

**MACHAKOS COUNTY KCSE TRIAL & PRACTICE EXAMINATION****2015***Kenya Certificate of Secondary Education***BIOLOGY**

Paper 1

**Time: 2 Hours****MARKING SCHEME**

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1. (a) Ans. The study of cells in living organism;  
(b) Ans. The study of insects.
  2. Ans. The genetic material is not surrounded by a nuclear membrane/genetic material lacks a membrane/  
not membrane bound/they are prokaryotic;  
- Organelles are not enclosed by membrane;  
- Lack most organelles e.g. mitochondria Rej. If no example/have few organelles;  
Mark first two.
  3. Ans. A stiff competition for available resources sets in, resulting in the elimination of one species;
  4. Ans. The adult and larvae occupy different niches/exploit different food hence do not compete for  
resources;
  5. (a) Ans. Hypotonic solution;  
(b) Ans. Turgor pressure; the cell gained water through the process of osmosis and becomes turgid; Rej:  
Absorbed for gained;
  6. (a) Ans. Golgi apparatus/body;  
(b) Ans. Chloroplast; Rej. Plural
  7. (a) Ans. Latin language is fairly static/it does not change with time or locality like most other languages;  
(b) Ans. Generic name of wolf; Rej. Genus name  
(c) Ans. Lion and leopard, they belong to the same genus Panthera;
  8. (a) Ans. Photolysis;  
(b) Ans. Grana of chloroplast; Rej. Chloroplast  
(c) Ans. Sunlight; chlorophyll;
  9. (a) Ans. – It ensures sufficient supply of nutrients and oxygen to the cells;  
- It ensures exchange and removal of waste products of metabolism from the body cells to excretory  
organs;  
- It ensures that blood flows out of the heart to all parts of the body;  
(b) Ans. The rhythmic contractions of the heart arises from within special cardiac muscles/the heart  
muscles are myogenic;
  10. Ans. After four months of pregnancy, the ovary stops secreting the hormone progesterone and the  
placenta takes over production of the hormone; progesterone maintains pregnancy;

11. (a) Ans. Anaphase I;

(b) Ans. Homologous chromosomes separate at the equator/homologous chromosomes start migrating to the opposite poles; sister chromatids attached at the centromeres;

(c) Ans. It is the reduction phase that results in haploid sex cells/gamete cells;

12. (a) Ans. *Salmonella typhi*;

(b) Ans. *Treponema palladium*;

13. (a) Ans. To show that oxygen is necessary for germination;

(b) Ans. No germination in A; germination occurs in B;

(c) Ans. Pyrogallic acid absorbed all the oxygen necessary for respiration/lacked energy for growth;

14. (a) Ans. Tracheole; Rej. Tracheoles

(b) Ans. It is moist to dissolve gases/for diffusion of gases in solution;

- It has thin epithelia to reduce distance for diffusing gases;

- It has numerous fine tubes to increase surface area for gaseous exchange;

Mark first two correct answers.

15. (a) Ans. Ribonucleic acid;

Reason: It has base U/Uracil;

(b) GGCACG;

16. (a) Ans. The energy produced by an animal when it is resting to maintain its life processes;

(b) Ans. The extra oxygen required to breakdown lactic acid that accumulates during exercise when oxygen supply is less than required;

17. (a)  $\text{Na}^+$  ions – Ans. Active transport

$\text{Mg}^{2+}$  ions – Ans. diffusion

(b) Ans. Reduces the rate of active transport due to increased rate of respiration/oxidation of glucose, hence less energy;

18. (a) Ans. P – has more nitrogenous wastes; more water, more mineral salts/ions; more oxygen than R;  
mark first two correct answers

19. (a) Ans. Rods and cones;

(b) Ans. Rods: Perceives light of low intensity; Cons: Perceives light of high intensity;

- Are not sensitive to colour

- Are sensitive to colour;

- Have low visual acuity;

- Have high visual acuity

Mark first one

20. (a) Ans. Transpiration.

(b) Ans. Cut shoot under water/assemble entire set up under water; apply petroleum jelly at the stopper – Glass – shoot connections; to ensure no air enters the leafy shoot xylem/apparatus causing airlock; to ensure apparatus is airtight;

(c) High temperatures increase the transpiration rate, hence the bubble moves faster;

21. Ans. 1mm = 1000 $\mu$ m

$$4\text{mm} = 4 \times 1000\mu\text{m}$$

$$= 4000\mu\text{m};$$

$$\text{Average size of cell} = \frac{4000}{8} \mu\text{m}$$

$$= 500\mu\text{m};$$

22. Ans. They have high turgor pressure that develops in the stem cell/parenchyma cells;

The presence of collenchyma cells thickened with cellulose;

23. (a) Ans. It balances pressure in the middle ear with that of the atmosphere to prevent distortion of the ear drum;

(b) Ans. Maintenance of body balance and posture in relation to gravity;

Rej: If relation to gravity is not mentioned.

24. (a) Ans. Light causes lateral migration of auxin to the dark side; where high concentration of auxin stimulates rapid cell elongation and faster growth hence the shoot bends towards light;

(b) Ans. It enables plant shoots to grow towards light for photosynthesis.

