show that oxygen is produced during photosynthesis; 1mk
 (b) Oxygen; 1mk
 (c) (i) Keep the pond weed in one position; and facilitate collection of gas by directing it into collecting test 1mk
 (ii) Create space between the funnel and flask/beaker so as to allow free circulation of water; 1mk
 (d) Sodium hydrogen carbonate is used to dissolve atmospheric carbon (IV) oxide thereby providing continuous supply of carbon (IV) oxide; 1mk
 (e) Warming the water to about 35°C; 1mk
 Introducing a bulb near the apparatus; 1mk
 Introducing red light near the apparatus; any 2
 (f) They are adapted to aquatic environment; ✓ (i.e. they are able to use dissolved carbon (IV) oxide; and photosynthesise under low light intensity;) 1mk
3. (a) Lumbar vertebra; 1mk
 (b) Large transverse process/presence of metapophysis/thick centrum; 1mk
 (c) Anterior view; 1mk
 (d) A – Neural spine; 1mk
 B – Metapophysis; 1mk
 C – Centrum; 1mk
 (e) C – Support of upper body weight; 1mk
 D – for attachment of abdominal muscles; 1mk
4. (a) P – Sporangium; 3mks
 Q – Spore; 1mk
 R – Rhizoid; 3mks
 (b) Formation of spores; 1mk
 (c) – Causes food spoilage;
 - Causes decomposition of dead matter thus releasing nutrients to the soil to increase its fertility;
 - Destroy old clothes/shoes/timber; (Any 1st 2) 2mks
 (d) (i) Fungi; 1mk
 (ii) – They lack chlorophyll;
 - Has cell wall made up of chitin instead of cellulose;
 - Store carbohydrates as glycogen; 1mk
 (1st any correct)
5. (a) – Pneumatophores/Aerial/Breathing roots;
 - Stomata; (1st two) 2mks
 (b) (i) A – Gill rakers;
 B – Gill bar/arch; 3mks
 C – Gill filaments; 1mk
 (ii) Trap food/solid particles hence prevent them from clogging the gill filaments; 1mk
 (iii) – Highly vascularised to transport oxygen that has diffused in;
 - Thin epithelium to reduce the distance gases diffuse across;
 - Numerous to increase surface area for maximum absorption of oxygen; 2mks

6. (a) NUMBER OF GERMINATING SEEDS TIME (MINUTES)

Garden pea seeds Wattle seed

0 5 10 15 20 25 30 35 40 45 50 55 60 65

0-2 2-4 4-6 6-8 8-10 10-12 12-14 14-16 16-18 18-20 20-22

6. (a) Labelling x – axis $\sqrt{1\frac{1}{2}}$ maximum value above 60
 Y – axis $\sqrt{1\frac{1}{2}}$
 Scale x – axis $\sqrt{1}$ (origin must be indicated)
 Y – axis $\sqrt{1}$
 Plotting of points $\sqrt{\sqrt{2}}$ mks
 Smooth curve x $\sqrt{1}$ @ 1mk – reject dotted curves
 Identification @ $\sqrt{1\frac{1}{2}}$ 1mk
1. Inverted curves – A max of 1mark (identification)
 2. 2 separate curves – mark the 1st and award a maximum of 5mks
 3. Extrapolated curves – deny curve and plotting marks
- (b) (i) 11 minutes; 1mk
 (ii) 19 minutes; 1mk
 (Acc: 18 minutes)
- (c) Garden peas ($\frac{1}{2}$ mark) because more seeds germinated when exposed to hot water for a short time $\sqrt{\quad}$ $\frac{1}{2}$ mk
- (d) (i) Pea seeds have a weak testa; (which is quickly soaked and starts allowing water into the seed) when exposed for long to hot water, the enzymes get denatured; and the embryo destroyed by excessive heat; 3mks
 (ii) Wattle seeds have a tough testa; which requires long time of contact with hot water to hasten softening of testa; 2mks
- (e) (i) Comparatively fewer/no garden pea seeds germinate but more/all wattle seeds will germinate; 1mk
 (ii) No wattle (reject fewer) will germinate while most/all garden pea seeds will germinate; 1mk
- (f) – Enzymes;
 - Seed viability;
 - Hormones; 3mks

7. Indoleacetic acid (IAA/Auxin); $\sqrt{\quad}$
 It promotes cell division and elongation and thus influences tropic responses $\sqrt{\quad}$; it also promotes formation of abscission layer to bring about leaf fall $\sqrt{\quad}$; (in deciduous plants) it also inhibits growth and development of apical buds/causes apical dominance $\sqrt{\quad}$; it also promotes growth of adventitious roots $\sqrt{\quad}$; in presence of cytokinins it induce formation of callous tissue to bring about healing of wounds; $\sqrt{\quad}$

