**NAME........................................................................................................CLASS..........................**

**INDEX NO......................... DATE ........................SIGN................... ADM NO ………………..**

**231/1**

**BIOLOGY**

**PAPER 1**

**MAY 2019**

**TIME: 2 HOURS**

**MARKING SCHEME**

 **CASPA EXAMINATIONS**

*(Kenya Certificate of Secondary Education)*

**BIOLOGY THEORY**

**FORM FOUR**

**Instructions**

**For Examiner’s Use Only**

|  |  |  |
| --- | --- | --- |
| **Question** | **Maximum Score** | **Candidate’s Score** |
| 1-33 | 80 |  |

***This paper consists of 13 printed pages. Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing***

1. Below is an image of a biological vector. Use it to answer questions that follow.



(a) Identify the parasite transmitted into human blood by the organism. (1 mark)

**Plasmodium species//*Plasmodium vivax//Plasmodium malariae//Plasmodium ovale//Plasmodium falciparum***

(b) Name the blood cells that are destroyed by the parasite in (a) above.(1 mark)

**Red blood cells//Erythrocytes.**

(c) State one biological method used to eradicate the larvae of this organisms. (1 mark)

**Fish feeding on the larvae;**

2. Give the structural adaptations of the following in an insect pollinated plant.

(a) Pollen grain. (1 mark)

**Rough //sticky to stick onto the body of the insect.**

(b) Stigma. (1 mark)

**Occur inside the flower ensuring that the insects brush against them as they look for nectar;// Sticky so that pollen grains from the body of an insect stick onto it; any 1**

3. State the causative agents of the following diseases

(i) Tuberculosis. (1 mark)

***Mycobacterium tuberculosis;* should be underlined separately.**

(i) Syphilis (1 mark)

***Treponemapallidum;* should be underlined separately.**

1. a) What do you understand by the term ecologically balanced ecosystem? 1mk

*Equilibrium between living organisms and their environment that ensures survival of all organisms.*

b) Give two reasons for loss of energy from one trophic level to another in a food web 2mks

*- Some energy is lost as heat during respiration*

*- Excretion*

5. Identify the following types of responses:

(a) Pollen tube growing towards the ovary (1 mark)

**Positive Chemotropism;**

(b) Maggots moving away from light. (1 mark)

**Negative Phototaxis;**

6. State two activities of the cell that are controlled by the nucleus. (2 marks)

**Cell division;//Growth;//respiation**

7. Distinguish between botany and zoology. (1 mark)

**Botany is a branch of science that deals with study of plants while zoology is a branch of science that deals with study of plants;**

8.The field of view of a light microscope appeared as shown below in diagram A and the diameter in A

was occupied by cells as shown in B.



 Calculate the length of one cell. (2 marks)

**Length of one cell= Diameter of field of view in um ;6000 um = 1000um;**

 **Number of cells 6**

9. State two importance of water in germination of seeds. (2 marks)

**Dissolve food substances//soften testa//hydrolyze food substances//activate enzyme any 2**

10. Why is sexual reproduction advantageous in flowering in plants? (2 marks)

**Hybrid vigour;**

**Causes variations;**

11. Below is an illustration of an organism captured by students during a practical lesson.



(a) Identify two features that enable the organism to be placed in the phylum Arthropoda.(2 marks)

**Segmented body;**

**Jointed appendages;**

**Bilateral symmetry;**

**Presence of exoskeleton;**

(b) Explain why the organism will die when Vaseline is applied on its thorax. (1 mark)

**Blocks the spiracles and thus no inhalation;**

12. Name two properties of enzyme amylase. (2 marks)

**Works best under alkaline pH;**

**Substrate specific;**

**Protein in nature;**

**Calatlyst;**

**Affected by temperatures;**

13. State the significance of natural selection. (2 marks)

**Formation of new species;**

**Elimination of undesirable characteristics;**

14. Explain why a plant shoot develops lateral branches when its tip is removed. (2 marks)

**Tip has a higher concentration of auxins,when the tip of shoot is removed auxin concentration is lowerd; less auxin concentration stimulates sprouting of lateral btranches;**

15. Why is eating a lot of biscuits harmful to the teeth. (2 marks)

**Sugar in biscuits get logged in between teeth, bacteria break down the sugars releasing acids; that corrode the enamel that cause tooth decay;**

16.a)Name the part of the chloroplast where each of the following activities take place.

Light stage**………… granum**

Dar stage…………..**stroma**

b)Name two types of cells in a leaf that carry out photosynthesis.

