**MURANGA EXTRA-COUNTY SCHOOLS JOINT EXAMS**

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

**FORM FOUR**

**END OF TERM TWO 2022**

**BIOLOGY 231/1**

**PAPER 1**

**TIME: 2 HOURS**

**MARKING SCHEME**

1. A form one girl observed a bird laying eggs in a nest which later hatched into chicks. Name two characteristics of living things that she concluded from the observations (2marks)

*i) Reproduction*

*ii) Growth and development*

*iii) locomotion/movement*

2. Name the stage in meiosis where chromosomes number is reduced by a half (1mark)

*At anaphase I rej anaphase alone*

3. State two characteristics of organisms that belong to the same species (2marks)

*They are hereditary distinct*

*They give rise to fertile offspring’s*

4. a) Live specimens should always be returned to their habitats whenever possible. What is the biological importance of this practice? (1mark)

*Maintaining the ecological balance*

b) Why is a dissecting pin important in biological experiments? (1mark)

*used to hold specimens into the dissecting board during dissection*

5. Mutations form basis for variations. Name the type of mutation that cause the following human disorders

(a) Albinism (2marks)

*Gene substitution; rej substitution alone*

(b) Down syndrome

*(Chromosomal) non-disjunction*

6. a) During a field trip a plant that had flowers drew the attention of a student. Name the division of the plant.

*Spermaphyta/ spermatophyta (1marks)*

b) Students observed an animal with the following features

* Dorsoventrally flattened body
* One pair of legs per segment
* Poison claws on the head
1. Name the class to which the animal belongs. (1mark)

*Chilopoda rej chilopoda*

1. State the mode of feeding of the animal (1mark)

*Carnivorous*

7. Study the process below and answer the questions that follow

Glucose process P Pyruvic acid + Energy.

1. Name the process P

*Glycolysis*

1. Name the part of a cell in which the process named in (a) above occcurs

*Cytoplasm*

8. Account for the following observations.

a) When fish is taken out of water it dies. (2marks)

*The gills filaments clump together; reducing the surface area for gaseous exchange; this causes suffocation of the fish to suffocate; any two*

1. The palisade cells are closely packed together (1mark)

*To ensure maximum trapping of light*

9. a) Give the significance of the following features of the red blood cells.

 Being biconcave in shape. (1mark)

*Increase the surface area for packaging of more haemoglobin hence maximum absorption of gases/to squeeze through the narrow lumen of blood capillaries*

b) Lacking mitochondria (1mark)

*Ensure the red blood cells do not utilize the oxygen they carry accept allow more space for haemoglobin packing rej packaging*

10) A person fell from the third floor of a building and had part of his brain damaged. Name the part of the brain damaged if the person suffers from the following

a) Loss of speech (1mark)

*Cerebrum*

b) Inability to regulate body temperature. (1mark)

*Hypothalamus*

c) Lack of balance (1mark)

*Cerebellum*

11. In body cells of all organisms chromosomes occur in pairs. Members of each pair have a characteristic length and shape.

a) What is the scientific name of such a chromosome pair? (1mark)

*Homologous chromosomes*

b) What name is given to a cell that contains one member of each pair of chromosomes? (1mark)

*Haploid*

c) Name the part in humans where meiosis takes place (2marks)

*Testis/ testes*

*Ovary/ ovaries*

12. Small birds like the European robin puff up (swell up) their feathers during winter. Explain the significance of the behavioral response. (3marks)

*To reduce heat loss; since the feathers trap more air; that acts as insulator;against heat loss/ that is a poor conductor of heat.*

13. Name the most appropriate tool that biology students can use for collecting (2marks)

i) Crawling animals

*Pitfall trap; rej pitfall alone*

ii) Stinging organisms

*Pair of forceps; rej forceps alone*

*Acc pair of tweezers*

14. During a microscopy class a student was unable to see the field of view. State two possible adjustments she needed to make to ensure that the field of view became visible. (2marks)

*Adjust the mirror;*

*Ensure that the diaphragm is fully open;*

*Ensure that the objective lens is clicked into position with the eye piece lens;*

15. Name the apparatures used to measure the following abiotic factors. (2marks)

i) Penetration of light in water

*Seechi disc*

ii) Light intensity

*Photographic light meter*

16. A lion is an exclusive carnivore. State two dental adaptations it has to its mode of feeding (2marks)

*Long conical/ curved canines to hold/ kill/ tear the prey;*

*( has premolars specialized into) carnassials teeth with smooth sides and sharp edges to slice through flesh and crush bones;*

