

NAME _____ INDEX NO. _____

CANDIDATE'S SIGNATURE _____

DATE _____

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

**MAKINDU DISTRICT INTER-SECONDARY SCHOOLS EXAMINATION
PRE - Kenya Certificate of Secondary Education
BIOLOGY
PAPER 1
THEORY
2 HOURS**

INSTRUCTIONS TO CANDIDATES

Answer all the questions in the spaces provided

For Examiners use only

Questions	Max score	Score
1 - 29	80	

This paper consists of 8 printed pages

Turn Over

1. Write down a word equation to show the process of photosynthesis in green plants. (2mks)

2. A diagram 5cm long was drawn for a specimen 1cm. what is the magnification of the specimen. (2mks)

3. List 2 types of lignification patterns in xylem vessels of woody plants. (2mks)

4. (a) What name is given to response to contact with surface exhibited by tendrils and climbing stems in plants. (1mk)

(b) State three biological importance of tropisms to plants. (3mks)

5. Mention one role played by each of the following hormones in human menstrual cycle
(a) Follicle stimulating hormone. (FSH) (1mk)

(b) Oestrogen (1mk)

6. (a) What THREE characteristics are used to divide the phylum Arthropoda into classes. (3mks)

(b) Give a classification of the housefly by filling in the table below (3mks)

Kingdom _____

Phylum _____

Class _____

7. Give a reason for each of the following observations

(a) A mature plant cell does not lose shape even after losing water. (1mk)

(b) Red blood cells lack a nucleus. (1mk)

8. In an experiment a piece of brain was removed from a rat. It was found out that the rat had large fluctuations in body temperature. Suggest the part of brain that was removed. (1mk)

9. Name three types of strengthening tissues found in plants (3mks)

10. In a certain breed of cattle, when a pure breed white skin cow is crossed with a pure breed red skin bull the F1 generation all have roan skin.

(a) Using letter R to represent red skin and W to represent white skin, work out the genotype of the F1 generation. (3mks)

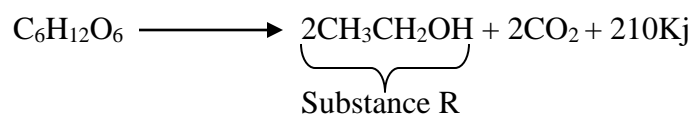
(b) Give a brief explanation for the occurrence of the roan skin colour. (1mk)

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

(i) Identify the stage of cell division. (1mk)

(ii) Reason (1mk)

12. The equation below represents respiration in a certain plant.



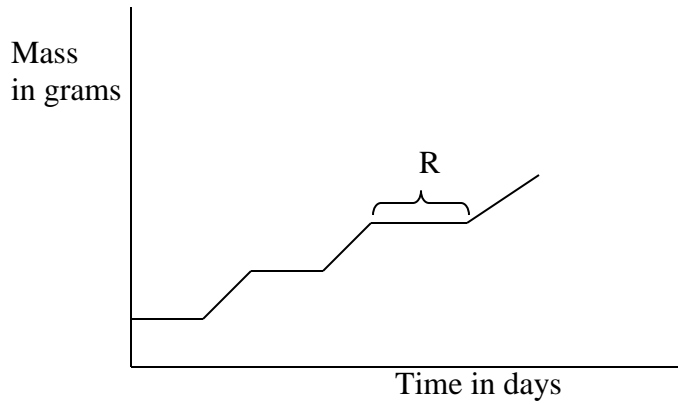
(a) (i) State the identity of substance R (1mk)

(ii) Give an equivalent of substance R in animals produced in a similar process (1mk)

(b) (i) What name is given to the above type of respiration (1mk)

(ii) Give two reasons why it is often difficult to calculate respiratory quotient in plants.(2mks)

13. The graph below represents the growth pattern of animals in a certain phylum.



(a) Name the type of growth pattern shown on the graph (1mk)

(b) Identify the process represented by R (1mk)

(c) Name the hormone responsible for the process in (b) above. (1mk)

