

231/1

BIOLOGY

PAPER 1

MAY 2015

2 HOURS

TIGANIA SOUTH PRE-MOCK 2015
Kenya Certificate of Secondary Education
BIOLOGY
Paper 1
TIME: 2 Hours

MARKING SCHEME

1. (a) What is a teat pipette used for in Biology Laboratory Lesson? (1 mrk)

Transfer of reagents in drops during biology tests

- (b) Give the name of a reagent that is used to test substances and at the same time used as a stain in the laboratory. (1mrk)

Iodine solution

2. A name of a certain garden plant is *Duranta Repens*

- i. What is the meaning is of repens? (1mrk)

Specific epithet/ species name

- ii. Identify one mistake shown by the written name. (1 mrk)

The species name has began with a capital letter

- iii. Distinguish between a *genus* and a *Species* as Taxa used during classification of Organism. (2mrks)

A genus is a group of Organisms that can interbreed to produce Infertile Offsprings where as a species is a group of Organisms that interbreed to produce Fertile offsprings

3. A form one student observing Onion epidermal cells under the low power objective counted 5 cells on a field of view measuring 5mm (a) Estimate the size of one cell.

$$\text{cell size} = \frac{\text{Diameter of the field of view in } \mu\text{m}}{\text{Number of cells in the field of view}}$$
$$= \frac{5000\mu\text{m}}{5\text{cells}}$$

$$= 1000 \mu\text{m}$$

- (b) If the eye piece magnification used was $\times 10$ and that of the objective lens was $\times 10$. What was the magnification of the microscope. Show your working. (2 mrks)

Total Magnification = Eye peiece magnification \times Objective lens magnification

$$Mg = \times 10 \times \times 10.$$

$$= \times 100$$

- (c) Estimate by approximation the Number of cells that would be observed if the objective lens magnification was changed to $\times 40$ (1mrk)
less than 5 i.e 4,3,2,or 1

- (d) What is the role of centriole in animal cells? (1mrk)

An organelle responsible for cell division formation of Flagella

4. Explain the following statements:

- i. The action of ptyalin stops at the stomach. (1mrk)
Acidic (The) pH is unsuitable/ Denatured by hydrochloric Acid in the stomach.
- ii. The small intestines contain Villi. (1mrks)
Microscopic (fingerlike) structures responsible for increasing surface area for absorption
- iii. High temperatures stops enzyme action. (5mrks)
high temperature denature (proteinous) Enzymes
- iv. Lack of magnesium leads to yellowing of leaves in plants. (2 mrks)
Magnesium is necessary for the formation of chlorophyll' in plants which is green colour/ lack of it/deficiency leads yellowing in plants
- v. The thyroid glands swell, in some individuals (1 mrk)
Deficiency of Iodine

5. Name one cofactor and one co-enzyme required for a blood clotting process to be normal.

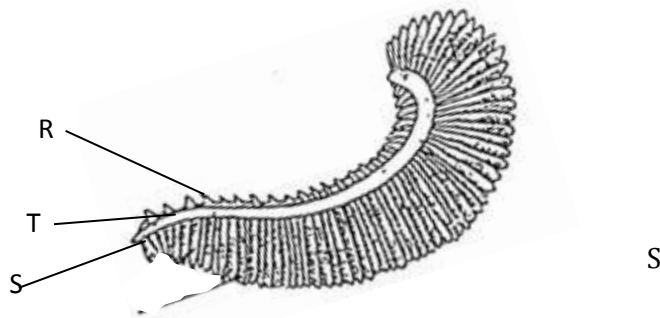
- a) Co-factor - **Calcium/note reject Ca^{++}** (1mrk)
- b) co-enzyme - **vitamin K/ Reject Vitamin** (1mrk)

6. What is counter current Mechanism in a Tilapia fish? (2mrks)
Mechanism where flow of blood is in the opposite direction of water flowing over the gills; to create a steep concentration gradient for gaseous exchange to occur by diffusion;

7. State three adaptations of the Red blood cell to its function. (3 mrks)

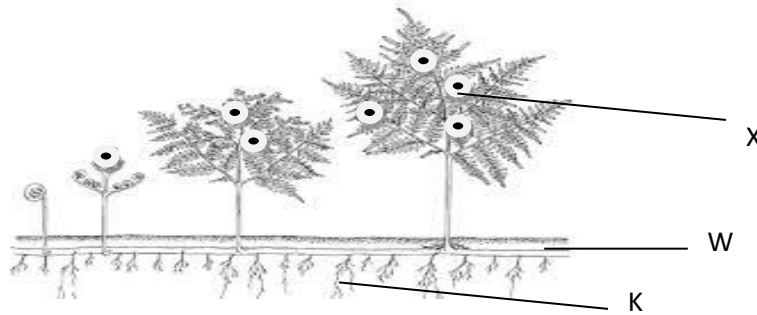
- i. **Bi-concave in shape**
- ii. **Flexible walls**
- iii. **Has haemoglobin**
- iv. **Non- nucleated**