17. a) State an example of structures in animals whose development demonstrates adaptive radiation (1mark)

*Pentadactyl limbs; the feet of birds; the beak of birds; mark any one correct*

b) Treatment of malaria is still a challenge in the world despite the invention of many anti malarial drugs. (3marks)

*Some parasites mutate; to acquire the gene for resistance; to the drugs used. (The ones without the gene are eliminated by the drugs) The ones with the resistant gene acquire a selective advantage to survive to maturity; and their offspring inherit the genes; A new population of resistant parasites is hence developed; OWTTE max 3mks*

18. Name two processes that brings about the translocation of manufactured food (2marks)

*Active transport*

 *diffusion*

*cytoplasmic streaming*

19. Name the disorder of the blood described by the following symptoms (2marks)

a) In ability of the blood to clot.

*Haemophilia*

b) Crescent shaped red blood cells with abnormal haemoglobin.

*Sickle cell anaemia.*

20. Explain how a nerve impulse is passed across a synapse (3marks)

*Impulse arriving at the pre-synaptic knob; causes synaptic vesicles containing (transmitter substance) Ace tylcholine to move and attach onto pre-synaptic membrane; burst to release Acetylcholine; which diffuses across the synapse to the post-synaptic membrane where it causes depolarization;of the membrane max 3 marks*

21.a) A large crocodile can survive on 20kg meat for a year. A small sized lion cannot. Explain (3marks)

*Crocodile is poikilothermic; so no energy lost to environment; while lion is homoiothermic; so heat energy constantly lost to environment;*

b) Name the part of the body that helps in insulation in the following: (2marks)

i) Birds

*Feathers;*

ii) Mammals

*Wool/ fur/ body hair/ adipose tissue;*

22. Name **two** types of valves in the heart. (2 marks)

***Atrio-ventricular valves/Cuspid valves;***

 ***Semi – lunar valves;***

23. Sometimes when one stands up very quickly after a long period of sitting, she may feel faint or dizzy. Explain. (2 marks)

***The rapid change in posture alters the body’s blood distribution; causing a temporary Lack of blood in the brain;***

24. The diagram below represents a bone of a mammal



(a) Identify the bone. (1 mark)

*Scapula; rej scapular*

 (b) Name the part marked **X**. (1 mark)

 *Spine;*

 (c) Name the bone that articulates at the part labeled **F**. (1 mark)

*Humerus;Rej Humerous*

(d) State two ways in which the bone is adapted to its function. (2 marks)

 *Has the glenoid cavity which articulates with the head of the humerus ;*

*Has a spine for attachment of muscles;*

*Is broad/has a large surface area for the attachment of the shoulder muscles;*

*Has acromion and metacromion for attachment of muscle (Any two)*

25. a) Under which of the following magnifications would one see a larger part of the specimen X 40 or X 500? Give a reason. (2 marks)

*X40; it is a lower magnification thus giving a wider view;*

b) State how magnification is worked out in a light microscope (1mark)

*Magnification=Eye piece lens magnification X Objective lens magnification;*

26. State two characteristics of mammals that are not externally visible (2marks)

*Presence of sweat glands;*

*Double circulatory system;*

*Lungs for gaseous exchange; any other correct answer*

27. State two uses of digested food in the bodies of animals (3 marks)

*Growth;*

*Repair of worn out tissues;*

*Protection;*

*Production of energy;*

28. Which cell organelle is present in large numbers in cells that produce Insulin? Give a reason for your answer (2marks)

*Golgi bodies/apparatus; for the transportation of the secretions/Insulin;*

29. Give three advantages of fossil records (3marks)

*Show extinction of certain organisms (at certain geological age);*

*Show transitional forms between groups of organisms;*

*Show direct evidence of the type of organisms that existed during a given geological period;*

*Show progressive increase in complexity from simple organisms to complex organisms;*

*Show that different classes of organisms arose at different times;*

30. What is the significance of diffusion to plant pollination? (1mark)

*The insects that carry out pollination are attracted by the scent from the flowers; (this may cause them to land on the flowers and transfer the pollen grains leading to pollination)*

31.a) Explain why it is not advisable to put a patient on a drip of distilled water for rehydration (3marks)

*Distilled water is hypotonic compared to the (patient’s) internal body fluids; by osmosis; the cells would take in distilled water, swell and burst/haemolyse(leading to death/more damage);*

b) Name the physiological process by which water molecules move from one cell to the other (1mark)

*Osmosis;*