

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA
MATRICULATION EXAMINATION
ADVANCED LEVEL
SEPTEMBER 2014

SUBJECT:	BIOLOGY
PAPER NUMBER:	I
DATE:	2 nd September 2014
TIME:	9.00 a.m. to 12.00 noon

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	Total
Score										
Maximum	10	12	11	12	10	10	12	11	12	100

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1. Give short explanations to describe the following observations:

1.1 Leydig cells contain a high proportion of smooth endoplasmic reticulum.

[two marks]

1.2 Certain cells of the pancreas are rich in rough endoplasmic reticulum and Golgi apparatus.

[two marks]

1.3 Plant root tissues have aquaporin rich membranes.

[two marks]

1.4 Microtubules play an important role in cell motility.

[two marks]

1.5 In eukaryotes, the cytoplasmic ribosomes and mitochondrial ribosomes have different sizes.

[two marks]
[Total: ten marks]

2. Briefly describe FOUR characteristic features that would allow a scientist to identify the following taxa:

2.1 Hydrozoan;

[two marks]

2.2 Platyhelminthes;

[two marks]

2.3 Polychaeta;

[two marks]

2.4 Arachnida;

[two marks]

2.5 Mollusca;

[two marks]

2.6 Bryophyta;

[two marks]
[Total: twelve marks]

3. The following short nucleotide sequence is part of a sex-linked gene.
sequence 1: TACAAAGTGTAGGAGGCCACCGCT

3.1 Define the term *sex-linked gene*.

[two marks]

3.2 What is the mRNA sequence that is transcribed from **sequence 1**?

[one mark]

	U	C	A	G
U	UUU } Phenylalanine UUC } UUA } Leucine UUG }	UCU } Serine UCC } UCA } UCG }	UAU } Tyrosine UAC } UAA } STOP UAG }	UGU } Cysteine UGC } UGA } STOP UGG } Tryptophan
C	CUU } Leucine CUC } CUA } CUG }	CCU } Proline CCC } CCA } CCG }	CAU } Histidine CAC } CAA } Glutamine CAG }	CGU } Arginine CGC } CGA } CGG }
A	AUU } Isoleucine AUC } AUA } AUG } Methionine	ACU } Threonine ACC } ACA } ACG }	AAU } Asparagine AAC } AAA } Lysine AAG }	AGU } Serine AGC } AGA } Arginine AGG }
G	GUU } Valine GUC } GUA } GUG }	GCU } Alanine GCC } GCA } GCG }	GAU } Aspartic acid GAC } GAA } Glutamic acid GAG }	GGU } Glycine GGC } GGA } GGG }

Table 1: The genetic code in triplet codons of the mRNA.
Each triplet specifies a particular amino acid.

3.3 Given that the start codon is AUG, use Table 1 to determine the amino acid sequence encoded by **sequence 1**.

[two marks]

A point mutation has occurred on the DNA strand, at the twenty first base, leading to the formation of a new allele which has the following sequence:

sequence 2: TACAAAGTGTAGGAGGCCACGGCT

3.4 Define the term *allele*.

[one mark]

3.5 What is meant by the term *point mutation*?

[two marks]

3.6 Briefly explain whether the mutation noted on the twenty first base would have any influence on the final protein produced.

[three marks]
[Total: eleven marks]

4. In humans, the enzyme lactase breaks down the sugar lactose. A deficiency of this enzyme leads to a condition known as lactose intolerance. In people suffering from this condition, lactose passes undigested through the digestive system, causing bowel problems. Bacteria in the large intestine digest lactose creating an osmotic imbalance leading to diarrhoea.

4.1 Name the monosaccharide components of lactose.

[one mark]

4.2 Describe the site of action of lactase in the human alimentary canal.

[one mark]

4.3 Briefly explain how water is absorbed in the human alimentary canal.

[one mark]

4.4 How could the breakdown of lactose by bacteria lead to an osmotic imbalance in the large intestine?

[two marks]

Most mammals stop producing the enzyme lactase soon after they start feeding on solid food, and subsequently become lactose intolerant. Around 10,000 years ago, some human populations began domesticating cattle. This event led to a change in the human diet which in turn caused changes in the genetic characteristics of those human populations.

4.5 Why is lactase production required for the survival of infant mammals?

[one mark]

4.6 Briefly explain how the domestication of cattle could have caused a change in the genetic characteristics of human populations.

[three marks]

One of the medical tests used to check whether a human is lactose intolerant or not is to give the person an aqueous solution of lactose and then check the blood glucose level every 30 minutes. The results obtained by two persons who sat for this test are represented in Figure 1.

