




---

SUBJECT: **Biology**  
 PAPER NUMBER: I  
 DATE: 3<sup>rd</sup> September 2018  
 TIME: 9:00 a.m. to 12:05 p.m.

---

### Directions to Candidates

- Write your index number in the space at the top left-hand corner of this page.
- Answer **ALL** questions. Write all your answers in the spaces provided in this booklet.
- The mark allocation is indicated at the end of each question. Marks allocated to parts of questions are also indicated.
- You are reminded of the necessity for good English and orderly presentation in your answers.
- In calculations you are advised to show all the steps in your working, giving your answer at each stage.
- The use of electronic calculators is permitted.

---

#### For examiners' use only:

Question	1	2	3	4	5	6	7	8	9	10	Total
Score											
Maximum	7	8	17	11	11	6	8	10	10	12	<b>100</b>

1. This question is about phospholipids and the cell membrane.

Figure 1 represents a simplified diagram of a phospholipid molecule.

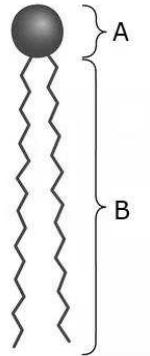


Figure 1: A simplified diagram of a phospholipid molecule  
(Image modified from: <https://i2.wp.com/www.getmygrades.co.uk>)

a. i. With reference to Figure 1, give the molecular sub-units of the parts that are labelled A and B.

A \_\_\_\_\_ (1)

B \_\_\_\_\_ (1)

ii. How do part A and part B differ in their properties with respect to water?

\_\_\_\_\_  
\_\_\_\_\_ (2)

b. In the space below, draw a labelled diagram illustrating the Fluid Mosaic model of a cell membrane.

(3)  
**(Total: 7 marks)**

2. This question is about the animal kingdom.

a. List **FOUR** characteristics that define an animal.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ (2)

b. Fill in Table 1 below by identifying the phylum for each given description.

Table 1: Features describing different phyla

Description	Phylum
Animals bearing cnidocytes	
Animals which do not have visible segmentation and produce a shell in most forms	
Animals which possess a notochord at some stage of their life cycle	
Metamerically segmented animals with chaetae	
Animals which have secondary radial (pentamerous) symmetry and bear tube feet	
Animals possessing an exoskeleton and articulated appendages	

(3)

c. The woodlouse, the spider and the locust are all arthropods. Yet, they belong to different classes. Fill in Table 2 below to give the class and **ONE** diagnostic feature for each class.

Table 2: Descriptions of arthropod specimens

Organism	Class	Diagnostic feature
Woodlouse		
Spider		
Locust		

(3)

**(Total: 8 marks)**

3. This question is about genetics.

a. A gene carried on the X-chromosome controls red-green colour blindness. Figure 2 shows the phenotypes in a family tree for this condition.

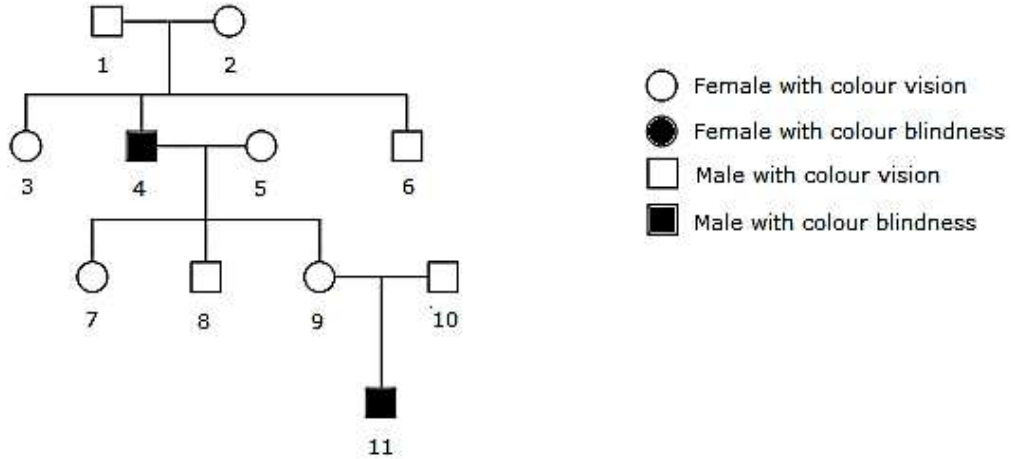


Figure 2: Phenotypes in a family tree for colour blindness

i. Deduce whether colour blindness is inherited through a dominant or recessive allele. Give a reason for your answer.

---



---



---



---



---



---

(2)

ii. What is the genotype of individual 7.

---

(1)

---

iii. The allele for widow's peak (type of hairline), *W*, is dominant to the allele for straight hairline, *w*. The gene controlling widow's peak is autosomal. Individuals 9 and 10 are both heterozygous for widow's peak.

What is the probability that individuals 9 and 10 will produce a male child who is colour blind and has a straight hairline?

---

---

---

---

---

---

---

---

---

---

\_\_\_\_\_ (4)

b. i. What are chromosomal mutations?

---

---

---

\_\_\_\_\_ (2)

ii. Give **TWO** examples of chromosomal mutations that might occur in humans and for each indicate how the karyotype of the individual differs from that of a normal individual.

Example 1: \_\_\_\_\_

---

---

\_\_\_\_\_ (2)

Example 2: \_\_\_\_\_

---

---

\_\_\_\_\_ (2)

**Question continues on next page**

DO NOT WRITE ABOVE THIS LINE

- c. Figure 3 shows the base sequence on a strand from a length of DNA and two possible types of point mutation. Name and describe the type of mutation shown in 1 and 2.

<b>Normal DNA : A C T G A G C T A</b>
<b>Mutation 1 : A C T G G A G C T A</b>
<b>Mutation 2 : A C T A G C T A</b>

Figure 3

- i. Mutation 1

\_\_\_\_\_  
\_\_\_\_\_ (2)

- ii. Mutation 2

\_\_\_\_\_  
\_\_\_\_\_ (2)

**(Total: 17 marks)**

4. This question is about stimulus reception in animals.

- a. Sense organs act as energy transducers. What is an energy transducer?

\_\_\_\_\_  
\_\_\_\_\_ (1)

- b. Distinguish between rods and cones.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

c. Figure 4 shows the distribution of rods and cone photoreceptors across the retina.

