**Name**…………………………………… …………………………..………… Index No:………………………….

**231/1**  Candidate’s Signature …………..……………

**BIOLOGY** Date: …………………………

**PAPER 1**

**THEORY**

**MARCH**

**TIME: 2 HOURS**

**PCEA JITEGEMEA HIGH SCHOOL**

***Kenya Certificate of Secondary Education (K.C.S.E.)***

**231/1**

**Biology**

**Paper 1**

**2 hours**

**INSTRUCTIONS TO CANDIDATES**

1. *Write your name, Index number and school in the spaces provided above.*
2. *Answer All questions in the spaces provided on the question paper.*
3. *Sign and write the date of examination in the spaces provided above.*
4. *Additional pages must NOT be inserted*.
5. ***This paper consists of 7 printed pages.***
6. ***Do not remove any pages from this booklet***
7. ***Candidates should check to ascertain that all pages are printed as indicated and that no questions***

***are missing.***

**FOR EXAMINER’S USE ONLY**

|  |  |  |
| --- | --- | --- |
| **Question** | **Maximum Score** | **Candidate’s Score** |
| **1-29** | **80** |  |

**1.** Name the cell organelles responsible for:

**(i)** Protein synthesis. (1mk)

……………………………………………………………………………………………………….

**(ii)** Destroying worn-out organelles and cells. (1mk)

……………………………………………………………………………………………………….

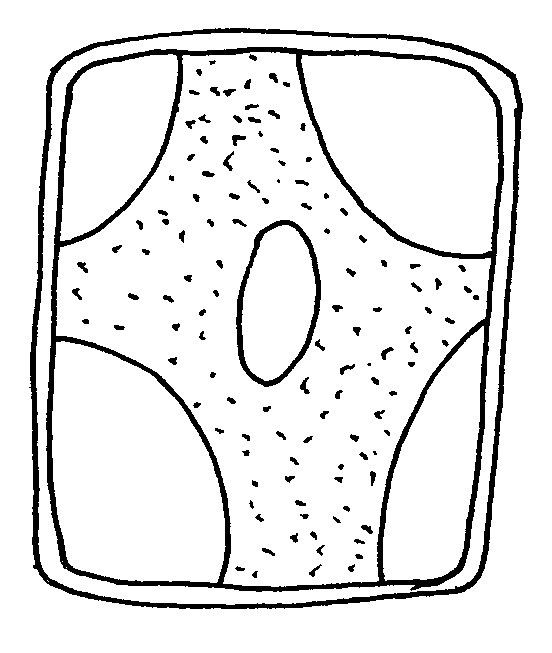
**2.** State the roles of placenta during pregnancy. (3mks)

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……………………………………………………………………………………………………….

**3.** The diagram below shows the appearance of a plant cell after it had been placed in a strong salt

solution.



**2**

**1**

**1**

**1**

**1**

**(a)** Name the process that is observed in the cell. (1mk)

……………………………………………………………………………………………………….

**(b) (i)** Name the substances present in the region marked 2. (1mk)

……………………………………………………………………………………………………….

**(ii)** Explain your answer in (b) above. (2mks)

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**4. (a)** State the phylum where all members have open circulatory system. (1mk)

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**(b)** Explain the advantages of closed circulatory system over open circulatory system. (2mks)

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………………………………………………………………………………………………………….

**5.** When exposed to light maggots move to dark areas. State the advantages of this response to maggots.

(2mks)

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………………………………………………………………………………………………………….

**6.** What is a test cross? (2mks)

………………………………………………………………………………………………….……….

…………………………………………………………………………………………………….…….

**7.** What is the importance of the following excretory products from plants. (3mks)

**(a)** Nicotine

……………………………………………………………………………………………………….

**(b)**Quinine

……………………………………………………………………………………………………….

**(c)** Rubber

……………………………………………………………………………………………………….

**8.** The equation below show respiration of a chemical of life use it to answer the questions that follow.

**2C51H98O6 + 145O2  102CO2 + 98H2O + Energy**

**(a)** Calculate the respiratory quotient. Show your workings. (2mks)

……………………………………………………………………………………………………….

……………………………………………………………………………………………………….

**(b)** Identify the substrate being respired in the above equation. (1mk )

……………………………………………………………………………………………………….

**9.** Give **two** reasons why study of biology is important. (2mks)

……………………………………………………………………………………………………….

