**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)

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

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

**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)

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

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

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

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

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

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

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

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

 (2mks)

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

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

**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)

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

 **(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)

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

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

 **(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)

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

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

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

 organism. (3mks)

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

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

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

**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)

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

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

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

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

**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 )

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

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

 **(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 )

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

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

**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 )

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

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

  **(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)

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

 **(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)

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

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

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

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

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

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

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 = $\frac{CO\_{2 Produced}}{O\_{2 Used/Consumed}}$



(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