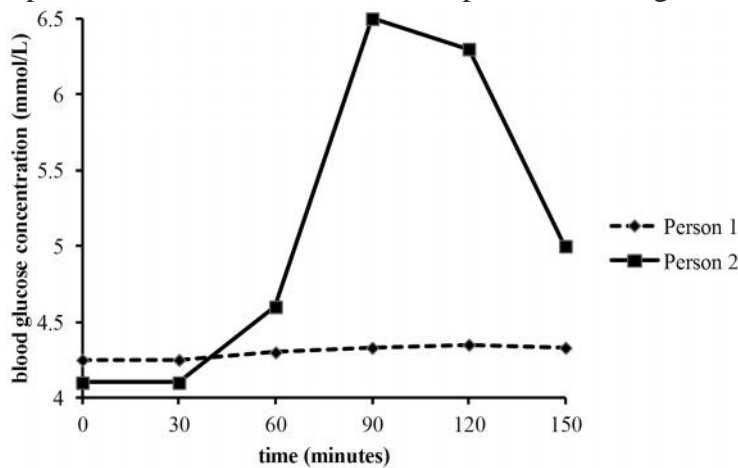


Figure 1: A graph showing the blood glucose level in two persons after taking an aqueous solution of lactose at 30 minutes

4.7 From Figure 1, which person is likely to be lactose intolerant. Explain your answer.

[three marks]
[Total: twelve marks]

5. Gamma-aminobutyric acid (GABA) is a neurotransmitter which when released from the presynaptic terminal, causes the postsynaptic cell's membrane potential to change as illustrated in Figure 2.

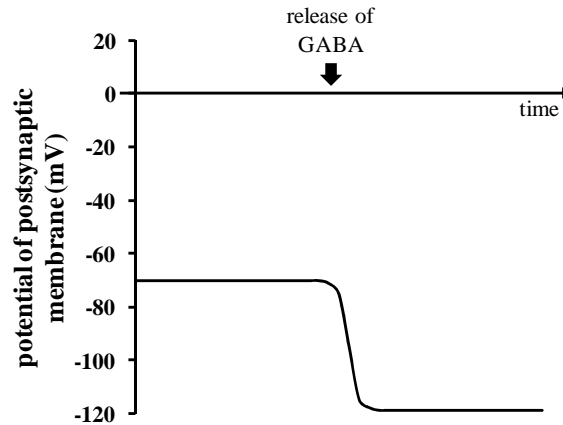


Figure 2

- 5.1 Briefly explain how GABA would be transported from the presynaptic terminal to the synaptic cleft.

[three marks]

- 5.2 Briefly explain how a resting membrane potential is normally established.

[two marks]

- 5.3 Explain, giving reasons, how GABA would influence the chloride ion (Cl^-) movement across the membrane of the postsynaptic cell.

[two marks]

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5.4 The simultaneous release of GABA and acetylcholine causes a decrease in the likelihood of generating an action potential. Briefly explain this observation.

[three marks]
[Total: ten marks]

6. Briefly explain the following terms as used in gene technology:

6.1 polymerase chain reaction (PCR);

[two marks]

6.2 gel electrophoresis;

[two marks]

6.3 DNA profiling;

[two marks]

6.4 recombinant DNA;

[two marks]

6.5 gene therapy.

[two marks]
[Total: ten marks]

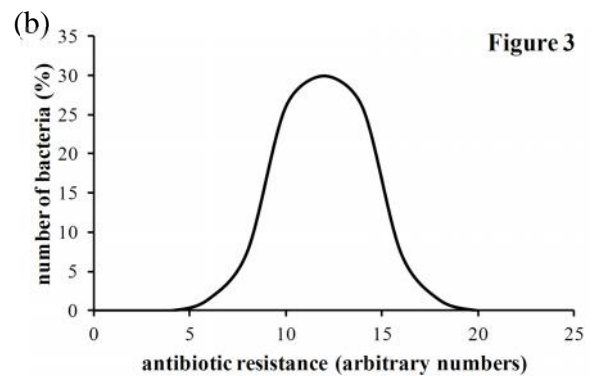
7. Selection is a major driving force in evolution.

(a) State, giving reasons, the type or types of selection involved in the statements 7.1 to 7.4.

(b) In each case you are provided with a graph illustrating the distribution of the characteristic prior to selection. Draw a line on each graph to show how the distribution of the mentioned characteristics would change after selection.

7.1 It has been noted that since the introduction of antibiotics, a number of species of bacteria are becoming more resistant.

