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# BIOLOGY
# Unit 3
# Trial Examination

## SOLUTIONS BOOK

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**SEMESTER 1**

Use this page as an overlay for marking the multiple choice answer sheets. Simply photocopy the page onto an overhead projector sheet. The correct answers are open boxes below. Students should have marked their answers with a cross. Therefore, any open box with a cross inside it is correct and scores 1 mark.

| | | | | |
|---|---|---|---|---|
| 1. | | B | C | D |
| 2. | A | B | | D |
| 3. | A | B | | D |
| 4. | | B | C | D |
| 5. | A | B | | D |
| 6. | A | | C | D |
| 7. | | B | C | D |
| 8. | A | | C | D |
| 9. | | B | C | D |
| 10. | | B | C | D |
| 11. | A | | C | D |
| 12. | A | B | | D |
| 13. | | B | C | D |

| | | | | |
|---|---|---|---|---|
| 14. | A | B | C | |
| 15. | A | | C | D |
| 16. | A | B | | D |
| 17. | A | | C | D |
| 18. | A | B | C | |
| 19. | | B | C | D |
| 20. | A | | C | D |
| 21. | | B | C | D |
| 22. | A | | C | D |
| 23. | | B | C | D |
| 24. | A | B | C | |
| 25. | A | B | | D |

***TEACHERS, PLEASE NOTE:***

*In marking the Exam, teachers should keep in mind that the language used in the suggested answers is sometimes more sophisticated than a student would offer since these answers are written for teachers' information in their correction of the Exam.*

*The answers suggested here might not be the only correct responses possible. Teachers must use their professional judgement in awarding marks for other answers offered. However, in accordance with the VCAA practice, students who give a correct response, and then offer a contradictory incorrect response within the same part of the question, should* ***not*** *be awarded any marks for the correct part of the response. Also in accordance with the VCAA practice, no half marks should be given.*

***SECTION A - MULTIPLE CHOICE QUESTIONS (1 mark each: 25 marks)***

| | | | |
|---|---|---|---|
| *1* | *A* | *16* | *C* |
| *2* | *C* | *17* | *B* |
| *3* | *C* | *18* | *D* |
| *4* | *A* | *19* | *A* |
| *5* | *C* | *20* | *B* |
| *6* | *B* | *21* | *A* |
| *7* | *A* | *22* | *B* |
| *8* | *B* | *23* | *A* |
| *9* | *A* | *24* | *D* |
| *10* | *A* | *25* | *C* |
| *11* | *B* | | |
| *12* | *C* | | |
| *13* | *A* | | |
| *14* | *D* | | |
| *15* | *B* | | |

***SECTION B - WRITTEN RESPONSES***

***Question 1***

*a* *Nitrogen and sulphur* *2 marks*

*b* *Starch* *1 mark*

*c* *Glucose molecules* *1 mark*

*d* *The energy needs of plants is less than animals, therefore plants can store their resources as complex carbohydrates that are relatively easy to convert to glucose (1). Fats give more energy per gram than carbohydrates so animals use fat as long term storage but use the more easily converted carbohydrates for short term storage (1).* *2 marks*

***Total Question 1: 6 marks***

***Question 2***

*a* *The potato cube will lose or gain mass in the different sucrose solutions.* *1 mark*

*b* *Osmosis* *1 mark*

*c* *The independent variable is the concentration of the sucrose solution.* *1 mark*

*d* *The dependent variable is the mass loss or gain of the potato cubes.* *1 mark*

*e* *There is no control as such but the various factors that need to be controlled are the amount of solution, the size and shape of the potato cubes should be the same and the time that the cubes are left in the solution should be the same.* *2 marks*

*f* *0.2M sucrose (1). The graph shows that the cube has no overall loss or gain of water at this molarity (1).* *2 marks*

*g* *No the student is not correct (1). The total amount of solutes in the cell is equivalent to the concentration of 0.2M sucrose (1).* *2 marks*

***Total Question 2: 10 marks***

***Question 3***

*a* *A hormone is a chemical produced in an endocrine gland that is released into the bloodstream or other body fluids where it moves to target cells.* *1 mark*

