Methodist Ladies' College
Semester 2 Examination
2016

Question/Answer Booklet

12 ATAR BIOLOGY

Please place your student identification label here.

Student Number: In figures | | | | | | | | |

In words _____

_____

Time allowed for this paper

Reading time before commencing work: ten minutes
Working time for paper: three hours

Materials required/recommended for this paper

To be provided by the supervisor

This Question/Answer Booklet
Multiple-choice Answer Sheet

To be provided by the candidate

Standard items: pens (blue and black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters
Special items: non-programmable calculators satisfying the conditions set by the Curriculum Council for this course

Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

1234567-8

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of exam
Section One: Multiple-choice	30	30	40	60	30
Section Two: Short answer	6	6	90	100	50
Section three: Extended answer	4	2	50	40	20
				Total	100

Instructions to candidates

1. The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2016.* Sitting this examination implies that you agree to abide by these rules.

2. Answer the questions according to the following instructions.

   Section One: Answer all questions on the separate Multiple-choice Answer Sheet provided. For each question shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, do not erase or use correction fluid, and shade your new answer. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

   Section Two and Three: Write your answers in the spaces provided in this Question/Answer Booklet. Wherever possible, confine your answers to the line spaces provided. Use a blue or black pen for this section. **Only the graph may be drawn in pencil.**

   Section Three consists of **four** questions. You must answer **two** questions, **one from Unit 3 and one from Unit 4**. Tick the box next to the question you are answering. Do **not** copy the questions when answering. Answers could be presented in a variety of ways: using clearly labelled tables and graphs or diagrams with explanatory notes, writing lists of points with linking sentences, and drawing annotated flow diagrams with introductory notes.

3. You must be careful to refine your responses to the specific questions asked and to follow any instructions that are specific to a particular question

4. Spare answer pages are provided at the end of this booklet. They can be used for planning responses and/or as additional space if required to continue an answer.
   Planning: If you use your spare pages for planning, indicate this clearly at the top of the page.
   Continuing an answer: If you need to use the space to continue an answer, indicate on the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

See next page

Section One: Multiple-choice **30% (60 Marks)**

This section has **30** questions. Answer **all** questions on the separate Multiple-choice Answer Sheet provided. For each question shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Suggested working time: 30 – 40 minutes.

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1. Which of the following sets of data would be best represented by a line graph?

   (a) The average body mass of merino sheep bred and raised in different countries.
   (b) The amount of wool produced by different sheep breeds.
   (c) The average change in body mass of merino sheep provided with feed containing different types of mineral nutrients.
   (d) the effect of amount of food eaten on growth rate of Australian Merino and English Southdown sheep.

2. Transgenic cows have been successfully produced in New Zealand. These cows produce modified milk that contains a human therapeutic protein that can be used to treat disease.

   A transgenic organism is one that

   (a) contains artificially inserted genes from another organism.
   (b) has been bred with another species so that the offspring contain genes from the two parent species.
   (c) has not been genetically modified.
   (d) contains genes from an extinct ancestor.

3. Frogs are likely to be particularly sensitive to fungal diseases because they are

   a) ectotherms and cannot adapt physiologically to environmental change
   b) usually found in moist environments
   c) frequently bitten by mosquitos, allowing entry to fungi
   d) unable to create an immune response to pathogens

4. Tuberculosis continues to cause sickness in many third world countries in the world because of ALL EXCEPT which ONE of the following reasons:

   (a) poor drinking water quality.
   (b) lack of money for health care.
   (c) crowded living conditions.
   (d) many people susceptible due to poor nutrition.

See next page

5. Which of the following life processes is characteristic of a virus?

a) sensation
b) excretion
c) growth
d) replication

6. The enzyme that adds nucleotides into a newly forming DNA strand is

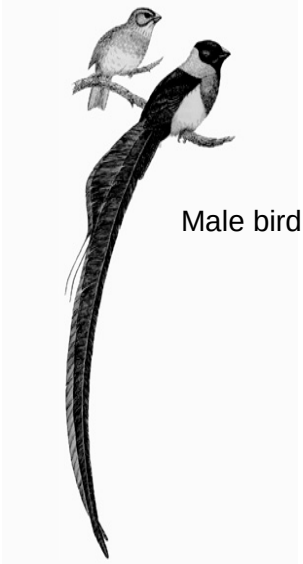
(a) DNA helicase.
(b) DNA primase.
(c) DNA ligase.
(d) DNA polymerase.

7. A section of DNA that codes for a protein is known as a

(a) allele.
(b) chromosome.
(c) gene.
(d) loci.

Question 8 refers to the graph and pictures below.

Female bird



Male bird

8. This graph demonstrates sexual selection because

(a) as a male's tail grows longer he becomes more attractive to females
(b) males with longer tails will have a greater chance of passing on the long tail allele to the next generation
(c) males who attract more females will fight off predators
(d) the longer the tail of a male the more likely he is to catch enough food to feed the offspring.