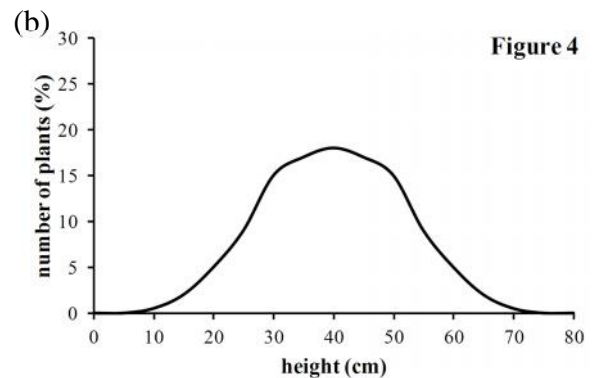
(a) _____



[three marks]

7.2 When a particular plant species colonized a new area, it was noted that individuals shorter than 20cm were finding it difficult to compete for sunlight, while those taller than 50cm were more susceptible to wind damage.

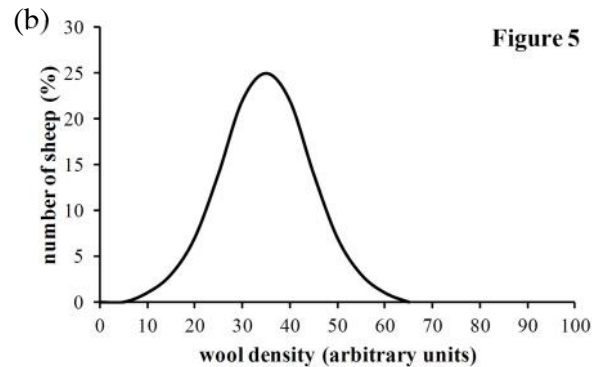
(a) _____



[three marks]

7.3 Domesticated sheep populations have denser wool than wild counterparts.

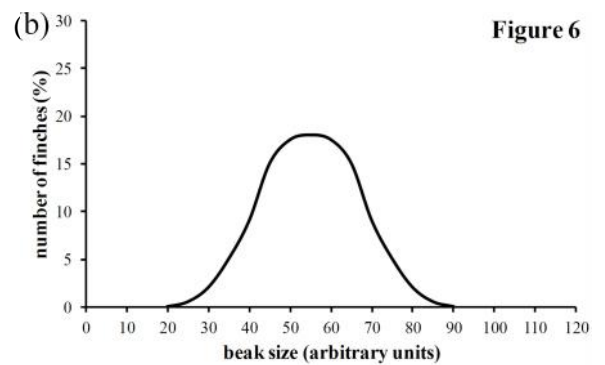
(a) _____



[three marks]

7.4 In the absence of competitors, a finch species exhibited a normal distribution for beak sizes. After the introduction of a competitor bird species, the finch species was being selected for either small or large beaks.

(a) _____



[three marks]

[Total: twelve marks]

8. The tiger, *Panthera tigris*, has six subspecies which occur at different non-overlapping locations along the Asian continent. Another three subspecies have already gone extinct in the past 80 years. One of the tiger subspecies that was close to extinction is *Panthera tigris altaica*, whose population has declined to as few as 20 individuals in the 1950s. Recent conservation methods have led to the reestablishment of its population to around 500 individuals.

8.1 In which Phylum is *Panthera tigris* classified? Give THREE diagnostic features of the named Phylum.

[two marks]

DO NOT WRITE ABOVE THIS LINE

8.2 Name and explain the isolation mechanism that might have led *Panthera tigris* to form a number of subspecies.

[three marks]

8.3 What is meant by the term *extinct*?

[one mark]

8.4 Name TWO causes that could have led to the decline in the population sizes of *Panthera tigris* subspecies.

[two marks]

8.5 Explain how the genetic diversity of *Panthera tigris altaica* compares to other *Panthera tigris* subspecies whose population has never declined below 200 individuals.

[three marks]
[Total: eleven marks]

9. A particular flowering plant may have red, purple or blue petals, which can either be smooth or wrinkled. The colour is controlled by two codominant alleles A^R and A^B . Individuals with $A^R A^R$ appear red, those with $A^R A^B$ appear purple, while $A^B A^B$ appear blue. The second gene, which is unlinked to the colour gene, is coded by two alleles, E or e . The presence of the dominant allele E allows the expression of smooth petals, while homozygous recessive individuals, ee , have wrinkled petals.

9.1 Define the following terms:

(a) codominant alleles;

[one mark]

(b) unlinked genes.

[one mark]

In an experiment, a plant homozygous for red-wrinkled petals was crossed with a plant homozygous for blue-smooth petals.