14. Explain briefly how floating aquatic plants are adapted for gaseous exchange.

15. Give three functions of vertebral column. (3mks)

16. List down 3 adaptations of gill filaments for gaseous exchange. (3mks)

17. (a) What do you understand by the term organic evolution? (1mk)
-
-
-
- (b) State two evidence which support theory of organic evolution, (2mks)
-
-
-
18. (a) Distinguish between population and community. (2mks)
-
-
-
- (b) Name a method that could be used to estimate the population size of the following organisms.
- (i) Fish in a pond (1mk)
-
-
- (ii) Black jack in a garden (1mk)
-
-
19. (a) What is the meaning of the following terms.
- (i) Homeostasis? (1mk)
-
-
- (ii) Osmoregulation? (1mk)
-
-
- (b) Name the hormones involved in the regulation of glucose level in blood (2mks)
-
-
-
20. Explain why it is important for athletes to train in high altitude before an important competition (3mks)
-
-
-
-

21. (a) Why are the xylem vessels more efficient in transportation of water than tracheids? (2mks)

(b) What is the function of companion cells in phloem tissue? (1mk)

22. What is the difference between systole and diastole? (2mks)

23. Explain why the upper surface of a leaf is darker in colour compared to the lower surface. (2mks)

24. (a) What are the building blocks of proteins? (1mk)

(b) List three properties of proteins. (3mks)

25. Name the blood vessel that transports blood from (2mks)

(i) Small intestine to the liver

(ii) The heart to the kidney

26. List 2 components of the pancreatic juice. (2mks)

27. Name two groups of organisms that cause food spoilage. (2mks)

28. What is the function of acetylcholine? (1mk)

29. Give two structural and two environmental factors that affect transpiration in plants. (4 marks)

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**MAKINDU DISTRICT INTER-SECONDARY SCHOOLS EXAMINATION
Kenya Certificate of Secondary Education
BIOLOGY
PAPER 1
THEORY
MARKING SCHEME**

1. Carbon (iv) oxide + water \longrightarrow Glucose \surd + oxygen; \surd (1mk)
2. Magnification = $\frac{\text{length of drawing};\surd}{\text{Length of object}}$

$$= \frac{5}{1}$$

$$= \times 5\surd$$
 (2mks)
3. Spiral \surd ; bordered pits; reticulate; multiple spiral OWTTE
 Acc any 2 (2mks)
4. (a) Haptatropism/Thigmotropism \surd
 (1mk)
 (b) Phototropisms – exposes the leaves position to maximize light absorption enhancing
 Photosynthesis
 Hydrotropism – enables roots of plant to get water
 Thigmotropism – enables the plant to obtain mechanical support especially plants lacking woody
 stems. OWTTE max 3
5. (a) Cause graafian follicle to develop in the ovary; stimulate ovary to secrete oestrogen.
 Any 1 1mk
 (b) Causes healing and repair of uterine wall after menstruation; stimulates the (anterior) pituitary
 to secrete luteinising hormone. Any 1 1mk
6. (a) – Number of limbs;
 - Number of body parts/divisions;
 - Number of segments;
 - Presence or absence of antennae;
 - Number of antennae;
 Any 3 x 1 = 3mks
 (b) Kingdom – Animalia;
 Phylum – Arthropoda;
 Class - Insecta; 3mks

This paper consists of 4 printed pages

Turn over

7. (a) Presence of outer (cellulose) cell wall; 1mk
 (b) To create more space for packaging of haemoglobin; (large surface area) 1mk
8. Hypothalamus; 1mk
9. - Sclerenchyma;
 - Parenchyma;
 - Collenchyma;
 - Xylem tissue/tracheids; Any three 3mks
10. Parent Gametes RR x WW ;√
 Gametes R R W W ;√
 F1 RW RW RW RW ;√
- (b) Partial/co-dominance/incomplete dominance 1mk
11. (i) Anaphase II rej anaphase
 (ii) Chromatids move to opposite poles 1mk
12. (a) (i) Ethanol/Alcohol;
 (ii) Lactic acid; 1mk
 (b) (i) Anaerobic respiration; 1mk
 (ii) Carbon (iv) oxide produced in respiration is utilized in photosynthesis; oxygen produced in photosynthesis is used during respiration.
13. (a) Intermittent growth;
 (b) Moulting/Ecdysis;
 (c) Ecdysome/moulting hormone; 3mks
14. Have large air spaces (aeranchyma); for gaseous exchange; Have broad leaves/ dissected leaves (with stomata) on upper surface; which open into large air spaces; 3mks
15. - Protect the spinal cord from mechanical damage.
 - Responsible for flexibility (movement) of the body.
 - Gives the body its shape
 - Muscles attachment
 - For support any 3 3mks
16. - Numerous to increase surface area for gaseous exchange;
 - Moist surfaces to dissolve gases;
 - Connected to ventilation mechanism;
 - Vascularised to transport respiratory gases;
 - Thin walled for easy diffusion of gases;