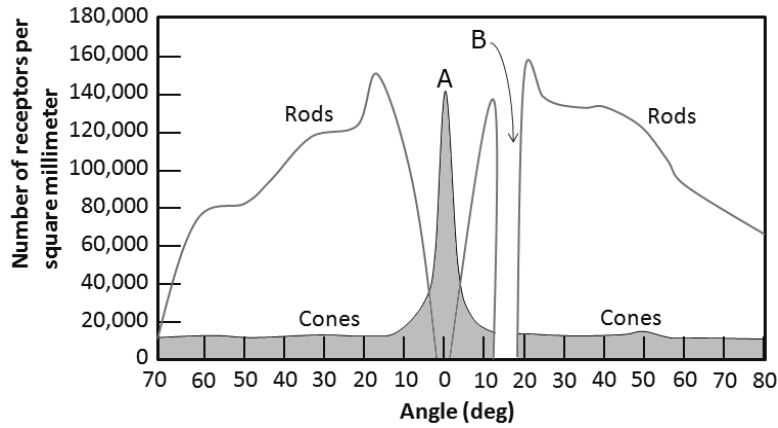


Figure 4: The distribution of rod and cone photoreceptors across the retina. (Modified from: [https://www.researchgate.net/profile/Yu\\_Yi\\_Chien](https://www.researchgate.net/profile/Yu_Yi_Chien))

i. With reference to Figure 4, explain why an image formed at A is perceived in detail.

---

---

(2)

ii. Explain why no image is seen when light is focused on the retina at B.

---

---

(2)

d. Explain why what appears as pitch black to a human may be dim light to a nocturnal animal.

---

---

---

---

---

---

(4)

**(Total: 11 marks)**

---

5. This question is about biotechnology.

a. What is DNA profiling?

---

---

(2)

b. A small amount of blood was found at the scene of a crime and DNA fingerprinting was carried out.

i. Which genetic technique is used in order to increase the amount of DNA to carry out DNA fingerprinting?

---

(1)

ii. Why are restriction endonucleases used?

---

---

(2)

iii. Briefly describe the use of gel electrophoresis in DNA profiling.

---

---

---

---

(3)

The results of a DNA fingerprint analysis using the blood sample found at the scene of the crime are shown in Figure 5. The DNA profile of the blood found at the crime scene is shown on the left and is labelled "crime scene". DNA profiles produced using blood samples from three suspects are shown on the right.

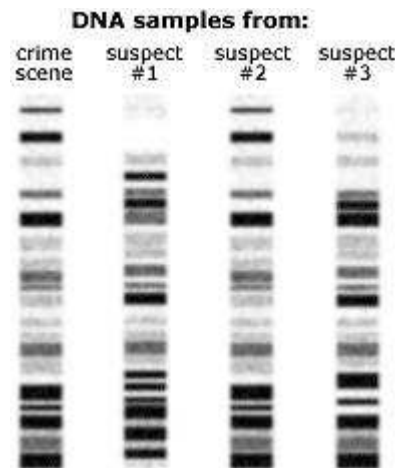


Figure 5: The results of a DNA fingerprint analysis  
(Source: <https://evolution.berkeley.edu/evolibrary/images/news/dnafingerprints.gif>)



iv. From the DNA analysis, which suspect is implicated in the crime?

\_\_\_\_\_ (1)

v. Give a reason for your answer to part (iv).

\_\_\_\_\_  
 \_\_\_\_\_ (2)

**(Total: 11 marks)**

6. This question is about the immune system.

Figure 6 shows a flow chart representing some of the stages involved in the immunological response to an antigen.

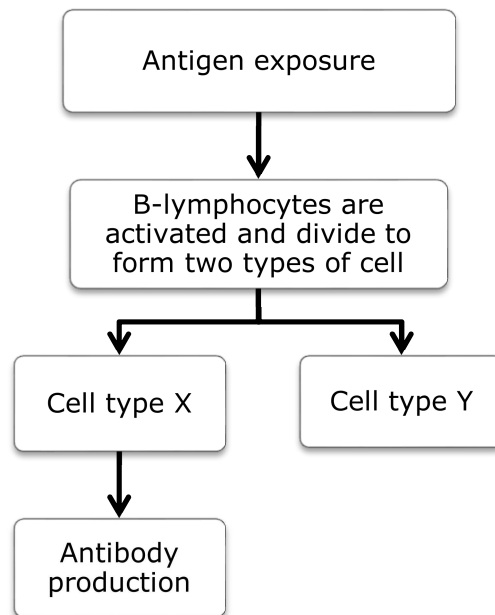


Figure 6: Flow chart representing some of the stages involved in the immunological response to an antigen.

a. What is an antigen?

\_\_\_\_\_ (1)

b. Give the name of:

i. Cell type X \_\_\_\_\_ (½)

ii. Cell type Y \_\_\_\_\_ (½)

**Question continues on next page**

---

iii. What is the function of cell type Y?

---

---

---

---

(2)

c. Viral diseases include influenza and measles. Viruses have antigens on their surface. Deduce why a person may have influenza several times, but usually has measles only once.

---

---

---

---

(2)

**(Total: 6 marks)**

7. This question is about local ecology.

a. List **FOUR** habitat types that are found in the Maltese Islands.

---

---

---

---

(4)

b. Clapham Junction is a karstland area in the limits of Buskett. Describe the characteristics of the type of vegetation that can be found in this karstland.

---

---

---

(2)

c. Give an example of a species of plants that you would expect to find locally in a garigue. (Both scientific and common names are accepted.)

---

(1)

- d. In which type of Maltese habitat would you expect to find shrubs like *Pistacia lentiscus* (lentisk), *Ceratonia siliqua* (carob tree) and *Olea europaea* (olive tree)?

\_\_\_\_\_ (1)  
**(Total: 8 marks)**

8. This question is about life cycles.

- a. Draw a generalised life cycle of *Funaria*.

(4)

- b. Describe the mechanisms used by this species to transfer spores.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_ (3)

- c. Fill in Table 3 to compare and contrast alternation of generations in Bryophyta and Polypodiophyta.

Table 3: Comparison of alternation of generations in Bryophyta and Polypodiophyta

	<b>Dominant stage</b>	<b>Level of ploidy in dominant stage (haploid/diploid)</b>	<b>Where are the sporangia located?</b>
Bryophyta			
Polypodiophyta			

(3)

**(Total: 10 marks)**

9. This question is about transpiration.

Figure 7 shows a schematic representation of the root.

a. On the figure, draw the **THREE** pathways (including direction of flow) in which water can move during transpiration. Clearly label each pathway.

