BIOLOGY F3 MARKING SCHEME.

1. Define the following terms.

a) Classification – **Placing living organisms into groups depending on their structural similarities and differences.**

b) Species – **A group of organisms that can freely interbreed to produce a viable offspring.**

2a) Name the class to which the organism belongs.   (1 mark)

   Crustacea

b) Give three reasons for your answer in (a) above.   (3 marks)

- **Two body part cephalothorax and abdomen.**
- **Two pairs of antennae.**
- **Four pair of month parts.**
- **Have forked appendages.**
- **Have compound eyes.**

3.In an investigation, a student extracted three pieces of potato cylinders using a cork borer. The cylinders were cut back to 40mm length and placed in a beaker containing a solution.

   The results after 30 minutes were as shown in the table below.

Feature	Results
Average length of the cylinder	38mm
Stiffness of cylinders	Spongy

a) Account for the results in the table above .   (3 marks)
- **Cylinders were placed in hypertonic solution hence lost water through osmosis and become spongy and shorter as they loose their turgidity.**

b) What would be a suitable control experiment?   (1 mark)
- **Boiled potato cylinders.**
- **Potato cylinders place in isotonic solution.**

4a) Name the physiological process that was being investigated.   (1 mark)
- **Aerobic respiration.**

b) State the role of potassium hydroxide in flask K.   (1 mark)
- **Absorb carbon (vi) oxide from the atmospheric air.**

c) State and explain the observation in flask N.

   Observation.   (1 mark)
- **White precipitate is formed.**

   Explanation.   (1 mark)

Carbon (iv) oxide were given out by rat/ (mice) during respiration.

5. Name the type of respiration that is most efficient. (1 mark)
- **Aerobic respiration.**

b) Give reason for your answer in (a) above. (1 mark)

   it produces more energy due to complete oxidation.

6a) State two differences between open and closed circulatory system. (2 marks)

Open	Closed
a. **Transporting fluid conveyed in general body cavity**	**Transport fluid conveyed in blood vessels.**
b. **No blood vessels.**	**Has blood vessels**
c. **Fluid flow under low pressure**	**Fluid flow under high pressure.**
d. **Flow slowly**	**Flow faster.**
e. **Fluid is in direct contact with tissues**	**Blood is not in direct contact with tissue**
f. **Blood lacks pigment**	**Blood has pigment.**

b) What is a single circulatory system? (1 mark)
- **Circulatory system in which blood flows only once through the heart in a complete circuit in the body.**

7. Name the organelles that are involved in each of the following. (3 marks)

a) Form site for ribosome attachment.
- **Rough endoplasmic reticulum.**

b) Formation of vescicles.
- **Golgi apparatus.**

c) Carry genetic material.
- **Nucleus.**

8. State two ways in which the muscles of mammalian heart are special. (2 marks)
- **Myogenic.**
- **Contrast continuously without fatigue.**
- **Presence of intercalated disc hence interconnected.**

9. Name one defect of the circulatory system in human. (1 mark)

- **Thrombosis.**
- **Atheroschonsis**
- **Cerebral vascular thrombosis.**

b) State two functions of blood other than transport. (2 marks)

- **Regulate body temperature.**
- **Defense against disease.**

- **Regulation of PH of fluids.**
- **Prevent excessive bleeding through clotting.**

10. State the economic importance of anaerobic respiration in plants. (1 mark)

- Baking bread.
- Production of alcohol in brewing.
- Biogas production.
- Silage formation.
- Sewage treatment.
- Compost manure formation.

11. Name two structures of gaseouses exchange in aquatic plants. (2 marks)

Pneumatophores; Aerenchyma tissue; cuticle.

12. State two factors that affect enzymatic activities. (2 marks)

- **PH value.**
- **Temperature concentration.**
- **Presence of inhibitors. Co-factors and con-enzymes concentration**.

b) Explain how one of the factors stated in (a) above affects enzymatic activities. (1 mark)

- **Inhibitor destroy active site/inhibit its function.**

13. Describe how population of grasshopper in a given area can be estimated. (3 marks)

Capture the grasshopper count and mark using permanent ink record and release: and allow time for them to mix. Recapture and count marked and unmarked and use the formular.

$$P = \frac{FM \times SC}{MR}$$

14. What is crenation? (1 mark)
Shrinking of red blood cells when placed in hypertonic solution.

15. Name one salivary gland in human. (1 mark)

- **Sub-ringual.**
- **Sub- mandibular.**
- **Parotid gland.**

b) State two functions of saliva. (2 marks)

- **Lubricate food/moisten.**
- **Contain salivary amylase.**
- **Provide alkaline media for digestion of starch.**

16a) Distinguish between respiration and respiratory surface. (2 marks)

- **Respiration** – process by which food substance are chemically broken down to release energy.
- **Respiratory surface**- site where gaseous exchange take place.

b) Two individuals were exposed in the following conditions.

S – Air rich in carbon (II) Oxide.

T- Air rich in carbon (iv) Oxide.

i) Which of the two individual was likely to suffer? (1 mark)

S

ii) Give reason to your answer b(i) above. (3 marks)

- **Combine with haemoglobin in form of carboxy haemoglobin a stable compound which does not dissociate reducing oxygen supply in the body tissues leading to suffocation.**

iii) How can the situation in b(i) above is corrected. (1 mark)

- **Administer air rich in oxygen to increase rate of breathing.**

c) Explain why athletes train at high altitude areas in preparation for competitions. (2 marks)

- **To acclimatize so as to produce more red blood cells /to increase oxygen carrying capacity for endurance when competing.**

17. State three main abiotic factors that influence plant growth and distribution in an ecosystem. (3 marks)

Light intensity, temperature, water, soil PH, soil fertility, soil texture.

b) Explain how the following adaptation enables the plants to survive in arid areas.

i) Thick, shinny waxy cuticle. (2 marks)

- **Thick- reduces transpiration rate.**
- **Shinny – reflect right to reduce evaporation of water (internal heating)**

ii) Fleshy green leaves with spines. (2 marks)

- **To store water.**
- **Spines – reduce surface area exposed hence reduce transpiration.**

18.

a) Name structures labeled M and N. (2 marks)

- **M- Chloroplast.**
- **N- Cell sap vacuole.**

b) Calculate the actual diameter of the cell. (1 mark)

2.5= 0.3125 mm

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ii) Calculate the magnification of the cell drawn above. (2 marks)

$$mg = \frac{LD}{A.D} \qquad \frac{49}{0.3125} \qquad = x157$$