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新加坡海星中学

MARIS STELLA HIGH SCHOOL
PRELIMINARY EXAMINATION TWO
SECONDARY FOUR

SCIENCE (BIOLOGY)
5078 / 04

21 August 2017

1 hour 15 mins

Additional materials:
Graph paper (1 sheet)

INSTRUCTIONS TO CANDIDATES

Write your class, index number and name on all the work you hand in.
Write in dark blue or black pen.
Do not use paper clips, glue or correction fluid.
You may use a pencil for any diagrams or graphs.

Section A

Answer **all** questions.
Write your answers in the spaces provided on the question paper.

Section B

Answer any **two** questions.
Write your answers in the spaces provided on the question paper.

The total number of marks for this paper is **65**.

For Examiner's Use

65

- 21 The following table shows the percentage⁹ changes in the mass of 4 groups of potato strips which have been immersed separately in 4 different solutions (I to IV) for one hour.

solution	percentage change in mass
I	+ 5%
II	- 5%
III	- 3%
IV	0%

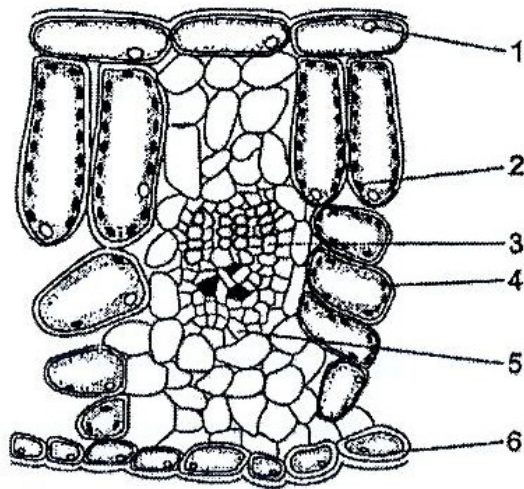
Which of the following conclusions can be drawn?

- A Solution (IV) is distilled water.
 - B Solution (IV) has the lowest water potential.
 - C Solution (I) has the highest water potential.
 - D Solution (II) has a higher water potential than solution (III).
- 22 Glucose in urine can be detected using a biochemical test. When the end of a test strip, which is coated with the enzyme glucose oxidase, is dipped into urine, the development of a blue colour indicates that glucose is present.

This is a reliable test which people with diabetes can carry out at home. Which feature of the enzyme makes this test so reliable?

- A It is stable to heat.
 - B It is specific.
 - C It reacts quickly.
 - D It remains chemically unchanged at the end of a reaction.
- 23 Kate has a damaged liver. Many functions of the body will be affected. However, there are some functions which will not be affected. Which of the following function will **not** be affected?
- A formation of glycogen
 - B formation of urea
 - C production of bile
 - D secretion of digestive enzymes

- 24 The diagram shows a cross-section of a leaf.



Which row correctly identifies the function of the structures?

	converts light energy to chemical energy	transports water and dissolved mineral salts	Involved in the transport of food substances
A	1, 2	3	5
B	1, 6	5	3
C	2, 4	3	5
D	2, 4	5	3

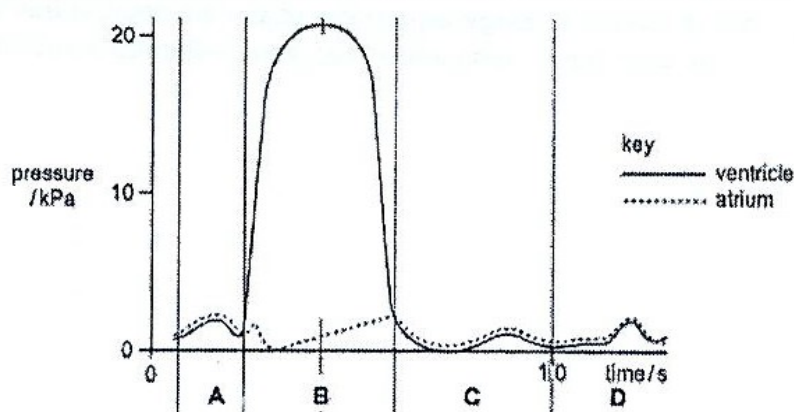
- 25 Which of the following environmental conditions would cause a higher rate of transpiration?

	air	light	temperature
A	damp	bright	cold
B	damp	dim	warm
C	dry	bright	warm
D	dry	dim	cold

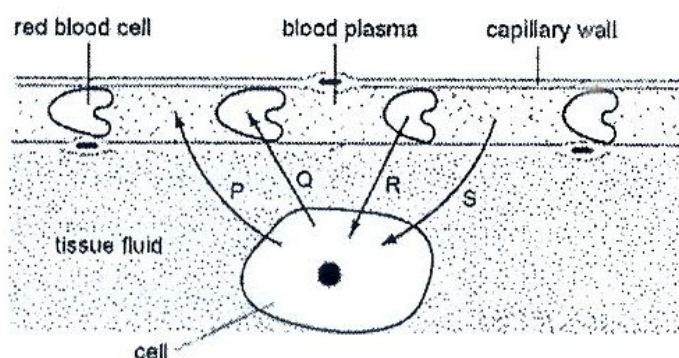
- 26 Into which of the following chambers of the mammalian heart does deoxygenated blood from the body enter?