See next page

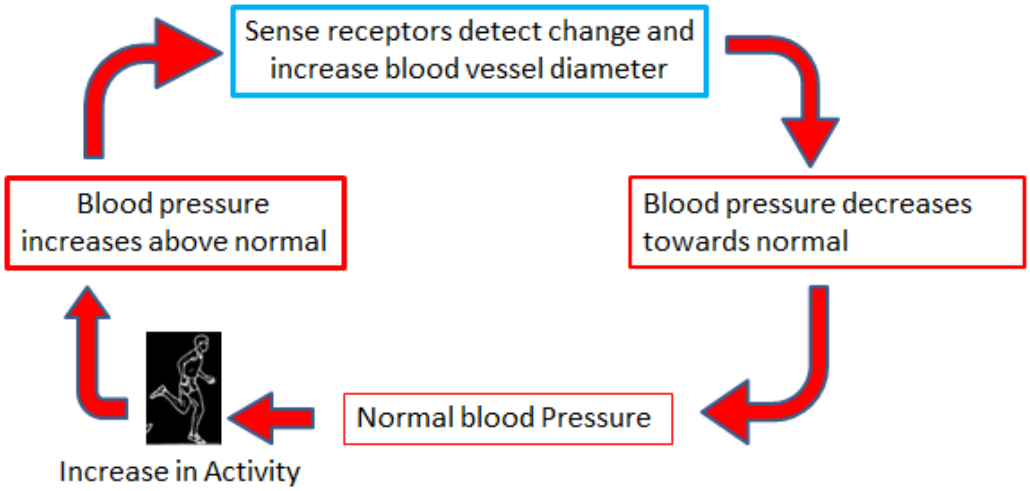
Biologists studying juvenile zebra sharks have noticed that they swim close to the surface and strongly resemble banded venomous sea snakes in colour and body form. The zebra sharks also use similar swimming movements to the sea snakes.

Juvenile zebra shark

9. The best hypothesis for this investigation would be that juvenile zebra sharks:

(a) avoid predation by mimicking venomous sea snakes.
(b) show convergent evolution with venomous sea snakes.
(c) appear similar to venomous sea snakes.
(d) swim closer to the surface than venomous sea snakes.

10. The flow diagram shows a homeostatic response in the body.



This sequence represents a

(a) positive feedback response, as it involves an increase in blood pressure.
(b) negative feedback response, as it produces an effect opposite to the stimulus.
(c) positive feedback, given it results in an increase in blood vessel diameter.
(d) negative feedback response, given it involves a decrease in blood pressure.

11. Of the factors listed below, which remains most constant in a human during a day?

(a) volume of fluid in cells
(b) fluid intake
(c) breathing rate
(d) blood concentration of hormones controlling urine production (ADH)

See next page

Questions 12 – 14 refer to the following information.

An experiment was carried out to investigate if exposure to a toxin (mustard gas) could cause mutations in *E. coli* bacteria. A solution of *E. coli* was carefully pipetted onto each of 5 plates. The *E. coli* plates were exposed to incubation in different concentrations of mustard gas, as shown in the table below. To test for mutations, an antibiotic (Ampicillin) was mixed into the agar on 4 of the plates, shown as √ in the table below**.** The final column shows the number of *E. coli* colonies after incubation.

Plate	Mustard gas (mg per L)	Ampicillin in agar	*E. coli* colonies per plate
P	none	none	600
Q	none	**√**	3
R	10 (low)	**√**	12
S	25 (medium)	**√**	30
T	50 (high)	**√**	60

12. Assuming NO bacteria were able to survive in ampicillin in the original population, what is the naturally occurring rate of mutation for ampicillin resistance in *E. coli*?

    (a) 10%
    (b) 2.0%
    (c) 0.5%
    (d) 5.0%

13. By how much does a high level (50 mg/L) of mustard gas change the naturally occurring mutation rate for ampicillin resistance in *E. coli*?

    (a) increases it 3 times
    (b) increases it 12 times
    (c) increases it 20 times
    (d) decreases it 10 times

14. Which plate or plates control/s for the effect of mustard gas exposure?

    (a) P
    (b) Q
    (c) P & Q
    (d) R & S

See next page

The next three questions depend on the following information.

Daphnia, a tiny freshwater invertebrate, sometimes appears red due to the presence of the respiratory pigment hemoglobin in its blood. At other times it appears colourless due to the absence of this pigment. Two experiments set out to investigate this difference.

Experiment 1

Colourless *Daphnia* were put in water of either high or low oxygen concentration. The effect on their colour is given below:

Oxygen concentration of water	High	Low
***Daphnia* colour**	remained colourless	turned red.

Experiment 2

Daphnia of different colours were put in water with very low oxygen concentration. Their life span varied, as given below.