Gibberellins :

They promote cell division; thus bring about elongation in dwarf varieties; They also bring about parthenocarpy by initiating formation of IAA; breaks dormancy in buds;brings about development of side branches; inhibits growth of adventitious roots; promotes germination of seeds by activation of hydrolytic enzymes/break dormancy of seeds; Retards leaf abscission/affects leaf expansion and shape;

Cytokinins;

Breaks dormancy in buds and seeds; promotes cell division in presence of IAA; promotes root formation on shoot; High concentration causes increased cell enlargement in leaves; stimulates lateral bud development; stabilizes protein and chlorophyll;

Abscisic acid;

High concentration causes stomatal closure; (by interfering with uptake of potassium ions) inhibits stem elongation; induces dormancy in buds/inhibits sprouting in buds; inhibits seed germination/ causes seed dormancy; causes abscission of leaves and fruits;

Florigens; it causes growth of flowers in flowering plants; promotes flowering;

Total 27 (max 20mks)

Ethlene; promotes ripening of fruits

8. The skin is made up of epidermis and dermis; The outermost layer is known as cornified layer; made of dead cells that protect it against mechanical damage//deseccation//microbes; The granular layer; is made up of living cells that give rise to cornified layer; The malphigian layer; with actively dividing cells that give rise to a new epidermal cells// that contain melanin; that protects the skin against ultra-violet rays; The dermis has several components. Has sweat gland//endorific glands; that produce sweat when hot which evaporates (carrying with it latent heat of vaporization) thus reducing the body temperature; under cold conditions, little or no sweat is produced thus heat is conserved; the sweat contains water, sodium chloride. Uric acid, urea etc and hence the skin acts as an excretory organ; Has hair; the hair stands erect to trap air when temperature is low to insulate/reduce heat loss/the hair lies flat to allow heat loss when the temperature is high; Has nerve endings; which are sensitive to stimuli such as heat, cold, pain, pressure, touch; Has subcutaneous fats/Adipose tissue; that insulate the body against heat loss; Has sebaceous glands; which secretes sebum, an antiseptic/water repellent that prevent drying/cracking of skin/make skin supple; Has arterioles that vasodilate when temperatures are high to loose heat by radiation/convection; and vasoconstrict when temperature is low to conserve heat/minimize heat loss; Has blood vessels/capillaries/arterioles; that supply food/oxygen/nutrients/and removes excretory products from the cells;

(Max 20)

Total 23

NAME _____ INDEX NO. _____

231/3
BIOLOGY
PAPER 3
(PRACTICAL)
JULY/AUGUST 2011
1 ¾ HOURS

NZAU/MUKAA FORM 4 CLUSTER EXAMS 2011
Kenya Certificate of Secondary Education
BOIOLOGY
PAPER 3
PRACTICAL
1 ¾ HOURS

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided above at the top of this page

Answer all the questions

You are required to spend the first 15 minutes of the 1 ¾ hours allowed for this paper reading the whole paper carefully before commencing your work

Answer must be written in the spaces provided in the question paper

Additional pages must not be inserted

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	14	
2	10	
3	16	
	40	

This paper consists of 6 printed pages

Turn Over

1. You are provided with solutions A and B; One of them being 25% sucrose solution and the other 25% glucose solution. Also provided are two pieces of visking tubing (10cm long), beakers, threads, Distilled water, source of heat, benedicts solution, sodium hydrogen carbonate and dilute hydrochloric acid. Tie one end of the visking tubing tightly using the thread provided.

(a) Fill one of the visking tubing with solution A, then tie tightly to prevent leakage. Do the same with the other visking tubing but fill it with solution B. Wash the outer surface of the visking tubing using distilled water. Dry the surface with a filter paper or tissue paper

(b) Using strings, suspend each tube in 100ml distilled water in 250ml beaker as shown below. Leave the tubings for 20 minutes

Solution A Visking tubing J Thread Distilled water Solution B T Visking tubing

(c) Using the reagents provided, test for the food substance in the water in the two beakers.

(J and T)

(10mks)

Food substance	Test	Procedure	Observation	Conclusion
Water in beaker J				
Water in beaker T				

(d) Account for the results obtained in the table above

(2mks)

(e) Which of the solutions is

(2mks)

(i) 25% glucose solution?

(ii) 25% sucrose solution

2. You are provided with the following:

A piece of irish potato labelled specimen K

A piece of mammalian liver labelled l

Hydrogen peroxide

(a) Peel the potato and make a cube of 1cm^3 . Place the cube in the test – tube labelled A

Cut an approximately equal size of the liver and place it in the test – tube labelled B. Keep the rest of the liver for later use.

