

**KAKAMEGA CENTRAL SUB-COUNTY JOINT EVALUATION EXAMS**  
**BIOLOGY 231/1**  
**MARKING SCHEME**

1. Diffusion is the movement of substances/molecules/particles from a region of high concentration to a region of low concentration until equilibrium is reached;  
Osmosis is the movement of water molecules from a region of dilute solution/hypotonic to more concentration/hypertonic solution across a semi — permeable membrane,
2. Light energy is absorbed by chlorophyll; The light energy splits water molecules/photolysis to form hydrogen ions/atoms and oxygen gas; Light converted to ATP;
3. The root hair is long/narrow to increase the surface area for absorption of water/mineral salt;  
Has many mitochondria (in cytoplasm) to supply energy for active transport of mineral salts;  
Thin walled to speed up the rate of absorption of water/mineral salts;
4. a) i) Maintenance of a constant internal environment;  
ii) Mechanism which regulates the osmotic pressure( of internal environment of an organism.  
Regulates salt water balance,  
(b) Insulin;  
Glucagon
5. a) Alternative form of genes;  
b) i) Some bases/nucleotides of a gene are removed;  
ii) The order of some bases/nucleotides of a gene are reversed;
6. a) Intervertebral disc  
b) Acts as shock absorber/cushions; Reduces friction; flexibility of vertebral column;
7. Tuft of hairs sprouting from pinna/baldness;  
Colour blindness/haemophilia;
8. Increased yields/hybrid vigour  
Resistance to pests;  
Resistance to drought;  
Early maturity;  
Resistance to diseases.
9. Interbred to produce fertile/viable offspring,0
10. They utilize energy from the sun/manufacture their own food And for subsequent trophic levels/for other organisms  
Rej. Produce food for themselves. /
11. a) Water/moisture  
Temperature/warmth.c  
b) Mobilize/activate enzymes/hydrolyse stored food/breaking of dormancy;  
Soften the testa;  
Acts as a solvent/transport medium;
12. i) Hydrogen carbonates/bicarbonates/sodium bicarbonates;  
ii) Haemoglobin /
13. Increased light intensity;  
Low relative humidity;  
High temperature;  
Source of variation;
14. Give rise to gametes;  
Source of variation;
15. a) Mixing of genetic material leading to hybrid vigour  
Resistance to diseases/increased chances of survival;

- New strains appear, /  
 b) Male part maturing at different time from female/protandry/protogyny;  
 Male and female parts on different plants/dioecious;  
 Heterostyly, Self sterility.0 /

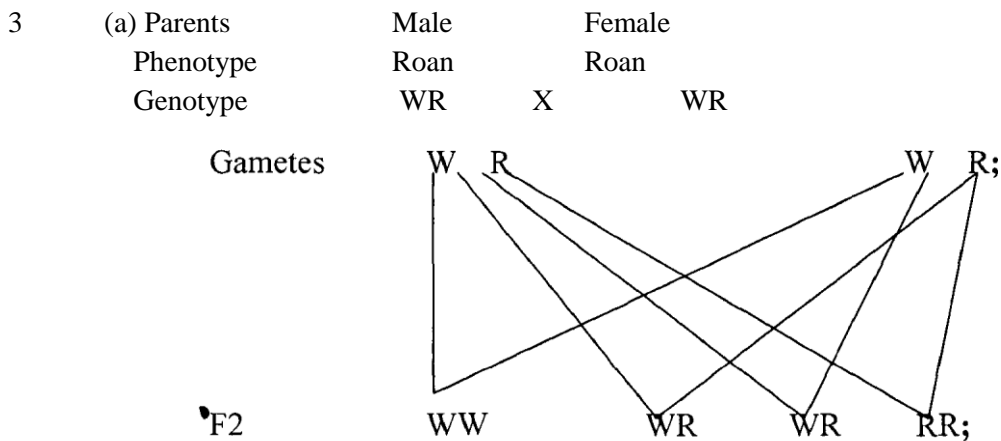
16.