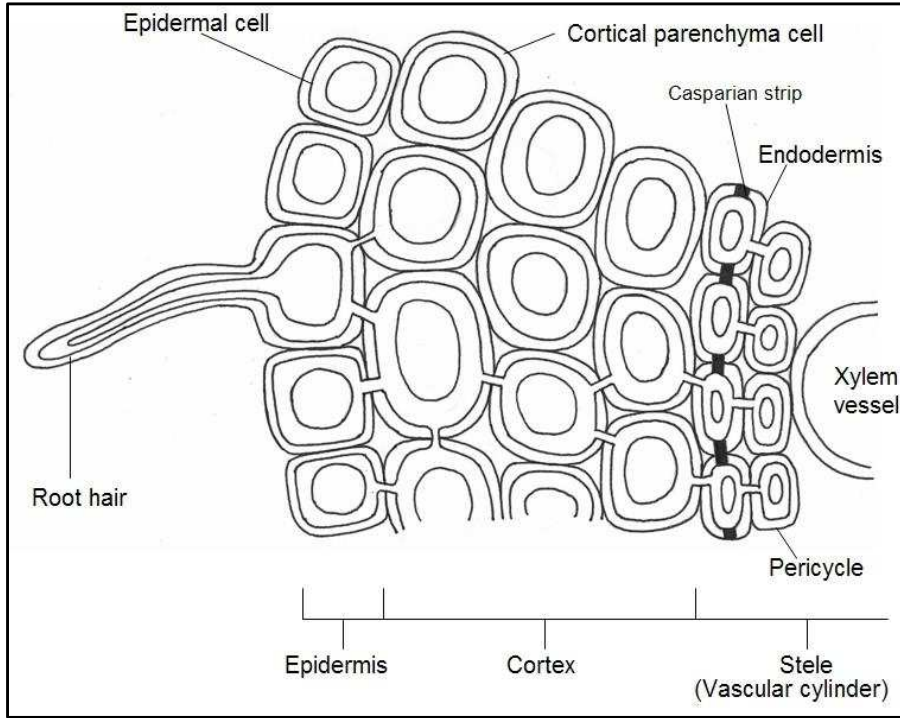


Figure 7: The cross section of the root.  
(Source: [http://cronodon.com/BioTech/Plant\\_Transport.html](http://cronodon.com/BioTech/Plant_Transport.html))

(3)

b. Briefly define the pathways mentioned as an answer to part (a).

---

---

---

---

---

---

---

(6)

c. How does water move from the stomata to the outside of the environment?

---

---

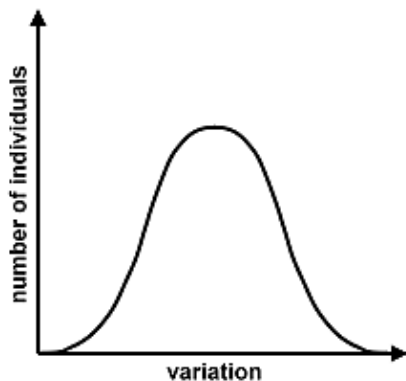
(1)

**(Total: 10 marks)**

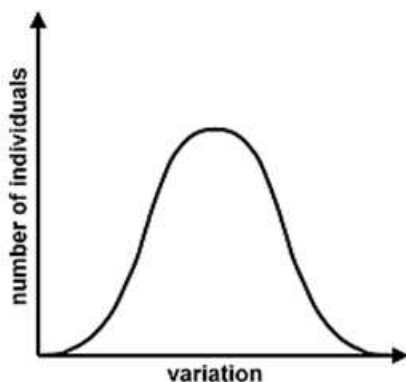
10. This question is about evolution.

- a. The graphs provided below show normal distribution curves for a certain set of traits/phenotypes/genotypes within a population.

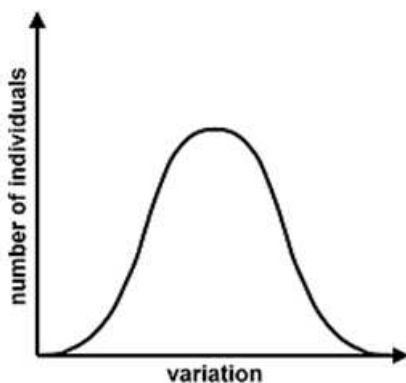
List the **THREE** types of selection processes occurring in natural and artificial populations and for each type draw a line on the graphs provided to show how the distribution would change after selection.



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_

(6)

(Graphs modified from: <https://www.adonline.id.au/plantevol/natural-selection>)

**Question continues on next page**

b. Fill in Table 4 to show the type of selection involved in the given statements.

Table 4

Statement	Type of selection
Babies born above or below the average birth weight are less likely to survive.	
Peccaries are consuming the low-spine-number cacti, and the insects are killing the high-spine-number cacti. As these gene combinations are removed from the cactus gene pool, there is less and less variety possible in subsequent generations.	
There are three different phenotypes of rabbits: black, grey and white. The environment for these rabbits consists of dark black rocks in one area and white rocks in another. Both the black and white rabbits would be able to find a place to hide from predators while the grey rabbit would not. The grey rabbit would then end up being selected against, creating two different populations of rabbits. The white and black rabbits would stay in their own conveniently coloured ecosystems and eventually become separated.	
Horses used to be the size of dogs but over years and years of evolution, larger horses had been favoured and selected for. This brings the size of the modern day horse to be much bigger than the dog-sized one.	

(4)

c. Distinguish between pre-zygotic and post-zygotic isolating mechanisms.

---



---

(2)

**(Total: 12 marks)**

**BLANK PAGE**

**BLANK PAGE**





---

SUBJECT:	<b>Biology</b>
PAPER NUMBER:	II
DATE:	4th September 2018
TIME:	9:00 a.m. to 12:05 p.m.

---

### Directions to Candidates

- Answer the question in Section A, any **TWO** questions from Section B and **ONE** question from Section C. Write all your answers in the separate booklet provided.
  - If more than two questions from Section B are attempted, only the first two answers shall be taken into consideration.
  - If more than one question from Section C is attempted, only the first answer shall be taken into consideration.
  - The mark allocation is indicated at the end of each question. Marks allocated to parts of questions are also indicated.
  - You are reminded of the necessity for good English and orderly presentation in your answers.
  - In calculations you are advised to show all the steps in your working, giving your answer at each stage.
  - The use of electronic calculators is permitted.
-

## Section A

### This section is obligatory.

1. Read carefully the following extract. Then using the information provided and your knowledge of Biology, answer the questions that follow. The numerals in the left-hand margin are the line numbers.

#### **Colder incubation makes baby turtles male, and now we know how**

5 While a genetic coin-flip determines the sex of a human baby, turtles have a more interesting method. A turtle egg hatches male or female depending on the temperature of its nest. Scientists have struggled since the 1960s to explain how a temperature cue can flip the sex switch for turtles and other reptiles. Recently, scientists from Duke University in the US and Zhejiang Wanli University in China have found how that mechanism works.

