

KISII CENTRAL SUB-COUNTY JOINT EVALUATION TEST
KENYA CERTIFICATE OF SECONDARY EDUCATION (K.C.S.E)

231/2

BIOLOGY

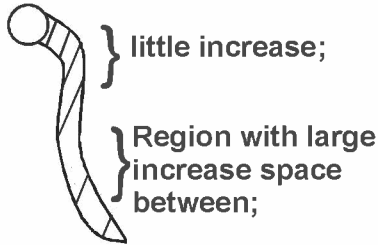
PAPER 2

TIME: 2 HRS

JULY/AUGUST 2016

1. a) Region of elongation/region of rapid growth in a root/radicle; (1mk)

b)



(2mks)

- c) Provide moisture/water for growth; (1mk)

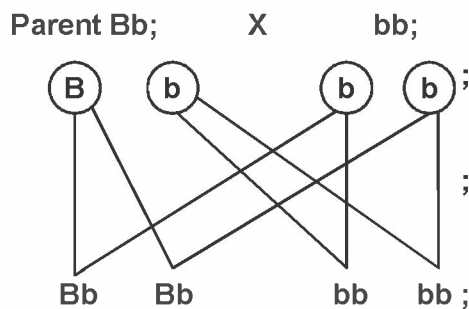
- d) Oxygen for respiration /oxidation of stored food; to provide energy for germination; (2mks)

- ii) Cotyledons - Store food necessary for germination; (1mk)

- e) Small seeds store very little amount of food; (1mk)

2. a)

1mk



3mks

- Genotypic ratio Bb : 1bb; 1mk

- b) Phenotypic ratio of children

- 1 broad lipped: 1 thin lipped; (1mk)

c)

Gene mapping	Gene sequencing
-Identifying positions occupied by specific genes on a chromosome	- Analysing DNA to reveal order of bases in all chromosomes; 1mk

3. a) X - Vacuole/Sap vacuole;

Y - Tonoplast;

Z - Chloroplast; 3mks

- b) Cellulose; 1mk

- c) Active transport ; (1mk)

- d) The cell sap is hypertonic to the solution/distilled water; hence water molecules move into the cell; by osmosis; making it to swell and eventually burst;

(Total 4 marks, max 3mks)

Total 8mks

4. a) 12.5%; (1mk)

- b) - Isotonic/iso-osmotic; (1mk)

- c) -1% Sugar solution is hypotonic to the cell sap; therefore water molecules moved in the cell sap; (through semi-permeable membrane) by osmosis; making the cells turgid/large hence increasing diameter of the cells; (4mks)

- d) Cytoplasm fills the cell/turgid before placing in 15% sugar solution; and after placing in 15% sugar solution the cytoplasm shrinks away from the cell wall/cell cytoplasm becomes plasmolysed; (2mks)

Total (8mks)5.

- a) i) The first 4 hours

0 - hr

Rapid increase in sugar level because there is fast absorption of glucose into blood; Rate of absorption higher than glucose assimilation/conversion into glucose; 2mks

1 - 4hrs

Decline in level of glucose due to use up/assimilation/conversion to glucose/rate of assimilation higher than rate of absorption; 1mk

iii) The 6th hour

-Sugar level below normal because absorption has ceased;

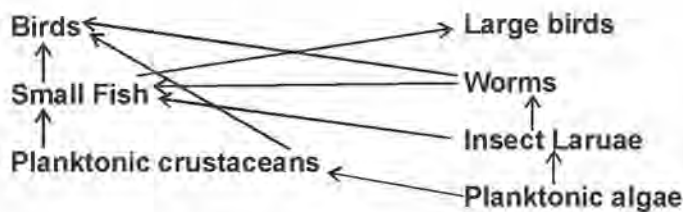
- Blood sugar has been assimilated/converted to glycogen/compensatory mechanisms have not started to function yet; (2mks)

b) i) Suffering from Diabetes (mellitus) /sugar diabetes; due to malfunctioning of pancreas/due to lack of enough insulin; (2mks)

ii) Administer insulin; 1mk **Rej insulin tablets**

Total 8mks

6. a) Food web

**Rej wrong arrows**Each arrow is $\frac{1}{2} \times 10 = 5$ mks

b) i) Planktonic algae ® crustaceans ®birds

(1mk)

ii) EITHER

Planktonic algae ®planktonic crustaceans® small fish ®large fish

OR

Planktonic algae ®insect larvae ®small fish® large fish; **Rej if numbered** (1mk)

c) The biomass of the producers in the lake was found to be greater than that of primary consumers. (1mk)

Explanation

-Producers must have a higher biomass to sustain organism of the next higher trophic level; (OWTTE) (1mk)

d) i) Two organisms that compete for food in the lake

-Planktonic crustaceans and insect larvae

- Small fish and birds ;

- Large fish and birds;

- Small fish and worms; First two only 2mks

ii)

- Planktonic algae;

- Worms;

- Insect larvae;

- Planktonic crustaceans;

- Small fish;

First two only 2mks

e) i) State three ways in which humans may interfere with this lake ecosystem

- Pollution e.g oil, fertilizers, other chemicals and siltation;

- Fishing;

- Removal/shooting of birds;

- Use of lake water for irrigation; etc

- Introduction of new species /biological control;

First 3 3mks

ii) How the ways may affect life in the lake

Pollution

-Toxic pollutants/addition of oil on water surface will kill the organisms/reducing the organisms;

- Fertilizers will cause algae bloom /eutrophication leading to increase in animal population; Siltation will cause poor penetration of light; therefore reduction in algae causing reduction of consumers; Siltation making lake shallow; causing reduction in animal population;