TROPHIC LEVEL	ORGANISM
Producer(s)	Phytoplankton, Water weed
Primary producer(s)	Fish, Mosquito larvae, Water snail, Protozoa
Secondary producer(s)	Kingfisher

17. Active transport;
18. Glucose + Oxygen — Water + Carbon (IV) oxide + Energy;
19. a) Deamination  
 b) To break down excess amino acids and convert ammonia to urea for it to be eliminated.
20. i) Glycogens;  
 ii) Starch ;  
 iii) Cellulose;
21. a) Contains nerves and blood vessels for sensitivity and supply of nutrients;  
 b) Protects the nerves and blood vessels.)
22. a) Lack of water;  
 Low temperatures  
 b) Epigeal is a type of germination where cotyledons are thrust above soil level while hypogeal cotyledons remains below soil level.
23. a) Sebum;  
 b) Cooling the skin,  
 Contains antiseptics which protects the skin from attack by bacteria;
24. a) Homodont; Having similar shaped sizes of teeth while Heterodont; Having different shapes, sizes of teeth;  
 (b) Haemolysis is the bursting of a red blood cells when put in a hypotonic solution while Plasmolysis is the shrinking of cytoplasm when a plant cell is put in a hypertonic solution;
25. Offspring can inherit undesirable characteristics from parents;  
 Sexual reproduction takes long time;  
 Fewer offsprings are produced;  
 It involves two different sexes;
26. a) Arteriosclerosis.; Varicose veins, thrombosis  
 b) Defence against diseases;  
 Regulation of body temperature;  
 Regulation of blood pH;
27. a) Sporangium;  
 b) Anchorage;  
 Absorption of nutrients;
28. a) Continents existed as one large land mass/Pangea/Laurasia and Gondwana land;  
 Present continents drifted from it leading to isolation of organisms;  
 Organisms in each continent evolved along different line hence new species;  
 b) Emergence of new life/species/organisms from pre — existing simple forms gradually over a long period of time to present complex forms;
29. Allows for smooth movement of food and lubrication of food;  
 Protects the walls of the stomach from being digested;

**KAKAMEGA CENTRAL SUB-COUNTY JOINT EVALUATION EXAMS**  
**BIOLOGY 231/2**  
**MARKING SCHEME**

- 1 (a) K- Pleural membranes;  
 L- Alveolus;  
 M- Intercostal muscles;  
 (b) - Has c- shaped cartilage rings that support it preventing it from collapsing and allow free flow of air;  
 - Inner lining has secreting cells that trap fine dust particles and micro- organisms;  
 - Inner lining has hair like structures called cilia that enhance upward movement of the mucus to the larynx;  
 (c) Diffusion;  
 (d) Mycobacterium tuberculosis;
- 2 (a) (i) Hypogeal;  
 Reason —  
 (ii) - Photosynthesis; OWTTE  
 - Gaseous exchange; accept. Transpiration.  
 (iii) - Epigeal;  
 (b) (i) - Intermittent growth;  
 (ii) - Moulting /ecdysis;  
 (iii) — Ecdysone; rej. Moulting hormones



Rej: Other letters

(b) Genotypic

Ratio	WW	:	WR	:	RR
	1		2		1;

Phenotypic

Ratio	White	:	Roan	:	Red
	1		1		1;

(2mks)

(c) Partial dominance/in complete dominance;

(1mk)

(d) Determine unknown genotypes;

(1mk)

4. (a) Photosynthesis;  
 (b) Light (energy); Chlorophyll;  
 (c) Oxygen — used in respiration, oxidation;  
 Released into the atmosphere;

