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BIOLOGY

PAPER 1 3009/1

Friday **17 MAY 2013** 9:00 A.M.–10:15 A.M.

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS AND INFORMATION FOR CANDIDATES

Do not open this booklet until you are told to do so.

Write your school number, candidate number, surname and initials in the spaces provided above.

There are fifty questions on this paper.

Answer **ALL** questions.

For each question there are four possible answers labelled **A, B, C, D**.

Choose the one you consider correct and circle the **LETTER** of your choice in the booklet.

Calculators are permitted, however **NO** graphing calculators are allowed.



This question paper consists of 22 printed pages and 2 blank pages.

PAPER 1

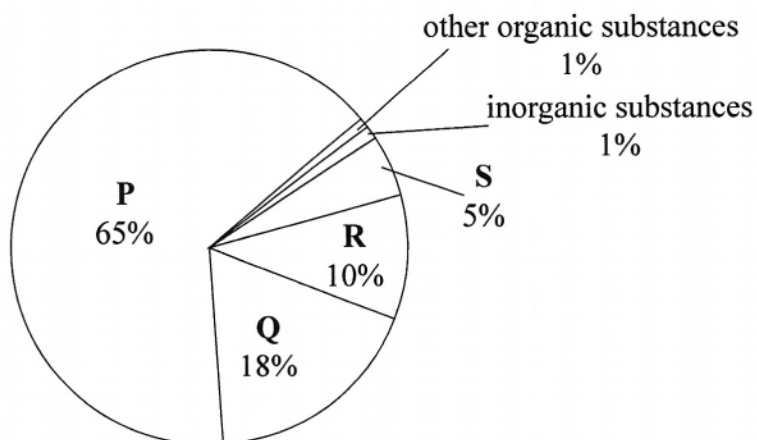
1. Which structure makes up most of a plant cell's volume?

- A chloroplast
- B mitochondria
- C nucleus
- D vacuole

2. Organic compounds always contain which element?

- A carbon
- B nitrogen
- C oxygen
- D phosphorus

3. The pie chart represents the main substances that make up the human body.



Name the substance represented by the letter **R**.

- A carbohydrates
- B fats
- C protein
- D water

4. Which of the following is produced by the mitochondria?

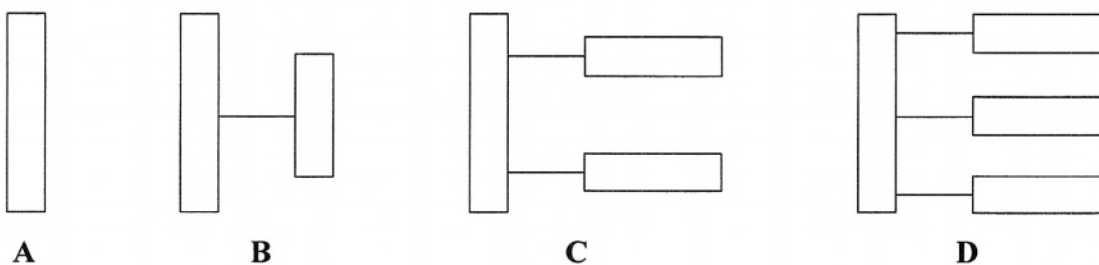
- A** energy
- B** nitrogen
- C** oxygen
- D** water

5. The table shows four compounds of the cell and their function.

Which option is true for a plant and an animal cell?

	cell component	major function	plants	animals
A	Cell Membrane	regulation of substances moving into and out of cell.	absent	present
B	Cell wall	cell protection and support	present	present
C	Chloroplast	conversion of light energy to chemical energy of organic molecules	present	present
D	Ribosome	protein synthesis	present	present

