

Charles

**WAKISSHA JOINT MOCK EXAMINATIONS**  
**MARKING GUIDE**  
 Uganda Certificate of Education  
 UCE August 2018  
**BIOLOGY 553/1**



**SECTION A**

1. A
2. C
3. A
4. B
5. A
6. A
7. C
8. A
9. B
10. B

11. A
12. C
13. B
14. C/D
15. B
16. C/D
17. B
18. D
19. D
20. C

21. B
22. C
23. C
24. B
25. C
26. B
27. D
28. B
29. C
30. C

**SECTION B**

31. (a) (i) The level of glucose increased <sup>(rapidly)</sup> because it is being absorbed into the blood stream; ✓ 02

*Reject, insulin converts  
Reject, correct explanation for wrong description*

- (ii) The level of glucose decreased <sup>(rapidly)</sup> because (insulin hormone) (secreted by the pancreas) facilitated the conversion of glucose to glycogen <sup>(storage in liver and muscles)</sup> / respiration / metabolism / fats 02

- (iii) The level of glucose increased <sup>(rapidly)</sup> because (after the level had gone below norm) (stimulated the secretion of glucagon from pancreas that facilitated) the conversion of glycogen to glucose for restoration of the glucose level to normal. <sup>(respiration / metabolism)</sup> 02

- (b) Insulin (hormone) ✓ 01

(c)

- (i) Blood glucose level remained constant; because the hormone had not had any effect yet / had not yet acted; ✓ 02

- (ii) Blood glucose level decreased <sup>(rapidly)</sup> because the insulin hormone <sup>(hormone x)</sup> caused the conversion of glucose to glycogen (for storage in the liver) 02

cells and muscles) Also increased the rate of up take of glucose during respiration; *break down of glucose / oxidation of glucose*

- (iii) Blood glucose level *increased*; because *the* low level of glucose stimulated the release of glucagon to facilitate the conversion of glycogen to glucose; *insulin is used up.* ✓

(d) (i) Pancreas;

(ii) Blood glucose level would rise above normal; which causes diabetes mellitus;

iii) Glucagon hormone; facilitates the conversion of glycogen to glucose and so increases the level of glucose in blood;

(d) Too much glucose in blood tends to cause over production of energy which can burn/ kill the tissues;  
Too little/ low level of glucose reduces energy production which can lead to death.

32. (a) (i) A Sensory neurone;  
B Motor neurone;

(ii) State three structures between neurone A and neurone B.

Sensory neurone	Motor neurone
Cell body situated between the axon and dendron.	Cell body situated at the terminal end of the axon;
Long dendron	Short Dendron;
Short axon	Long axon;
Cell body located outside the central nervous system	Cell body located in the central nervous system;
Has only one dendron	Has numerous dendrons;

@ 01 max = 03marks

(b) (i) Reflex

01mark

(ii) Describe the process that resulted in the action.



- When a foot stepped on the thorn, the pain receptors in the skin are stimulated;
- The pain receptors immediately generate impulses; that are carried by the sensory neurons to the spinal cord;
- The impulses are then transmitted from sensory neuron to interneuron; across a synapse;
- Then impulses are conducted from interneuron to the motor neuron; across another synapse;
- The impulses leave the spinal cord along the motor neurone to the effectors /thigh muscles; which contract and foot is immediately withdrawn from the thorn;

**@ ½ Max = 03marks**

33. (a) R Sugar solution of R was more concentrated; hypertonic; to the fluid in the plant tissue R.
- S The sugar solution of S was of the same concentration; isotonic; to the fluid in the plant tissue S
- T The sugar solution of T, was more dilute; (hypotonic) to the fluid in the plant tissue T.
- (b) This is to prevent loss of moisture; from the petri-dish and gain of moisture into solutions in the petri-dishes from the atmosphere.
- (c) Stalk R had sap of less concentration; than sugar solution in the petri dish; so it lost water; to the sugar solution by osmosis; its cells became plasmolysed; and therefore the curvature inwards;
- Stalk T had sap more concentrated; than sugar solution in the petri-dish; it gained water; from the sugar solution in by osmosis; its cells became turgid; and therefore the curvature outward;

**Total 10 Marks**

## SECTION C

Answer any **two** questions from this section.

34. (a) Describe the mechanism of gaseous exchange in a cockroach. (10marks)
- Inhalation; abdominal muscles relax; causing increase in volume of the abdomen; spiracles open; and air ( $O_2$ ) enters the trachea; diffuses along the trachea; until it reaches the thin walled; and fluid-filled; tubes called tracheoles; oxygen diffuses in the fluid; and into the cells; at the end of the tracheal system; tracheoles have thin; permeable walls; which are in contact with the cells;
  - Exhalation; muscles of abdomen contract; reducing abdominal volume;  $CO_2$  diffuses from tracheoles; into the trachea; then to open spiracles; to the outside;

(b)

- Numerous spiracles; to allow entry of large amounts of  $O_2$  and exit  $CO_2$ ;
- Spiracles have valves; to keep them open to allow in  $O_2$ ; (and close to prevent water loss)
- Trachea have rings of chitin; to prevent collapsing when air pressure inside them falls;
- Tracheoles are thin-walled; to provide short diffusion distances for respiratory gases ( $CO_2$  and  $O_2$ );
- Tracheoles divide repeatedly; to increase surface area for absorption of gases;
- Tracheoles are fluid-filled; to dissolve respiratory gases;

**Total 15 Marks**

35. (a) What is parasitism? (2marks)  
Is an association between two organisms where one (the parasite) benefits and the other (the host) loses (adversely);
- (b) Give three effects of Ecto-parasites on their hosts. (3marks)
- Causes anemia
  - Destroy animals' skin, fur or wool.