***Daphnia* colour**	colourless	red
Survival time	short (< 1 day)	long (> 5 days).

15. From the results of Experiment 1 it can be inferred that:

(a) hemoglobin presence in *Daphnia* is determined genetically.
(b) colourless *Daphnia* are selected against as the oxygen content of water drops.
(c) *Daphnia* can produce hemoglobin in response to low oxygen concentration.
(d) *Daphnia* need hemoglobin to absorb oxygen

16. From the results of Experiment 2 alone, it appears that :

(a) *Daphnia* produce hemoglobin when sufficient oxygen is present.
(b) *Daphnia* can produce hemoglobin in response to low oxygen concentration.
(c) colourless *Daphnia* are selected against in water of low oxygen concentration.
(d) red *Daphnia* are selected against in water of high oxygen concentration.

17. From these observations and your biological understanding it seems likely that *Daphnia* evolved in water with oxygen concentration that was:

(a) variable.
(b) stable
(c) high.
(d) low.

18. A vaccination contains

(a) a small dose of pathogenic microorganisms
(b) dead or weakened microorganisms
(c) an anti-toxin to prevent effects of disease
(d) a small dose of antibodies

19. Which of the following methods is the <u>least</u> required to destroy all forms of bacteria in a growing culture?

(a) careful boiling of the nutrient agar before the bacteria start to grow.
(b) pasteurisation by heating the culture to 72^{o}C for 15 seconds
(c) heating the culture to 100^{0}C for 15 mins
(d) heating the culture to 120^{o}C for 15 mins, at high pressure

20. Direct spread of a disease could occur in all the following ways except:

(a) touching pus from an open wound.
(b) breathing in air containing viral particles
(c) eating lettuce with fecal bacteria from contaminated water
(d) touching one's nose after shaking hands with someone who just wiped their runny nose with their hand

21. Crown Gall in plants produces disease by:

(a) replicating a virus inside the plant cell.
(b) transferring a protist into the xylem tubes of the plant
(c) changing the DNA sequence of the infected plant
(d) multiplication of spores on the roots of the plant

22. Which of the following pathogens could replicate by binary fission?

(a) viral bee disease, such as sacbrood
(b) bat lyssavirus
(c) malaria
(d) crown gall disease

23. At some point in the life cycle of organisms which reproduce sexually, the diploid number of chromosomes must be reduced to the haploid number because:

(a) sperm cells must have the same number of chromosomes as egg cells
(b) the chromosome number would otherwise double in each generation
(c) mutations can alter the number of chromosomes in body cells
(d) all cells of an organism must have the same number of chromosomes

24. An example of a phenotype is

(a) AB type blood.
(b) two alleles, for type A and type B blood.
(c) a sperm with an allele for A blood.
(d) lack of iron in the diet causing anemia.

See next page

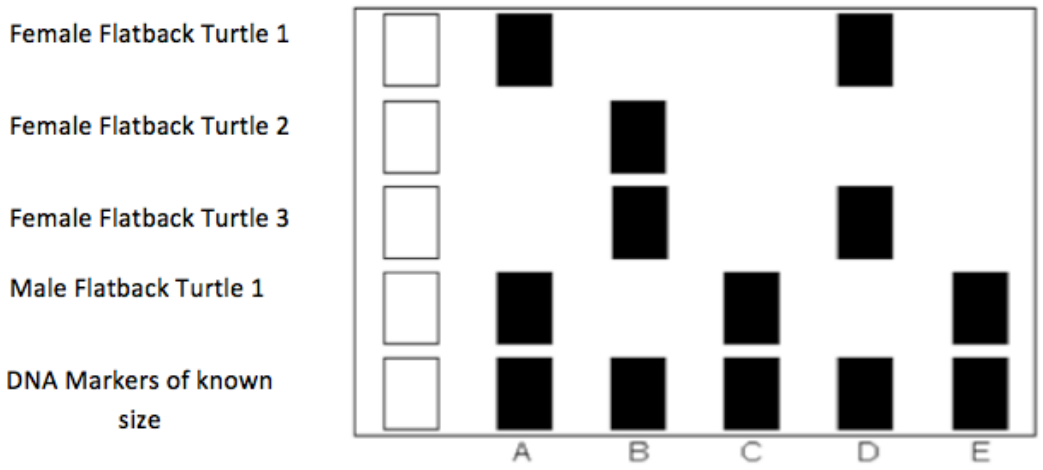
25. Homologous chromosomes are two chromosomes with:

(a) differing sets of genes, in the same sequence, with the same alleles
(b) the same set of genes, in a different sequence, with the same alleles
(c) a different set of genes, in the same sequence, with different alleles
(d) the same set of genes, in the same sequence, sometimes with different alleles

26. Comparative embryology reveals many similarities between the vertebrate families. These similarities do NOT include:

(a) pentadactyl limbs
(b) body hair
(c) gill slits
(d) post-anal tail

The image below shows the DNA fingerprints of three female Flatback Turtles and one male Flatback turtle. The female turtles are from the same breeding population.