17. (a) Emergency of modern forms of life from ancient simple forms over long period of time; 1mk
Change of organisms from simple to complex over long period of time;
- (b) – Fossil records;
- Geographical distribution;
- Comparative embryology;
- Comparative anatomy;
- Cell biology;
- Any 2 2mks
18. (a) Population – is total number of organisms of same species occupying a given habitat;
Community – is a total population of different species of plants and animals/organisms in a given area/habitat coexisting/living with each other/co-habiting/interacting with each other; 2mks
- (b) (i) Capture recapture method 2mks
(ii) Quadrat 1mk
19. (a) (i) Homeostasis – maintenance of a constant internal environment; 1mk
(ii) Osmoregulation – mechanisms which regulate osmotic pressure of internal environment of an organism/regulation of salt/solute and water balance/content in the blood/internal environment/ osmotic pressure balance. 1mk
- (b) Insulin;
Glucagon; 2mks
20. - Partial pressure of oxygen is low/oxygen refined found in highlands
- Body stimulated to manufacture more haemoglobin and red blood cells
- Athletes will absorb more oxygen in the competition to produce more energy.
(Sequence of events is important) 3mks
21. (a) Cross walls no xylem dissolves completely/absence of cross walls; cross walls no tracheids remain but perforated; (2mks)
(b) Generate energy required for translocation; (1mk)
22. Systole – contraction of ventricle muscles;
Diastole – relaxation of ventricle muscles; (2mks)
23. Has palisade layer containing cells with large populations of chloroplasts. (2mks)
24. (a) Amino acids; (1mk)
- (b) - Dissolve in water to form colloid;
- Denatured at high temperatures;
- Are amphoteric (i.e. have both acidic and basic properties); (3mks)
25. (i) Hepatic portal vein;
(ii) Renal artery; (2mks)
26. - Pancreatic amylase
- Pancreatic lipase

- Trypsin
 - Sodium hydrogen carbonate
- Acc any two

(2mks)

27. Bacteria;
Fungi;

(2mks)

28. (Impulse) transmitter substance across a synapse

29. Environmental factors

- Wind
- Light intensity
- Humidity
- Water availability

Structural factors

- Size of leaf
- Position of stomata / size of the stomata / number of stomata
- Thickness of the cuticle.

Any two from environmental factors and two from structural.

NAME _____ INDEX NO. _____

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

MAKINDU DISTRICT INTER-SECONDARY SCHOOLS EXAMINATION
PRE - Kenya Certificate of Secondary Education
BIOLOGY
PAPER 2
THEORY
2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Answer all the questions in section A in the spaces provided
2. In section B answer question 6 (compulsory) and either question 7 or 8.

For Examiners use only

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	

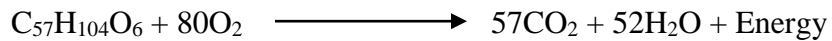
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Turn Over

1. (a) What is meant by oxygen debt? (1mk)

(b) What is respiratory quotient (RQ)? (1mk)

(c) The oxidation of a certain food substrate in man is represented by the equation below



(i) Calculate the respiratory quotient of the food substrate. (2mks)

(ii) Name the substrate being oxidized. (1mk)

(iii) Give reasons why fats are not normally used for respiration although they yield high amounts of energy during respiration. (2mks)

(d) Name the organelles in which oxidation of food substrate occur within living cells (1mk)