A left atrium
 B right atrium
 C left ventricle
 D right ventricle

- 27 The graph shows pressure changes in the left ventricle and the left atrium in one cycle of contraction of the heart. During which period of time is the ventricle contracting?



- 28 The diagram below represents a blood capillary with an adjacent cell. The arrows represent the transfer of substances between the capillary and the cell.



Which arrows accurately represent the transfer of the specific substances?

	glucose	carbon dioxide	oxygen
A	P	R	Q
B	Q	S	P
C	R	Q	S
D	S	P	R

- 29 After finishing a race, an athlete still continues to breathe more quickly and deeply than normal for several minutes.

Which statement correctly explains this observation?

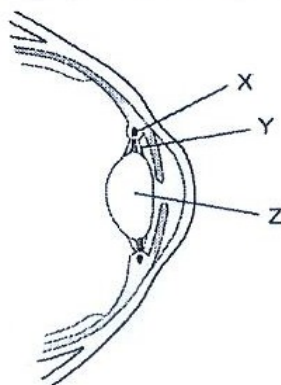
- A to remove carbon dioxide produced during anaerobic respiration
- B to remove urea produced from the breakdown of amino acids
- C to take in extra oxygen to break down lactic acid
- D to replace stored glycogen in muscles

- 30 A man injures his arm in an accident. Afterwards, he can feel objects in contact with his hand, but he cannot move his hand away from them.

What could be the cause of this?

- A Receptors in his hand are damaged.
- B The nerve connection is cut only between the receptors in his hand and his central nervous system.
- C The nerve connection is cut only between his central nervous system and the effectors in his arm.
- D The nerve connection between the receptors in the hand and his central nervous system as well as the nerve connection between the central nervous system and the effector are cut.

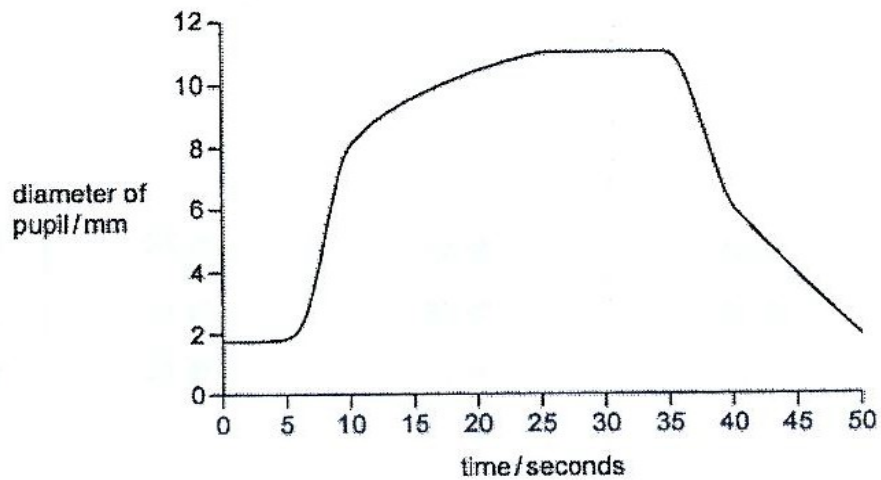
- 31 The diagram shows a section through part of the eye.



What happens to parts X, Y and Z when the eye focuses on a near object?

	X	Y	Z
A	contracts	tight	more convex
B	contracts	slack	more convex
C	relaxes	tight	less convex
D	relaxes	slack	less convex

- 32 The graph shows the changes in the size of the pupil of the eye as the light intensity of the surroundings is changed.



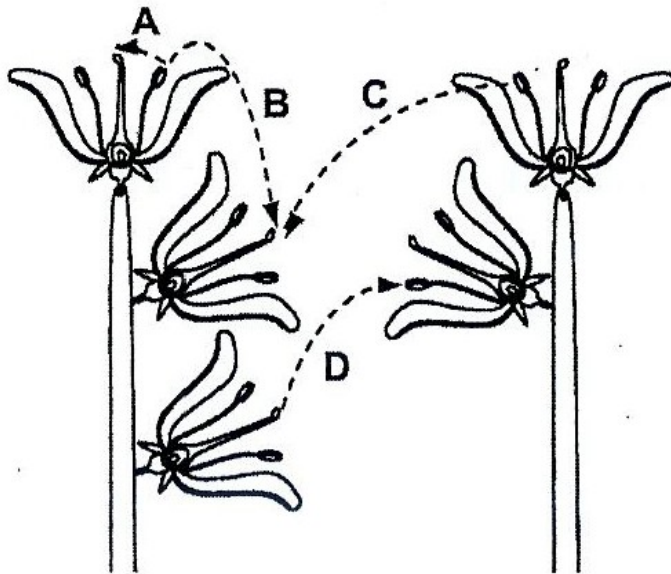
Which time period shows the light intensity increasing?

- A 5 to 10 seconds
 - B 10 to 25 seconds
 - C 25 to 35 seconds
 - D 35 to 40 seconds
- 33 These events occur during sexual reproduction in plants.

- 1 development of fruit
- 2 fertilisation
- 3 growth of pollen tube
- 4 pollination

- A 1 → 2 → 3 → 4
- B 2 → 1 → 3 → 4
- C 3 → 4 → 1 → 2
- D 4 → 3 → 2 → 1

- 34 The diagram shows two plants of the same species.