8. The diagram below represents an organ from a finned bony fish. Study it and answer the question that follows



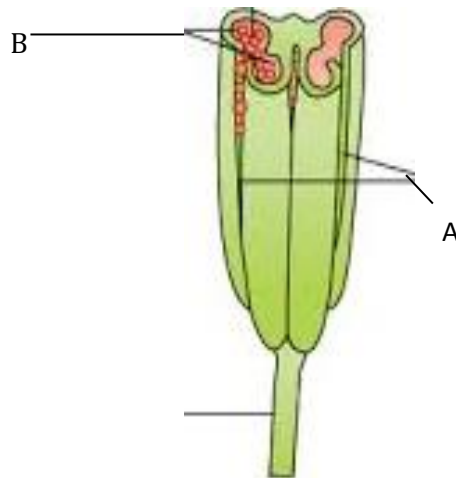
- i. Identify the organ. (1mrk)
Gill/ Reject Gills
- ii. State three adaptations of the part labeled **S** to its functions. (3 mrks)
i. highly vascularised for transportation of gases
ii. thin epithelium to reduce distance travelled by diffusing gases
iii. large surface area for gaseous exchange
9. (a) State the importance of pleural fluid in the lung of a mammal. (2mrks)
i. Lubricates the Lungs and reduces friction during breathing
ii. Moistens the alveolus to dissolve diffusion gases
- (b) What function does the cilia of the trachea play during gaseous exchange in a mammal? (1 mrk)
Waft away/ Removes mucus and foreign particles from the Lungs
- (c) What significance does mucus offer a mammal during gaseous exchange? (1 mrk)
Traps any foreign particles that try to enter the lungs
10. The equation below represents a process that take place in plants and animals
$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$$
- (a) Name the process. (1 mrk)
Respiration
- (b) State two requirements necessary for the process (a) above to process at maximum rate. (2 mrks)
Respiratory Enzymes as catalysts
(suitable) optimum temperature
Optimum pH
- (c) What is the role of Cristae in the process above? (1 mrk)
Provides a large surface area for respiratory enzymes to work
- (d) In which part of the cell does glycolysis and Krebs cycle occur? (2 mrks)
Glycolysis - **cytoplasm**
Krebs cycle - **matrix**
11. State the role of each of the following components of the skin. (2 mrks)
i. Melanin - protects the skin against ultraviolet rays
ii. Sebum
- **Kills bacteria by its antiseptic properties**
- **Keeps the hair and skin soft and supple**

12. Study the diagram below and answer the questions that follows



- i. Name parts. (2mrks)
 - ***W Rhizome***
 - ***K Adventitious root***
 - ii. Name the division of Kingdom plantae the diagram represent. (1 mrk)
Pteridophyta
 - iii. Give the identity of **X** and state its function. (2 mks)
 - Identify of X - ***Sorus/ Rejest sori***
 - Function - ***has reproductive spores***
13. State THREE Biotic factors in an ecosystem. (3 mks)
- i. ***Parasitism***
 - ii. ***Predation***
 - iii. ***Symbiosis***
 - iv. ***Saprophytism***
14. Name two specific bacteria involved in denitrification process in a Nitrogen cycle (2 mrks)
- ***Thiobacillus denitrificans***
 - ***Pseudomonas denitrificans***
15. Define:
- (a) Biosphere (1 mrk)
Space (that) where life is possible on planet in the atmosphere, lithosphere & hydrosphere
 - (b) Ecological Niche (1 mrk)
The position and role of an organism in an habitat

16. The diagram below represents a male reproductive transverse section structure in plant



- i. Name structures (2mrks)
A - ***pollen sacs***
B- ***Pollen grain***
 - ii. Name the type of cell division taking place in structure A (1 mrk)
Meiosis
 - iii. State Two significance of the named type of cell division in (ii) above in Sexual Reproduction. (2mrks)
 - i. ***Formation of gametes/ sex cells***
 - ii. ***Brings about genetic variation amongst the offspring's***
17. State Three applications of Genetic in our day to day life. (3 mrks)
- i. ***Genetic counseling***
 - ii. ***Plant and Animal breeding***
 - iii. ***Genetic Engineering***
18. Give the full Name of the abbreviation. (1 mrk)
DNA- Deoxyribon Nucleic Acid;
19. (a) State the Three theories advanced to support the origin of life. (3 mrks)
- i. ***Creation theory***
 - ii. ***Chemical evolution theory***
 - iii. ***Organic evolution theory***
- (b) Name three types of Fossils
- i. ***Mineralized Fossils***
 - ii. ***Amber***
 - iii. ***Frozen Organisms***
 - iv. ***Moulds***

