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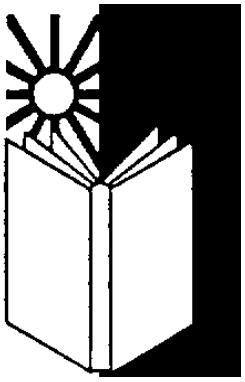

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BIOLOGY

Unit 4 Trial Examination
SOLUTIONS BOOK

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NOVEMBER 2002

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.

	A	B	C	D
1.				
2.				
3.				
4.				
5.				
6.				
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8.				
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23.				
24.				
25.				

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

SECTION B - WRITTEN RESPONSES

Question 1

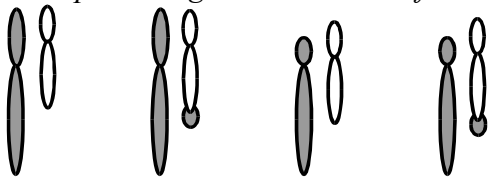
a *Non homologous chromosomes are chromosomes that are not a pair and therefore carry different genes at non-identical loci.* *1 mark*

b *Translocation is most likely to occur during crossing over of homologous chromosomes in **metaphase I** (1) during the first division of **meiosis**. (1)* *2 marks*

c

Only one possible gamete of the father. (1)

Four possible gametes, below, of the mother (all or nothing for 1 mark)



2 marks

d *The individuals that are phenotypically normal are physically/functionally the same as the individual that does not have the condition.* *1 mark*

e *½ OR 1 in 2 OR 50% OR 1:1* *1 mark*

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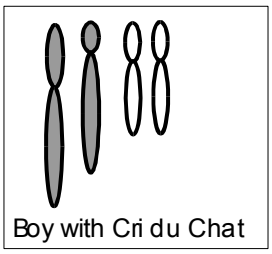
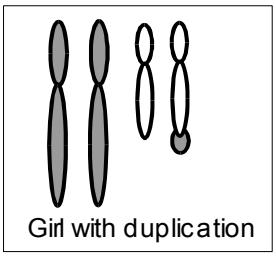
Question 1 continues:

f





1 mark each *2 marks*

g *Karyotype analysis* *1 mark*

h ***White blood cells*** *are collected from a blood sample taken from the child. (1) These cells are stimulated to divide then stained and the chromosomes of* ***actively mitotic cells*** *are photographed and examined for abnormalities.(1)* *2 marks*

Total Question 1: 12 marks

Question 2

a *AB, Ab, aB, ab. (All or nothing mark.)* *1 mark*

b

	AB	***Ab***	***aB***	***ab***
AB	*AABB*	*AABb*	*AaBB*	*AaBb*
Ab	*AABb*	*AAbb*	*AaBb*	*Aabb*
aB	*AaBB*	*AaBb*	*aaBB*	*aaBb*
ab	*AaBb*	*Aabb*	*aaBb*	*aabb*

Genotypes are AABB, AABb, AAbb, AaBB, AaBb, Aabb, aaBB, aaBb, aabb
1 mark ALL correct genotypes, 1 mark working shown correctly *2 marks*

c

Genotype	***Phenotype (flower colour)***	***Number out of 16 offspring***
AaBb	*Purple*	*9*
Aabb	*Red*	*3*
aaBb	*White*	*3*
aabb	*White*	*1*

1 mark for correct colours, 1 mark for correct ratios of colours, 1 mark for clear working *3 marks*

Total Question 2: 6 marks

Question 3

a *Cytosine, Adenine, Guanine (All or nothing, spelling must be perfect).* *1 mark*

b *An exon is part of the coding area of a gene that is both transcribed and translated.* *1 mark*

c *X linked recessive inheritance (1) as XX females can be carriers, and shown shaded, without showing symptoms but XY males either have the condition as in II-3, or do not, as in III-9. (Students must refer to the diagram for 1 mark here)* *2 marks*

d *PCR= Polymerase Chain Reaction (1)*
Purpose is to to reproduce a small sample of DNA through many cycles resulting in an adequate amount for testing. (1) *2 marks*