……………………………………………………………………………………………………….

**10.** What is the importance of the following parts of a seed.

**(a) (i)** Micropyle. (1mk )

……………………………………………………………………………………………………….

**(ii)** Cotyledons. (1mk)

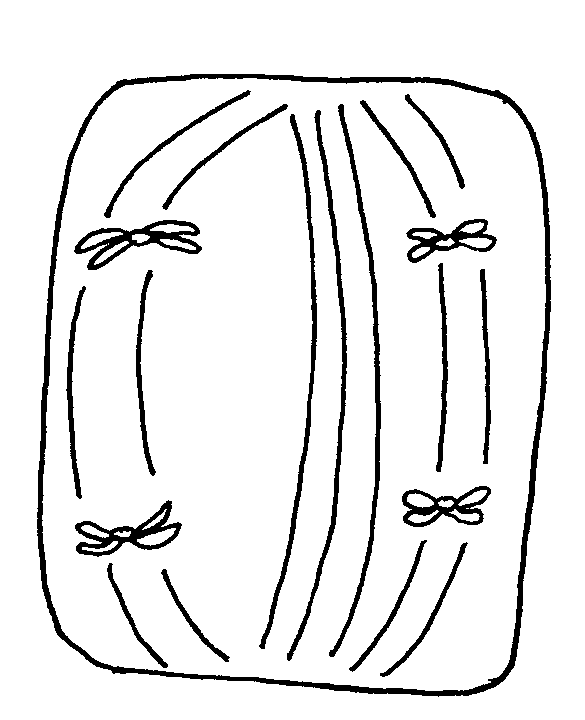
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**(b)** Name **two** factors inside the seed that causes seed dormancy. (2mks)

……………………………………………………………………………………………………….

……………………………………………………………………………………………………….

**11.** Below is a diagram that represents a certain stage of cell division.



**(a)** Name **two** organs in the animal body where this cell division takes place. (2mks)

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……………………………………………………………………………………………………….

**(b)** Name the stage of cell division represented by the diagram. (1mk)

……………………………………………………………………………………………………….

**12.** Differentiate between the following ecological terms

(a) Population (1mk)

(b) Community (1mk)

(c) Niche (1mk)

**13.** State the changes that occur in arterioles in human skin during thermoregulation. (2mks)

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……………………………………………………………………………………………………….

**14.** State **three** factors that contribute to the deceleration phase in the population curve of an

organism. (3mks)

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**15. (a)** What is meant by the term non-disjunction? (1mk)

……………………………………………………………………………………………………….

**(b)** Give an example of a genetic disorder caused by:

**(i)** Non-disjunction (1mk)

……………………………………………………………………………………………………….

**(ii)** Gene mutation (1mk)

……………………………………………………………………………………………………….

**16. (a)** State **two** ideas proposed by Lamark in his theory of evolution. (2mks)

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……………………………………………………………………………………………………….

**(b)** Why is Larmark’s theory not acceptable. (1mk)

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**17. (a)** Name **two** tissues in plants which are thickened with lignin. (2mks)

……………………………………………………………………………………………………….

………………………………………………………………………………………………………

**(b)** How is support attained in herbaceous plants. (1mk)

……………………………………………………………………………………………………….

**18. (a)** State **two** functions of bile juice in the digestions of food. (2mks )

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……………………………………………………………………………………………………….

**(b)** Why does starch digestion stop when the food reaches the stomach? (2mks)

……………………………………………………………………………………………………….

……………………………………………………………………………………………………….

**19.** **(a)** Explain how the following prevent self pollination

**(i)** Protogyny (1mk)

……………………………………………………………………………………………………….

**(ii)** Self-sterility (1mk)

……………………………………………………………………………………………………….

**(b)** Give **two** advantages of cross-pollination. (2mks )

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……………………………………………………………………………………………………….

**20.** State **two** sites used for gaseous exchange in sub-merged aquatic plants (2mks)

……………………………………………………………………………………………………

……………………………………………………………………………………………………

**21.** What causes diabetes insipidus? (1mk )

……………………………………………………………………………………………………….