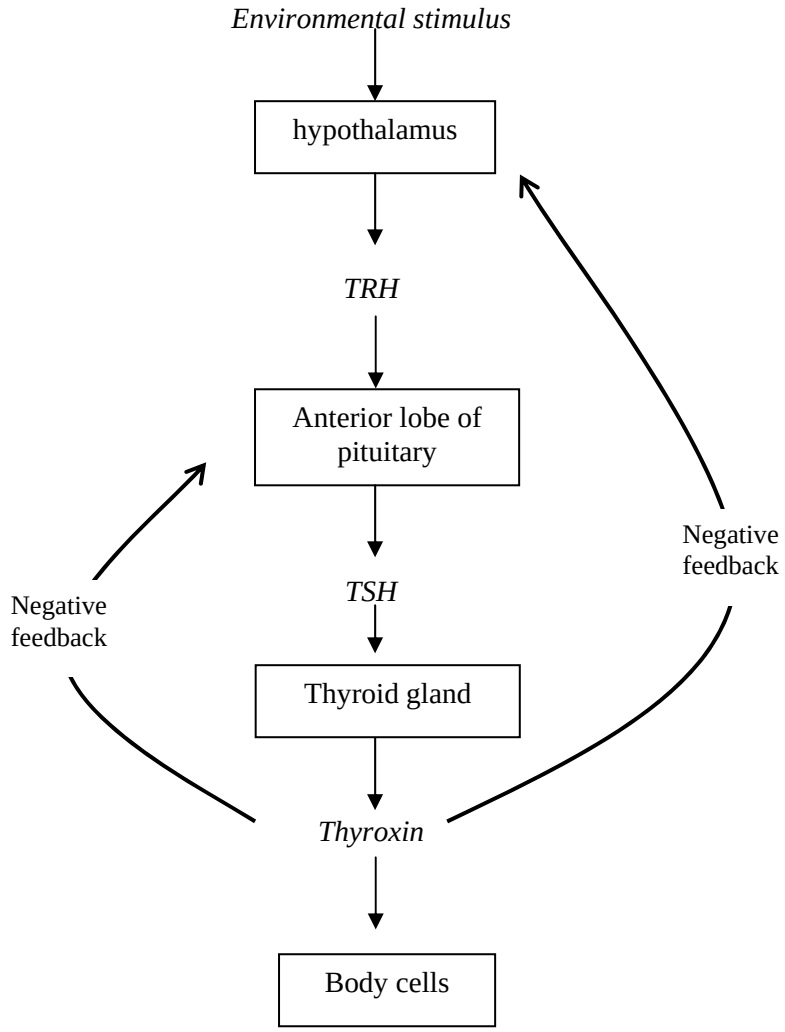
*b* *An increase in metabolic rate could be found by measuring an increase in oxygen uptake (1) as an increase in metabolic rate means an increase in aerobic respiration to provide energy and therefore an increase in oxygen uptake (1).* *2 marks*

*c* *As gene expression results in protein formation (1) fatty acid synthetase would be a protein (1).* *2 marks*

*d* *Fatty acid synthetase would be an enzyme and would function to speed up the rate of a chemical reaction.* *1 mark*

*e* *The levels of thyroxin in the bloodstream need to be maintained at a constant minimum amount so as to maintain a basic metabolic rate.* *1 mark*

*f*




*1 mark for correct labeling and 2 marks for correct negative feedback* *3 marks*

*g* *If iodine intake is reduced there would be insufficient thyroxin being formed (1) as a result therefore there would be an increase in both TRH and TSH (1).* *2 marks*

*h* *This is an autoimmune disease (1) as the body produces antibodies against its own tissue by failing to recognize "self" material (1).* *2 marks*

*i* *If these antibodies bind to the TSH receptor site and mimic what would happen if TSH itself bound then the result would be an increase in production of thyroxin (1) as the negative feedback of thyroxin resulting in less TSH would not result in lowering thyroxin production (1).* *2 marks*

***Total Question 3: 16 marks***

***Question 4***

| | | |
|---|---|---|
| *a* | *A signaling molecule is a molecule that transduces a signal between cells.* | *1 mark* |
| *b* | *A signal transduction pathway is the process by which a cell converts one kind of signal to another (1). An example is Systemin triggering the release of lipase → free linolenic acid → jasmonic acid → release of proteinase inhibitor (1).* | *2 marks* |
| *c* | *The browsing insect will not be able to produce proteinase enzymes for the breakdown of ingested protein (1) therefore causing the insect to become sick or take longer to develop increasing the chance of being eaten by predators (1).* | *2 marks* |
| *d* | *The action of pheromones is such that they are chemicals produced by living organisms that transmit a message to other individuals of the same species. Methyl jasmonate is similar to a pheromone in that it is a volatile chemical that affects other living organisms (1) but it is different from a pheromone in that it is not influencing in this case members of its own species (1).* | *2 marks* |
| | ***Total Question 4:*** | ***7 marks*** |

***Question 5***

| | | |
|---|---|---|
| *a* | *An RNA virus is an intracellular parasite whose genetic material is RNA rather than DNA.* | *1 mark* |
| *b* | *enzymes* | *1 mark* |
| *c* | *When the viral genetic material has been changed into DNA and incorporated into the host genome (1), this DNA can be copied to mRNA and translated into proteins forming the viral coat and the enzyme reverse transcriptase (1).* | *2 marks* |
| *d* | *Macrophages that have ingested microorganisms display antigens on their surface that the T helper cell recognizes (1). B cells that bind to the same macrophage are helped to differentiate into plasma cells that produce antibodies (1).* | *2 marks* |
| *e* | *The protein SPL7013 by binding to the surface of the virus particle will prevent the virus particles from attaching to the T cells (1) should the virus particles manage to move through the vagina into the bloodstream. If the virus particles cannot attach to the T cells then they cannot deliver their RNA and reverse transcriptase into the cell for reproduction (1). So HIV rates would be expected to fall.* | *2 marks* |
| *f* | *A vaccination involves injecting an individual with a suspension of attenuated living or dead virus that will stimulate the immune system to produce specific antibodies (1) whereas this treatment does not involve the production of antibodies (1).* | *2 marks* |
| *g* | *Proteins that are foreign as SPL7013 is, can be detected by the immune system and as a result antibodies could be formed against it.* | *1 mark* |
| | ***Total Question 5:*** | ***11 marks*** |
| | ***Total Section B:*** | ***50 marks*** |
| | ***Total Exam:*** | ***75 marks*** |

**END OF SUGGESTED SOLUTIONS**