Which arrow represents cross-pollination?

- 35 How does continuous variation differ from discontinuous variation?

	continuous variation has two or more distinct types	continuous variation is controlled by
A	no	few genes
B	no	many genes
C	yes	few genes
D	yes	many genes

- 36 A pure-breeding, red-flowered plant is crossed with a pure-breeding, white-flowered plant. All the offspring have red flowers.

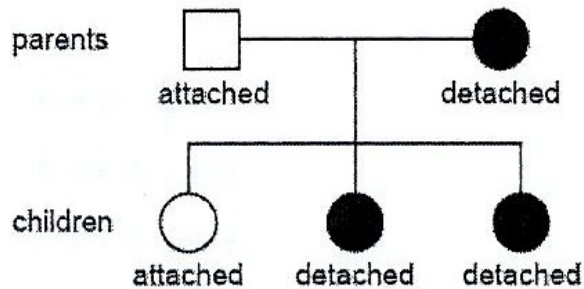
Taking R as the dominant allele for red flowers and r as the recessive allele for white flowers, what is the genotype of these offspring?

- A R
- B RR
- C Rr
- D rr

- 37 The shape of a person's earlobes is determined by a single gene. This gene has dominant and recessive alleles.

The allele for detached earlobes is dominant to the allele for attached earlobes.

The diagram shows the inheritance of earlobe shape in a family.



What is the probability of the next child from the same parents having detached earlobes?

- A 0 %
 - B 25 %
 - C 50 %
 - D 75 %
- 38 A gene of a particular organism contains 37% Adenine (A). Which of the following would best represent the percentage distribution of the other nucleotides in this gene?

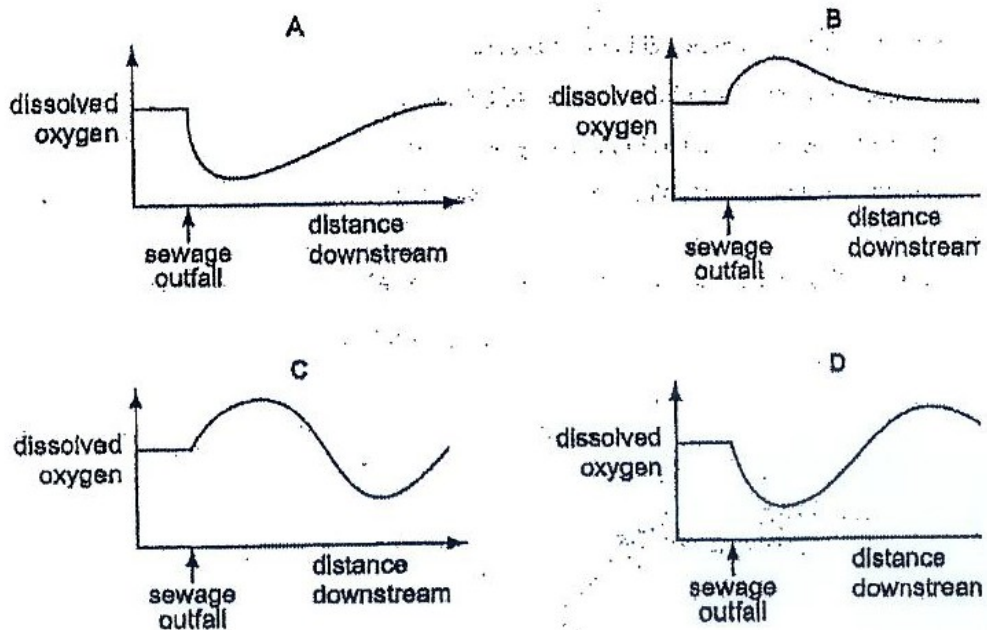
	cytosine (C)	guanine (G)	thymine (T)
A	13 %	13 %	37 %
B	13 %	37 %	13 %
C	13 %	37 %	37 %
D	37 %	13 %	13 %

- 39 The diagram below shows a food chain found in a freshwater lake that is polluted by insecticides.

single cell organisms → insect larvae → small fish → large fish

Which organisms in the food chain will accumulate the highest concentration of insecticide in their body tissues?

- A single cell organisms
 - B insect larvae
 - C small fish
 - D large fish
- 40 Which graph shows the most likely effect of pollution by sewage on the amount of oxygen dissolved in a river?



-END OF PAPER-

Section A

Answer **all** the questions in the spaces provided.

- 1 Figure 1 below shows an experiment with three different set-ups involving a visking tubing and equal concentrations of different substances placed at the start of the experiment.