9.2 Identify the genotype of:

homozygous for red-wrinkled petals -

homozygous for blue-smooth petals -

[one mark]

9.3 What is the genotype and the phenotype of the F_1 generation produced through crossing the individuals mentioned in Question 9.2? (working must be shown)

[two marks]

DO NOT WRITE ABOVE THIS LINE

9.4 The F_1 offspring are allowed to self-fertilise. Use a Punnett square to show the possible genotypes produced as a result of this cross. (working must be shown)

[three marks]

9.5 What is the phenotypic ratio of the cross carried out in Question 9.4?

[two marks]

9.6 The insect pollinators that are attracted to this plant have a preference to flowers with smooth petals. Explain whether you would expect the frequency of the alleles for smooth and wrinkled flowers of the F_3 population to conform with the Hardy-Weinberg equilibrium.

[two marks]
[twelve marks]

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MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA
MATRICULATION EXAMINATION
ADVANCED LEVEL
SEPTEMBER 2014

SUBJECT:	BIOLOGY
PAPER NUMBER:	II
DATE:	3 rd September 2014
TIME:	9.00 a.m. to 12.00 noon

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 and afterwards, use your knowledge of biology to answer the questions that follow. The numerals in the left-hand margin are line numbers.

Viral outbreaks

5 The recent Ebola epidemic in West Africa has so far claimed more than 670 lives in what is now the worst outbreak of the disease. Cases have already been recorded in Sierra Leone, Guinea and Liberia. Now it has reached Lagos in Nigeria. With Lagos being Africa's largest city, boasting a population of around 21 million, an outbreak there could be disastrous. Many of the residents of the city live in cramped conditions.

10 Ebola is a haemorrhagic virus with an incubation period of up to 21 days. This virus causes extensive internal bleeding, and can lead to death caused by circulatory shock. Initially, those infected experience a sudden onset of fever, muscle pain, weakness, headaches, a sore throat, vomiting and diarrhoea. As the infection worsens, it leads to external and internal bleeding, since the virus breaks down the epithelial cells of blood vessels, leading to a 90% fatality rate.

Ebola is highly contagious and can be transmitted even after those infected have died, because the virus can be transmitted through contact with bodily fluids. Additionally the virus is thought to be transmitted between species. Fruit bats may be the natural hosts of the virus, and may be the reason the virus has spread across Africa.

15 Ebola is not the only virus that should alert concern. Chikungunya, a mosquito-borne virus native of Central Africa, is also on the move. Cases have been identified in the US for the first time, and virologists are warning it could spread to Europe.

20 The virus, which causes rash, fever and severe joint pain, has exploded in Central America and the Caribbean since its arrival in the American continent last December. As of 18 July, the number of cases identified across the Caribbean and parts of the surrounding mainland this year is 442,000, a 24 per cent rise within a week.

25 "We're seeing an epidemic ripping through a naive population, with a very large number of cases in the Dominican Republic and elsewhere," says Peter Hotez of Baylor College of Medicine. "There is every reason to believe we could see similar epidemics along the US Gulf Coast maybe later this summer or starting next year."

Currently, there is no specific treatment available for Chikungunya. Drugs and vaccines are in development, but are only in the early stages of testing.

Modified from:

Ebola outbreak: What you need to know about its spread: New Scientist: July 2014

Threatwatch: Chikungunya virus hits the US and Europe: New Scientist: July 2014

- 1.1 Briefly explain the main characteristics of viruses. [four marks]
- 1.2 Why are authorities highly worried about the detection of the Ebola virus in Lagos? [two marks]
- 1.3 Suggest TWO ways by which health authorities may avoid the spread of Ebola. [two marks]
- 1.4 The Ebola virus has an incubation period of nearly three weeks, during which no symptoms appear. Explain why this property of the viral infection is causing further concerns to health authorities. [two marks]
- 1.5 One of the body's first responses to a pathogenic infection is fever. Explain how fever could help the human body against disease. [two marks]
- 1.6 Using the information given in the extract, explain why the Ebola virus leads to bleeding. [two marks]
- 1.7 Pathogens, such as the Ebola virus (line 10), can induce a high fatality rate in human populations. Give TWO possible reasons why some individuals manage to survive highly fatal infections. [two marks]
- 1.8 What is scientifically understood by the phrase, 'an epidemic ripping through a naive population' (line 22)? [two marks]
- 1.9 Chikungunya is rarely fatal and recovery from the infection grants life-long immunity. Briefly explain how the human body is able to acquire life-long immunity against this virus. [five marks]
- 1.10 Suggest TWO alternative ways of controlling Chikungunya spread, other than vaccine development. [two marks]

[Total: twenty-five marks]

SECTION B

(Answer any **TWO** questions from this section; your answers should take the form of essays. Each question carries twenty-five marks).

2. The pituitary gland plays an important role in the human endocrine system. Discuss.
3. Give a comparative account of support systems in animals.
4. Give an account on the structure and replication of DNA.
5. ATP is the universal energy currency in living organisms. Discuss.