2. In man the presence of Rhesus antigen makes one Rhesus positive. The gene for presence of Rhesus positive is dominant over the gene for its absence.
(a) Using letter R to designate the Rhesus positive gene, work the inheritance of Rhesus antigen in a marriage between a homozygous Rhesus positive man and a Rhesus Negative woman (4mks)

(b) Work out the probability that the children will be Rhesus positive (1mk)

(c) In this marriage it was noted that after the first born child was born the woman miscarried the second and the third pregnancies explain. (3mks)

3. (a) Give two advantages of fossil records as an evidence of organic evolution. (2mks)

(b) (i) Explain the principle of the natural 'use' or 'disuse' as explained by Lamarck's theory of evolution (2mks)

(ii) Lamarck's theory of evolution is not acceptable. Give one reason for why this theory is not acceptable (1mk)

(c) (i) What is a vestigial structure? (1mk)

(ii) Name one vestigial structure in man (1mk)

(d) What is adaptive radiation (1mk)

4. The diagram below represents a food web in a certain ecosystem.

(a) Name the trophic level occupied by each of the following.

(2mks)

(i) Caterpillars

(ii) Small insects

(b) From the food web construct two food chains which end with lizards as tertiary consumer. (2mks)

(c) (i) Which organisms have the least biomass in this ecosystem.

(1mk)

(ii) Explain the answer in (c) (i) above.

(3mks)

5. The diagram below represents a longitudinal section of dicotyledonous root tip.
J K L H I G I

(a) Mention the processes which occur at the parts labelled H, I and L

(3mks)

H _____

I _____

L _____

(b) State the functions of the parts labelled G and K.

(2mks)

G _____

K _____

(ii) The part labelled J was found to be stained when the plant was left to stand in a solution of a dye. Give an explanation for this observation.

(1mk)

(c) Give two adaptive features of the structure labelled K for its function.

(2mks)

SECTION B

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

6. Two persons X and Y drunk equal volumes of concentrated solution of glucose. The amount of glucose in their blood was determined at intervals. The results are shown in the table below.

Time (minutes)	Glucose level in blood (mg/100cm	
	X	Y
0	87	84
15	112	123
30	139	170
45	116	188
60	100	208
90	95	202
120	92	144
150	88	123

- (a) On the grid provided, plot graphs of glucose level in blood against time on the same axes. 7mks

(b) What was the concentration of glucose in the blood of X and Y at the 20th minute. (2mks)

(c) Suggest why the glucose level in person X stopped rising after 30 minutes while it continued rising in person Y (2mks)

(d) Account for the decrease in glucose level in person X after 30 minutes and person Y after 60 minutes. (3mks)

X

Y

(e) Name the compound that stores energy released during oxidation of glucose.

(f) Explain what happens to excess amino acids in the body (5mks)

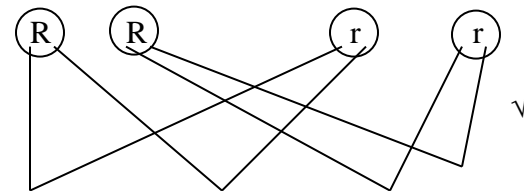
231/2
BIOLOGY
PAPER 2
(THEORY)
JULY/AUGUST 2011

MAKINDU DISTRICT INTER-SECONDARY SCHOOLS EXAMINATION
Kenya Certificate of Secondary Education
BIOLOGY
PAPER 2
THEORY
MARKING SCHEME

1. (a) This is the oxygen required to get rid of lactic acid which accumulates in the body tissue of animals after anaerobic respiration/a strenuous activity/vigorous activity (1mk)
- (b) Ratio which shows the relationship between the amount of carbon (iv) oxide released and oxygen consumed over a given period of time during respiration. (1mk)
- (i) $RQ = \frac{\text{Vol of CO}_2 \text{ produced}}{\text{Vol of O}_2}$
 $= \frac{57}{80}$
 $= 0.71$
- (ii) Fat / lipids ✓
- (iii) – Fats require higher amount of O₂ for oxidation than carbohydrates
 - Fats are not completely oxidized
 - Fats are not easily soluble in H₂O hence are not easily transported to respiratory sites (2mks)
- (d) Mitochondria (1mk)