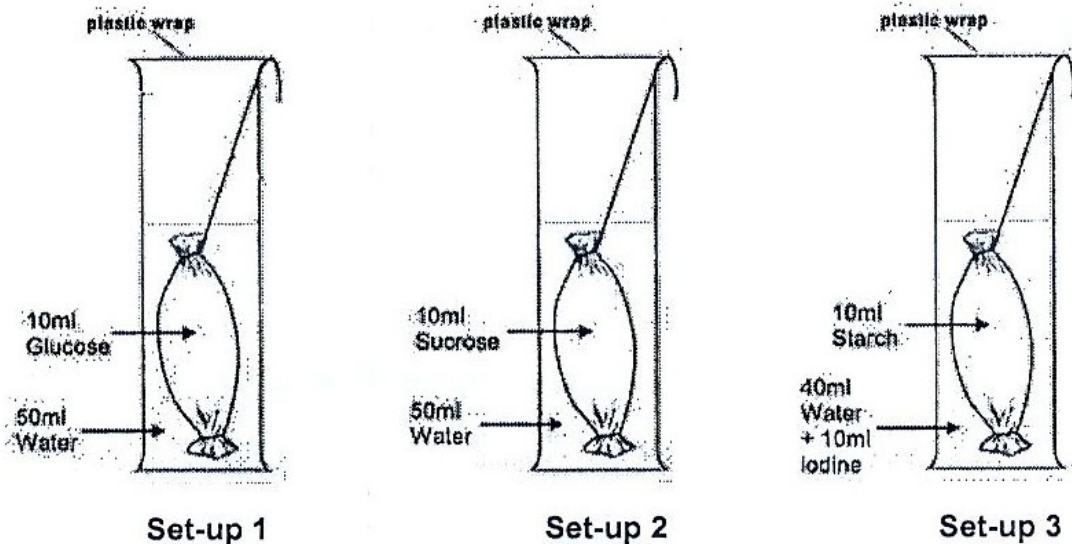


Figure 1

- a) What is the purpose of having the plastic wrap on top of the measuring cylinders?

.....
[1]

- b) (i) Predict what will happen to the water level in Set-up 2 after 5 hours.

.....
[1]

- (ii) Explain your prediction.

.....

[3]

- c) (i) Predict what will happen to the starch in the visking tubing in Set-up 3 after 2 hours.

.....
[1]

- (ii) Explain your prediction.

.....

[2]
 [Total: 8]

- 2 Fig. 2.1 illustrates the relationship between the age of a pig and the activity of the enzymes in its digestive system.

As the pig grows older, its diet is gradually changed to grains and soya beans.

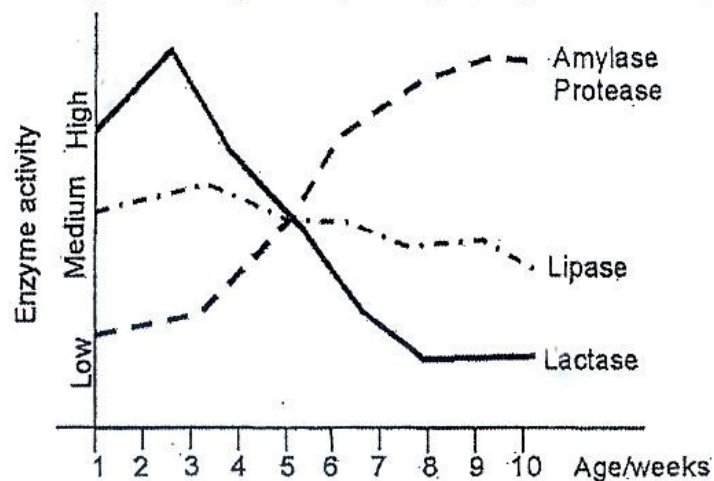


Figure 2.1

- a) (i) Suggest a suitable diet for a young pig that is less than 3 weeks old.

.....
[1]

- (ii) Explain your answer in (a)(i).

.....

[2]

b) (i) State the changes in the activity of lactase, protease and amylase after week 3.

.....

[3]

(ii) Explain your answer in (b)(i) with reference to the pig's diet as it grows older.

.....

[2]
 [Total: 8]

- 3 Fig. 3.1 below shows an experiment set up by a student to investigate the effect of varying temperature on the rate of photosynthesis.

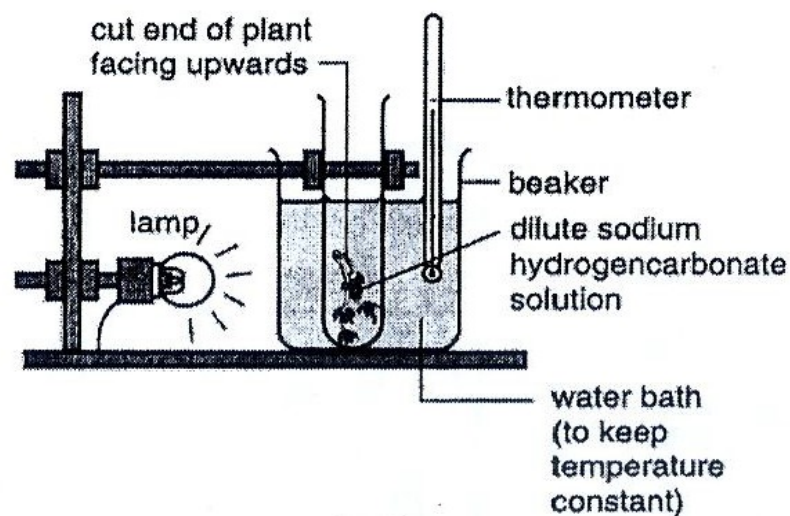


Fig. 3.1

The lamp was exactly 8.0 cm from the beaker. The temperature of the water in the bath was maintained at 35.0°C.

Next, the lamp was switched on and the number of bubbles emerging from the cut end within 1 minute was counted.

The count was repeated twice.