27. Which is the most likely mother of the male Flatback turtle?

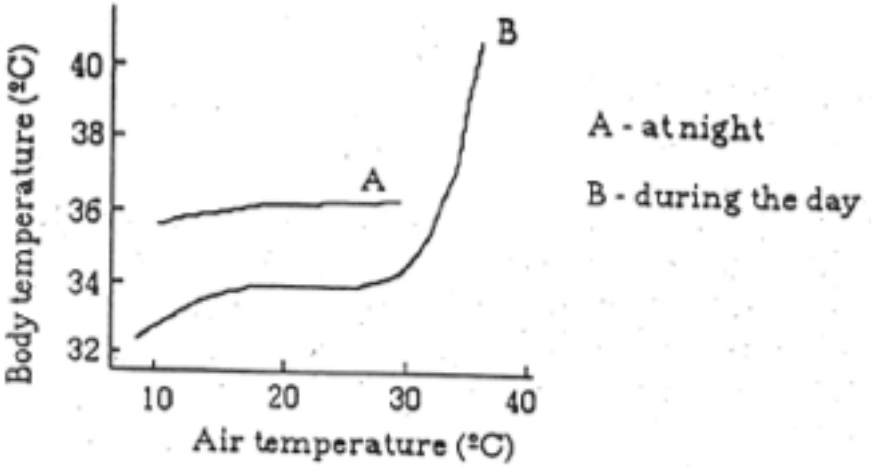
(a) Flatback Turtle 1
(b) Flatback Turtle 2
(c) Flatback Turtle 3
(d) None of these turtles

28. Body size is determined by the interaction of numerous alleles. This is an example of:

(a) monogenic inheritance
(b) polygenic inheritance
(c) codominance
(d) evolutionary change

See next page

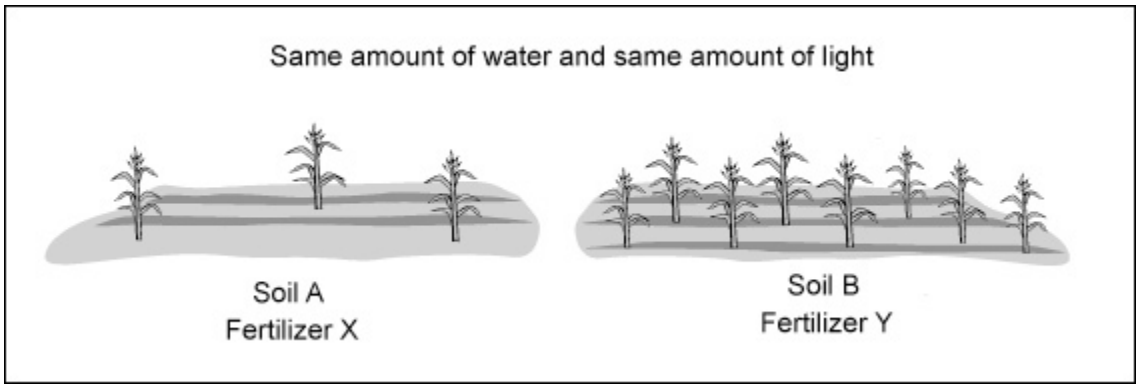
29. The following graph shows the body temperature of a nocturnally active possum at different air temperatures.



What is the normal resting body temperature of this possum?

(a) from 32 to 40 ºC
(b) usually about 4ºC higher than the air temperature
(c) 34 ºC
(d) 36 ºC

30. A farmer wants to find out which type of soil is best for growing corn. She also wants to find out which type of fertilizer is best for this corn. She sets up two plots using two different types of soil and two different types of fertilizer, as shown below:



The farmer can conclude from this experiment that

(a) Soil B is the best soil for growing corn.
(b) Fertilizer Y is the best fertilizer for growing corn.
(c) Soil B is the best soil and Fertilizer Y is the best fertilizer for growing corn.
(d) It is NOT possible to conclude from this experiment which soil or which fertilizer is best for growing corn.

End of Section One

See next page

Section Two: Short answer **50% (100 Marks)**

This section has **six (6)** questions. Answer **all** questions. Write your answers in the spaces provided in this Question/Answer Booklet. Wherever possible, confine your answers to the line spaces provided. Use a blue or black pen for this section. **Only the graph may be drawn in pencil.**
Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