[Total: fifty marks]

SECTION C

(Answer **ONE** question from this section).

6. Use your knowledge of biology to explain the evolutionary importance of the following:

- 6.1 nectar in entomophilous flowers;
- 6.2 bilateral symmetry in animals;
- 6.3 respiratory pigments in animals;
- 6.4 cleidoic egg in reptiles;
- 6.5 placenta in mammals.

[five marks each]

7. Use your knowledge of biology to distinguish between the following terms:

- 7.1 *polar bodies* and *mature ovum* in oogenesis;
- 7.2 *morula* and *blastula* in humans;
- 7.3 *monoecious* and *dioecious* plants;
- 7.4 *endosperm* and *embryo* in angiosperms;
- 7.5 *binary fission* and *budding*.

[five marks each]

[Total: twenty-five marks]

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

UNIVERSITY OF MALTA, MSIDA

MATRICULATION EXAMINATION

ADVANCED LEVEL

SEPTEMBER 2014

SUBJECT:	BIOLOGY
PAPER NUMBER:	III
DATE:	4 th September 2014
TIME:	9.00 a.m. to 10.30 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.
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-

For examiners' use only:

Question	1	2	3	Total
Score				
Maximum	20	21	9	50

1. The snail, *Cepaea nemoralis*, exhibits a variety of shell colouration. As noted in Figure 1, some individuals have dark bands on the surface of their shell (banded) while others have no bands at all (unbanded). These snails are preyed upon by birds, which break their shells to eat their soft body. The broken shells are left on the ground near the birds' feeding sites.



Figure 1.
(<http://evolgen.wikispaces.com>)

In an investigation, all the snails living in two areas were removed. The two areas had similar habitats, but one area had predatory birds that feed on *Cepaea nemoralis*, while the other area had none. An equal number of banded and unbanded snails were released in both areas.

Over a two week period, broken snail shells were collected from the area where predatory birds were present. The same number of living snails was collected from the area without predatory birds. The numbers of banded and unbanded snails were counted in both collections. Table 1 shows the results of this investigation.

	Number of snails	
	Unbanded	Banded
Broken snail shells found around stones in area with predatory birds	49	169
Shells of living snails in area without predatory birds	107	111

Table 1

- 1.1 Which factor(s) might determine whether snails are banded or not?

[one mark]

- 1.2 Which statistical test could be used to determine whether the results obtained in each area were due to chance or not?

[one mark]

1.3 Suggest an explanation for the results recorded in this investigation.

[three marks]

1.4 Why was the area without predatory birds included in the investigation?

[one mark]

In a different investigation, the population size of *Cepaea nemoralis* was investigated using a capture/recapture method. 300 snails were collected, marked and immediately released. After 1 day, 250 snails were randomly recaptured and the number of marked individuals was counted before being released again. The same procedure was repeated another two times but the scientist randomly recaptured the 250 snails after 7 days and 14 days respectively. The results obtained are recorded in Table 2.

	Number of marked specimens collected
Recaptured after 1 day	61
Recaptured after 7 days	133
Recaptured after 14 days	135

Table 2

1.5 Where would the scientist carrying out this experiment mark the snails? Give a reason for your answer.

[one mark]

1.6 Which results from Table 2 would be the most reliable? Give a reason for your answer.

[two marks]

1.7 Given that the population size can be estimated through the use of the equation below, estimate the population size of *Cepaea nemoralis* in the area of study.

$$P = \frac{n_1 \times n_2}{n_3}$$

P = estimated population size

n₁ = number of specimens captured, marked and released

n₂ = number of specimens recaptured

n₃ = number of marked specimens in the recapture

[three marks]

1.8 Give TWO advantages and TWO disadvantages of using a capture/recapture method to estimate the population size of *Cepaea nemoralis* in this investigation.

[four marks]

1.9 After estimating the snail population, the scientist wanted to estimate the number of plants growing in the same region. Briefly describe how the scientist would carry out this investigation.

[four marks]

[Total: twenty marks]

2. Eight sealed test tubes were set up as indicated in Figure 2. A bicarbonate indicator was added to each test tube. The bicarbonate indicator is sensitive to pH changes. As the carbon dioxide concentration decreases, the pH value increases and the indicator changes from yellow to red to purple (as indicated in Table 3). The indicator does not harm the plants or animals under study.