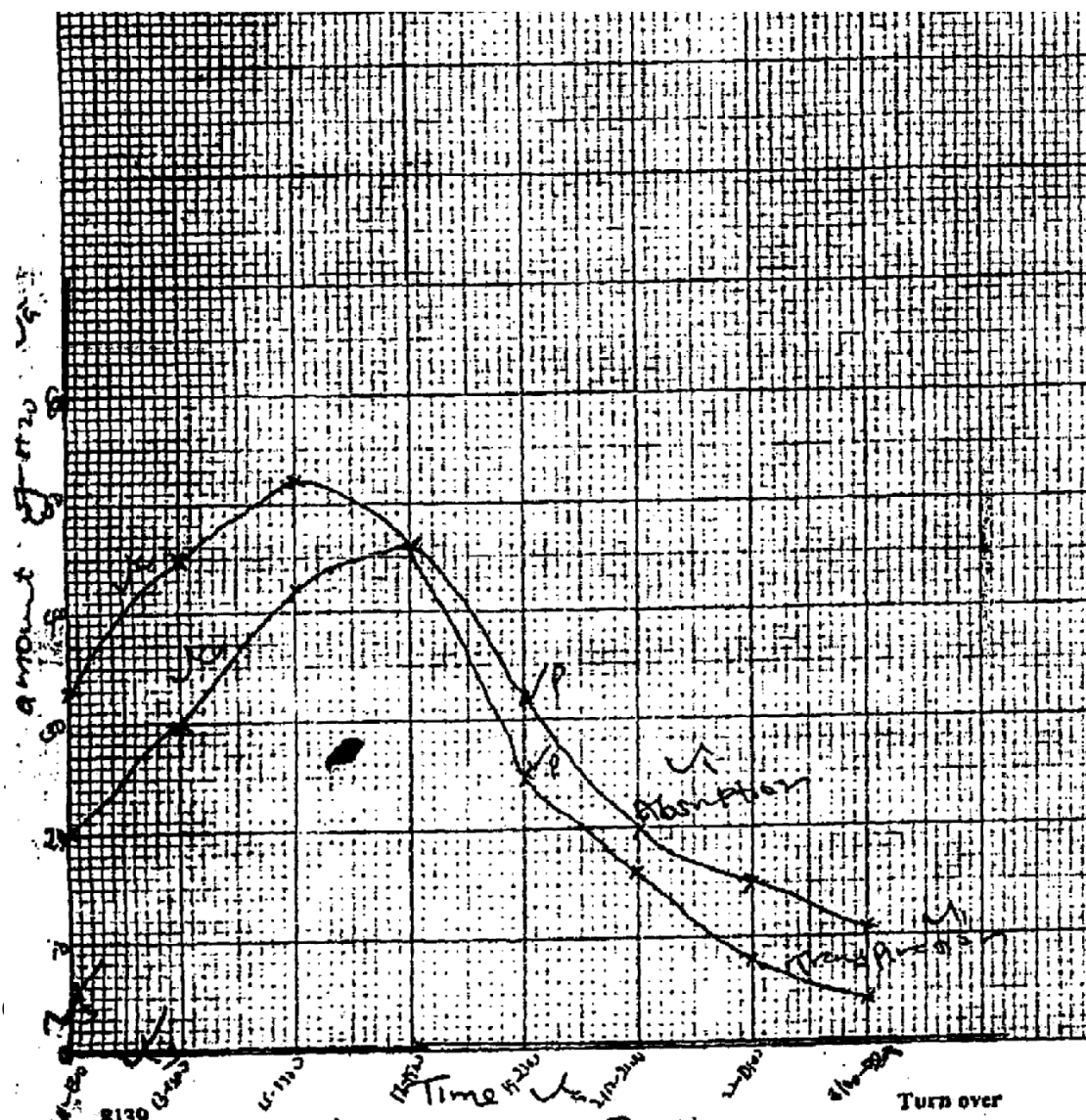
Glucose — used in respiration;

Converted to sucrose or starch for storage;

Used in formation of sturdiness cellulose cell wall/ cytoplasm;

5. (a) L<sub>1</sub> - Inner cells gained water by Osmosis; hence increased in length; epidermal cells did not gain water because they are covered by a water proof cuticle leading to curvature;  
L<sub>2</sub> - Inner cells lost water by osmosis; leading to (flaccidity) decrease in length; epidermal cells did not lose water due to waterproof leading to curvature;  
(b)  
Support in (herbaceous) plants;  
Absorption of water;  
Opening and closing of stomata  
Movement of water from cell to cell  
Leading in infectious plaits  
Folding of leaves in the Mimosa
6. (a) Graph(turn next page)  
(b) 17.001- 19.99 hrs;  
(c) (i) Transpiration  
1100 — 17000 rapid increase in the rate of transpiration; due to high light intensity/ high temperature;  
17000 — 0300 hrs decrease (in the rate of transpiration); due to low light intensity/ absence of light in temperature;  
(iii) Absorption  
11 .00 — 1900 hrs increase (in the rate of absorption of water); to replace water lost- through transpiration;  
1900 — 0300 hrs decrease (in the rate of absorption of water); due to the fact that rate of transpiration has declined;

(d) Both transpiration and absorption decrease;



1.scheme

(e) Wind; light; atmosphere pressure; humidity; temperature; (Any 1st 2)

(f) Temperature - at high temperature the rate is higher/at low temperature the rate is Low; Wind- rate of transpiration is high when it's windy/lower when air still;

Humidity — when humidity is low, the rate of transpiration is faster/ when its high the rate of transportation is low;

Pressure- the rate is high at low atmosphere pressure at high atmosphere pressure the rate is low;

7.

a) - Light intensity;

- Light duration;