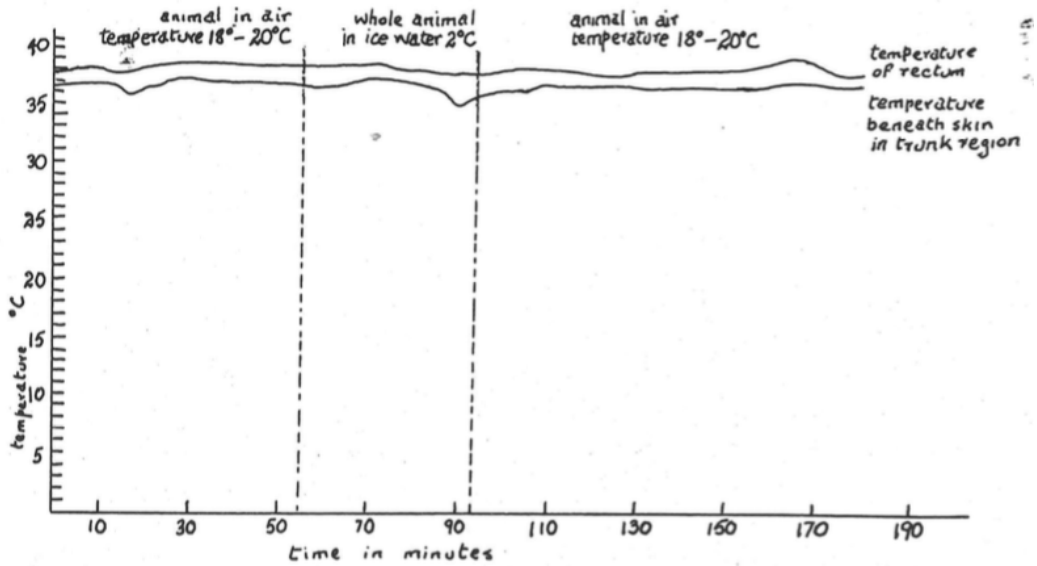
- Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
- Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question(s) that you are continuing to answer at the top of the page.

Suggested working time: 90 minutes.

Question 31 **19 marks**

The picture below shows a musk-rat from North America. It spends much time swimming in ice-cold water at about 0ºC. Its body is thickly furred, but its long tail is usually naked.

A muskrat was carefully fitted with temperature sensors, one in its rectum, one beneath the skin of its belly, and another attached to its tail. Graph A below shows the data from the first two temperature sensors.



GRAPH A

See next page

Recordings were taken as the animal was on land (18- 20^{o}C) for 55 mins, entered ice water at 2^{o}C for about 40 mins, and then returned to land for the remainder of the 180 minutes.

a) From the data in Graph A, is the musk rat ectothermic or endothermic? Justify your answer.

_____

_____

(2 marks)

b) The long naked tail forms a considerable part of the total body of the musk rat. Without referring to the data below, what effect would you have expected this to have on heat loss when the animal swims in ice water, and why? (2 marks)

_____

_____

_____

c) The data below shows the results from the tail thermometer. Graph these on the grid.

Note that as well as moving in and out of water, at 150 mins the musk rat began to run. Mark clearly on your graph the changes in conditions. (5 marks)

Time from start of experiment (mins)	Tail temperature ^{o}C	Time from start of experiment (mins)	Tail temperature ^{o}C
0	27.5	90	2
10	27	95	5 ***Left water***
15	29	100	7
30	28	110	12
50	30	125	15
55	***Entered water***	140	17
57	7	150	17
60	3	150	***Started running***
70	2	170	25
80	2.5	175	36

See next page

(If you wish to have a second attempt at this item, the grid is repeated at the end of the Question/Answer Booklet on page 47.Indicate clearly on this page if you use the second grid and cancel this grid).

d) Describe the effect on tail temperature of passing from air to ice water and back again.

(3 marks)

e) How is the change in tail temperature in ice water of great benefit to the musk rat?

(2 marks)

f) State and explain another change in tail temperature that benefits the musk rat, seen in the data above.

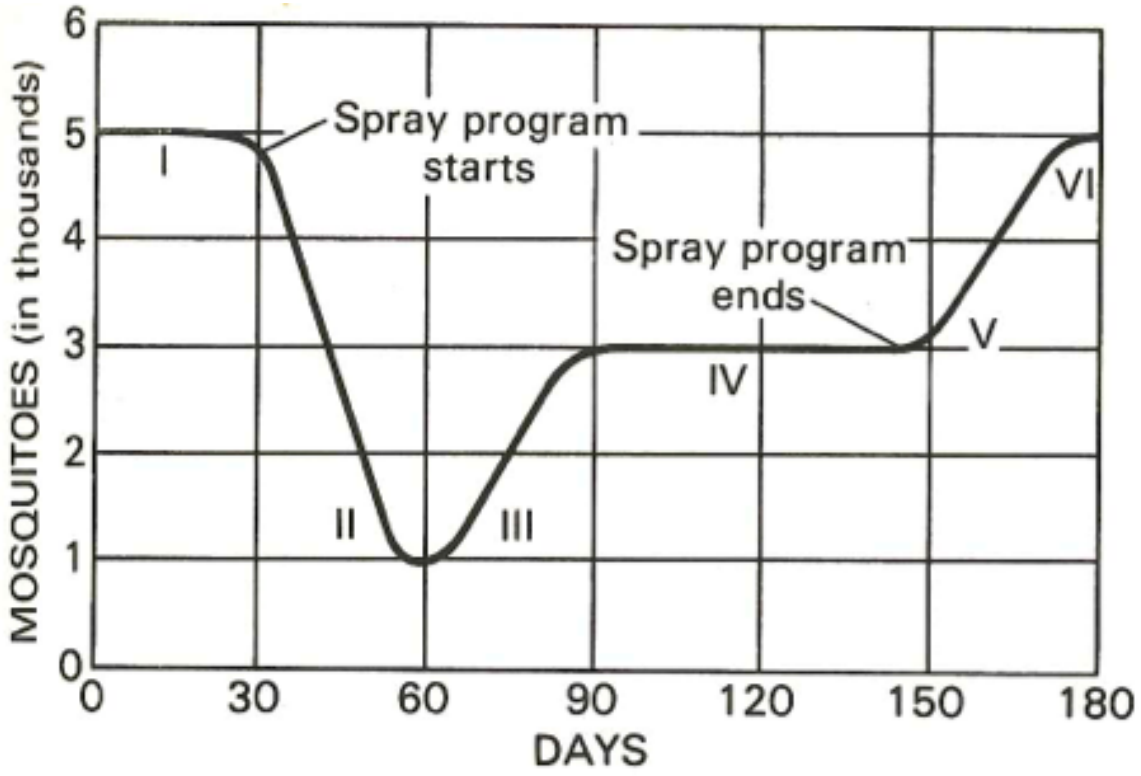
(3 marks)