20. Name a chemical substance required for transmission of impulse in a synapse. (1 mrk)
Acetylcholine
21. State the functions of the following structures in neuron
- i. Node of Ranvier (1 mrk)
Speeds up the propagation of impulse through Action potential
 - ii. Myelin sheath (1 mrk)
Shock absorber
22. Name the chemical substances involved in thickening of the following support tissues in plants
- i. **Collenchyma** (1mrk)
 - ii. **Sclerenchyma** (1mrk)
23. State the Number of the following vertebra in a mammal
- i. Cervical Vertebrae (1mrk)
7/seven
 - ii. Lumbar Vertebrae (1mrk)
12/ twelve
24. State Three functions of Obturator Foramen in the pelvic girdle in a mammal (3mrks)
- i. Passage of Nerves**
 - ii. Passage of Muscles**
 - iii. Passage of Blood Vessels**
25. What is
- (i) Tendon? (1mrk)
(Tissue) A tissue made of collagen that joins a muscle to a bone
 - (ii) Ligament? (1 mrk)
A tissue made of collagen that holds a bone

Tigania South 2015

Biology confidential

Each candidate will require the following:

50ml distilled water labelled Q1.

One ripe tomato labelled specimen J.

2 pieces of sewing machine cotton thread 9 15cm long each)

Benedict's solution

One mature pod from leguminous plant labelled specimen K.

Iodine solution,

One mature (dry) fruit of Bidenspilosa(Black jack)

Labelled specimen L.

10cm long piece of visking tubing (wet) and preferably of 3cm width.

100 ml solution (made of 2% starch and 20% glucose) labelled Q2.

Means of heating /Flame (candle or Bunsen burner)

100ml beaker

A measuring cylinder – upto 10ml

Distilled water.

6 test tubes

Tap water / water in a wash bottle

Test tube rack

Test tube holder

A sharp razor blade / scalped

'Note'

Guide lines for the preparation of solution Q2

To prepare 1 litre of solution Q2, dissolve 20g starch in about 500ml distilled water, dissolve 200g glucose in the solution.

Make up the total volume of the mixture 1 litre by adding distilled water.

TIGANIA SOUTH JOINT EVALUATION TEST 2015
MARKING SCHEME
P3 PREMOCK
BIOLOGY PAPER 3

1.

LIQUID	PROCEDURE	OBSERVATION	CONCLUSION
Q1	Add iodine solution to solution Q1;	No colour changes/iodine colour remained /brown colour is retained;	No starch / starch absent;
	Add equal amount of benedict's Solution to Q1 and then heat.;	No colour change / benedicts solution remained unchanged /Blue colour of benedicts solution remains;	No reducing sugar/reducing sugar absent.;
Q2.	Add iodine solution to Q2;	Black/blue/black/ Blakishblue/bluish/black colour forms;	Starch present;
	Add equal amounts of Benedict's solution to Q2 then heat;	Green → yellow → orange colours observed;	Reducing sugars present;

½ mk each Total

6mks (b)

LIQUID	OBSERVATION	CONCLUSION
Q1	Iodine colour retained /brown colour of iodine retained / No colour change;	No starch/starch absent;
	Green → yellow → orange; (correct sequence)	Reducing sugar present;

½ mk each

Total: 2 mks

(c)i) Diffusion;

(ii) Ileum / small intestine; placenta /lungs/ proximal convoluted tubule;

(d) The visking tubing is semi-permeable and has small pores; reducing sugar molecules are small and hence move from region of high concentration to region of low concentration into visking tubing; starch molecules are large and did not diffuse through the small pores of the visking tube;

2. (a) C -Hypocotyl

Importance —protects the plumule /shoot tip/first foliage leaves /opens path through the soil for the cotyledon to pass/pulls the cotyledon out of the soil.

D Cotyledons/seed leaves

Importance: Photosynthesis

Food storage /food reserves

Provide food for germinating seedlings /young plants.

E Coleoptile/plumule sheath Rej: cover/coat

Importance-protects the delicate tip/first leaves/foliage leaves

(b)

(i) nodules/root nodules

(ii) Rhizobium/Rhizobia/Rhizobium bacteria rej. Bacteria alone.

(iii) Symbiotic relationship in which bacteria gets protection and nutrients while the plant gets nitrogen in form of nitrates fixed by bacteria.

(c) (i) Epigeal

(ii) Cotyledons are brought out of the ground.

(d) Water

Oxygen;

Optimum temperature

3. (i) 4.5 cm, 1 mk

(ii) Magnified size=4.5 cm

$mg = x \ 6$

real size = $\frac{4.5}{6}$;

= 0.75 cm 2 mks

(i) Dentine ; 1 mk

(ii) Has cusps/ ridges; to enable it grind / chew food; (into smaller pieces)

(iii) Blood vessels; ✓ 2 mks

Nerve fibres; ✓ 1 mk