

## KCSE PAPER 1 2018 MARKING SCHEME

### 4.5 BIOLOGY (231)

#### 4.5.1 Biology Paper 1 (231/1)

|    |   |           |
|----|---|-----------|
| 1. | a) Lysosomes/golgi apparatus;   | (1 mark)  |
|    | b) White blood cells fight pathogens to protect the body, the lysosomes contain lytic enzymes which destroy pathogens;/golgi apparatus synthesize lysosomes which contain lytic enzymes that destroy pathogens;   | (1 mark)  |
| 2. | <ul style="list-style-type: none"> <li>• Cylindrical body;</li> <li>• 9 – 100 segments;</li> <li>• Each segment has two pairs of legs;</li> <li>• Pair of short antennae;</li> <li>• Has two clumps of many simple eyes;</li> <li>• Has anterior genital pore/apparatus;</li> <li>• Has three body parts (head, thorax and trunk);</li> </ul> <p style="text-align: center;"><b>Any 2</b></p> | (2 marks) |
| 3. | Premolars; molars;  | (2 marks) |
| 4. | a) Photosynthesis;/gaseous exchange in plants;  | (1 mark)  |
|    | b) Stoma/somata;  | (1 mark)  |
|    | c) Are more on the lower surface of terrestrial plants/fewer on the upper surface; to reduce transpiration;   | (2 marks) |
| 5. | <ul style="list-style-type: none"> <li>• Cools the plant;</li> <li>• For uptake of water up the xylem vessels;</li> <li>• Mechanism through which mineral elements are transported in the plant;</li> <li>• Removal excess water;</li> <li>• Maintains turgor pressure;</li> <li>•</li> </ul>   | (3 marks) |
| 6. | (i) (Blood) plasma;   | (1 mark)  |
|    | (ii) Has (more large) proteins/blood platelets;<br>High (hydrostatic) pressure/low pressure of tissue fluid;<br>Has red blood cells;  | (2 marks) |
| 7. | (a) Process by which living organisms/cells break down /oxidize (organic) food materials into simpler compounds to release energy;  | (1 mark)  |
|    | (b) – Peristalsis;<br>-Absorption of materials;<br>-Chewing (movement of jaw muscles);<br>-Churning;<br>-Secretion of digestive enzymes<br><b>Any 3</b>   | (3 marks) |
| 8. | <ul style="list-style-type: none"> <li>• Numerous to increase surface area through which materials diffuse;</li> <li>• Thin/one-cell thick/single cell epithelium/endothelium for faster diffusion;</li> </ul>  | (3 marks) |



|     |  |                      |
|-----|--|----------------------|
|     | <ul style="list-style-type: none"> <li>• Lined with a single cell epithelium for faster diffusion;</li> <li>• Are selectively permeable for passage of materials;</li> <li>• Narrow lumen to maintain pressure;</li> </ul> <p><b>Any 3</b></p>   |                      |
| 9.  | a) Gill;   | (1 mark)             |
|     | b) Fish mouth opens lowering pressure in buccal cavity and water rushes in; mouth closes increasing pressure that forces water into the gill cavity/opercular cavity; O <sub>2</sub> rich water flows over the gills in a counter current direction to capillary blood flow; causing O <sub>2</sub> to diffuse into the gill capillaries; <b>Any 3</b> | (3 marks)            |
| 10. | <ul style="list-style-type: none"> <li>• Water;</li> <li>• Carbon (IV)oxide;</li> <li>• Energy/Adenosine Triphosphate;</li> <li>• Alcohol/ethanol/ethyl alcohol;</li> </ul> <p><b>Any 2</b></p>  | (2 marks)            |
| 11. | (a) Thermoregulation;<br>Osmoregulation;<br>Regulating salt balance;<br><b>Any 1</b>   | (1 mark)             |
|     | (b) – Blood vessels/arterioles;<br>– Hair;<br>– Sweat glands;<br>– Erector pili muscles;<br>– Nerve endings<br><b>Any 3</b>  | (3 marks)            |
| 12. | <ul style="list-style-type: none"> <li>• To fit in the (limited space) in the kidney/occupy less space;</li> <li>• Increase surface area for (selective) reabsorption;</li> <li>• Allow for more time for (selective) reabsorption;</li> </ul>   | (3 marks)            |
| 13. | <ul style="list-style-type: none"> <li>• Cannot be used for most animals/plants;</li> <li>• Assumes organisms are evenly distributed;</li> <li>• Inaccuracy (over/under-estimation);</li> </ul> <p><b>Any 2</b></p>  | (2 marks)            |
| 14. | (a) Epigeal;   | (1 mark)             |
|     | (b) Hypocotyl elongates faster than the epicotyl; pushing cotyledons above the ground;   | (3 marks)            |
| 15. | Fish uses dissolved oxygen for gaseous exchange; gill filament epithelium dries up; gill filaments clamp together; surface area for gaseous exchange reduced; oxygen lacks moist surface for dissolution causing death(due to suffocation);  | (4 marks)            |
| 16. | <ul style="list-style-type: none"> <li>• Femur;</li> <li>• Pelvic girdle;</li> </ul>   | (1 mark)<br>(1 mark) |
| 17. | <ul style="list-style-type: none"> <li>• Converts carbon (IV) oxide to carbonic acid; which easily dissociates into hydrogen ions (H<sup>+</sup> and hydrogen carbonates (HCO<sub>3</sub><sup>-</sup>-for easier transportation; reducing acidity in blood;</li> </ul>   | (3 marks)            |