g) Outline two ways this investigation could have been made more reliable.

(2 marks)

Question 32 **15 marks**

A tropical island was heavily infested with mosquitoes. Because of diseases carried by mosquitos, the health authorities decided to spray using Parathion, a long-lasting pesticide. Parathion is easily absorbed by insects and isn't broken down in organisms so it remains active in the air or soil for at least 15 years. Spraying with Parathion was carried out over a period of several months. Daily counts of mosquito population size yielded the following data:



a) Describe briefly the following; use dot points.

i. The change in mosquito number from point I to II. (1 mark)

_____

_____

ii. The change in mosquito population from III to IV (2 marks)

_____

_____

_____

b) Name the independent variable. (1 mark)

_____

See next page

c) What hypothesis were the authorities testing? (2 marks)

d) Did the experiment have a control? Explain. (2 marks)

e) State the likely effect of Parathion on the genetic makeup of the mosquito population at 180 days (VI) compared to the start (I). (1 mark)

f) i. Name the effect on the mosquitoes demonstrated by these results, which is often seen in the response of organisms to the continued use of chemicals. (1 mark)

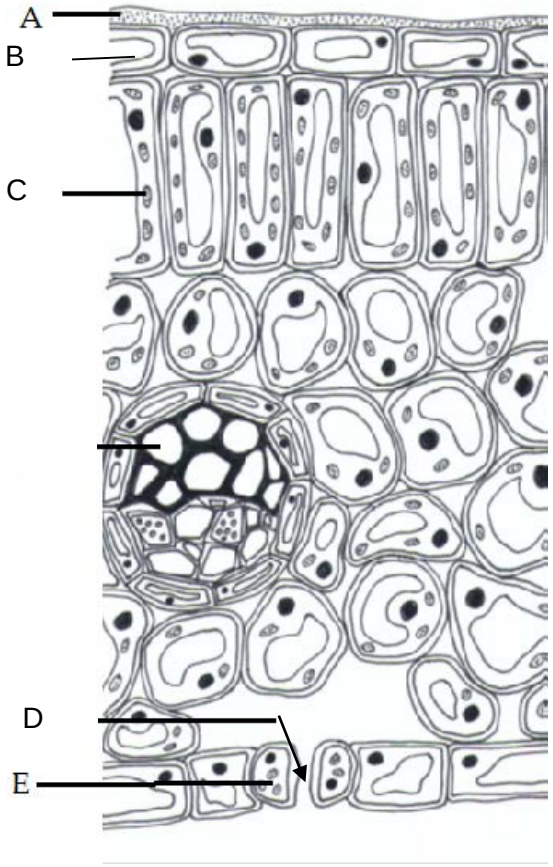
ii. What biological process underlies the effect named in f)i. above? (1 mark)

g) Will the spraying of mosquitos be beneficial to the health of the people on the island? Explain two possible consequences of the spraying program. (4 marks)

See next page

Question 33 **17 marks**

The diagram below shows the internal structure of a leaf from a temperate climate plant.



a) Referring to labelled parts of the diagram, state and explain three <u>differences</u> that you would expect to observe if this leaf were taken from a xerophyte. (6 marks)

1. _____

_____

_____

2. _____

_____

_____

3. _____

_____

_____

b) Name and explain a physiological adaptation allowing some plants such as cacti to carry out photosynthesis in very arid conditions. (3 marks)

Some jarrah forests in the South West of WA have experienced tree deaths due to extended high temperatures in recent summers. These forests are also threatened by a disease that causes death of branches.

c) Name the disease responsible for the death of many jarrah and other trees. (1 mark)

d) Name, draw and label key parts of the type of organism responsible for this disease. (3 marks)

e) Explain two adaptations of this disease that enable it to infect widespread areas of forest.

(4 marks)

Question 34 **(10 marks)**

Read the following adapted extract ***The Evolutionary Lessons of Marsupials*** and answer the questions that follow.