2. (a) Parental phenotype ♂ Rh+ ♀ Rh- ✓

Parental genotype R R r r ✓

Gametes  ✓

Fusion

F1 generation Rr Rr Rr Rr ✓ (4mks)

(b) 1 or 100% (1mk)

This paper consists of 5 printed pages

Turn Over

- (c) In the first pregnancy the baby was born $\sqrt{\text{Rhesus +ve}}$ hence Rhesus antigen crossed through the placenta to the mothers blood stream prompting the mothers immune system to produce Rhesus antibodies. In the second pregnancy the Rhesus antibodies get into foetal circulation, an antigen antibody reaction $\sqrt{\text{occurs}}$ in the foetal circulation system leading to destruction of the foetal Red blood cells/Red blood cells are haemolysed leading to death, causing haemolytic disease of the new born. $\sqrt{\text{}}$
3. (a) – Show different groups of organisms with similar embryonic origin were able to arise at different times
 - Give almost exact evidence of the type of organisms that existed. (2mks)
- (b) (i) – More use of a particular organ by an organism, the organ developed more, and enlarged in size
 - Less/lack of use of a particular organ by an organism, the organ decreased in size and become vestigial/rudimentary.
- (ii) Acquired characteristics do not affect the genotype of an individual/organism hence can not be inherited
- (c) (i) These are structures that ceased to be functional and as a result have decreased in their size over along period of time
- (ii) – Coccyx
 - Appendix
 - Nictating membrane in eye
 Rej tail max 1 1mk
- (d) A process in which structures that have common embryonic origin get modified to perform different functions. 1mk
4. (i) Primary consumers. 1mk
 (ii) Primary consumers/secondary consumers any one 1mk
- (b) Green plants \longrightarrow caterpillars \longrightarrow small insect \longrightarrow lizards
 Decaying leaves \longrightarrow caterpillars \longrightarrow small insect \longrightarrow lizards 2mks
- (c) (i) Hawks 1mk
 (ii) At each trophic level energy is lost as heat/in respirations; or lost in feaces/defecation/waste products of metabolism/excretion; some parts of the organism are not eaten; 3mks
5. (a) H – Cell division/mitosis/growth.
 I – Translocation/transport of products of photosynthesis
 L – Cell elongation/expansion 2mks
- (b) (i) G – Protect the delicate apical meristem from mechanical / injury / damage
 K – Absorption of water and mineral salts 2mks
 (ii) J (Xylem) – Conducts water containing dye

(c)Thin walled/one cell thick for easy diffusion of water and mineral salts; numerous to provide large S.A for absorption; are elongated to make close contact with soil for easy absorption/provide large surface for absorption; have large cell vacuole containing sap to exert high osmotic pressure for absorption. Max 2 2mks

6. (a) A GRAPH OF GLUCOSE LEVEL AGAINST CONCENTRATION

Glucose level (mg/100cm³) Time (minutes) x – axis 1cm reps 7.5 minutes y – axis 1cm reps

10mg/100cm³ 0 15 30 45 60 75 90 105 120 136 150

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210

X Y P C L P C L

(b) $X - 14 \pm 2$
 $Y - 140 \pm 2$ (2mks)

(c) Person X is capable of regulating glucose, while person Y is likely to be diabetic, acc.
Insulin is not produced. Rej. Insufficient amount of insulin. (2mk)

(d) X Insulin released (by islets of langerhans in pancreas; excess glucose is converted to glycogen (in liver);
Y – Insulin is not released; thus the decline is due to glucose being released in the urine (3mks)

(e) Adenosine triphosphate/ATP rej AU 1mk

(f) Deaminated; resulting in the formation of ammonia; Ammonia combines with carbon dioxide to form urea (and water); urea is passed out through urine; carbohydrate group is oxidised; 5mks

