



STAV Publishing 2007

BIOLOGY

Unit 4

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.stav.vic.edu.au>
© STAV Publishing October 2007
ABN 61 527 110 823

All rights reserved. Except under the conditions described in the Copyright Act 1968 of Australia and subsequent amendments, no part of this publication may be reprinted, reproduced or utilised in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any other information storage or retrieval system, without permission in writing from the publisher.

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

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

SECTION B - WRITTEN RESPONSES

Question 1

<i>a</i>	Male parent	Female parent	White puppies	Black puppies	Brown puppy
Genotypes	IiBb	IiBb	IIBB, IIBb, IiBb IiBB, IiBb, IiBb	IiBb, iiBB	iibb

(1) (1) All possibilities (1) (1)
2 marks

6 marks
1 mark

b Two
c A is the most dominant, followed by aⁿ, followed by a. (Data said 'a' was a recessive mutation)

1 mark
1 mark

d Aa and aⁿa
e Alexandra Aa and/or Aaⁿ
Normal aⁿa
Primrose Queen aa

3 marks
Total Question 1: 12 marks

Question 2

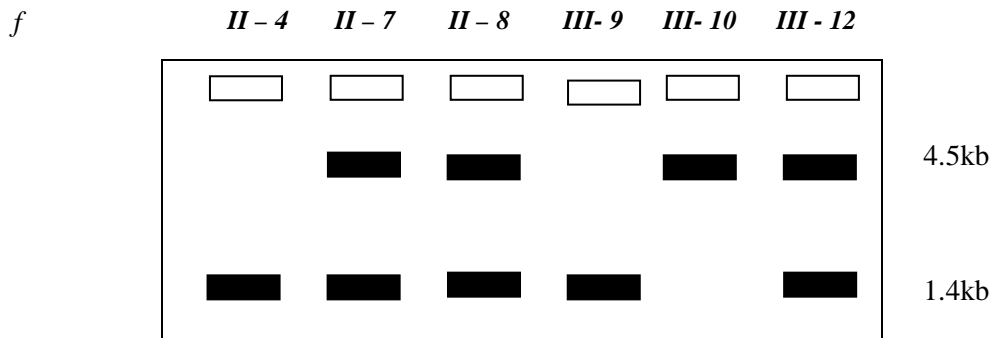
- a Autosomal as the gene is on an autosome (chromosome 1) (1). Dominant as rats that are heterozygous show resistance to warfarin (1). 2 marks
- b Anything appropriate eg. W for resistant and w for sensitive.
Warfarin resistant Ww and WW (1)
Warfarin sensitive ww (1) 2 marks
- c Those individuals that are heterozygous have a selective advantage over the homozygous recessive individuals in being resistant to warfarin (1) and a selective advantage over the homozygous dominant individuals in not requiring a large dose of vitamin K in the diet (1), and hence they have become more numerous in the population. 2 marks
- d The frequency of the dominant allele would tend to decline (1) as a resistance to warfarin is no longer a selective advantage and individuals that are homozygous resistant need a high intake of vitamin K and this becomes a selective disadvantage (1). 2 marks

Total Question 2: 8 marks**Question 3**

- a The allele is on the X chromosome (1) and it will not be expressed in a heterozygous organism (1). 2 marks
- b As this allele is on the X chromosome males only need to have one allele to have the condition as they only have one X chromosome (1) and as all sufferers have died before reproducing they have not been able to pass the allele on to their daughters (1). 2 marks
- c Gene therapy 1 mark
- d Anything reasonable. Two points for two marks.
The need to make sure that the gene is inserted into the right region of the individual's chromosome and not in the middle of a gene (1).
The gene needs to be "switched on" once inserted and "switched off" when appropriate (1).
The patient may have an immune response against the virus used as a vector to insert the gene (1). 2 marks
- e The gene for the gamma chain was inserted in or near the oncogene for leukaemia (1). This resulted in the activation of the oncogene and the boys dying of leukaemia (1). 2 marks
- f The allele for SCID would still be present in the gametes of the boys (1) and as this condition is X linked males only pass their X chromosome down to their daughters not their sons (1). 2 marks

Total Question 3: 11 marks**Question 4**

- a The condition is autosomal recessive (1) as II 7 and II 8 have an unaffected son. If it was X linked all males would not be carriers but would have the condition and if it was dominant there can be no carriers (1). 2 marks
- b G is guanine (1). A is adenine (1). Correct spelling for marks. 2 marks
- c Transcription is the process of copying the genetic instructions present in the DNA to messenger RNA. 1 mark
- d This would not result in repeated leucines being added to the polypeptide chain as the triplet repeats occur in the intron 1 of the gene (1) and the introns are removed from the primary mRNA leaving only the exons for translation (1). 2 marks
- e Polymerase chain reaction. (No marks for abbreviation PCR) 1 mark



Sizes in the right place (smallest at the bottom) (1) plus all correct 2 marks.

3 marks
Total Question 4: 11 marks

Question 5

- a* Genetic diversity is the genetic variation within a species i.e. the variety of alleles for the genes within a population of that species. 1 mark
- b* If a species with little genetic diversity is subject to an environmental pressure such as a disease all individuals will be equally susceptible and this could lead to the extermination of the species. 1 mark
- c* Rare alleles are more likely to be lost from small populations (1) and small populations are more susceptible to genetic bottlenecks (1) 2 marks

Total Question 5: 4 marks

Question 6

- a* Structural difference one: reduced canine teeth
Reason: cooking of meat not having to rip raw meat.
Structural difference two: reduced brow ridge
Reason: Brow ridges may have served as buttresses against the stress exerted by jaw muscles or as protection for the eyes. 2 marks
- b* This individual (ancestor 2) would be more closely related to modern man (1) than ancestor 1 as it has smaller brow ridges, and a larger brain case than ancestor 1 making its skull more structurally similar to modern man (1). 2 marks

Total Question 6: 4 marks

Total Section B: 50 marks
Total examination: 75 marks

END OF SUGGESTED SOLUTIONS