By 110 million years ago, mammals had split into two distinct groups, the placental mammals, including humans and most modern mammals, and the marsupial mammals. These groups evolved for millions of years in two increasingly different directions.

Their most obvious difference is the evolution of their reproductive approaches. Placental mammals develop inside their mother's womb giving birth to well-developed young. Marsupial mammals give birth to less-developed young which continue their development inside a pouch.

The evolution of marsupials was further shaped by the drifting of the continents. The ancient landmasses of Laurasia and Gondwana broke apart, isolating one group of marsupials on the continental island of Australia while isolating another group in South America. These separate populations of marsupials evolved separately into many differing species.

From: (Klappenbach 2013) [online] Available at: http://animals.about.com/cs/mammals/a/aa061901a.htm [Accessed: 2 Aug 2013].

a) Give two (2) different phrases or terms that best describe the type of evolution outlined in the article. (2 marks)

1._____

2. _____

b) Name, with brief description, two lines of evidence <u>other than</u> genomes or reproductive structures that scientists could have used to develop theories about the evolutionary pathways of mammals and marsupials. (2 marks)

1.

_____

_____

2.

_____

_____

c) Scientists have sequenced the genomes of marsupial species from South America and Australia. Explain how these genomes can give information about marsupial evolution. (2 marks)

_____

_____

_____

_____

Read the following information carefully to determine the relationships of different groups:

Wombats and Koalas share the sub order Vombatiformes. The wombat family Vombatidae consists of two genera *Vombatus* and *Lasiorhinus*.
The genus *Vombatus* has only one species *Vombatus ursinus*, the common wombat. However there are three existing subspecies *Vombatus ursinus hirustus* (Australian mainland), *Vombatus ursinus ursinus* (Flinders Island) and *Vombatus ursinus tasmaniensis* (Tasmania).
Lasiorhinus has two species, *Lasiorhinus krefftii* the northern hairy-nosed wombat and *Lasiorhinus latifrons*, the southern hairy-nosed wombat.

d) Use the information above to draw a phylogenetic tree showing the relationship between the different wombats. (4 marks)

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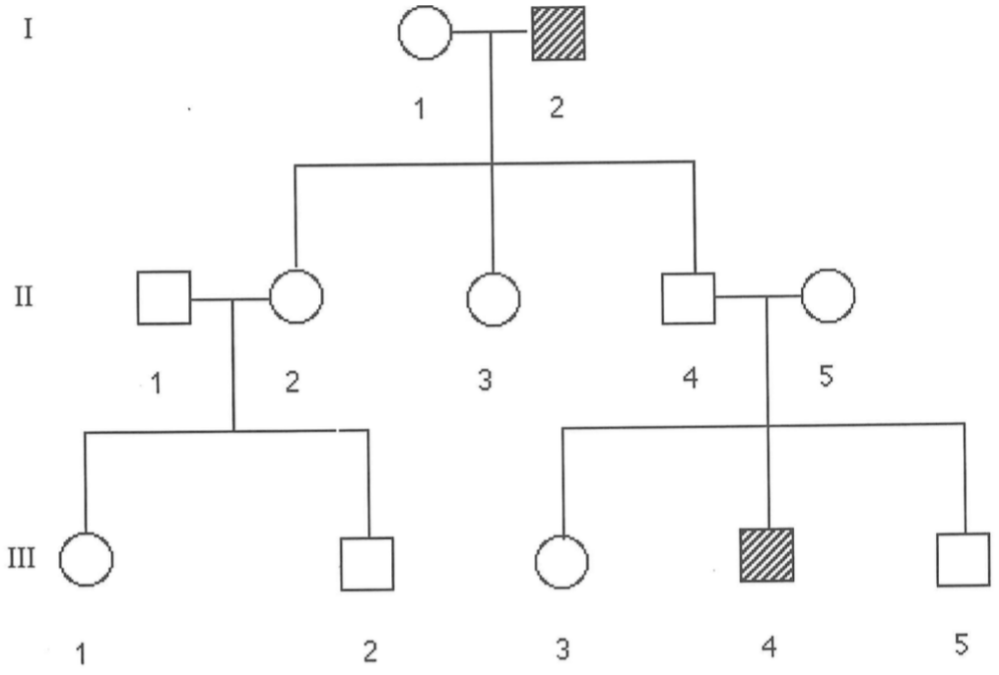
See next page

Question 35 **(20 marks)**

The pedigree below shows the inheritance of a skin condition in cattle that is rare but not serious. It is inherited as an autosomal recessive. Individuals possessing the trait are shaded. Using the symbols D for the normal allele and d for the disease allele, answer the questions below. Show full working.



a) What is the probability that each of the following individuals is heterozygous for the characteristic? Show your working or reasoning in each case.

i) II 3

ii) II 5

(2 + 2 marks)

See next page

b) Indicate whether the following statements are true or false and give a reason for your answer.

i). individual I 2 must have one parent with the condition. (2 marks)

ii) individual III 3 has a 1 in 4 chance of being a carrier of the skin condition. (3 marks)

c) A breeder is keen to know if III 5 is a carrier for the skin condition. Explain how this could be determined by breeding, showing your working.