- Causes wounds and sores on host's skin, allowing pathogens to enter its body.
- Cause body weakness
- Spread diseases

(c) Describe how tapeworms are adapted to the parasitic mode of life. (10marks)

- The larvae, cercaria, produces enzymes; which enable them to soften and penetrate the host's skin
- Adult worms have suckers for attachment so that they are not dislodged
- Male carries female ensuring that eggs produced by female are fertilized before being shed into blood vessels.
- Eggs have spines enabling them to bore through the narrow blood vessels to reach the intestines
- Eggs are produced in large numbers to enhance survival
- They have a secondary host, the snail to increase survival rate.
- Adult worm in blood produces chemical substances which protect it against the host's defense mechanism
- Cercaria or larvae are encysted and can remain dormant but viable for long period of time until they come into contact with human body
- Feed on host's blood, tissue fluid and cells and have no alimentary canal
- Both larva forms, miracidia and cercaria are able to swim increasing the chances of meeting their host

(maximum 10 marks)

Give Maximum 10 Marks

Total = 15Marks

36 (a) Describe what is meant by a fertile soil. (5marks)

A fertile soil is one with good drainage; aeration, with micro and macro-elements; in the right proportions; for plant growth;

(b) How are plants involved in soil conservation? (10marks)

- Provide leaf litter which provides mulch;
- The decomposing plant materials; add nutrients to soil.
- Root nodules with nitrogen fixing bacteria fix nitrogen into nitrates hence adding fertility;
- Plant roots maintain soil structure; and hence improve drainage & aeration.
- Organic matter from plants improves soil drainage;

Any 5

37. (a) What is photosynthesis? (2 marks)  
 Photosynthesis is the process by which green plants build up carbohydrates; from carbon dioxide and water in the presence of sunlight and chlorophyll;
- (b) Describe an experiment to show that light is necessary for photosynthesis. (8 marks)

**Aim: An experiment to show that light is necessary for photosynthesis;**  
 (00 ½ marks)

**Materials**

- Plant;
  - Aluminium foil
  - Water;
  - Source of heat
  - Ethanol;
  - White tile;
  - Iodine solution;
  - Test tube;
- (@ ½ mark Max. 01½ marks)

**Procedure/method:**

- (a) Destarch the plant, by leaving it in darkness for 24 hours;
- (b) Make a stencil from a piece of aluminum foil and attach it to the destarched leaf;
- (c) Place the plant in sunlight for four hours;
- (d) Destarched a leaf from the plant and remove the stencil from the leaf;
- (e) Dip the leaf in boiling water for two minutes;
  - To kill protoplasm to prevent any further chemical changes;
  - To burst any starch grains, so that the cells are permeable to iodine solution;
- (f) Roll up and place it in a test tube containing 70% methylated spirit (ethanol) ;
- (g) Boil the leaf in ethanol until all the chlorophyll is dissolved out;
- (h) Carefully remove the hardened leaf from ethanol;
- (i) Then dip the leaf into boiling water for one minute to soften it;
- (j) Then spread the leaf flat on a white surface and add drops of iodine over the leaf surface;
- (k) Finally wash leaf in cold water, hold leaf up in the light, and observe;

(@ ½ Max. 04½)



### **Observation**

- Parts of the leaf that did not receive light turned brown (or yellow);
- Parts of the leaf that received light turned blue-black (or blue) ;

*(@ ½ mark Max. 01marks)*

### **Conclusion**

- Starch is present only the parts of the leaf that received light; and so light is necessary for photosynthesis to take place.

*½ mark*

*Overall total = 8marks*

(c) Describe how leaves are adapted to absorption of sunlight energy.

*(5marks)*

- Leaves are broad and flat; providing a large surface area for absorption of sun light;
- Leaves are arranged into a mosaic pattern; to minimize over lapping; for maximum absorption of light;
- The leaves are thin; providing short distances for rapid penetration of light;
- Cuticle and epidemis are thin and transparent; for rapid penetration of light into leaf; Mesophyll cells have numerous chloroplast; containing chlorophyll; to trap light energy;
- Palisade cells are closed packed; forming a continuous layer for trapping light;
- Chloroplasts move and arranged alongside the cell wall facing the sunlight; for efficient absorption of light;

*(@½ mark Max. 5marks)*

**END**