**22. (a)** Name **two** structures for gaseous exchange in aquatic plants. (2mks )

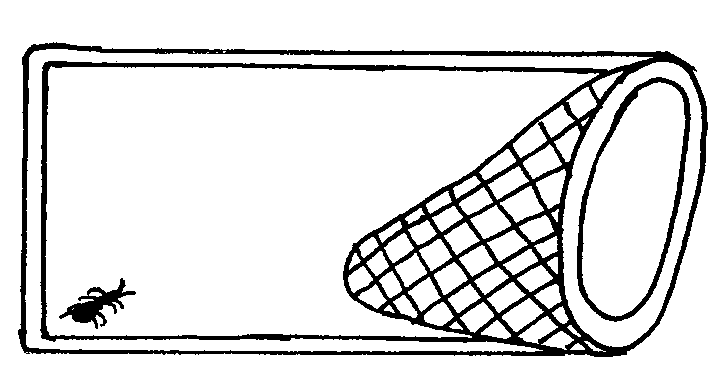
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**(b)** What is the effect of contraction of the diaphragm muscles during breathing in mammals? (3mks)

……………………………………………………………………………………………………….

……………………………………………………………………………………………………….

**23.** Give the name of the apparatus shown below and its use. (2mks)

Name……………………………….…………………………………………………………………….

Use ……………………………………………………………………………………………………….

**24.** Name the tissues in plants responsible for:

**(a)** Transport of carbohydrates. (1mk)

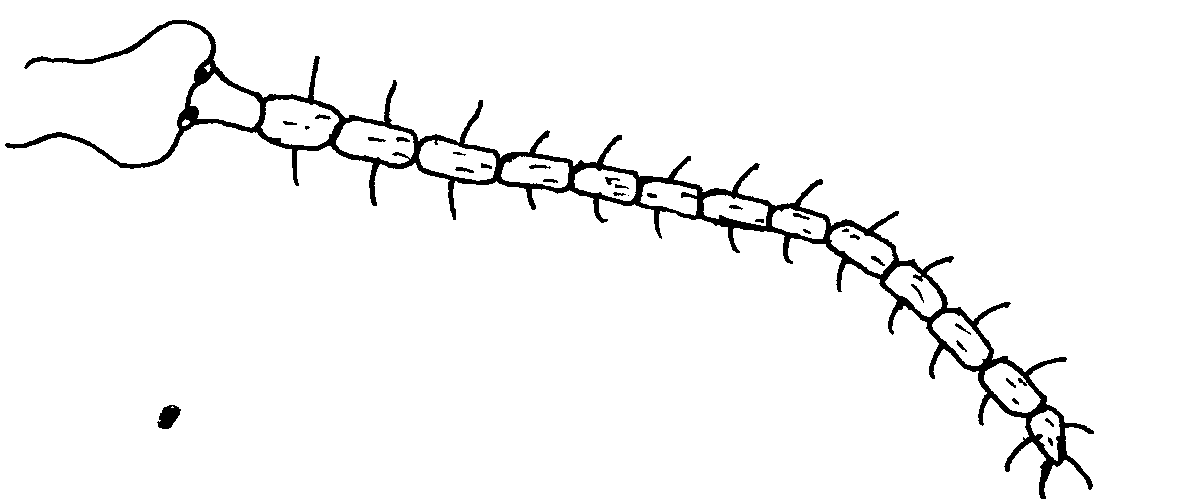
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**(b)** Primary growth. (1mk)

……………………………………………………………………………………………………….

**(c)** Transport of water and mineral salts. (1mk)

……………………………………………………………………………………………………….

**25.** Study the diagram and answer the questions that follow.

**(a)** Identify the class to which the organism belongs. (1mk)

……………………………………………………………………………………………………….

**(b)** Give reasons for your answer in (a) above. (1mk)

……………………………………………………………………………………………………….

**26.** State **two** functions of cell sap. (2mks)

……………………………………………………………………………………………………….

……………………………………………………………………………………………………….

**27.** Distinguish between convergent and divergent evolution. (2mks)

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……………………………………………………………………………………………………….

**28.** Explain how oil as a pollutant may affect aquatic plants and animals? (3mks)

……………………………………………………………………………………………………….

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29. Give **two** forms in which carbon (IV) oxide is transported in tissues of mammals. (2mks)

……………………………………………………………………………………………………….

……………………………………………………………………………………………………….