The experiment was repeated using water baths of 15.0°C, 25.0°C, 35.0°C, 45.0°C and 55.0°C.

Table 3.1 below shows the data that was obtained:

Temperature / °C	Number of bubbles evolved per minute			Average number of bubbles evolved per minute
	Count 1	Count 2	Count 3	
15.0	1	2	1	
25.0	2	1	3	
35.0	4	3	5	
45.0	6	4	8	
55.0	4	3	3	

Table 3.1

- a) Suggest what is the purpose of having the dilute hydrogencarbonate solution in this experiment.

.....
[1]

- b) Calculate the average number of bubbles evolved per minute at each temperature and indicate your answers in **Table 3.1**.
 Round off to the nearest whole number. [1]

- c) On a piece of graph paper provided, plot a graph to show the effect of temperature on the average number of bubbles evolved per minute. [3]

- d) Based on the graph that you have plotted, describe and account for the trend observed as the temperature was increased from 15.0°C to 55.0°C.

.....

[5]

[Total: 10]

- 4 Bicuspid Aortic Valve Disease (BAVD) is the most common inheritable disease of the valve, occurring in 1-2% of the population.

Fig. 4.1 below shows the difference between a normal and diseased valve.

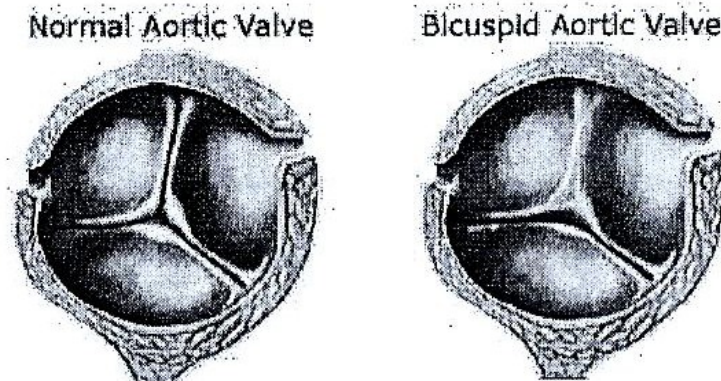


Fig. 4.1

- a) Based on Fig. 4.1, describe a key difference between a normal and diseased valve.

.....
[2]

- b) Suggest how the change in the structure of the valves can cause the valves to malfunction and affect the functions of the heart or body.

.....
[2]

- c) Suggest why patients of BAVD may suffer from fainting spells.

.....
[1]

[Total: 5]

- 5 Albinism in humans is characterised by the complete or partial absence of pigment in the skin, hair and eyes. Albinism affects the production of melanin, the pigment that colours skin, hair and eyes.

In albinism, cells that produce melanin do not work properly because of inherited genetic mutations. There are a number of genetic mutations that can cause albinism and these are passed onto a child by their parents.

Albinism is caused by a recessive allele.

- a) Draw a genetic diagram, with clear labels and symbols drawn, when an albino mother and a non-albino father, who is a carrier of albinism, produce an offspring.

Use **A** to represent dominant allele and **a** to represent the recessive allele. [4]

- b) What is the percentage chance that a child will be born an albino?

.....[1]
[Total: 5]

- 6 Digestive enzymes are naturally abundant in many raw fruits and vegetables, for example, apples, avocados, carrots, grapefruit, spinach and tomatoes.

There is another type of enzyme found in fruits and vegetables, which is known as peroxidase. Its function is to break down hydrogen peroxide, which is one of the toxins produced as a by-product of using oxygen for respiration.

Hydrogen peroxide is broken down to water and oxygen in the process.

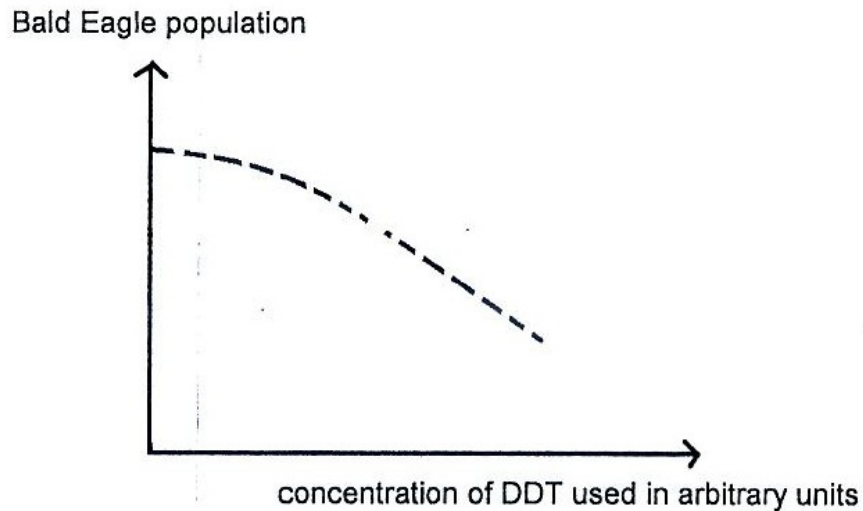
Using the concept of the lock and key hypothesis, explain how peroxidase is able to break down hydrogen peroxide.

.....
.....
.....
.....
.....[4]
[Total: 4]

- 7 DDT was introduced in 1948 as an effective pest control substance for the agriculture in industry in the United States. It was widely used to solve pest problems by farmers.