10 For a common turtle species called the red-eared slider (*Trachemys scripta elegans*), eggs incubated at 32 °C produce female hatchlings, while those at 26 °C hatch as males. This study showed that cooler temperatures turn on a gene called Kdm6b which in turn flicks a biological switch called Dmrt1 triggering the development of testes and resulting in the birth of a male turtle. If that gene is not turned on, testes do not develop and the turtle hatches as a female. Kdm6b activates the Dmrt1 by modifying histones.

15 In the new study, the team from Zhejiang Wanli University developed a way to lessen the activity of particular reptilian genes by injecting viruses bearing snippets of artificial RNA into developing eggs. The researchers used the technique to weaken the effects of the Kdm6b gene in the embryos of red-eared slider turtles before the gonads formed, then tracked the embryos' development at 26 °C. This temperature should have yielded all male turtles. Instead, in two separate experiments done with different gene-silencing viruses, 80 and 87 percent of the surviving embryos became female.

20 Research showed that while Kdm6b does behave differently as temperatures rise, it does not show the same response in all tissues. This suggests that the gene does not directly sense temperature, but is instead receiving messages from some higher-up gene that reacts directly to temperature and directs Kdm6b's behaviour in different tissues, the researchers propose.

While it is not known exactly why turtles and other reptiles have developed this method of sexual differentiation, it can leave them vulnerable to climate change.

(Adapted from: [www.sciencenews.org](http://www.sciencenews.org); Focus, July 2018)

- a. Explain how the sex of a human baby is genetically determined. (2)
- b. What is the genus name of the red-eared slider and to what class does it belong? (2)
- c. Both humans and turtles are vertebrates. Give **FOUR** identifying characteristics of vertebrates. (4)
- d. What is meant by the term gene? (line 10) (2)
- e. What are histones? (line 11) (2)
- f. i. What are viruses? (line 17) (2)  
ii. In this study, viruses are acting as vectors. What are vectors? (1)
- g. Assuming the same procedures as those used during the formation of recombinant DNA, which enzymes are required to cut "snippets of artificial RNA"? (line 13) (1)
- h. Using your own words, explain how cooler incubation temperatures result in the birth of male turtles. (3)
- i. Why did the majority of surviving embryos become females when artificial RNA was inserted into developing eggs which were incubated at 26 °C? (3)
- j. Why does the method of sexual differentiation used by turtles "leave them vulnerable to climate change"? (line 24) (3)

**(Total: 25 marks)**

## **SECTION B**

**Answer any TWO questions from this section. Your answers should take the form of essays. Each question carries twenty five marks.**

1. Discuss how the specific shape of biomolecules confers functionality in biological systems.
2. Give a detailed account of the metabolic role of the liver.
3. A biogeochemical cycle can be defined as one of several natural cycles, in which matter moves through the biotic and abiotic parts of an ecosystem. Discuss this statement with reference to carbon and nitrogen cycles.
4. Discuss how ruminant mammals, hind-gut fermenters and carnivorous mammals adapted differently to their mode of nutrition.

**(Total: 50 marks)**

***Questions continue on next page***

**SECTION C**

**Answer ONE question from this section.**

1. Use your knowledge of Biology to give a comparison of the following pairs:
  - a. actinomorphic and zygomorphic dicots; (5)
  - b. morula and blastula; (5)
  - c. Bohr effect and chloride shift; (5)
  - d. protandry and protogyny; (5)
  - e. lytic and lysogenic life cycles. (5)

OR

2. Use your knowledge of Biology to explain the following statements:
  - a. Evolutionary fitness and biological diversity depend on the process of meiosis. (5)
  - b. Porins (transport proteins) found in the outer membrane of mitochondria and chloroplasts are also found in bacterial cell membranes. (5)
  - c. Human skin shows high skin colour variety from the darkest brown to the lightest pinkish-white hues. (5)
  - d. Although on the outside, it all appears very different, the pentadactyl limb is wide-spread in tetrapods. (5)
  - e. Bone marrow stem cells have unique properties that allow them to be used in the treatment of X-linked SCID (severe combined immune-deficiency). (5)

**(Total: 25 marks)**




---

SUBJECT:	<b>Biology</b>
PAPER NUMBER:	III
DATE:	5 <sup>th</sup> September 2018
TIME:	9:00 a.m. to 10:35 a.m.

---

### Directions to Candidates

- Write your index number in the space at the top left-hand corner of this page.
  - Answer **ALL** questions. Write all your answers in the spaces provided in this booklet.
  - The mark allocation is indicated at the end of each question. Marks allocated to parts of questions are also indicated.
  - You are reminded of the necessity for good English and orderly presentation in your answers.
  - In calculations you are advised to show all the steps in your working, giving your answer at each stage.
  - The use of electronic calculators is permitted.
- 

### For examiners' use only:

Question	1	2	3	Total
Score				
Maximum	19	11	20	<b>50</b>

- 1. This question is about different physiological aspects of human beings.
  - a. Figure 1 is a trace from a spirometer for a subject who breathed quietly for six normal breathes, then took an inspiration as deep as possible, followed by one expiration as deep and rapidly as possible.

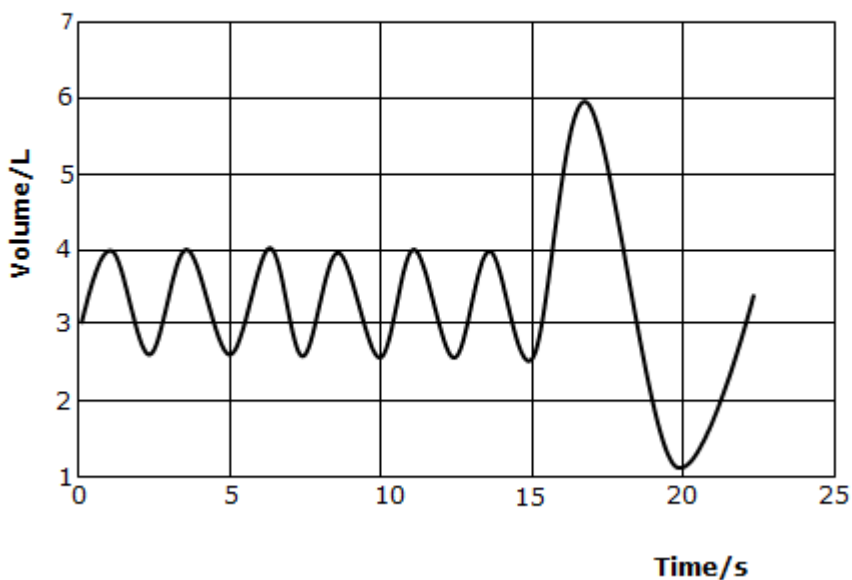


Figure 1: Spirometer tracing of six normal breaths followed by a deep inspiration and a rapid expiration.

i. Use Figure 1 to calculate the mean tidal volume.

