



Trial Examination 2000

# VCE Biology Unit 4

Written Examination

Suggested Solutions

**SECTION 1**

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

**SECTION 2****Question 1**

- a. A codon is 3 bases of mRNA. 1 mark
- b. Translation. 1 mark
- c.

Base Number	1	2	3	4	5	6	7	8	9	10	11	12	13
DNA	C	A	G	T	A	T	T	C	C	A	T	G	A
mRNA	G	U	C	A	U	A	A	G	G	U	A	C	U

- d. valine – isoleucine – arginine – tyrosine 1 mark
- e. serine – stop 1 mark
- f. Incomplete sequence, i.e. protein not produced. 1 mark
- g. Restriction enzymes or restriction endonucleases. 1 mark
- h. DNA is universal, the same four bases are found in the DNA of all living things. 1 mark
- i. Humans are choosing suitable features from organism. 1 mark

**Total 9 marks****Question 2**

- a. i. Strands are made of nucleotides which contain the bases adenine (A), thymine (T), cytosine (C) and guanine (G). A pairs with T, and C pairs with G. 1 mark
- ii. Bases that pair are complementary, so if the sequence of bases in one chain is complementary to the sequence of bases in another chain, it implies that the DNA is similar and that the two species are closely related. 1 mark
- b. i. • DNA not altered by age, formaldehyde.  
• All the DNA is present. 1 mark
- ii. Mitosis. 1 mark
- c. No.  
DNA will only match exactly from the same species. The two strands are from different species. 1 mark
- d. Looked the same anatomically. 1 mark
- e. No – because to interbreed they would have to be the same species. 1 mark

**Total 7 marks**

**Question 3**

Genetically identical copies are made, so if the parent is suited to the environment then the offspring will be as well.

For example, cuttings.

OR

Only one parent required, therefore energy efficient.

For example, bacteria.

2 × 1 mark  
Total 2 marks

**Question 4**

- a. i. Meiosis. ½ mark  
 ii. Mitosis. ½ mark  
 iii. Mitosis. ½ mark

b.

Stage	Haploid	Diploid
M		(✓)
O	✓	
Q	✓	
S		✓
T		✓
U		✓

5 × ½ mark  
Total 4 marks

**Question 5**

- a. i. P – TTLL, ttll. 1 mark  
 ii. Alternative form of a gene, occurs at the same locus on homologous chromosomes. 1 mark
- b. TtLl – tall, cut-leaved. 1 mark
- c. 9 tall, cut-leaf : 3 tall, potato-leaf : 3 dwarf, cut-leaf : 1 dwarf, potato leaf 2 marks  
 Total 5 marks

**Question 6**

- a. No. Alleles do not segregate usually as they are on the same chromosome. 2 marks

- b. 2 marks
- 
- $\overbrace{\hspace{10em}}^{20}$   
 ————| 2 |—————| 13 |—————| 5 |—————| 5 |—————|  
 A D B C

- c. i. Crossing over. 1 mark  
 ii. Meiosis. 1 mark  
 iii. Provides variation/mixes up existing genes.  
 Therefore, species is better equipped to resist environmental change. 2 marks

Total 8 marks

**Question 7**

- a. Species may be unable to interbreed. 1 mark
- b. One of: behaviour nocturnal/diurnal, different mating call, don't recognise each other, different requirements for breeding. 1 mark
- c. A characteristic of an organism which enables it to survive and reproduce in a particular environment. 1 mark
- d. i. Divergent evolution, OR speciation. 1 mark  
ii. Natural selection. 1 mark
- Total 6 marks

**Question 8**

- a. Sum of all the genes found in a particular population. 1 mark
- b. For example, no blood type A on Bentinck Island so no interbreeding.  
OR  
Any other suitable evidence from the table. 2 × 1 mark
- c. i. Not from mainland Australia. 1 mark  
ii. Mainland Australia. 1 mark
- d. Mutation, random change in the genetic material of one of the parents.  
OR  
Because only 42 individuals were tested on Bentinck Island the sample size was too small and the A allele may be present but not sampled. 2 × 1 mark
- e. Disagree. 1 mark  
Too short a time period (one generation) to significantly alter gene frequencies by interbreeding alone. 1 mark
- f. Culture. 1 mark
- Total 10 marks