**FORM FOUR PRE-MOCK EXAMINATION.**

**TERM 1 2021**

**SEPTEMBER 2021**

**BIOLOGY PAPER ONE**

**TWO HOURS**

***Instructions to candidates***

1. *Write your name and class in the space provided above*
2. *Sign and write the date of the examination in the spaces provided above*
3. *Answer all the questions in the spaces provided*
4. *This paper consists of* ***10*** *printed pages*
5. *Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.*
6. *Candidate should answer all the questions in English*

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| **FOR EXAMINERS USE ONLY** |

|  |  |  |
| --- | --- | --- |
| QUESTION  | **MAXIMUM SCORE** | **CANDIDATE’S SCORE** |
| 1. **32**
 |  **80** |  |

1. Identify the following. (2mrks)
2. Type of movement in cells.

**Cytoplasmic streaming**

1. Arrangement of leaves on a plant.

**Phyllotaxy**

1.
2. Explain how adequate water supply increases the rate of glucose formation in plants. (1mrks)

**Provides more hydrogen ions that reacts with carbon (IV) oxide forming glucose**

1. Name the element obtained from insects by insectivorous plants. (1mrk)

**Nitrogen**

1.
2. A mushroom research station would like to employ a researcher. Which scientist is most appropriate. (1mkr)

**Mycologist**

1. Name the branch of biology that deals with phylogenetic relationship between organisms. (1mrk)

**Evolution**

1. State the role of the diaphragm.
2. In the light microscope. (1mrk)

**Regulates the amount of light passing through the condenser to illuminate the specimen**

1. During ventilation in man. (1mrk)

**Contract and relaxes, increasing and decreasing volume of the thorax cavity. *(all must be present and orderly)***

1. Explain why plants absorb water in waterlogged soil but not mineral salts. (2mrks)

**Water absorption is by osmosis which does not require energy; mineral salts are absorbed by active transport that requires energy that depends on oxygenthat is deficient in water logged soil;**

1. A biological washing detergent removes stains like oils from cloths.
2. Name the enzyme that it contains. (1mrk)

**Lipase**

1. Explain why the stains would be removed faster with the detergent in water at 35oc rather than at 15Oc. (1mrk)

**35Oc – optimum temperature for the enzyme by 15Oc inactivates the enzyme.**

1. Below is a diagram of an embryo sac.



K

J

Identify the structures labelled. (2mrks)

J. **Polar nuclei**

K. **Antipodal cells**

1. Explain why low temperature will cause seed dormancy by not very high temperatures. (1mrk)

**Dormancy is a resting period caused by low temperature while high temperature destroys the embryo.**

1.
2. Explain why the average length of the chicken egg is 6cm while that of a human is 0.1mm. (1mrk)

**The chicken egg stores food for the developing embryo while the human one does not store food.**

1. Identify two features that enable mammalian fallopian tubes perform their function. (2mrks)

**Cilia**

**Smooth muscles.**

1.
2. State a limiting factor of using a potometer to measure the rate of transpiration. (1mrk)

**It assumes all the water absorbed is transpired (yet some may be used up)**

1. Name the tissue that transports hormones in plants. (1mrk)

**Phloem.**

1. To control the spread of malaria, fish are introduced into water bodies near residential area.
2. Name this method of population control. (1mrk)

**Biological control**

1. State an advantage of the above method. (1mrk)

**No pollution; No residual effect. (mark any one)**

1. Apart from vaccination, state two ways of controlling highly infectious disease among animals. (2mrks)

**Isolation; Quarantine**

1.
2. Name the enzyme that breaks down hydrogen carbonate ions in mammalian blood to release carbon (IV) oxide. (1mrk)

**Carbonic anhydrase**

1. Explain why obligate anaerobes die in presence of oxygen. (1mrk)

**Lack catalase enzyme to break down toxic hydrogen peroxide produced during aerobic respiration**

1.
2. Name the group of sporangia born on fern leaves. (1mrk)

**Sori**

1. Why are fruits not produced in gymnosperms? (1mrk)

**Absence of ovaries.**

1.
2. Explain why lactating mothers need extra energy. (1mrk)

**Secretion of milk requires more energy.**

1. State the function of interstial cells found in the testes. (1mrk)

**Secretion of testosterone.**

1. Below is a diagram showing a foetus in the uterus.



State two observations showing that parturition is about to take place. (2mrks)

**Dilation of the cervix**

**The foetus is upside down.**

1. The symptoms of typhoid disease include high fever, vomiting and diarrhoea. Explain why they may lead to death if not treated. (2mrks)

**High fever is due to increased temperature which may denature enzymes affecting metabolism; vomiting and diarrhoea may cause dehydration.**

1. The table below represents a chromatid which undergoes a mutation, the letters genes.

**Before mutation**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| L | M | N | O | P | Q |

**After mutation**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| L | O | N | M | P | Q |

1. Name the type of mutation. (1mrk)

**Inversion**

1.
2. Identify the nucleic acid whose base sequence is shown below. (1mrk)