Fishing

This will increase the number of crustacean's worms /insect larvae thus depleting planktonic algae;

Removal of birds/shooting

This will increase small fish/worms;

Little or no change in planktonic algae;

Use of lake water

Irrigation/removal of water in large quantities will lead to drying up /reducing volume of water; hence becomes less habitable/environment becomes unsuitable new species /biological control;

New species/Biological Control

New species may eat up /will compete for food with existing species leading to imbalance of ecosystem;

7. a) Define the term tropism

- Growth movement of plants; in response to external unilateral/unidirectional stimuli;

b) Mechanism of various types of tropism in plants phototropism;

-Growth movements of plant shoots in response to unilateral sources of light;

- The tip of the shoots produce auxins down the shoot;

- Light causes auxins to migrate to outer side/darker side causing growth on the side away from light; hence growth curvature towards source of light/ roots are negatively phototropic;

Geotropism;

-Response of roots/parts of a plant to the direction of force of gravity;

- Auxins grow towards the direction of force of gravity; causing positive geotropism in roots while shoot grows away from force of gravity (negatively geotropic);

Thigmotropism/Haptotropism;

- Growth response of plant when in contact with an object;

- Contact with support causes migration of auxins to outer side causing faster growth on the side away from contact surface;

- This causes tendrils/stem to twine around a support;

Hydrotropism;

-Growth movement of roots in response to unilateral source of water/moisture;

- The root grows towards the source of water/positively hydrotropic while leaves are negatively hydrotropic;

Chemotropism;

-Growth movement of parts of plants to unilateral source of chemicals;

- The chemicals form a gradient between two regions e.g pollen tube growing towards the ovary through the style;

22mks Total 20mks

8. Ovaries

-Have several Graafian follicles; that develop and burst open to release/produce mature ova;

- Secrete sex hormones (oestrogen); which initiate/control development of secondary sexual characteristics;

- Produce hormones oestrogen and progesterone; which prepare the uterus for implantation and subsequent nourishment of the embryo;

Oviducts (fallopian tube)

- Are thin narrow and tubular to increase flowing speed of semen containing sperms;

- are funnel shaped on the end next to ovary which enables them to receive the ovum;

- their lining contains cilia which propel the ovum towards the uterus;

- has peristaltic muscles that enable movement of zygote/ovum to the uterus for implantation;

- is fairly long to increase surface area for fertilization;

Uterus

- is muscular for protection of developing embryo;

- has elastic wall that allows growth and development of foetus/embryo;

- has a highly vascularised endometrium that provides nutrients/gaseous exchange to developing embryo;

Cervix;

- has valves that close the lower end of the uterus to ensure continued pregnancy during gestation period;

- is capable of dilating;

- has narrow entrance/neck-like entrance to uterus that enables quick swimming of sperms to uterus;

- has suction mechanism that draws up/pulls sperms into uterus;

- has a "W" shape that fits well with the glans of the penis to ensure sperms are deposited at the right point;

Vagina

- is elastic and muscular to enable good accommodation or penetration of the penis thus proper deposition of sperms and for easy parturition;

- allows menstrual flow;

- has sensitive labial walls which secrete/produce lubricating substances that ensure/enable/facilitate good coition;

- capable of considerable enlargement, due to elastic muscles, to accommodate baby during parturition;

Clitoris

-has sensitive cells for orgasm;

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PAPER 3

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1. a) i) Pisces;

Rej if P is small letter (1mk)

- ii) Presence of fins;
 Presence of gills;
 Presence of scales;
 Presence of lateral lines;

Mark first two 1 x 2 = 2mks

b)

Food substance	Procedure	Observation	Conclusion
Starch	To 2cm ³ of decant of P, add (2 drops of) iodine solution;	Yellow/brown colour Iodine colour remains same no colour change;	Starch absent
Protein	To 2cm ³ of decant of P in a test tube, add (equal amounts of) 10% sodium hydroxide followed by 1% Copper (II) Sulphate solution and shake.	Violet/purple colour;	Protein present
Reducing sugars Rej Simple sugar/monosaccharide	To 2cm ³ of decant of P in a test tube, add (equal amounts of) Benedict's solution heat/boil/warm in a <u>hot</u> water bath; Rej; Warm, water bath alone	Blue colour of Benedict's solution remains /persists;	Reducing sugars absent

ii) BeriBeri - Lack of vitamin B1; (Thiamine)

Pelagra - Lack of vitamin B2; (Riboflavine and Nicotine Acid)

Pernicious anaemia - Lack of vitamin B12 (Cobalamine)

2. a) V - Collenchyma;

K - Parenchyma;

L - Sclerenchyma;

U - Xylem;

b) Collenchyma, Sclerenchyma and Xylem walls are lignified Parenchyma - Turgidity of cells; make them firm

c) i) Part R contains/stores starch;

ii) Active transportation of water from root cortex to root xylem;/where root pressure begins;

d) i) Xylem/U;

ii) Transpiration pull;

- Capillarity;

- Cohesion and adhesion;

Rej Cohesion/adhesion alone

- Root pressure;

e) i) Q - Phloem;

ii) Companion cell;

iii) Contains mitochondria which produces energy necessary for translocation in sieve tube;

3. a) Adrenaline hormone;

b)

Q - Cortex; R - Pelvis; T - collecting duct;

c) Ultra filtration;

d) i) - Plasma proteins; acc Fibrinogen/blood proteins

- Blood cells; acc (WBC, RBC and plateletes all together)

ii) Are large in size and can't pass through small pores of Bowman's capsule;

e) Have long loop of Henle;

Few glomeruli;