---

---

---

---

(2)

ii. Calculate inspiratory reserve volume.

---

---

---

---

(2)

---

iii. Calculate expiratory reserve volume.

---

---

---

---

(2)

iv. Find the vital capacity.

---

---

---

---

(2)

***Question continues on next page***

- b. The human physiology is affected considerably by high altitude. In a recent study, some physiological responses and adaptations to altitude were studied when a young climber ascended Mount Everest. Table 1 shows how blood oxygen saturation and resting heart rate varied with altitude.

Table 1: Blood oxygen saturation and resting heart rate varied with altitude  
(Adapted from: Linoby et al, 2013)

Altitude / m	Oxygen saturation / %	Resting Heart Rate / bpm
1300	98	64
2150	97	68
2800	96	74
3500	94	78
4200	90	83
5300	89	82
6400	83	98
7500	79	102
8300	76	104

- i. Use the data provided in Table 1 to plot a graph of oxygen saturation against altitude. On the same axes, plot a graph of resting heart rate against altitude. Use graph paper on next page. (6)
- ii. Explain any trends that are observed in the graphs plotted as an answer to part (i).

---



---



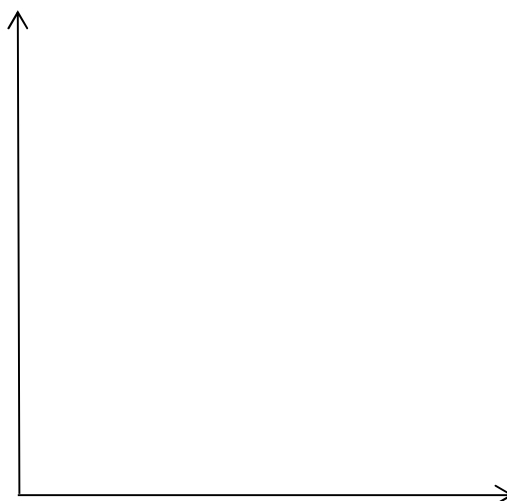
---



---

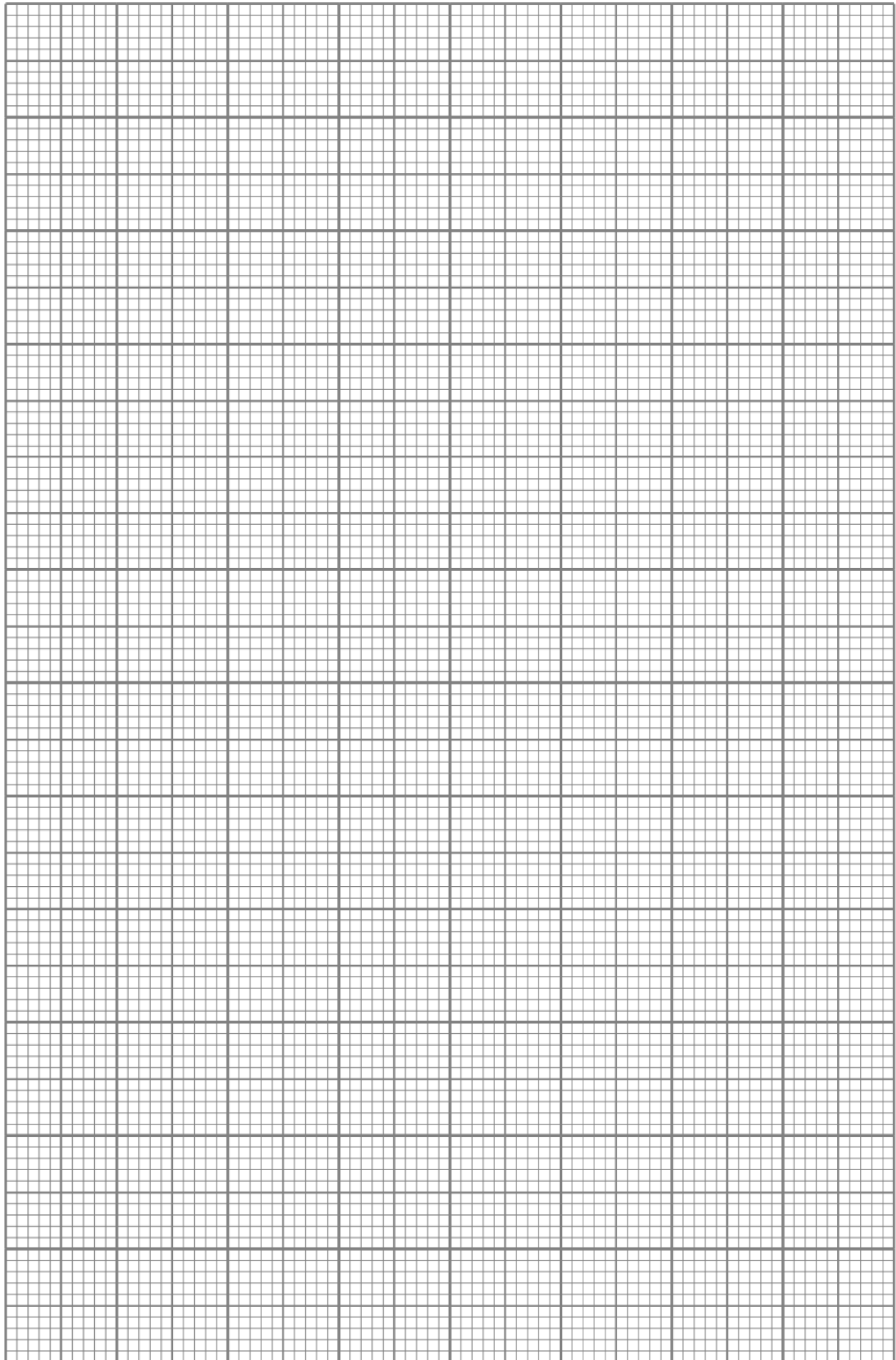
(3)

- iii. From the data given and your knowledge of Biology, sketch a graph to show how the respiratory rate would vary with altitude.



(2)





**(Total: 19 marks)**

2. This question concerns bone structure.
- a. Figure 2 represents a longitudinal section through the femur.

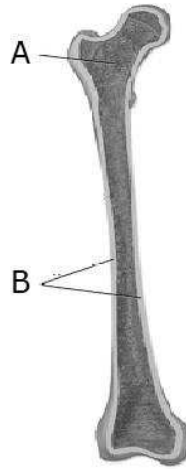


Figure 2: Longitudinal section through the femur.

