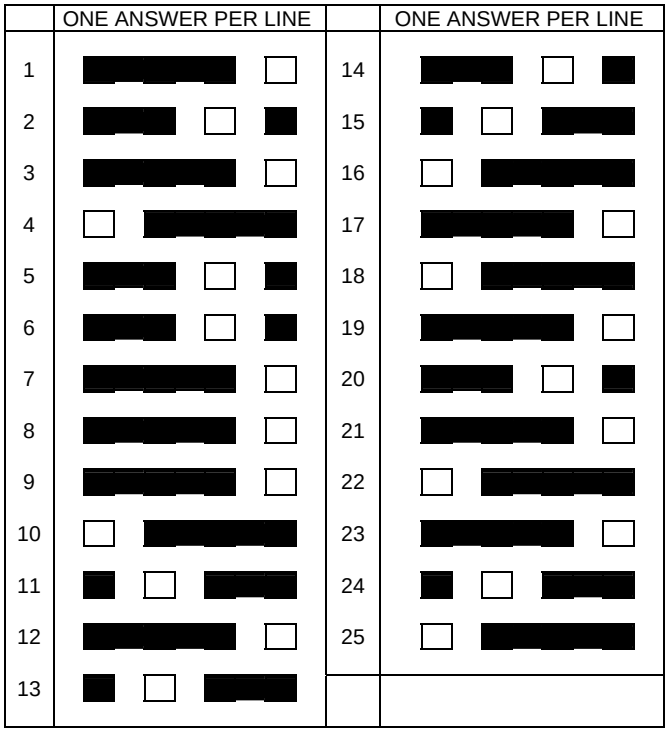
BIOLOGY
Unit 3
Trial Examination

SOLUTIONS BOOK

Published by STAV Publishing. STAV House, 5 Munro Street, Coburg VIC 3058 Australia.
Phone: 61 + 3 9385 3999 • Fax: 61 + 3 9386 6722 • Email: stav@stav.vic.edu.au Website: http://www.sciencevictoria.com.au/stavpublishing/

ABN 61 527 110 823

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 shaded their answers. Therefore, any open box with shading inside it is correct and scores 1 mark.



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

SECTION B - WRITTEN RESPONSES

Question 1

a	*Triglyceride*	*1 mark*
b	*Fatty acids (1) and glycerol (1)*	*2 marks*
c	*The chylomicron is surrounded by phospholipid molecules and is therefore hydrophilic on the outside and hydrophobic on the inside (1). The triglycerides are hydrophobic and will dissolve in the hydrophobic interior of the chylomicron (1) and can be transported as the hydrophilic part of the chylomicron will enable it to be transported in the blood which is a polar liquid.*	*2 marks*
d	*Primary structure.*	*1 mark*
e	***X*** *is an alpha helix (1) and* ***Y*** *is a beta pleated sheet (1).*	*2 marks*
	Total Question 1:	***8 marks***

Question 2

a	*This is a sensory or afferent neuron, as it brings information into the spinal cord.*	*1 mark*
b	*Action potential.*	*1 mark*
c	*Influx of sodium ions.*	*1 mark*
d	*The pacinian corpuscle only fires off when there is a change in stimulus (1). A firm fitting ring or belt will only fire off at the start, and, as there is no change there will be no excitation of the pacinian corpuscle after that, hence the person doesn't feel the sensation (1).*	*2 marks*
e	*There will be no response as they will cancel each other out as A is excitatory and B is inhibitory.*	*1 mark*

f *The Ca^{2+} ions would not be able to enter the neuron as the drug blocks the calcium channels (1). As Ca^{2+} ions are needed for the membrane of the vesicle containing the neurotransmittor to fuse to the presynaptic membrane to release the neurotransmittor there will be no passage of impulse across the synapse (1) and therefore no further relay of the message.* *2 marks*