7. (a) Wind; windy conditions. Transpiration rate increases; wind disperses fruits/seeds/spores wind an agent of pollination;
(b) Temperature; changes in temperature affect rate of photosynthesis/other Biochemical reaction/metabolic/enzymatic reactions;
- Increase in temperature increases transpiration acc. Converse
(c) Light, green plants need light for photosynthesis; some plants need it for flowering. Some seeds (like lettuce) require it for germination.
(d) Humidity – when humidity is low transpiration rate increases; (acc the converse)
(e) PH – Each plant requires specific PH to grow well (acidic or Alkalinity or neutral)
(f) Salinity; - plants with salt tolerant tissues (e.g. mangrove) grow in saline areas; plants in estuaries adjust to salt fluctuations;
(g) Topography; North facing slopes in temperate lands have more plants than south facing slopes (acc converse) wind ward side plants have stunted and distorted growth, lee ward side plants are stunted/windward normal growth.
(h) Rainfall/water – fewer plants in dry areas/where rainfall is less (acc converse)
- Water for germination; H₂O for dispersal of seeds
- Raw material for photosynthesis water as a solvent for minerals provides turgidity; a medium of transport of plant nutrient (in plant tissues)
Pressure – Atmospheric pressure variations affects
Availability of CO₂ that affects photosynthesis
Availability of O₂ for respiration
Low pressure increases rate of transpiration
Mineral salts; plants thrive/grow well in soils with mineral salts
Plants living in soils with deficiency of particular elements have special methods of obtaining it.
Acc. Legumes obtain nitrogen by nitrogen fixation/carnivorous plants/insectivorous plants/corniferous trees obtain their nutrients from mycorrhizal association)

8. (a) Continuous Discontinuous
- Controlled by many genes - Controlled by one or two major genes
- Exhibits wide range of differences for the some - No intermediate forms
Characteristics/intermediate forms occur. 2mks

(b) Mutations – Changes in genes/chromosomes leading to a change in the offspring

Fertilization – parental genes combine differently hence passing different traits from the parents to the offspring

Crossing over – chromatids of homologous chromosomes break and rejoin at chiasma this leads to genetic material crossing from one inner chromatid to the other

Independent – assortment of genes – during metaphase of first meiotic division homologous chromosomes come together in pairs and subsequently segregate into daughter cells independently of each other. It also brings about a wide range of different gamete combinations leading to a wide range of variation among individuals of the same species.

(c) Deletion – Loss of a part/portion of a chromosome, some sections of chromosome missing

Duplication – some sections of the chromosome replicate and an extra length

Inversion – A portion of a chromosome breaks then rejoins in inverted position

Translocation – some of a chromatid breaks off and attaches to another chromatid of a non-homologous chromosome

Non-disjunction – some section/which chromosome missing

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

MAKINDU DISTRICT INTER-SECONDARY SCHOOLS EXAMINATION
PRE - Kenya Certificate of Secondary Education
BIOLOGY
PAPER 3
PRACTICAL
1 ¾ HOURS

INSTRUCTIONS TO CANDIDATES

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

Candidates may be penalized for recording irrelevant information and for incorrect spelling especially of technical terms.

For Examiners use only

QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
1	13	
2	14	
3	13	
Total score	40	

This paper consists of 5 printed pages

Turn Over

1. E A B D C

(a) (i) Identify the type of cell (1mk)

(ii) State two reasons for your answer in (a) above. (2mks)

(b) (i) Name the parts labelled B and D (3mks)

B _____

D _____

E _____

(ii) State the function of the parts labelled A and C (2mks)

A _____

C _____

(c) State one difference between the above drawing and a similar one observed under the light microscope. (1mk)

Electron microscope

Light microscope

- (d) A student observed seven cells along the diameter of the field of view under the light microscope. The diameter of the field of view was 5.6mm. Calculate the diameter of one cell in micrometer 4mk

2. Using the cork borer provided bore out three long pieces of potato tissues. Measure out and cut three 5cm cylindrical pieces.
 Take the pieces of potato tissue and place each into a separate test – tube you have labelled D, E and F respectively.
 Fill test-tube D with solution labelled L1
 Fill test-tube E with solution labelled L2
 Leave test-tube F blank i.e. ad no liquid to it
 Allow the experiment to stand for 30 minutes

(i) After 30 minutes, remove one piece of tissue at a time, dry it with blotting paper and measure its length. Record your measurements in the table below.