(3 marks)

d) Individual II 2 is crossed with individual II 4.
What is the probability that their first offspring will be a normal-skinned male? Show your working. (4 marks)

(4 marks)

e) A biology student who was unaware of the mode of inheritance of the skin condition examined the pedigree and concluded that the disease was inherited as a sex-linked recessive gene. On the basis of the pedigree alone, could this conclusion be correct?
Explain your answer with full working.

Question 36 **(19 marks)**

(a) Before agricultural scientists could genetically modify crops, farmers relied on naturally occurring variation. Name and explain the process used by famers to increase pest resistance in a crop, depending only on natural variation.

[3 marks]

(b) A variant of the soil bacterium *Bacillus thuringiensis* produces a protein, **Cry1Ab**, that is toxic to insect pests. If the gene responsible for production of this protein is inserted into crop plants, then they can produce the toxic protein too.
Explain how the gene for **Cry1Ab** could be isolated and inserted into the crop genome.

[4 marks]

(c) Give two advantages of scientific modification of crop genes, such as inserting the gene for **Cry1Ab,** compared to traditional methods of improving the crop genes.

[2 marks]

(d) Describe 1 main disadvantage of gene insertion such as that described above.

[1 mark]

Making a protein such as **Cry1Ab** involves RNA in three different forms: transfer, messenger and ribosomal RNA.

(e) Fill in the table below with the name of each type of RNA, a simple diagram of its overall structure, and a statement of its key role in protein synthesis.

TYPE OF RNA	***DIAGRAM***	***ROLE IN PROTEIN SYNTHESIS***

(9 marks)

End of Section Two

See next page

Section Three: Extended answer **20% (40 Marks)**

Section Three consists of four questions.
Questions 37 and 38 are from Unit 3. Questions 39 and 40 are from Unit 4.
Answer **one** question from Unit 3 and **one** question from Unit 4.

Use black or blue pen or ballpoint for written answers and pencil for diagrams. Crossing out of incorrect material is acceptable and preferable to using correction fluid.

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Suggested working time: 50 minutes.

Unit 3: Choose either Question 37 or Question 38.

Indicate the question you will answer by ticking the box next to the question. Write your answer on pages 28–32. When you have answered your question, turn to page 33 and indicate the second question you will answer on that page.

Question 37 **(20 marks)**

DNA carries the genetic code across generations of individuals. In a population, the frequency of alleles may vary over time.

(a) Using labelled diagrams, explain how the structure of DNA enables it to perform its key functions in the cell cycle. (10 marks)

(b) After a natural disaster, a barren and isolated island slowly becomes colonised as a small variety of plants and animals are blown or washed up onto it. A log washes onto a beach containing a small colony of around 100 beetles. They are one species, but a mix of colours, from brown to yellow-green, with a variety of wing sizes.

Using this example, suggest how selection pressures and the effects of genetic drift could lead over time to an island population of large, bright green, wingless beetles. (10 marks)

Question 38 **(20 marks)**

Variation within species is important to the survival of species and populations.

(a) i. Explain what is meant by DNA sequencing and DNA profiling, giving an overview of how each is carried out.
ii. Give examples of how both DNA sequencing and DNA profiling are important in environmental conservation. (10 marks)

(b) i. Briefly outline the role of the environment in variation.
ii. Describe the genetic processes in sexual reproduction that lead to variation and outline the significance of these. (10 marks)

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Unit 4: Choose either Question 39 or Question 40.

Indicate the question you will answer by ticking the box next to the question. Write your answer on the pages provided.

☐ **Question 39** **(20 marks)**

(a) Barramundi are euryhaline, meaning they are able to live in both freshwater and salt water environments. In Northern Australia they mostly inhabit freshwater rivers but descend to estuaries and tidal flats to spawn. Explain the challenges and changes to osmoregulation that would need to occur in these fish as they move between fresh and salt water.

(10 marks)

(b) Compare and contrast the diseases tetanus and malaria in terms of:

- Type of pathogen and structure
- Conditions for infection
- Mode of transmission
- Impact on host (10 marks)

☐ **Question 40** **(20 marks)**

(a) Name the main type of nitrogen waste excreted by each of the three following animals: freshwater fish, magpie, kangaroo.
Outline the survival advantages of each form of waste, referring to the environment and way of life of each animal. Use a table format for your answer.

(10 marks)

(b) The recent outbreak in Brazil of the mosquito-borne Zika virus was of worldwide concern, especially as many people travelled to Rio for the Olympics.

Outline five (5) different management strategies that could be used to control the spread of a new infectious disease such as Zika.
Give a specific example for each strategy. (10 marks)

End of questions

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Additional working space:

Question number:_____

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Question number:_____

Alternative grid for Question 31