G-A-C-U-A-G-A-C-G

**RNA**

1. If the above strand was involved in protein synthesis, how many amino acids would the protein have. (1mrk)

**3**

1. Explain why resistance to antibiotics is considered an example of evolution. (2mrks)

**The gene for resistance due to mutation is transmitted; hence creating a new population of resistant strains.**

1.
2. People are encouraged to take the corona virus disease vaccine. How does it work. (1mrk)

**Stimulates the body to make antibodies**

1. What is the significance of;
2. Red blood cells lacking mitochondria. (1mrk)

**Not to use up oxygen.**

1. Xylem vessels being dead. (1mrk)

**Not to lose water to the neighboring cells**

1. Use of fossil fuel as source of energy causes global warming. Governments are being encouraged to use ‘clean energy’. State two sources of this energy. (2mrks)

**Hydroelectric power**

**Wind**

**Solar**

**Geothermal**

1. An athlete training to take part in an international competition moved to a high attitude area to train for 12 days. He took his pulse rate per minute and recorded as shown below.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Pulse rate  | 72 | 78 | 89 | 92 | 92 | 90 | 86 | 80 | 77 | 74 | 72 | 72 |

Account for the change in the pulse rate from.

1. Day 1-5. (2mrks)

**Low oxygen concentration; increases pulse rate to supply more oxygen to the tissues**

1. Day 6-12. (2mrk)

**Acclimatization/ more RBC have formed; tissues get adequate supply of oxygen.**

1. A patient complained of frequent thirst. A sample of the patient’s urine was found not to have any sugar.
2. Name the hormone the person was deficient of. (1mrk)

**Antidiuretic hormone/ Vasopressin.**

1. Name the gland that secretes the above hormone. (1mrk)

**Pituitary gland**

1.
2. The paddles of a whale and fins of a fish adapt them to aquatic habitat.
3. Name the evolutionary process that may have given rise do these structures. (1mrk)

**Convergent evolution**

1. What name is given to such structures. (1mrk)

**Analogous structures**

1. State two advantages of natural selection. (2mrks)

Allows survival of organisms with better qualities

**Eliminates organisms with unfavorable traits**

1.
2. Explain why ingestion of salty food may reduce the amount of water passed out in urine. (2mrk)

**Salt increases osmotic pressure by blood; hence more water is reabsorbed from kidney tubules**

1. Explain why small birds puff their features when cold. (2mrks)

**To reduce heat loss; feathers trap more air that insulates against heat loss.**

1.
2. Explain why halophytes have pneumatophores. (1mrk)

**Have lenticels that are sites for gaseous exchange.**

1. Explain how the following features adapt root hairs cells to absorption
2. Large sap vacuole. (1mrk)

**Store sap to increase osmotic pressure to facilitate osmosis.**

1. Numerous mitochondria. (1mrk)

**For generation of more energy to facilitate active transport.**

1. A certain metabolic pathway takes place following sequence.

J-K-L-M-N

An inhibitor was added to the reactants during an experiment. At the end of the experiment, there was more K and little L, M and N.

1. At what stage of the sequence was the inhibitor added. (1mrk)

**K-L**

1. Briefly explain how the inhibitor affected the reaction. (2mrks)

**The inhibitor competes with K for the active of the enzyme; hence accumulation of K.**

1.
2. Suggest a change in the diet of a person whose liver is damaged. (1mrk)

**Avoid lipids/ fatty food.**

1. State the importance of caecum in herbivores. (1mrk)

**Harbor bacteria that secrete cellulose to digest cellulose.**

1. Name the polysaccharide that offers mechanical support in;
2. Arthropods (1mrk)

**Chitin**

1. Plants. (1mrk)

**Cellulose**

1.
2. Explain why an effective respiratory system is associated with the circulatory system. (2mrks)

**Circulation system transports away the respiratory gases; creating a steep diffusion gradient**

1. Distinguish between haemoglobin and myoglobin. (2mrks)

**Haemoglobin- A protein found in the RBCs to transport oxygen**

**Myoglobin- A protein found in muscles that stores oxygen**

1.
2. New born babies have a higher heart beat than adults. Explain why? (2mrk)

**Babies have a larger surface area to volume ratio hence they lose heat; require more oxygen for respiration to maintain body temperature at optimum.**

1. What Is the advantage of oxyhaemoglobin over carboxyhaemoglobin? (1mrk)

**Oxyhaemoglobin is unstable and dissociates easily.**

1. Explain why;
2. Fish pass a lot of water over the gills frequently. (1mrk)

**For maximum extraction of oxygen/gaseous exchange as there is less dissolved oxygen/ gases in water.**

1. Lack of magnesium leads to yellowing of leaves. (1mrk)

**Magnesium is required for synthesis of chlorophyll.**

1. The organisms below belong to kingdom Animalia.



1. Name the phylum and class where they belong. (2mark)
2. Phylum. **Arthropoda**
3. Class. **Insecta**
4. Give a reason for placing the organisms in the class in (**a(ii)** above. (1mrk)

**3 body parts**

**3 pairs of legs**

**A pair of antennae (mark any one)**