25. (i) Ans. I. Deletion

II. Substitution

(ii) Ans. Albinism/Sickle - cell anemia;

26. Ans. It has stomata for efficient diffusion of gases; It is thin to allow gases to diffuse through short distances; It has air spaces for easy circulation of gases; it has broad and flat lamina to provide large surface area for absorption; Mark 1<sup>st</sup> three

27. Ans. Analogous structures, are those with different embryonic origin but have undergone modification to perform similar functions in different organisms; Examples wings of insects and birds/webbed feet for frogs and ducks;

Homologous structures, Are those with a common embryonic origin but have undergone modifications to perform different functions; example The pentadactyle limb of vertebrates;

28.

a) Ans. Ulna

b) i) Ans. Hinge joint;

ii) Ans. Presence of cartilage at the articulation areas;

- Has synovial fluid;
- Presence of ligaments holding the two bones;
- Movement in one plane only ( 180<sup>0</sup>)

Mark first correct.

29. Ans. Pollen tube is a passage of male nuclei to reach the ovum in the ovary;

30. a) Ans. Because it is destroyed / denatured; by alkaline medium / bile salts in the duodenum;

b) Ans. They act as valves to regulate movement of food;

- they contract and relax to cause churning and push food along the gut / peristalsis;

- they contain secretory cells which secrete mucus and intestinal juice;

Mark first two.

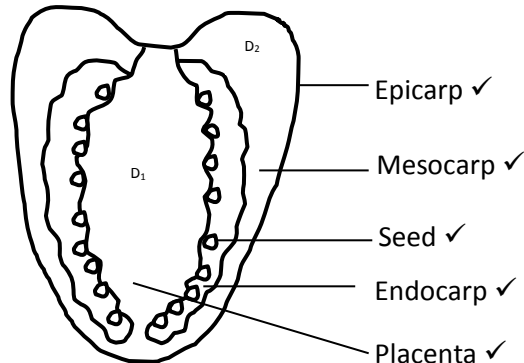
# MACHAKOS COUNTY

231/3

BIOLOGY

MARKING SCHEME

1. (a) (i)



NB

D<sub>1</sub> = Proportionality name

- Features/structures must be of appropriate size.

$$L = \frac{5}{2} = \text{Max 2 Marks}$$

D = 2 Marks

Total 4 Marks

D<sub>2</sub> = Accuracy

- No broken outlines
- No shading
- All structures must be shown

If D<sub>1</sub> is wrong reject D<sub>2</sub>

$$(ii) \frac{\text{Length of Drawing}}{\text{Length of Actual specimen}} = \frac{5\text{cm}}{4\text{cm}} \checkmark \frac{1}{2} = 1.25 \checkmark \frac{1}{2}$$

1 Mark

(b) (i) Berry/Succulent ✓ 1

(ii) – Juicy ✓ 1 endocarp

- Has several seeds ✓ 1 (which develop from fused carpel)

(c) (i) Axile ✓ 1 placentation/Central placentation. Rej. Free central

(ii) Placenta is located at axis ✓ 1 of the fruit.

(d) (i) Animal(s) ✓ 1 Rej. Insects

(ii) – Brightly coloured ✓ 1 to attract animals ✓ 1

- Juicy ✓ 1, to attract animals ✓ 1 which feed on it.

- Seeds are covered with hard testa ✓ 1, to resist being digested ✓ 1 by enzymes in animal's gut.

Mark first 2 (2 x 2 = 4 Marks)

NB. – Earth marks are tied.

- Rej. if description of feature is not linked with function.

2. (i)

Experimental set up	Solution x inside the tubing	Iodine solution outside the tubing
Beginning of the experiment	White/cream ✓ 1 Rej. yellow	Colour of iodine retained/Yellow/Brown. ✓ 1 Rej. Red
End of the experiment	Solution turns Blue black/Black ✓ 1	No colour change/Yellow/Brown ✓ 1

(ii) Starch ✓ 1

(iii) Semi-permeable ✓ 1

(iv) Iodine (molecules) moved into ✓ 1 starch solution/solution X across the tubing through diffusion ✓ 1 turning it blue black.

Starch (molecules) were too large ✓ 1 such that they could not ✓ 1 move across the tubing into iodine solution.

4 Marks

(b) (i) Diffusion/selective diffusion

(ii) – Size of diffusing molecules ✓ 1

- Solubility ✓ 1

- Thickness of the medium/tubing/membrane

- Permeability of medium/tubing/membrane.

Mark first two only 2 Marks

3. (a) Arthropoda ✓ 1

- Segmented body ✓ 1

- Exoskeleton ✓ 1 (made of chitin)

(b) Insecta ✓ 1

- Three body parts/Body divided into head, thorax and abdomen

- Three pairs of limbs/legs

- Pair of antennae

Rej. Compound eyes and wings because they are missing in specimen Q3.

(c)

Q <sub>1</sub> (Bee)	Q <sub>3</sub> (Termite)
- Has pair of wings	- Lacks wings
- Body hairy	- Body not hairy
- Has thick legs	- Has thin legs
- Large in size	- Small in size
- Head with proboscis	- Head with mandibles

- Max 2 Marks

- Mark first two only

(d) (i) - Transport pollen grains

(ii) - Have pollen basket ✓ (on tibia) for storage ✓ of pollen.

- Has pollen brush ✓/hairs (on tarsal) for cleaning ✓ pollen from the body into pollen basket.

Max 2 Marks