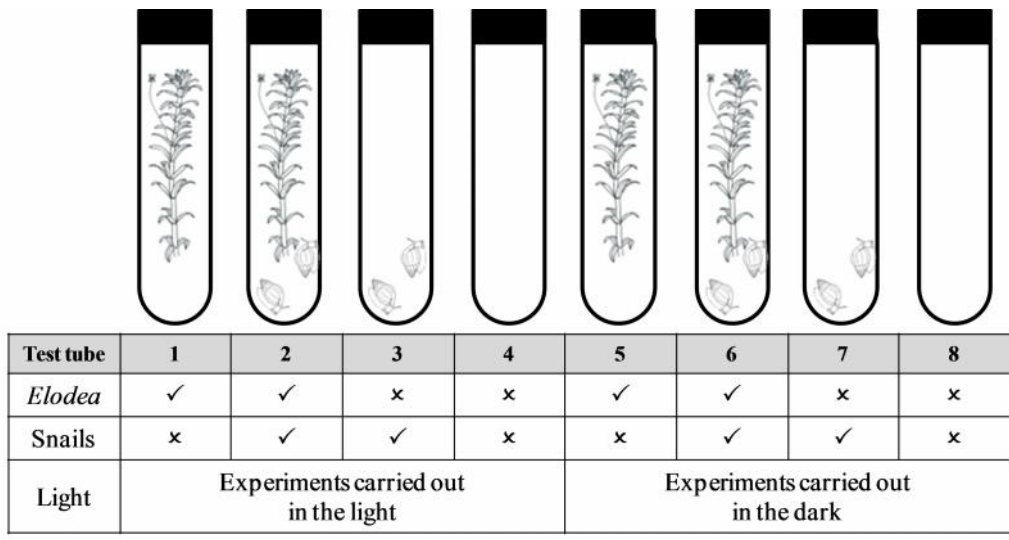


Figure 2

pH	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Colour of bicarbonate indicator	Yellow	Yellow	Orange	Red	Magenta	Purple	Purple

Table 3

In the beginning of the experiment the colour of the bicarbonate indicator in all eight test tubes was red. After allowing the test tubes to stand at their respective conditions (as noted in Figure 2) for 5 hours, the colours of the indicator in each test tube was recorded.

2.1 Suggest, with reason, which test tube contained the highest amount of carbon dioxide at the end of the experiment.

[two marks]

2.2 Suggest, with reason, which test tube contained the least amount of carbon dioxide at the end of the experiment.

[two marks]

2.3 Complete Table 4, by suggesting the indicator's colour noted at the end of the experiment.

	Colour after 5 hours
Test tube 1	Purple
Test tube 2	Red
Test tube 3	
Test tube 4	Red

	Colour after 5 hours
Test tube 5	
Test tube 6	
Test tube 7	
Test tube 8	Red

Table 4

[two marks]

2.4 Why were test tube 4 and test tube 8 included in the analyses?

[two marks]

A scientist used test tube 1 to determine the effect of different light intensities on the rate of photosynthesis. He measured the time taken for the bicarbonate indicator to change colour from red to purple at different light intensities. The results obtained are represented in Figure 3.

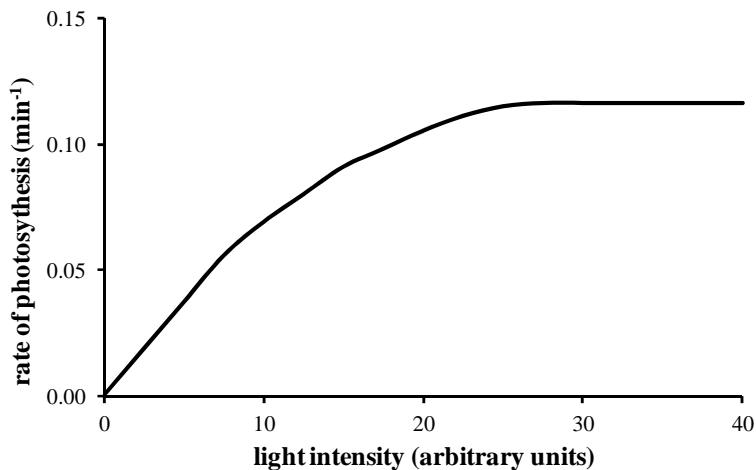


Figure 3

2.5 Describe TWO ways by which the light intensity may be varied during this experiment.

[two marks]

2.6 Which mathematical equation did the scientist use to estimate the rate of photosynthesis?

[one mark]

2.7 Briefly explain the biological processes that give rise to the graph noted in Figure 3.

[three marks]

2.8 State TWO ways in which this experiment could be improved to give more accurate results.

[two marks]

2.9 The scientist repeated the experiment, but this time the effect of temperature on the rate of photosynthesis was tested. Using Figure 4, sketch a graph that would represent the results obtained, if the experiment is carried out at temperatures between 20°C and 70°C?