However, in 1962, scientist Rachel Carson highlighted the environmental impacts that coincide with the widespread use of DDT as shown in the graph below.

Graph of Bald Eagle population against concentration of DDT used



- a) State the trend of the number of Bald Eagles in the community arising from the use of DDT.

.....
[2]

- b) Explain how DDT can possibly impact the Bald Eagle population.

.....

[3]
 [Total: 5]

Write your answers in the spaces provided.

- With references to specific activities of Man, describe and explain how these activities have affected the ecosystem and so caused the extinction of some of these species.

.....[5]

-[5]

[Total: 10]

9 (a) Compare and contrast the fertilisation process in flowering plants and in humans.

[4]

(b) Describe the differences between the offspring of asexual and sexual reproduction in plants and explain advantages and disadvantages of producing plants by these two methods.

.....[6]
[Total: 10]

10 Fig. 10.1 below is a passage about the Glucose Tolerance Test.

Glucose Tolerance Test

A Glucose Tolerance Test is a diagnostic test for diabetes. After fasting overnight, you are given a concentrated sugar solution (50 to 100 grams of glucose) to drink, and your blood is sampled periodically over the next several hours to test its glucose levels. Normally, blood glucose does not rise very much and returns to normal within two to three hours. In a diabetic, the blood glucose usually rises more after the glucose solution and takes from four to six hours to come down.

Freudenrich, Ph.D., Craig. "How Diabetes Works." 22 June 2001. HowStuffWorks.com.

<<http://health.howstuffworks.com/diabetes.htm>>

- (a) Explain what causes the blood glucose to return to normal levels within two to three hours of the Glucose Tolerance Test for a normal (non-diabetic) person.

.....

.....

.....

.....

.....[3]

- (b) Suggest a type of diet that may be advisable for diabetic patients and explain your choice.

.....

.....

.....

.....[3]

- (c) Identify the type of response that takes a few hours and list three characteristics of this type of response.

.....

.....

.....

.....

.....[4]

[Total: 10]

~ END OF PAPER ~

SEC 4 PRELIMINARY EXAMINATION 2
ANSWERS

MULTIPLE CHOICE QUESTIONS

Section A [20 marks]

1	2	3	4	5	6	7	8	9	10
C	B	D	C	C	B	B	D	C	C
11	12	13	14	15	16	17	18	19	20
B	D	D	C	D	C	C	A	D	A

STRUCTURED QUESTIONS

Section B [45 marks]

1a)	<ul style="list-style-type: none"> To prevent the evaporation of water from the set-up OR To reduce water loss due to evaporation 	1
b)(i)	<ul style="list-style-type: none"> The water in Set-up 2 will decrease / water level will fall / drop. 	1
b)(ii)	<ul style="list-style-type: none"> There is a higher water potential outside the visking tubing [1] containing 10ml sucrose solution. Water molecules move into the visking tubing; [0.5] down a water potential gradient [0.5] There is a net movement of water molecules [0.5] Osmosis occurs [0.5] 	3
c)(i)	<ul style="list-style-type: none"> The starch will remain in the visking tubing. 	1
c)(ii)	<ul style="list-style-type: none"> The starch molecules are too large [1] to pass through the partially permeable membrane [1] of the visking tubing. OR Starch molecules (in the visking tubing) turn blue-black. [1] Iodine molecules are small enough to pass through the partially permeable membrane [1] of the visking tubing. <p style="text-align: right;"><i>Max. 2</i></p>	2
2a)(i)	<ul style="list-style-type: none"> A suitable diet will be one filled with lactose / milk 	1
a)(ii)	<ul style="list-style-type: none"> The activity of enzyme lactase is high. [1] It will be able to digest lactose products into maltose [1] for the pig's daily consumption. 	2
b)(i)	<ul style="list-style-type: none"> After Week 3, the activity of amylase starts to increase; [0.5] to a high level [0.5] After Week 3, the activity of protease also starts to increase; [0.5] to a high level [0.5] The activity of lactase starts to decrease; [0.5] 	3