**JITEGEMEA HIGH SCHOOL**

**BIOLOGY PAPER 1**

**MARKING SCHEME**

1. (i) Ribosomes;

(ii) Lysosomes;

1. Shields foetus from pathogens from the mother;

Holds foetus in position by umblical cord;

Prevents direct connection of blood vessels of mother and foetus;

1. (a) Plasmolysis;

(b) (i) (strong) salt solution;

(ii) Water moved out of the vacuole by osmosis;

1. (a) Arthropoda; Rej. Anthropoda; Arthropods;

(b) - Oxygenated and deoxygenated blood are completely separated/do not mix;

* Animals tend to be more active due to efficient transport of gases and nutrients;
* Blood circulates over longer distances at faster rate due to high blood pressure;
* Blood flow to organs is well regulated based on demand;

1. – avoid descication/drying/dehydration;

* Escaping predators;

1. Cross done to determine an unknown genotype;

By use of recessive parents;

1. (a) Manufacture of insecticides

Used as a mild stimulant in cigarettes

(b) Treatment of malaria

(c) Manufacture of **rubber** tyres/shoes/insulators

1. (a) RQ =



(b) Lipids

1. – Help in solving environmental problems;

* Enables entry into careers;
* Enables one to develop scientific skills;
* Useful in international co-operation;

1. (a) (i) Allows water and air into the embryo;

(ii) Cotyledons – Contain stored food for the growing plumule and radical;

(b) - Very low concentration of hormones and enzymes;

Accept gibberellins hormones

* Presence of chemical inhibitors that inhibit germination/abscisic acid;
* Embryo not yet fully developed;

1. (a) Ovary;

Testes;

(b) Anaphase 1

12. (a) All members of the same species in a given habitat at a given time;

(b) All members belonging to different species interacting in a given habitat;

(c) Is the specific position occupied by an organism in the ecosystem and its role;

1. Increase in body temperature leads to vasodilation of arterioles;

Decrease in **body** temperature leads to vasoconstriction of arterioles;

1. Predation;

Diseases/parasites;

Drought/floods/excess cold;

1. (a) It is where there is addition or loss of one or more whole chromosomes during anaphase of meiosis II

(b) (i) Down’s syndrome;

Klinefelter’s syndrome;

Turner’s syndrome;

(ii) Sickle cell anaemia;

Albinism;

Haemophilia

Colourblindness

1. (a) The law of use and disuse (organisms developed certain features which were required by the environment);

The acquired characteristics were inherited by the offsprings;

(b) Characteristics in organisms are passed on to offspring through genes in gametes;

1. (a) Sclerenchyma;

Xylem;

(b) When parenchyma cells become turgid;

1. (a) – Neutralizes acidic chyme from the stomach;

* Emulsifies fats
* Provides an alkaline medium for enzyme activities;

(b) Salivary amylase acts in alkaline environment; the stomach is acidic hence it is denatured/ it stops working;

1. (a) (i) The stigma matures earlier and is ready to receive pollen grains before the anthers are

- ripe enough to shed the pollen grains;

(ii) The pollen grains are sterile to the stigma of the same plant;

(b) There is mixing of genetic characteristics between different plants;

There is a wide range of variations between offsprings and parents;

|  |  |
| --- | --- |
| The rods | The cones |
| Sensitive to dim light | Sensitive to bright light |

1. Stem; Leaf surface;

-Roots

1. (a) Aerenchyma tissues;

Stomata;

Pneumatophores;

(b) The diaphragm is pulled down causing it to flatten; this increases the volume of the chest cavity and the pressure reduces;

1. Bait trap; used for attracting and trapping small animals;
2. (a) Phloem tissue;

(b) Meristems

(c) Xylem tissue;

1. (a) Chilopoda;

(b) Has one pair of walking legs per segment;

1. Cell cap – offers turgidity of the cell contributing to mechanical support;

* Regulates the osmotic pressure of the cell, of the plant;
* Contains sugar ions and waste products;

1. Convergent evolution – Is where structures with different embryonic origin have evolved to perform similar functions due to exploitation of a common habitat/ecological niche;

**While** Divergent evolution/adaptive radiation is where structures with common embryonic origin and similar basic pattern have been modified in different species to perform different functions;

1. Reduces oxygen supply; (Leading to suffocation).

Oxygen is required for respiration

Clog the respiratory surfaces (gills and stomata); hindering circulation of respiratory gases; leading to death of plants and animals;

1. Bicarbonate ions;

Carbaminohaemoglobin;

Weak carbonic acid