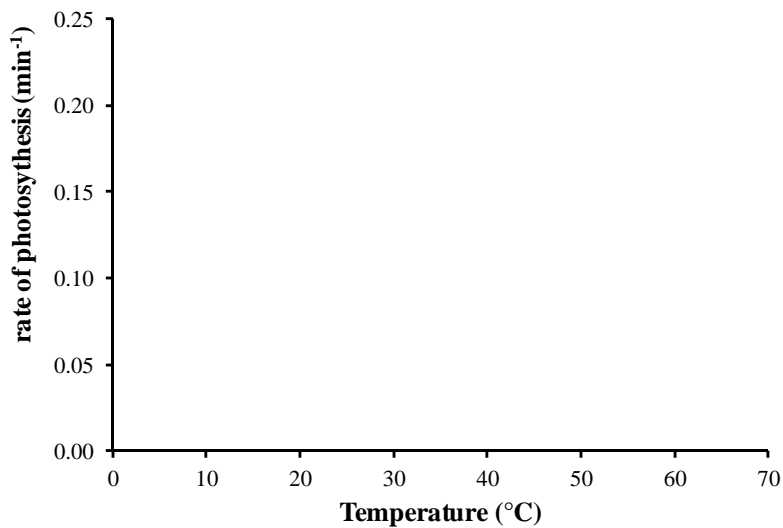


Figure 4

[two marks]

2.10 Briefly explain the processes that would lead to the graph sketched in question 2.9.

[three marks]

[Total: twenty-one marks]

3. In order to investigate the movement of water through plant tissue, the experiment shown below (Figure 5) was set up with rooted plant cuttings.

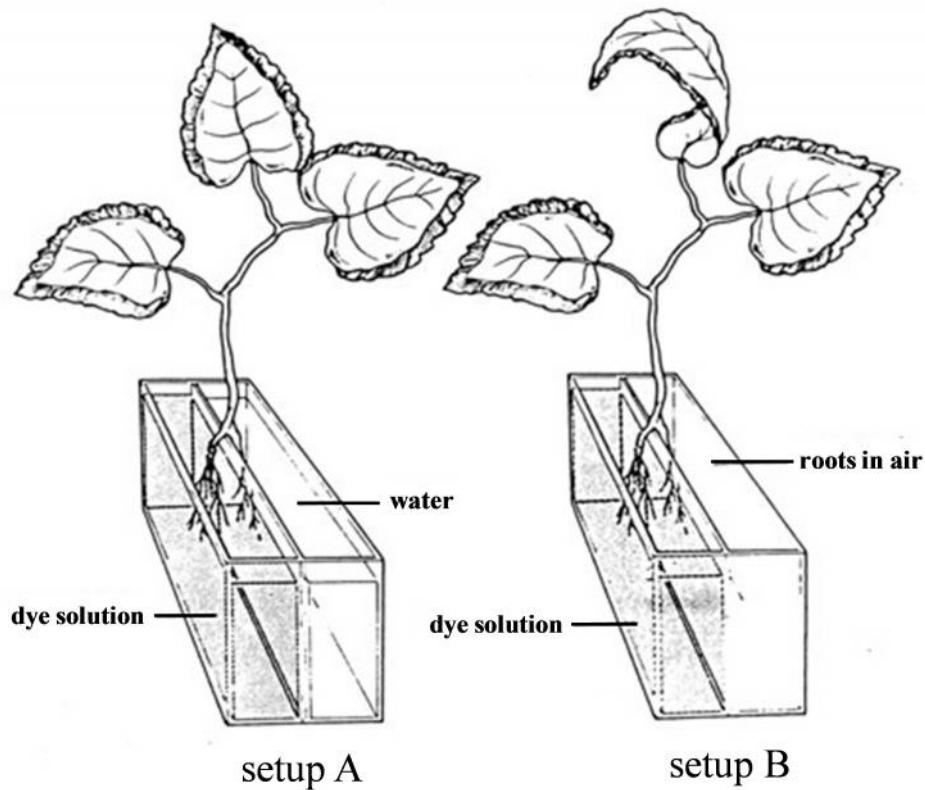


Figure 5
(<http://www.nuffieldfoundation.org>)

After an hour, the cutting with half its roots in water and half in dye solution (setup A) had some leaves with the dye in their veins while other leaves did not contain any dye. In the other cutting, with one set of roots left in air (setup B), the dye appears throughout the veins in all the leaves.

3.1 Briefly explain the observations noted in this experiment.

[three marks]

3.2 Figure 6 shows a high power photomicrograph of a transverse section of a vascular bundle from the stem of the plant in setup B. Label and annotate the photomicrograph to indicate the different types of plant cells and also indicate the location of the dye in the vascular bundle.