	<ul style="list-style-type: none"> to a low level [0.5] 																																		
2b)(ii)	<ul style="list-style-type: none"> As the pig grows older, the <u>amylase is able to digest its diet of grains;</u> [0.5] <u>containing starch to maltase.</u> [0.5] The <u>protease is able to digest its diet of soya beans;</u> [0.5] <u>containing proteins to polypeptides and subsequently into amino acids.</u> [0.5] 	2																																	
3a)	<ul style="list-style-type: none"> The dilute hydrogencarbonate solution serves to <u>incorporate carbon dioxide</u> [0.5] into the experiment; for <u>the plant to absorb</u> [0.5] for photosynthesis to occur. [0.5] 	1																																	
3b)	<p>Average number of bubbles evolved per minute at each temperature</p> <table border="1"> <thead> <tr> <th rowspan="2">Temperature / °C</th> <th colspan="3">Number of bubbles evolved per minute</th> <th rowspan="2">Average number of bubbles evolved per minute</th> </tr> <tr> <th>Count 1</th> <th>Count 2</th> <th>Count 3</th> </tr> </thead> <tbody> <tr> <td>15.0</td> <td>1</td> <td>2</td> <td>1</td> <td>4/3 = 1.33 (1)</td> </tr> <tr> <td>25.0</td> <td>2</td> <td>1</td> <td>3</td> <td>6/3 = 2.00 (2)</td> </tr> <tr> <td>35.0</td> <td>4</td> <td>3</td> <td>5</td> <td>12/3 = 4.00 (4)</td> </tr> <tr> <td>45.0</td> <td>6</td> <td>4</td> <td>8</td> <td>18/3 = 6.00 (6)</td> </tr> <tr> <td>55.0</td> <td>4</td> <td>3</td> <td>3</td> <td>10/3 = 3.33 (3)</td> </tr> </tbody> </table> <p><i>All values must be rounded off to the <u>nearest whole number (in bold).</u></i></p>	Temperature / °C	Number of bubbles evolved per minute			Average number of bubbles evolved per minute	Count 1	Count 2	Count 3	15.0	1	2	1	4/3 = 1.33 (1)	25.0	2	1	3	6/3 = 2.00 (2)	35.0	4	3	5	12/3 = 4.00 (4)	45.0	6	4	8	18/3 = 6.00 (6)	55.0	4	3	3	10/3 = 3.33 (3)	1
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55.0	4	3	3	10/3 = 3.33 (3)																															
3c)	<p>Refer to the graph at the back of the answer key</p> <p>Marking points for graph:</p> <ul style="list-style-type: none"> Appropriate X and Y axes – 0.5 Appropriate title of graph – 0.5 All points clearly marked and plotted – 1 Graph is a well-drawn, smooth curve – 1 	3																																	
3d)	<ul style="list-style-type: none"> The rate of photosynthesis is low at 15.0°C; [0.5] The <u>enzymes in the plant are still inactive</u> [0.5] at 15.0°C. As the <u>temperature increases to 45.0°C;</u> [0.5] the <u>average number of bubbles evolved per minute also increases.</u> [0.5] <u>The enzymes in the plant are becoming more active;</u> [0.5] <u>due to an increase in kinetic energy;</u> [0.5] <u>There are more frequent collisions between enzyme and substrate molecules;</u> [0.5] <u>There are more enzyme-substrate complexes formed;</u> [0.5] At 55.0°C, the average number of bubbles evolved per minute <u>starts to decrease.</u> [0.5] <u>The enzymes in the plant are denatured at a high temperature.</u> [0.5] 	5																																	

4a)	<ul style="list-style-type: none"> A normal valve has 2 separate valves [1] beside each other, the bicuspid and the aortic valve. A diseased valve has 2 valves side by side merged together / stuck together as one single entity. [1] <p>AA: A normal valve has 3 flaps while a diseased valve has 2 flaps. [1]</p>	2
4b)	<ul style="list-style-type: none"> The diseased valve is unable to allow blood flow to the aorta efficiently. [1] This means that less blood from the left ventricle will be sent to the other parts of the body [1] 	2
4c)	<ul style="list-style-type: none"> Patients of BAVD might take a long time for the oxygenated blood to reach the brain. [1] <p>AA: Less blood reaches the brain. [1]</p>	1
5a)	<p>Full genetic diagram Must include (the marking points):</p> <ol style="list-style-type: none"> clear symbols, Aa and aa clear labels - Parental phenotypes, parental genotypes, gametes, crossing of gametes, offspring genotypes and phenotypes <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p>Parental phenotypes Albino mother Non-albino father</p> <p>Parental genotypes aa X Aa [1]</p> <p>Gametes (a) (a) X (A) (a) [1]</p> <p>Offspring genotypes Aa aa Aa aa [1]</p> <p>Offspring phenotypes Non-albino Albino Non-albino Albino [1]</p> <p>**Lines drawn must be correct to obtain the following 2 marks.</p> </div>	4
5b)	<ul style="list-style-type: none"> % chance that the child will be born an albino: 50% 	1
6)	<ul style="list-style-type: none"> Peroxidase digests hydrogen peroxide into water and oxygen. Hydrogen peroxide is the substrate [0.5] (which is the key) Peroxidase is the enzyme [0.5] (which is the lock) When peroxidase binds to hydrogen peroxide at its active site; [1] forming an enzyme-substrate complex; [1] Peroxidase digests hydrogen peroxide; [0.5] into its products, water and oxygen. [0.5] 	4

7a)	<ul style="list-style-type: none"> As the concentration of DDT used increases, the number of Bald Eagles in the community decreases. 	2
7b)	<ul style="list-style-type: none"> When the plants grow, the (harmful) chemicals from the DDT are incorporated into the plants (as producers). [0.5] Primary consumers (like rabbits) feed on the plants [0.5] Chemicals are then incorporated into the body tissues of the rabbits. [0.5] as they are non-biodegradable [0.5]; They are not excreted [0.5]; Bioamplification occurs. [0.5] As Bald Eagles occupy the top of the food chain / are tertiary consumers; [0.5] Concentration of chemicals in the body tissues of the Bald Eagles is the highest. [0.5] <p style="text-align: right;">Max. 3</p>	3

FREE RESPONSE QUESTIONS
Section C [20 marks]