Solution into which tissue was placed	Measurement before putting in solution	Measurements after adding solution
L 1	5cm	
L 2	5cm	
Zero (0)	5cm	

(3mks)

(ii) Account for the observation made in the measurements of each tissue after 30 minutes in test tubes labelled D, E and F above.

D (1mk)

E (1mk)

F

(1mk)

(b) Crush the rest of the potato into paste using a pestle and mortar and add 20 ml water to make a suspension and stir. Carry out food tests on the suspension using the reagents provided. Fill your answers in the table below. (8mks)

Food substance	Procedure	Observation	Conclusion / Deductions

14mks

3. You are provided with specimens labelled J and K
(a) (i) Make a transverse section of specimen J. draw and label the section. (4mks)

(ii) State the magnification of your drawing. (1mk)

(b) (i) Make a transverse section of specimen K. Draw and label the section. (3mks)

(ii) What type of fruit is specimen K (1mk)

(iii) Name the type of placentation in specimen K (1mk)

(c) (i) Name the agent of dispersal of specimen K. (1mk)

(ii) How is specimen K adapted for dispersal by the agent named in (c) (i) above (2mks)

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BIOLOGY
PAPER 3
(PRACTICAL)
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BIOLOGY
PAPER 3
PRACTICAL
MARKING SCHEME

1. (a) (i) Plant cell
(ii) Large and centrally placed vacuole
- Presence of cell wall
- Presence of chloroplast
- Nucleus/cytoplasm is located towards the periphery.
Max 2 2mks
- (b) (i) B – Cell membrane/plasma membrane
D – Nucleus
E – Tonoplast 3mks
- (ii) A – site for respiration
C – Protein transport 2mks
- (c) Electron light
- More details are observed/
more organelles are seen - Less details are seen/few organelles are seen 1mk
- (d) 1mm - 1000µm
5.6mm - ?

$$\frac{5.6\text{mm} \times 1000\mu\text{m}}{1\text{mm}} = 5600\mu\text{m}$$
Diameter of one cell = $\frac{\text{diameter of field of view in micrometer}}{\text{No of cells in the field of view}}$

$$\frac{5600\mu\text{m}}{7} = 800\mu\text{m}$$
 4mks
2. (a) (i) Tissue in L1 should be shorter than 5cm.
Tissue in L2 should be longer than 5cm
Tissue in test tube F (blank) should be 5cm long 3mks

This paper consists of 3 printed pages

Turn over

(ii) L1 – L1 is hypertonic to the cellsap of potato tissue and therefore water moves out of the cells into L1 by osmosis. The cells become plasmolysed and flaccid and thus leads to shrinking and decreases in length of the potato tissue.

L2 – L2 is hypotonic to the cell sap of the potato tissue cells. The cells therefore gained water by osmosis and became turgid leading to increase in length of the tissue;

Zero (0) solution in F – there was no net change in length of potato in test tube F because there was no net osmosis taking place between it and the surrounding medium (air); i.e. it acted as a control experiment. 3mks

Food substance	Procedure	Observation	Conclusion
Starch	Add a little of iodine solution to the suspension	Blue black colour seen	Starch seen
Reducing sugars	Add a little benedicts solution to the suspension and shake, heat to boil;	Colour changes from blue to green to yellow to orange	Reducing sugars present;
Non-reducing sugars	Add little dilute hydrochloric acid and shake. Heat to boil. cool Add dilute sodium hydrogen carbonate solution until fizzing stops. Add a little benedicts solution heat	Colour changed from blue to green	Little/amount traces of non-reducing sugar present.

3. (a) (i) Epicarp endocarp Placenta Mesocarp Ovules/seeds/sterile seeds.

Max 4

Diag 1

Label any 3

Penalize if wrongly labelled

(ii) Mg x1 or x2

(b) (i) Endocarp Oil gland Epicarp/Exocarp Seed Mesocarp Placenta
Diag 1mark
Label any 2
Penalize if wrongly labelled

(ii) Berry✓
(iii) Axile/central✓

(c) (i) Animals; ✓
(ii) - Brightly coloured to attract animals- scented to attract animals
- It is succulent/juicy to attract animals
Slimy/hard seed coat to prevent seeds from being digested.