|     |   |           |
|-----|---|-----------|
| 18. | (a) Height (tallness);<br>Long hair;<br>Skin colour (light);<br>Any 2   | (2 marks) |
|     | (b) Most of the genes are sex-linked and are carried on the X - chromosomes; boys receive X chromosomes from the mother (and Y chromosomes from the father); if the X carries a recessive gene, it is more likely to be phenotypically expressed in boys; | (3 marks) |
| 19. | (a) Beak M  | (1 mark)  |
|     | (b) Beak M is simple/basic; original beak; the birds separated to occupy different niches; and specialized for different diets; leading to more complex/developed beaks over time;<br>Any 3   | (3 marks) |
| 20. | (a) Different embryonic origin but evolved to perform similar functions (due to exploitation of same kind of environment);  | (1 mark)  |
|     | (b) – wings of bats and insects;<br>-Eyes of mammals and molluscs;<br>-Limbs of mammals and arthropods;<br>-Flipper in whales/dolphins and fins of fish;  | (2 marks) |
| 21. | <ul style="list-style-type: none"> <li>• Twining around a support;</li> <li>• Use of tendrils/spines/thorns/hooks (to cling on nearby plants/trees);</li> <li>• Turgid cells (in their stems);</li> </ul> Any 2   | (2 marks) |
| 22. | Gradual change from simple life forms to complex forms over a (long) period of time;  | (1 mark)  |
| 23. | <ul style="list-style-type: none"> <li>• Growth; and development;</li> <li>• Reproduction;</li> </ul>   | (2 marks) |
| 24. | <ul style="list-style-type: none"> <li>• A camel is a desert animal, a longer nephron increases the surface area for reabsorption of water; to conserve it; a whale is aquatic animal, (does not need to conserve water);</li> </ul>                      | (3 marks) |
| 25. | (a) Aestivation;  | (1 mark)  |
|     | (b) Reduced metabolic activity; hence low rate of respiration; minimizing water loss/ dessication (to the environment);   | (3 marks) |
| 26. | <ul style="list-style-type: none"> <li>• Less-toxic;</li> <li>• Very soluble;</li> <li>• A small molecule (easily filtered in the kidneys);</li> <li>• Requires less water to excrete;</li> </ul> Any 2   | (2 marks) |

|     |  |           |
|-----|--|-----------|
| 27. | <p>Mouse is active/has a large surface area to volume ratio; hence has a higher metabolic rate (rate of breathing) to cope with the rate at which energy (oxygen) is consumed or lost to the environment; an elephant is less active/has a small surface area to volume ratio hence has a lower rate at which energy (oxygen) is used or lost; <i>or</i></p> <p>Mouse is small in size/has large surface area to volume ratio; hence has a metabolic rate (rate of breathing) to cope with the rate at which oxygen is consumed/energy is lost to the environment; an elephant is large in size/has small surface area to volume ratio; hence has a lower rate at which oxygen/energy is lost;</p> | (3 marks) |
|-----|--|-----------|

[HTTPS://KCSEREVISION.COM](https://kcserevision.com) - REVISION RESOURCES