

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		C	D
4.	A	B		D
5.	A	B	C	
6.	A		C	D
7.	A	B		D
8.	A	B	C	
9.	A		C	D
10.	A	B	C	
11.	A		C	D
12.		B	C	D
13.		B	C	D

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

SECTION B - WRITTEN RESPONSES**Question 1**

- a Carbohydrate (accept Cellulose) 1 mark
- b Glucose (accept monosaccharide) 1 mark
- c Both biomacromolecules are made up of the same monomers glucose. 1 mark
- d The monomers are joined together differently and therefore need different enzymes to break them down (1). Humans have the enzymes to be able to break down biomacromolecule 2 but not biomacromolecule 1(1). 2 marks
- e The monomer, glucose, passes mainly by facilitated diffusion (from areas of high concentration to areas of low concentration) through protein channels. 1 marks

Total Question 1: 6 marks

Question 2

- a Attach both an anticancer drug and also a vitamin, such as folic acid, that is absorbed in higher quantities by cancer cells than normal cells, to a dendrimer 1 mark
- b Take two groups of mice of the same age that are suffering from the same type of cancer (1). Treat one group with the dendrimer to which an anticancer drug and folic acid have been attached, and treat the other group with the anticancer drug administered by normal injection (1). The treatment with the dendrimer would be considered to be effective if a much higher proportion of mice given the dendrimer, with the attached drug, survived, than mice in the other group (1). 3 marks

Total Question 2: 4 marks

Question 3

- a Box A Receptors
Box B Effectors 2 marks
- b This is a Negative Feedback (1) as the response given by the effectors, represented by Box B, will act on the variable or stimulus causing it to increase if it is too low or decrease if it is too high (1). 2 marks
- c Any suitable example. eg Variable – glucose level is too high
Receptor – Islets of Langerhan cells in the pancreas (1)
Effector – alpha cells in the pancreas produce less glucagon and (1) beta cells of the pancreas produce more insulin.
Response – glucose moves from the bloodstream into cells (1). 3 marks
- Total Question 3: 7 marks**

Question 4

- a Structural protein 1 mark
- b Secondary structure (accept β pleated sheet) 1 mark
- c One of either: This is a structural protein which needs to be strong in order to support connective tissue OR
The pleated sheet structure of the protein gives long range elasticity. 1 mark
- d Guanine (correct spelling for 1 mark). 1 mark
- e The amino acid cysteine in position 1734 in the normal individual is replaced by tyrosine in the Marfan's Syndrome individual. 1 mark
- Total Question 4: 5 marks**

Question 5

- a Signal transduction 1 mark
- b Red light is needed for germination of the lettuce seeds. 1 mark
- c Set up the same experiment as above (1) and then expose the seeds that had been placed in far red light to white light for a period of time. If most of the seeds then germinate it can be concluded that the far red light did not kill the embryo (1). 2 marks
- d The final wavelength of light exposure determines whether the seed will germinate. Or the effects of red light and far red are mutually exclusive. 1 mark
- e Red light and far red light reverse each other's effects. 1 mark
- f Red light is needed to convert inactive P_r to the active form, P_{fr} in order to bring about germination (1). If the seeds are buried well below where light can penetrate then no germination will occur (1). 2 marks
- g Chlorophyll absorbs red light for photosynthesis but not far red (1). The shaded plant will therefore be exposed to more far red light than red light. This will have the effect of the active P_{fr} being converted to the inactive P_r (1). The result will be stem elongation as P_{fr} prevents stem elongation (1). 3 marks
- Total Question 5: 11 marks**

Question 6

- a Droplet infection. (Coughing/sneezing) 1 mark
- b Interferon is a group of proteins (1) that when released from virus infected cells make locally uninfected cells more resistant to virus infection by causing them to make antiviral proteins (1). 2 marks
- c Cells are quite specific in their receptor sites that enable viruses to penetrate them. Horse cells have receptors enabling Equine virus to penetrate but human cells do not have these receptors so are not susceptible to the Equine virus. 1 mark
- d As the virus is capable of changing its antigenic structure the antibodies that a horse might have against a previous virus would no longer be effective (1). By being vaccinated with a new weakened strain the horse will form new antibodies specifically against the new antigens (1). 2 marks
- e If the mother was vaccinated just prior to birth, her antibodies would cross the placenta and would also be present in the breast milk (1). These maternal antibodies would interfere with the immune response of the foal if it was vaccinated too soon. The maternal antibodies would eventually be broken down and the foal would be left with no antibodies against the virus (1). 2 marks

Total Question 6: 8 marks

Question 7

- a Desmosomes hold cells together. The fine fibrils that extend from the protein plaques into the cytosol of the two adjacent cells act as anchoring sites (1). This structure is very strong as the cells are interconnected by these filaments (1). 2 marks
- b An autoimmune disease. 1 mark
- c All cells have specific proteins called markers on their cell membranes (1). B cells and T cells recognize cells as “self” i.e. being part of the same body if they have the same markers as the B and T cells and they will not initiate an immune response and destroy them (1). 2 marks
- d IVIG contains IgG immunoglobulins which are antibodies. These antibodies would bind to the abnormal autoantibodies and remove them. 1 marks
- e This is passive immunity (1). The antibodies have been formed in another person and then injected into the patient (1). 2 marks
- f As the injected antibodies are foreign protein the individual will form their own antibodies against these injected antibodies and will therefore destroy them in 2 to 3 months. 1 mark

Total Question 7: 9 marks

Total Section B: 50 marks

Total examination: 75 marks

END OF SUGGESTED SOLUTIONS