(Adapted from: [https://upload.wikimedia.org/wikipedia/commons/thumb/f/fa/Structure\\_of\\_a\\_Long\\_Bone.png](https://upload.wikimedia.org/wikipedia/commons/thumb/f/fa/Structure_of_a_Long_Bone.png))

Identify the type of bone tissue labelled A and B.

A \_\_\_\_\_ (1)

B \_\_\_\_\_ (1)

- b. Figure 3 shows a micrograph of a cross-section through compact bone.

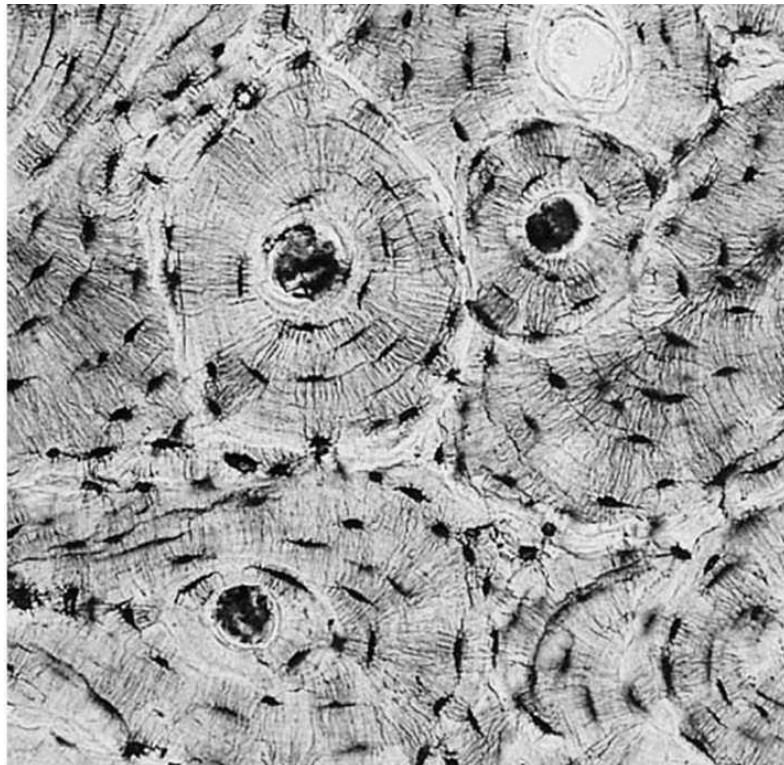
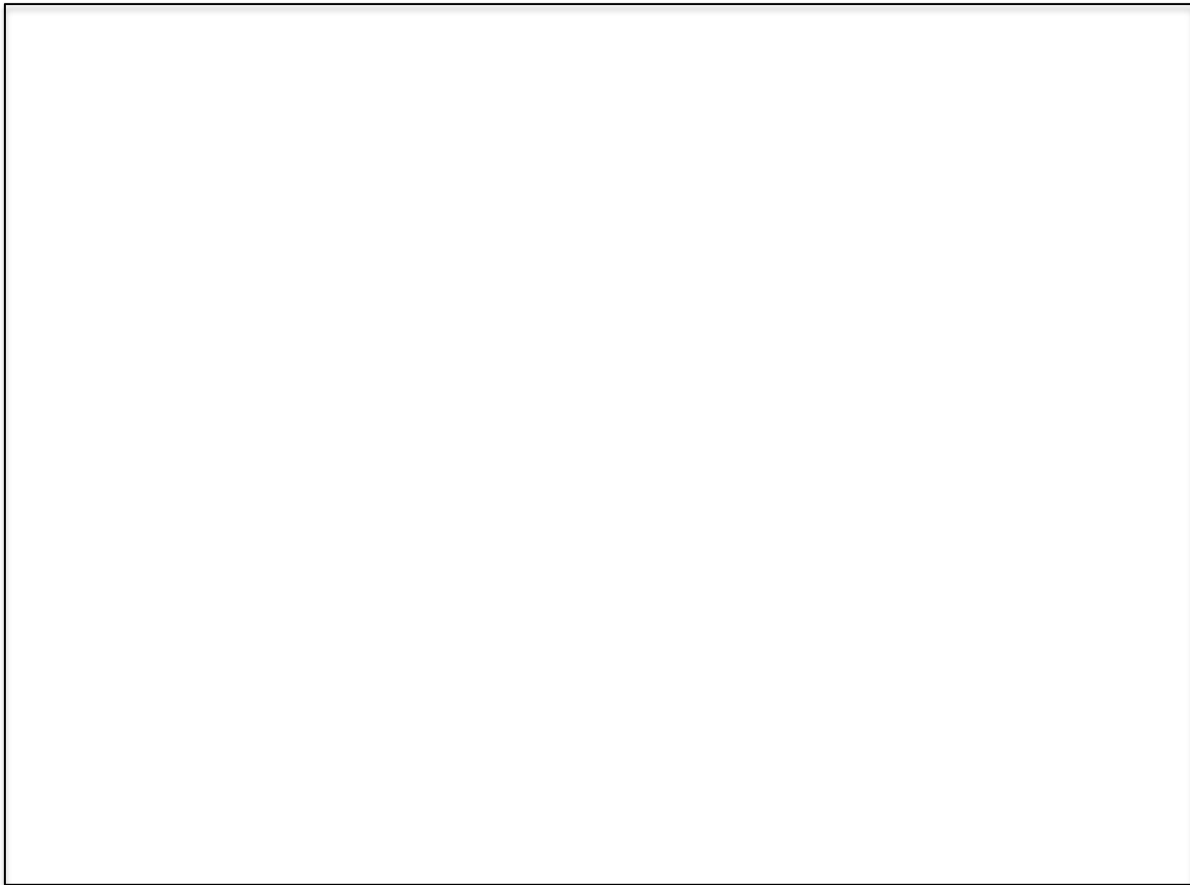


Figure 3: Transverse section of compact bone. Microscope magnification x400.  
(Source: [www.sciencetopia.net/biology/bone-connective-tissue](http://www.sciencetopia.net/biology/bone-connective-tissue))

In the space provided below, draw a labelled diagram depicting **ONE** osteon.



(6)

c. Identify the structure shown in Figure 4 and fill in the labels.