**Guard cells**

**Palisade cells**

**Spongy mesophyll cells.**

17. State any three disorders due to gene mutation in human beings.

**Albinism**

**Sickle cell anemia**

**Haemophilia**

**Colour blindness**

18. Why is it important that the radicle develops first during germination? (2 marks)

**For absorptions of minerals salts and water;**

**Anchorage;**

19. (a) Explain one event of mitosis that restores the genetic constitution of an organism. (1 mark)

**Replication of chromosomes during interphase produces doubling chromosomes for sharing out;/ Alignment of spindle at equator during metaphase without association of homologous chromosomes prepares for separation of replicated chromatids;/the separation of chromatids during anaphase will result in same number of chromosomes in daughter cells;**

(b) Identify the following types of cell division:

(i) Division of generative nucleus into male nuclei. (1 mark)

**Mitosis;**

(ii) Division of cells lining the seminiferous tubules. (1 mark)

**Meiosis;**

20. State two observable characteristics that show discontinuous variations in *Drosophila melanogaster*

(2 marks)

**Wing length;-long dominant over vestigial wing**

**Eye colour;-red eyes dominant over white eye.**

**Size of abdomen;-broad abdomen dominant over narrow abdomen**

**Body colour ;-grey body colour dominant over black body colour**

21. Explain why athletes breathe quickly and deeply after a 100 meters sprint. (3 marks)

**To increase the supply of oxygen; required to get rid of lactic acid; due to anaerobic respiration;**

22.(a) State two proteins that determine human blood groups. (1 mark)

**Antigen A;/antigen B;/rhesus factor/ all mentioned to get a mark:**

(b)(i) What is the role of blood capillary? (1 mark)

**Site for exchange of substances;**

(ii) Explain why blood does not clot in undamaged blood vessels. (1 mark)

**Presence of prothrombin in blood//presence of heparin;**

23.(a) List one type of chromosomal aberrations. (1 mark)

**Deletion //duplication//inversion//tranlocation//non disjunction// any 1**

(a) State one advantage of polyploidy in modern farming. (1mark)

**Increased yields//early maturity//resistance to drought,pests and disease//any 1**

24. Explain:

(a)Why insulin is not administered orally. (1 mark)

**Insulin is a hormone that is transmitted through blood;**

(b) Why stomach wall is lined with mucus (1 mark)

**To prevent autodigestion;**

25.(a) what is homeostasis? (1 mark)

**Self adjusting mechanism that maintains a steady internal state in organisms;**

(b) State two behavioral mechanisms used by snakes to increasetheir body temperature. (2 marks)

**Coiling;**

**Basking;**

26. Explain why only a small amount of food materials taken up by herbivores is passed on to secondary consumers. (2 marks)

**Absorbed food is used in cell metabolism;**

**Lost in excretion;**

27. Below is a diagram of a respiratory surface. Use it to answer questions that follow.



(a) Name the physiological process involved in the exchange of gases in the structure above. (1 mark)

**Diffusion;**

(b) Identify the substance in cell labeled w that has high affinity for gas X. (1 mark)

**Haemoglobin;**

(c) State the advantage of gas Y being transported in cells labeled W(1 mark)

**Does not affect the pH of blood;**

**Efficient in loading and offloading of oxygen**;

28.(a) Explain why when transplanting a young plant, it is advisable to remove some leaves. (2 marks)

**Reduce the surface area/number of stomata exposed to envinronmental factors; thus lower the rate of transpiration;**

(b) Give one role of xylem vessels other than transport(1 mark)

**Mechanical support;**

29. (a) Protoctista; **Rej**– Starting with a small letter(i.e. protoctista)

– Wrong spelling

(b) Osmoregulation;

30. State two characteristics of a bony fish which enable it to reduce friction in water. (2 marks)

**Streamlined body;/inflexible head;/scales overlap and are pointed backwards;/mucus covering the body;**

31.(a) Identify the structural difference between the wing of a bird and the wing of an insect (1 mark)

|  |  |
| --- | --- |
| Wing of a bird | Wing of an insect |
| **originates from theendoskeleton** | **originates from the exoskeleton;** |
| **Has bones** | **No bones;any 1** |

(b) Identify the type of evolution exhibited by the wings of birds and insects and state the name given to such structures. (2 marks)

**Convergent evolution; analogous structures;**

32.a) Name two characteristics that are controlled by genes located on

Y chromosomes

 **premature baldness**

**Tuft hair in ear pinna and nose**

X chromosomes

**Colour blindness**

**haemophilia** 2mks

1. How is the rib adapted for its function? 2mks
* *It is long and curved to increase surface area for muscle*
* *Has tuberutum and captulum / projections for articulation with thoracic vertebrae;*
* *\* Curved to form a ribcage*

33.(a) what is the role of a pollen tube. (1 mark)

**Facilitates transfer of male nuclei to the embryo sac;**

(b) Identify the role of the following hormones in males:

(i) Follicle stimulating hormone. (1 mark)

**Synthesis of sperms;**

(ii) Testosterone. (1 mark)

**Development of secondary sexual characteristics in males/production and maturation of sperms;any 1**