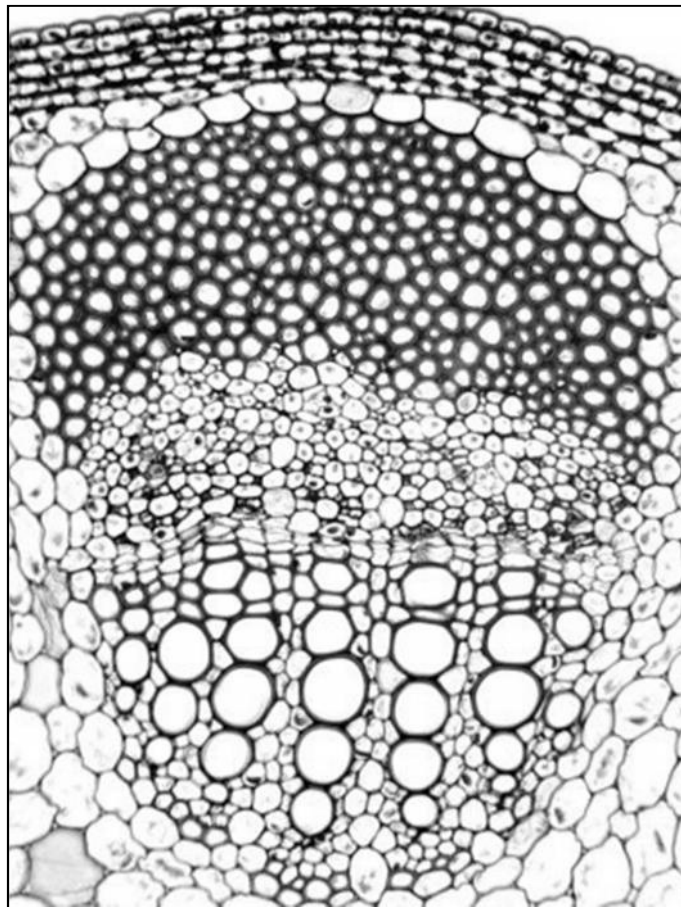


Figure 6

[six marks]
[Total: nine marks]

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UNIVERSITY OF MALTA, MSIDA
MATRICULATION EXAMINATION
ADVANCED LEVEL
SEPTEMBER 2014

SUBJECT:	BIOLOGY
PAPER NUMBER:	IV – <i>Practical</i>
DATE:	29 th August 2014
TIME:	1 hour 30 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. Obesity is a growing problem in Malta, with more than 25% of the population being classified as obese. The high intake of calories in the form of sugars, including reducing sugars, appears to be a major contributing factor.

It is possible to estimate the quantity of reducing sugars in foods and beverages by using Benedict's reagent. In this experiment you are required to design a method to estimate the levels of reducing sugars in three samples of soft drinks. The three samples provided include two normal soft drinks and a low-calorie version, with the latter containing the sugar substitute aspartame, which is a modified form of the amino acid aspartic acid.

You are provided with the following:

- Soft drink samples
- 5% glucose solution
- Benedict's reagent
- Glassware and plasticware
- Distilled water
- Other laboratory apparatus as required

- 1.1 What is the objective of your experimental investigation?

[one mark]

- 1.2 Suggest a suitable null hypothesis for this experiment.

[two marks]

- 1.3 Use the 5% glucose solution to prepare four glucose solutions of different concentrations. The total volume of each solution should be 20ml. Show your calculations by completing the table below.

Concentration of glucose solution	Volume of distilled water added (ml)	Volume of 5% glucose solution added (ml)	Total volume (ml)
5.0%			20
2.5%			20
1.0%			20
0.5%			20

[four marks]

- 1.4 Devise and describe an experimental procedure that may be used to estimate the concentration of reducing sugar in each of the soft drinks provided by comparing them to the glucose solutions prepared in Question 1.3. Your answer should include the following:
- (a) preparation of a control;
 - (b) procedure for testing for reducing sugars;
 - (c) assessment of concentration of reducing sugars in each sample of soft drink.

Candidates are advised use 1 millilitre of sample to 5 millilitres of Benedict’s reagent during the analyses.

DO NOT WRITE ABOVE THIS LINE

[fifteen marks]

1.5 List and justify TWO suitable precautions that should be taken during this experiment.

[four marks]

Carry out the investigation that you devised in Question 1.4 and record the results in Question 1.6.

1.6 Record your results in the space provided below. *Marks will be awarded for the structure and the organisation of the results obtained.*

[six marks]

1.7 What conclusions can be drawn from your results?

[four marks]

1.8 List ONE source of error and explain how it may have influenced your results.

[two marks]

1.9 Briefly describe ONE modification in the experimental design that could improve the results of this experiment.

[two marks]

[Total: forty marks]

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