Structure \_\_\_\_\_

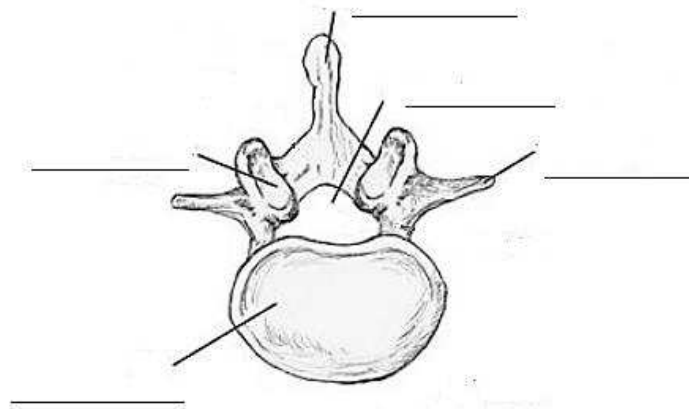


Figure 4

(Adapted from: <https://img.medscapestatic.com/pi/meds/ckb/57/12057tn.jpg>)

(3)

**(Total: 11 marks)**

3. This question is about microscopy and animal histology.
- a. Fill in Table 2 to identify the type of epithelial tissue presented in Figures 5 to 9. List **ONE** function for each type of epithelial tissue.

Table 2: Epithelial tissue

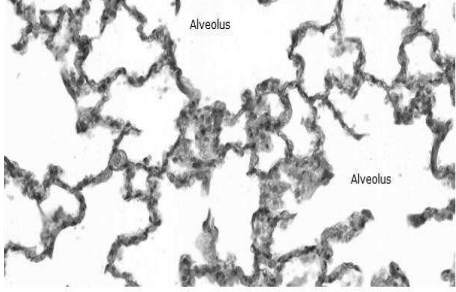
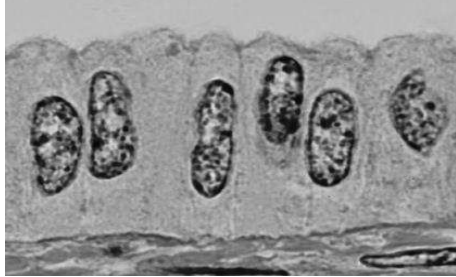
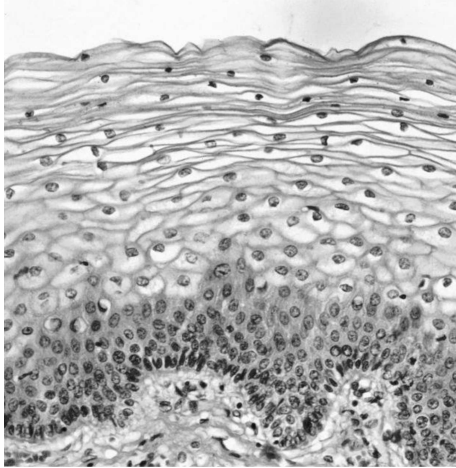

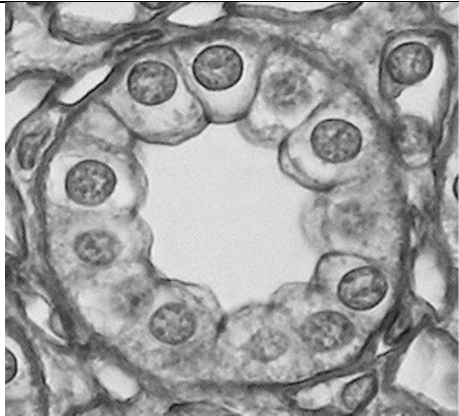
		Type of epithelial tissue	Function
i.	 <p>Figure 5 (Source: <a href="http://www.anatomybox.com/alveoli">http://www.anatomybox.com/alveoli</a>)</p>		
ii.	 <p>Figure 6 (Source: <a href="https://media.gettyimages.com">https://media.gettyimages.com</a>)</p>		
iii.	 <p>Figure 7 (Source: <a href="https://media.gettyimages.com">https://media.gettyimages.com</a>)</p>		

Table 2 continued

		Type of epithelial tissue	Function
iv.	 <p>Figure 8 (Source: <a href="http://www.biology.uco.edu">www.biology.uco.edu</a>)</p>		
v.	 <p>Figure 9 (Source: <a href="http://stevegallik.org">http://stevegallik.org</a>)</p>		

(10)

b. Figure 10 shows a cross-section through the testis.

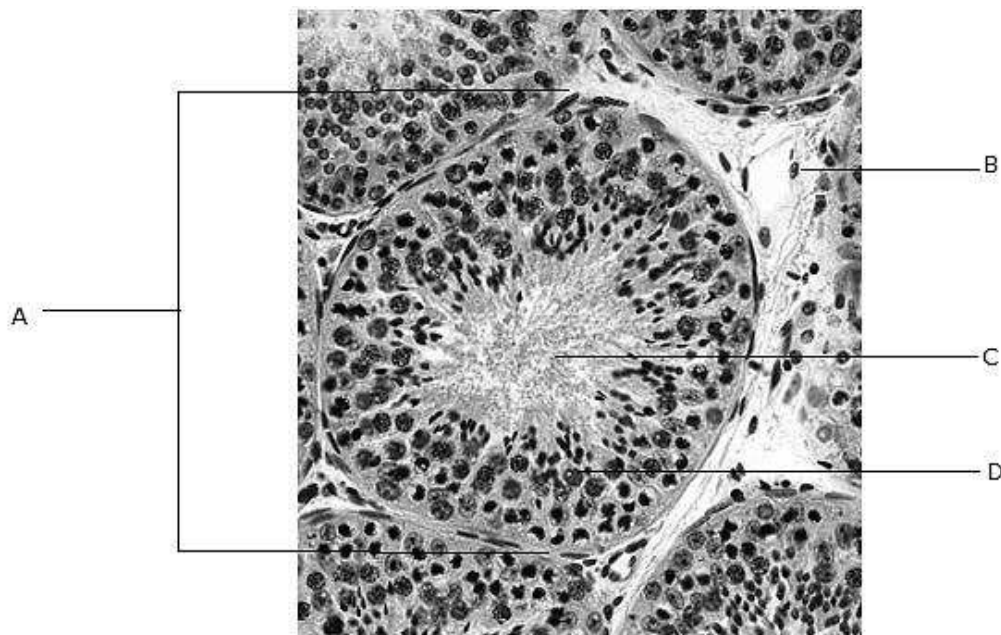


Figure 10: Cross-section through the testis.

(Adapted from: [http://moodle2.rockyview.ab.ca/pluginfile.php/64194/mod\\_book/chapter/25719/biology\\_30/images](http://moodle2.rockyview.ab.ca/pluginfile.php/64194/mod_book/chapter/25719/biology_30/images))

**Question continues on next page**

i. Identify structures A to D.

A \_\_\_\_\_ (1)

B \_\_\_\_\_ (1)

C \_\_\_\_\_ (1)

D \_\_\_\_\_ (1)

ii. What is the role of cell B?