Total Question 2: ***8 marks***

Question 3

a *The shade leaves as the value of the graph is higher than for the sun leaves.* *1 mark*

b *The shade leaf is T/S B and the sun leaf is T/S A (1). The sun leaf will have a thicker palisade layer to maximize photosynthesis when light is abundant as light can penetrate the leaf (1).* *2 marks*

c *In full white light sun plants will have a greater rate of photosynthesis.* *1 mark*

d *The temperature must be kept constant (1) as an increase in temperature will increase the rate of photosynthesis (1).* *2 marks*

e *As the sun plant leaves took a shorter time to float (1) their rate of photosynthesis in full light is faster than shade leaves (1).* *2 marks*

f *As the shade plant leaves took a shorter time to float they were able to photosynthesise faster in green light than the sun plant leaves. (1)* *1 mark*

g *In its natural environment the sun plant has full light and can readily absorb blue and red light for photosynthesis, the shade leaves will receive the light that has passed through the canopy with little blue and red light (1) so it needs to be able to utilize other wavelengths (1) such as green light in order to photosynthesise.* *2 marks*

Total Question 3: ***11 marks***

Question 4

a *Cholesterol is needed to maintain fluidity and flexibility in the cell membrane.* *1 mark*

b *An enzyme.* *1 mark*

c *Competitive inhibition means that the substrate and the inhibitor must both compete for the active site of the enzyme (1). In order to do this, the inhibitor and the substrate must have a similar shape to attach to the active site, therefore statin has a similar shape to HMG-CoA (1).* *2 marks*

d *Rational drug design involves the research into the construction of a drug that fits a biological target and interferes with its action. Rational drug design would have involved finding a compound that inactivates an enzyme in the pathway to form cholesterol.* *1 mark*

e *Patients would experience a build-up of statins in the body as they are prevented from being broken down and this would be toxic to the patient.* *1 mark*

Total Question 4: ***6 marks***

Question 5

a	*A protein*	*1 mark*
b	*Passive immunity (1). The antibodies have been made in another individual and passed on, in this case, in the breast milk (1).*	*2 marks*
c	*A receptor protein*	*1 mark*
d	*Receptor mediated endocytosis or endocytosis.*	*1 mark*
e	*In an acidic pH the antibody is able to bind to the receptor and is held in this acidic environment as the vesicle moves through the cell (1). On the other blood side of the cell, the pH is alkaline and the antibody, due to change in shape at a different pH, does not bind as well in an alkaline environment and so is released (1).*	*2 marks*
	Total Question 5:	***7 marks***

Question 6

a		*The flagella allow them to propel themselves through the thick mucus.* ***Or*** *Production of protease enzymes that digest the mucus would enable the bacteria to reach the intestine cells.*	*1 mark*
b	*i*	*Any of: The acidity of the stomach* ***Or*** *Digestive enzymes in the intestine* ***Or*** *Natural flora of the intestine*	*1 mark*
	ii	*The cell wall would be resistant to acid or enzyme attack* ***Or*** *they undergo rapid reproduction.*	*1 mark*
c		*Signal Transduction.*	*1 mark*
d		*As chloride and sodium ions move into the lumen of the small intestine, the concentration of solutes becomes higher in the lumen of the intestine (1), water will move by osmosis from the area of low concentration of solutes (the cells) into areas of high concentrations of solutes (1) (the lumen of the intestine) resulting in diarrhoea and dehydration.*	*2 marks*
e		*A vaccine is a suspension of attenuated living or dead microorganisms that when introduced into an individual results in the production of specific antibodies.*	*1 mark*
f		*As cholera is caused by enteric bacteria, by taking an oral vaccine antibodies are more likely to be found close to the intestine where the bacteria are.*	*1 mark*
g		*After vaccination the antigens in the vaccination combine with some B cells, causing them to reproduce to form cloned cells (1). These cloned cells then form plasma cells that produce antibodies against the cholera bacteria. Some B cells form B memory cells that survive and react immediately to produce antibodies should a person become infected with the cholera bacteria (1).*	*2 marks*
		Total Question 6:	***10 marks***

Total Section B: ***50 marks***
Total examination: ***75 marks***

END OF SUGGESTED SOLUTIONS