- Light wavelength/quality;

b) – Wide/ broad/ flat lamina; to provide large surface area for absorption of carbon dioxide and light for photosynthesis;

- Thin to ensure a short distance; for carbon dioxide to reach photosynthesis cells(factor diffusion of gases);

- Thin transparent upper epidermis; to allow easier penetration of Light to photosynthetic cells;

- Presence of stomata! guard cells; for efficient/ faster/ rapid diffusion of carbon dioxide into the leaf! oxygen out/ gaseous exchange;

- Palisade cells contain many chloroplast; which are next to upper epidermis to receive maximum light for photosynthesis;

- Chloroplasts have chlorophyll; to trap light;

- Leaves have leaf veins; xylem to conduct water to photosynthetic cells; phloem to translocate products of photosynthesis to other parts of plant;

- Large! intercellular air spaces in the spongy mesophy/ layer; for storage of carbon dioxide and for easier gaseous exchange;

- Waxy water proof cuticle; to reduce water loss and reflect excess light;

- Leaf mosaic/ non- overlapping leaves; for maximum exposure to light;

8. a) pollen grains stick in the stigma surfaces; that surface of stigma produces a chemical substance; which stimulates the pollen grain to produce a pollen tube / germinate; The pollen tube/ germinate. The pollen tube grows down (into the tissues of style); from where it derives nutrients; the generative nucleus divides; to give rise to two male nuclei; The pollen tubes disintegrates; and male nucleus fuses with the egg cell; and forms the zygote; The other male nucleus fuses with the two polar nuclei; to form a triploid nucleus; The process involves double fertilization; (Max 1 6mks)

b) integument change into seed coat / testa; Zygote into embryo;

Ovary wall into fruit;

Ovule into seed;

Triploid nucleus into endosperm

Style dried up / fall off leaving a scar / corolla dries up (falls off) stamens dry up;

**KHWISERO SUB-COUNTY PRE-M-CATS 2015**  
**BIOLOGY 231/3**

**MARKING SCHEME**

- Q1. (a) Starch test to 1cm<sup>3</sup> of solution Q, add 3 drops of iodine solution ;solution turned to blue black; starch present
- (b) Reducing Sugar; To 2cm<sup>3</sup> of Q, add equal amount test/Bendicts of Benedicts solution and heat to boiling ; colour changes from blue to green to yellow and finally orange; reducing sugar present;
- (c) Biuret test/Profen test; to 1cm<sup>3</sup> of Q add equal amount of NaOH; the add 1 % CuSO<sub>4</sub> solution dropwise; Colour changes to purple violet  
Protein are present (9mks)

Correct procedure: absent; conclusions

X 3 = 9mks

- (d) To 1cm<sup>3</sup> DCPIP in test tube, add solutionQ and dropwise if it is decolourise vitamins will be present;
- (c) Starch (amylase) – Pancreatic amylase  
Proteins - trypsin

Q 2 (a) Dicotyledonae; ( correct spelling only)

(b)network leaf venation;

Broad leaf;

(c) It is green; simple, Broad network venation; serrated margin pointed apex.

(d) Insect

(i) Brightly coloured bracts/sepals/ petals

(ii) Sticky pollen grains

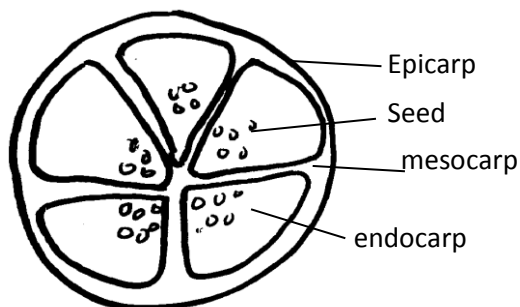
(iii) Reproductive organ eclosed in by the sepal ass petals so that they can be reacted by visiting insect pollinators

(iv) Scented

(e) male parts

- Anthers are below the stigma  
Are 7/8 in number
- Pollen grains are yellow
- Pollen grains are sticky

f)



Q 3. A Alimentary system/Digestive system;

B. gaseous exchange system; Rej alveoli

(ii) A: smooth muscles

C: Skeletal muscles

(iii) On the bones

(v) They have thin epithelial lining to enhance gaseous they are numerous to increase S.A for exchange of gases.

(3) Highly vascularised to enhance transportation of gases.

(4) Moist for dissolution of gases hence increasing rate of gaseous exchange

(v) To make up their /have thin walls to enhance short distance for gaseous exchange;

To make them to increase surface for diffusion of gases;