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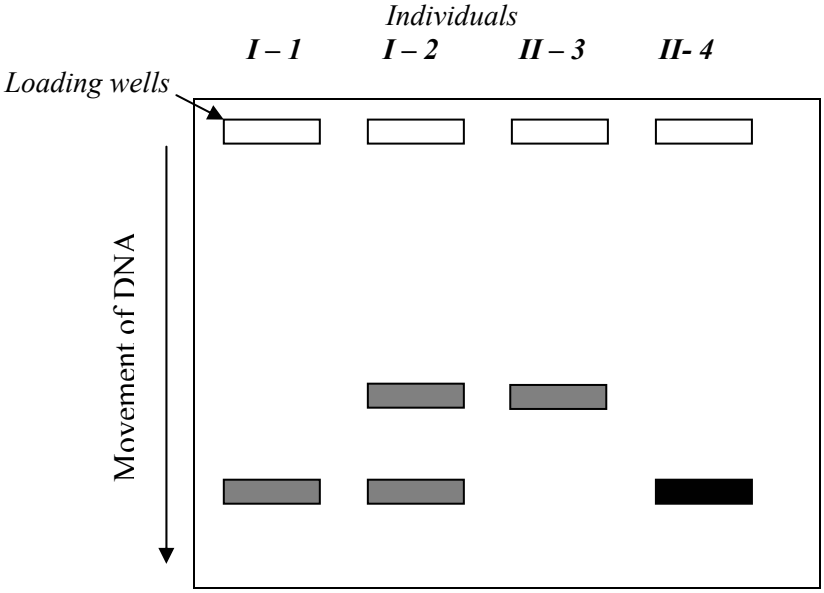
Question 3 continues:

e



1 mark for individuals I-1 and I-2 correct
1 mark for individuals II-3 and II-4 correct
1 mark for distinguishing that individual I-4 has twice as much DNA in the band (drawn thicker or darker) *3 marks*

Total Question 3: 9 marks

Question 4

a *haploid* *1 mark*

b *Founder Effect* *1 mark*

c *Analyse allele frequencies in surviving cheetahs. (1) If there is little diversity they all come from the surviving few. (1)* *2 marks*

d *Modern cheetahs lack genetic diversity. (1) Therefore a single environmental change could find none fit to survive it. (1)* *2 marks*

Total Question 4: 6 marks

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Question 5

a *Anything sensible, for example:*
- *It flew (there is no reason to assume that the common ancestor was flightless)*
- *It was blown there*

But not carried by humans (It moved long before humans had evolved.) *1 mark*

b
- *There was variation in the alleles for body size and wing size in the gene pool of the original birds. (1)*
- *There were no predators on Mauritius to kill large birds that didn't fly well.(1)*
- *The birds that survived put their energy into growing big bodies and small wings. (1)*
- *Over many generations of breeding, these large flightless birds became the most common in the population. (1)*

4 marks

c *Geographically isolated populations are unable to exchange alleles in their gene pools. (1) Therefore, with time and different selection pressures in the isolated places, enough variation accumulated in the gene pools that different species have evolved. (1)* *2 marks*

d *Anything sensible, for example:*
- *Humans caught the birds for food.*
- *Humans introduced predators that killed the birds.*
- *Humans destroyed the birds' habitat.* *1 mark*

e *Gondwana (1)*
A common ancestor has evolved into all these species that live in locations that were once part of Gondwana. (1) *2 marks*

Total Question 5: 10 marks

Question 6

a *Any two of:*
- *Anaerobic decomposition of the dead animal.*
- *Rapid covering by sediment or ash.*
- *Death in a place that was protected from scavengers.* *2 marks*

b *A fossil that would provide a link in the progression of features seen in fossils that have been discovered.* *1 mark*

c *Relative dating: Using comparisons of position of fossils in strata to establish a time-line. (1)* *2 marks*
Absolute dating: Using the decay of radioactive isotopes to estimate the time since a fossillised animal died. (1)

d *Bipedal* *1 mark*

e *Anything sensible, for example:*
- *Animal's head is higher, can see predators/prey/mates.*
- *Can carry food/weapons in the "hands".*
- *Can use hands to signal to other members of the species.* *1 mark*

Total Question 5: 7 marks

Total Section B: 50 marks

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