8a)	<p>Specific activities of Man</p> <p>Activity 1: Overfishing [1]</p> <ul style="list-style-type: none"> Large fishing fleets are set to catch massive quantities of fish with their efficient equipment to meet the demand for fish and seafood. [0.5] When a huge net is swept across the ocean bed, the heavy rollers used to weigh down the nets are dragged along the ocean floor This destroys the habitats of many marine creatures. [0.5] Reduced marine biodiversity / gene pool [0.5] as breeding grounds are destroyed and might result in extinction of species. <p>Activity 2: Deforestation [1]</p> <ul style="list-style-type: none"> Forests are cleared for timber, paper and growing of agricultural crops [0.5] Organisms living in the forests lose their habitats and source of food and shelter [0.5] They may eventually not survive and become extinct. [0.5] 	5
b)	<p>Reasons for the importance of conservation of plant and animal species</p> <p>1. To maintain biodiversity by preventing the extinction of species</p> <ul style="list-style-type: none"> A large gene pool is important as many wild plants and animals possess favourable genes. Plants with better resistance to diseases and drought can be produced by crossing domestic species with wild species. Many tropical plants are of great importance as they are sources of medicinal drugs. 	5

	<p>2. <u>To allow for species diversity</u></p> <ul style="list-style-type: none"> • This means to have a wide variety of different species of organisms living in a given area. • Each species has its role to play in maintaining the balance in the ecosystem. <p>3. <u>To maintain a stable and balanced ecosystem</u></p> <ul style="list-style-type: none"> • This prevents disruption of natural cycles such as the carbon cycle, and also prevents global warming. <p>4. <u>For economic purposes</u></p> <ul style="list-style-type: none"> • Marine life needs to be conserved as they are major source of human food. Tropical plants provide raw materials for industries. • Tropical rainforests also provide food for example, rice, pineapple and banana <p>5. <u>For scientific research</u></p> <ul style="list-style-type: none"> • The study of wildlife provides useful information to humans. <p style="text-align: right;"><i>Max. 5 points with some elaboration</i></p>	
9a)	<p><u>Similarities</u></p> <ul style="list-style-type: none"> • In both plants and humans, the <u>male gamete fuses with the female gamete to form a diploid zygote</u>. [1] <p><u>Differences</u></p> <ul style="list-style-type: none"> • In plants, the <u>male gametes reach the ovum via the growth of the pollen tube</u>. In humans, the sperms with the <u>sweeping movement from the cilia in the fallopian tube swim towards the ovum</u>. [1] • In plants, the <u>site of fertilisation is the ovule</u>. In humans, the site of fertilisation is in the <u>fallopian tube / oviduct</u>. [1] • In plants, there are <u>two male gametes</u>. One of the gametes fuses with the ovum to form the zygote. In humans, there is <u>only one male gamete that fuses with the ovum to form the zygote</u>. [1] • In humans, a <u>film of water / liquid is needed for the sperms to swim</u>. In plants, this is <u>not required</u>. [1] <p style="text-align: right;"><i>Max. 4 points with direct comparison made for each point</i></p>	4

b)	<ul style="list-style-type: none"> • <u>Asexual reproduction produces genetically identical offspring.</u> [1] • <u>Sexual reproduction produces genetically different offspring.</u> [1] • <u>In asexual reproduction, only one parent plant</u> is required. [1] • <u>Beneficial qualities are likely to be passed down to offspring</u> [1] as genes are inherited from the parent plant. • <u>However, there is less genetic variation in the offspring.</u> [1] • The species is <u>less well adapted to changes in the environment.</u> [1] <p style="text-align: right;"><i>Max. 2 marks</i></p> <ul style="list-style-type: none"> • <u>In sexual reproduction, more varieties of offspring</u> can be produced from sexual reproduction; there is <u>greater genetic variation</u> [1] • <u>This increases the chance of the species surviving changes in the environment.</u> [1] • <u>However, two parents</u> are required instead of one. [1] • It is <u>less economical</u> as sexual reproduction need various devices to attract pollinating agents. [1] • There is always a <u>considerable waste of pollen grains</u> and <u>resources</u> [1], especially in wind-pollinated flowers. <p style="text-align: right;"><i>Max. 2 marks</i></p>	6
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10a)	<ul style="list-style-type: none"> • The pancreas (islets of langerhans) <u>produces insulin;</u> [0.5] • It increases the <u>permeability of cell membranes</u> to glucose; [0.5] • (thus) <u>increases the rate of glucose uptake</u> by cells; [0.5] • Insulin stimulates liver to <u>convert glucose to glycogen;</u> [0.5] • to be <u>stored in the liver and muscles;</u> [0.5] • Insulin <u>increases oxidation of glucose during tissue respiration</u> [0.5] 	3
b)	<ul style="list-style-type: none"> • <u>Fibre</u> [1] • <u>cannot be digested;</u> [1] • It <u>will not increase the blood sugar level;</u> [0.5] • and <u>will be passed out as faeces / egested</u> [0.5] 	3
c)	<ul style="list-style-type: none"> • <u>Hormonal response</u> [1] • Hormones are transported to the target organs via the <u>bloodstream / by the blood.</u> [1] • The response may <u>affect more than one target organ.</u> [1] • Responses may be <u>short-lived or long-lived.</u> [1] • It is an <u>involuntary response / action.</u> [1] <p><i>Reject:</i> It will take a long time (already mentioned in the question)</p> <p style="text-align: right;"><i>Max. 3 for characteristics of hormonal response</i></p>	4