\_\_\_\_\_ (1)

c. Describe, in point form, the exact procedure you would carry out to view a prepared slide under the high power magnification of the microscope.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (5)

**(Total: 20 marks)**

**BLANK PAGE**

**BLANK PAGE**





L-Università  
ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE  
EXAMINATIONS BOARD

**ADVANCED MATRICULATION LEVEL  
2018 SECOND SESSION**

---

SUBJECT: **Biology**  
PAPER NUMBER: IV – *Practical*  
DATE: 30<sup>th</sup> August 2018  
TIME: 1 hour 35 minutes

---

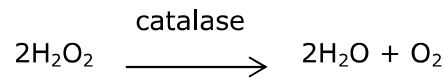
### Directions to Candidates

- Write your index number in the space at the top left-hand corner of this page.
  - Answer **ALL** parts of the question. Write all your answers in this booklet. Drawings of biological material and graphical representations of data are to be made on the appropriate pages within this booklet.
  - The marks allotted to parts of question are indicated.
  - You are reminded of the necessity for good English and orderly presentation in your answers.
  - In calculations you are advised to show all the steps in your working, giving your answer at each stage.
  - The use of electronic calculators is permitted.
- 

### For examiners' use only:

Question	Total
Score	
Maximum	40

- 
1. Catalase is an enzyme in the potato tuber. This enzyme catalyses the breakdown of hydrogen peroxide into oxygen and water according to the following equation:



Several factors and chemicals affect the rate of reaction of the enzyme catalase.

You are required to devise and implement an experiment to determine the effect of copper sulfate on the rate of reaction of the enzyme catalase.

You are provided with the following materials:

- a. potato extract;
- b. 5% hydrogen peroxide;
- c. copper sulfate solutions (0.25 M, 0.5 M, 1 M, 1.5 M);
- d. distilled water;
- e. other laboratory apparatus as required.

**Candidates are advised to use 1 cm<sup>3</sup> of each solution during this experiment.**

- a. State the aim of your biological investigation.

---

---

---

(1)

- b. Suggest suitable null and alternative hypotheses for this investigation.

---

---

---

---

(2)



DO NOT WRITE ABOVE THIS LINE

- 
- d. List and justify **TWO** precautions that should be taken during the experiment.

---

---

---

---

(4)

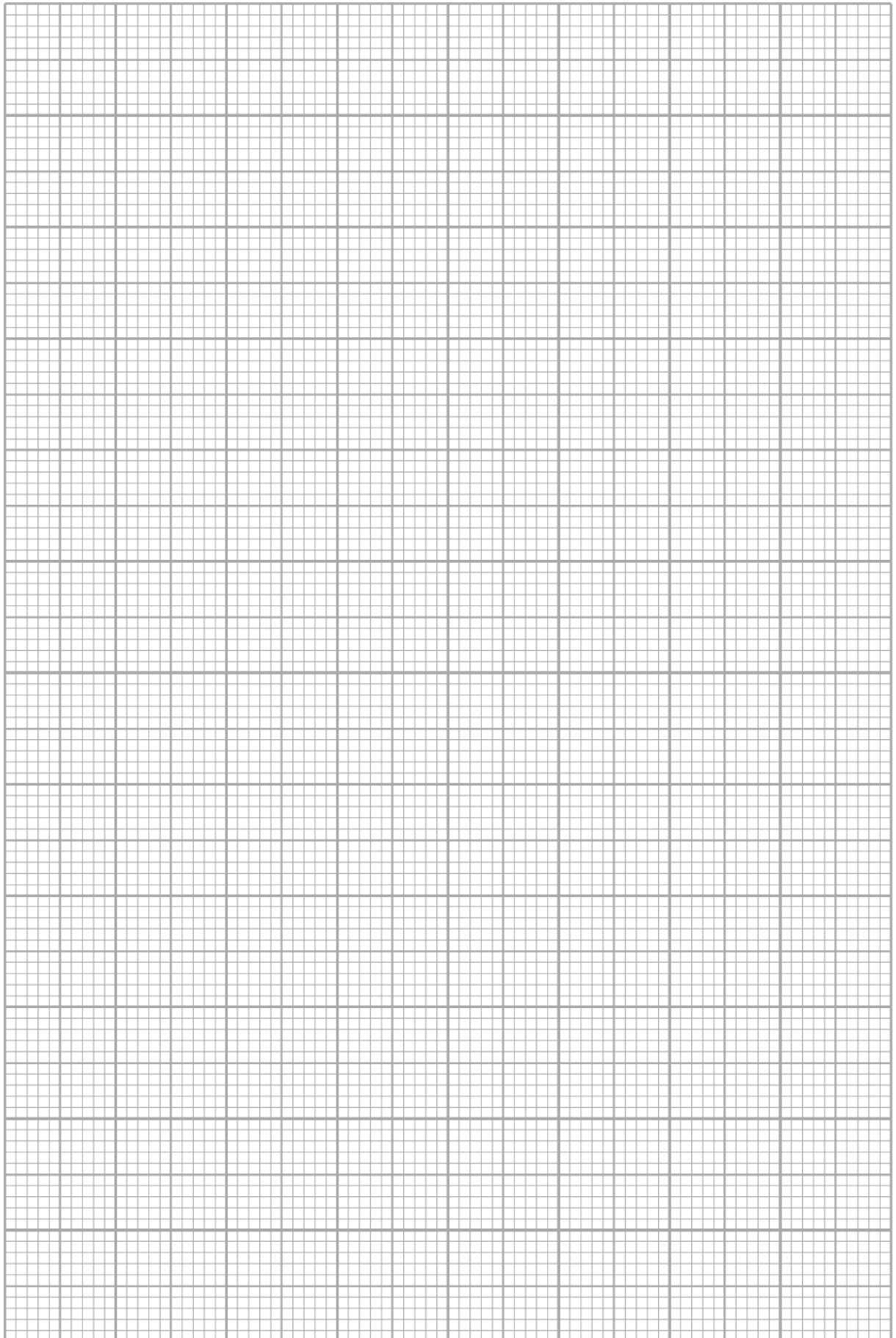
- e. Devise and compile a suitable table for recording your results. Do not enter any results in the table at this stage. Use the space below for the results table.

--

(6)

Carry out the investigation that you devised and insert the results in the table you prepared as your answer to part (e).

- f. Use the graph paper below to draw a graph of rate of reaction against copper sulfate concentration. (6)



---

g. Briefly describe any trend that emerges from your graph.

---

---

---

---

---

---

---

---

(3)

h. Use your biological knowledge to explain in detail your results.

---

---

---

---

---

---

---

---

---

---

(4)

i. List **TWO** sources of error in your investigation.

---

---

---

---

---

---

(2)

**(Total: 40 marks)**

**BLANK PAGE**

**BLANK PAGE**