

***STAV***  
***Publishing***  
**2001**

**BIOLOGY**  
**Unit 4 Trial Examination**  
**SOLUTIONS BOOK**

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A.C.N. 007 165 611  
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**NOVEMBER 2001**

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

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

**TEACHERS, PLEASE NOTE:**

In marking the Trial Exam, teachers should keep in mind that this paper is designed as a teaching tool. 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 Trial 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	14	D
2	C	15	A
3	A	16	D
4	D	17	D
5	B	18	A
6	C	19	C
7	C	20	D
8	A	21	B
9	B	22	C
10	C	23	D
11	D	24	C
12	C	25	A
13	A		

**SECTION B – Short Answer Questions****Question 1**

- a  $I^A$  and  $i$  (All or nothing mark.) 1 mark
- b No it is not possible (1). The alleles of the parents are  $I^A$  and  $i$  as mother is blood group A  $I^A i$  or  $I^A I^A$ , and father is  $ii$ , so the baby must have got  $I^B$  allele from a different parent. (1) 2 marks
- c i 1 in 2, or 50% (1)
- ii 1 in 2, or 50% (The second child was group O, so the mother must be  $I^A i$ .) (1) 2 marks

**Total Question 1: 5 marks****Question 2**

- a Female, affected (All or nothing mark) 1 mark
- b  $X^R X^r$  1 mark
- c (The cross is  $X^R X^r$  and  $X^R Y$ )  
 $X^R Y$  - unaffected boy,  $X^R Y$  - affected boy,  $X^R X^r$  - affected girl,  $X^R X^R$  - affected girl (All 4 genotypes and phenotypes correct = 2 marks, one small mistake = 1 mark, no half marks) 2 marks

**Total Question 2: 4 marks**

**Question 3**

- a  $W^s W^w$  and  $W^s W^p$  (1 mark each) 2 marks  
 b 2 of each of the genotypes  $W^s W^s$ ,  $W^s W^p$  and  $W^s W^w$  (1 mark)  
 The genotype  $W^w W^p$  is lethal (1 mark)  
 A correct, suitable diagram to aid explanation - as at right. (1 mark)

	$W^s$	$W^p$
$W^s$	$W^s W^s$	$W^s W^p$
$W^w$	$W^s W^w$	$W^w W^p$

**Total Question 3: 5 marks**

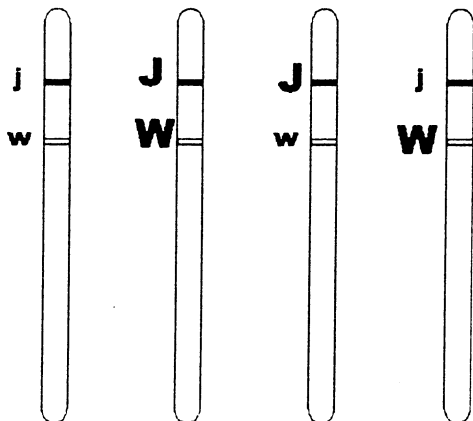
**Question 4**

- a Adenine and thymine (1)  
 Cytosine and guanine (1)  
 (NOTE: All spelling must be correct here) 2 marks  
 b (Reading from bottom of the gel up to the top...)  
 TAC GAT GCG CAT TAG CGT TCA 1 mark  
 c AUG CUA CGC GUA AUC GCA AGU 1 mark  
 d At a ribosome in the cytoplasm. (1) 1 mark  
 e 3 marks are to be awarded, either for correct labels on a diagram or for text correctly describing:  
 • mRNA moves through ribosome  
 • tRNA has complementary anticodon and carries amino acid  
 • amino acids link together to form polypeptide 3 marks  
 f Met-Leu-Arg-Val-Ile-Ala-Ser 1 mark  
 g A number of answers are possible here.  
 A correct point mutation (substitution, addition or deletion of one base). (1)  
 A correct consequence in terms of altered amino acid sequence. (1) 2 marks

**Total Question 4: 11 marks**

**Question 5**

- a Linked genes 1 mark  
 b All mice would be normal. 1 mark  
 c



Both non-recombinant chromosomes correct = 1 mark  
 Each correct recombinant chromosome 1 mark

- d Normal, both waltzer and jittery, just waltzer, just jittery.  
 (2 or 3 correct = 1 mark, all 4 correct = 2 marks) 3 marks  
 e Individuals with chromosomes rearranged compared to the parental chromosome type. (1) 2 marks  
 f The map shows that the genes are 18 map units apart (1)  
 This means that 18% of the offspring in the  $F_2$  generation would be expected to be recombinants. (1) 1 mark  
2 marks

**Total Question 5: 10 marks**

**Question 6**

- a *founders* 1 mark
- b *There are several niches on some of the islands (1), so different species of finch have evolved to occupy these different niches. (1)* 2 marks
- c *Start: 1400 birds*  
*End: 200 – 250 birds*  
*(In line with VCAA policy, answers should be VERY close to these numbers to gain the mark.) (All or nothing for the mark here.)* 1 mark
- d *There was variation in the gene pool of the finches for beak size. (1)*  
*The drought meant that only large beaked birds were well adapted to obtain food. (1) These large beaked birds survived to breed, many smaller beaked birds did not, so the average beak size of the surviving birds increased. (1)* 3 marks
- e *Prediction: The average beak size remained near 11 mm. (1)*  
*Explanation: The birds with smaller beaks had been selected out of the gene pool, so average beak size remained larger than before the drought. (1)*  
*(NOTE: This question is based on genuine research, and the beak sizes did, in fact, remain larger.)* 2 marks

**Total Question 6: 9 marks****Question 7**

- a *<sup>14</sup>C dating is not accurate over time spans as long as 3.3 million years, rock dating is more reliable here.* 1 mark
- b *Curved fingers and powerful thumb are useful for holding onto branches. (1)*  
*This suggests that Australopithecus spent at least part of the time in trees. (1)* 2 marks
- c *Divergent evolution* 1 mark
- d *Answers may vary. Features include: increasing cranium (and so brain) size, protruding/receding jaw bones, "heaviness" of brow bones. (1)*  
*Order is: Australopithecus, Neanderthal man, Modern man (1)* 2 marks

**Total Question 7: 6 marks****Total Section B: 50 marks****Total Examination : 75 marks**