(i) Add 2ml of the hydrogen peroxide into each of the test-tubes A and B containing potato and liver piece respectively. Observe carefully and record your observations (2mks)

(ii) Which enzyme is found in both tissues that results in the observation? (1mk)

(iii) Explain the reaction involved (2mks)

(iv) Write down a word equation showing the breakdown of hydrogen peroxide in this reaction (2mks)

(b) (i) Boil the remaining piece of liver in a test-tube for 10 minutes. Cool it in a water bath. Add hydrogen peroxide into it and observe (1mk)

(ii) Account for the observation you made in (b) (i) above (2mks)

3. You are provided with a specimen labelled F. Study it and answer the questions that follow
(a) Describe specimen F (4mks)

(b) State the agent of pollination (1mk)

(c) State four ways in which the specimen is adapted for pollination (4mks)

(d) Open specimen F. Draw and label the pistil (5mks)

(e) Magnification show your working

(2mks)

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BIOLOGY
PAPER 3
(PRACTICAL)
JULY/AUGUST 2011
1 ¾ HOURS

NZAI/MUKAA FORM 4 CLUSTER EXAMS 2011
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BOIOLOGY
PAPER 3
PRACTICAL
MARKING SCHEME

1. (c)

Food substance	Test	Procedure	Observation	Conclusion
Water in beaker J	Reducing sugar;√	Add benedicts solution and heat;√	No colour change/Blue colour of Benedicts solution remain;√	Reducing sugars absent√
	Non-reducing sugar;√	Add dilute hydrochloric acid, boil, cool add sodium hydrogen carbonate, heat;√	No colour change;√	Non-reducing sugar absent;√
Water in beaker T	Reducing sugar//	Add benedicts solution and heat//	Green to yellow and eventually orange/brown precipitate;√	Reducing sugar present;√
	Non – reducing sugar//	Add dilute hydrochloric acid, boil, cool add sodium hydrogen carbonate place in hot water bath//	Green to yellow and eventually orange/brown precipitate//	Non-reducing sugar present//

NB:

- The test for non-reducing sugars in the water in beaker. T will not score if the candidate had scored for the same test under water in beaker J
- Test for reducing sugars should always come first. If the candidate starts with the test for non-reducing sugars before coming to test for reducing sugars, only the test for reducing sugars scores.
- Key // Means seen – No score
; marking point

(d)The visking tubing is semi-permeable;√ the smaller glucose molecules diffuse out of solution B into the distilled water while the larger sucrose molecules do not diffuse out;√ 2mks

- (e) (i) Solution B;√
(ii) Solution A; √

2mks

2. (a) (i) Bubbles are formed, forming a foam in both test-tubes A and B; more foam seen in test –tube B than in test – tube A. (2mks)
(ii) Enzyme catalase (1mk)
(iii) Hydrogen peroxide is broken down by enzyme catalase into water and oxygen; the gas forms the foam observed (2mks)
(iv) Hydrogen peroxide \longrightarrow water + oxygen (2mks)
- (b) (i) No foam is observed (1mk)
(ii) Enzyme catalase has been denatured; by boiling and cannot function any longer (2mk)
3. (a) Corolla – Brightly coloured√1/yellow colour
- Partially fused√1
- Presence of nectar guides√1
Sepals (calyx) - Green in colour√1
- Partially fused√1
Pistil – Long and slender style√1
- Flattened stigma√1
Stamens – Filaments are five√1
- Five anthers√1
- Lobed anthers√1 (4mks)
- (b) Insects (1mk)
- (c) – Brightly coloured petals to attract insects√1
- Presence of nectar guides to guide insects to the nectaries√1
- Tubular corolla to bring the insects into contact with the anthers and the stigma√1
- Large corolla to attract insects√1 (4mks)
- scented to attract insects
- (d)
Stigma√1 Style√1 Ovary√1

- (i) Drawing – 2mks
D1 – Continuous outline;
D2 – proportional parts i.e. the stigma, style and the ovary; (2mks)
(ii) Labelling – 3mks
- (e) $Mg = \frac{\text{Length of drawing}}{\text{Length of actual specimen}}$
= xmg√1 (2mks)

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REQUIREMENTS

A mature Tecoma flower – labelled F.
Means of cutting.
Mammalian liver – labelled L.
Hydrogen peroxide.
Means of cutting.
Labels.
Means of heating.
Test tubes and holders.
Cutting surface (white files).
Beakers (250ml).
Visking tubing (10cm long) – per student.
Solution A – 25% sucrose solution.
Solution B – 25% glucose solution.
Cotton thread. (40cm long) – Per student.
Distilled water (250ml) – per student.
Blotting paper/tissue paper.
Irish potatoes – labelled K.
Sodium Hydrogen carbonate
Benedict solution
Dilute HCL