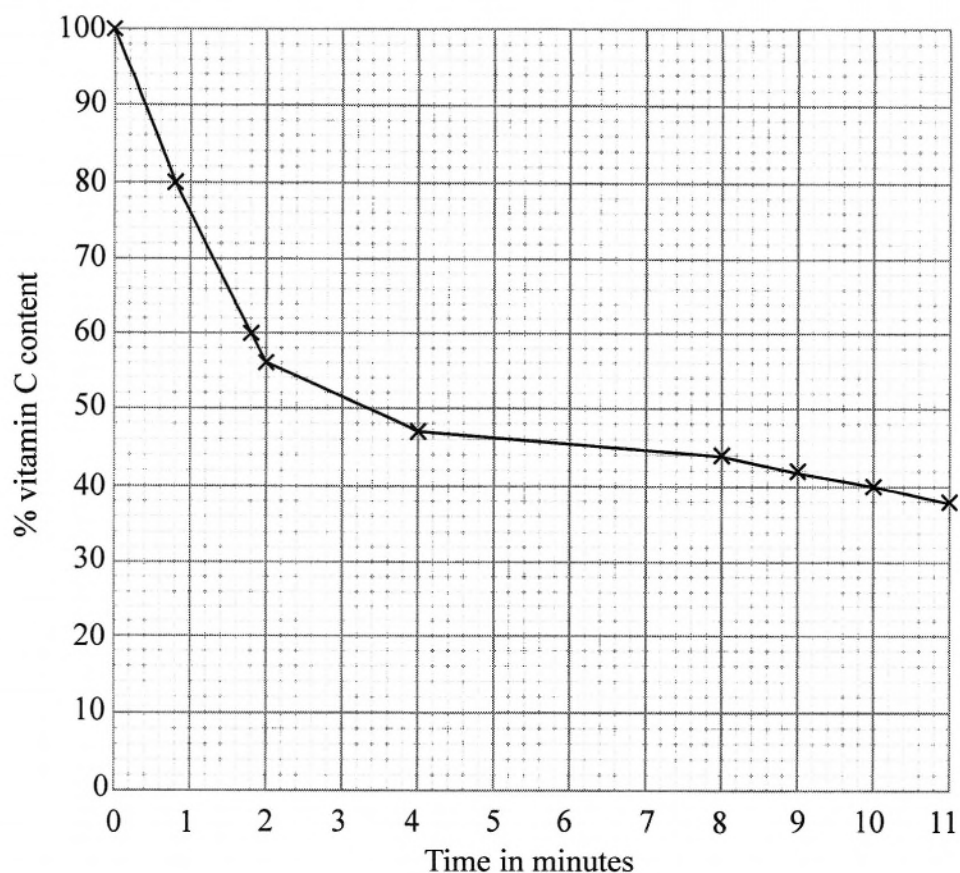
6. Which of the following represents a fat molecule?



7. Which structure does **not** require an immediate source of energy to function?
- A cilia
 - B flagella
 - C root hair
 - D vacuole
8. The table shows the body mass and recommended daily protein intake of four people.
- Which person needs the most protein per kilogram of body mass?

	person	body mass/kg.	daily protein intake/g
A	child under 1 year	7	14
B	child of 8 years	28	25
C	boy of 16 years	63	38
D	adult man	65	37

9. The graph shows the effect of heat on the vitamin C content of cabbage.

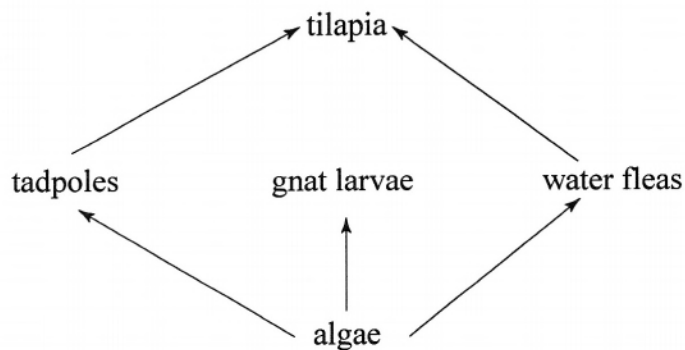


Approximately how long did it take for half of the vitamin C to be lost?

- A 0.5 minutes
 B 4.0 minutes
 C 7.2 minutes
 D 10.0 minutes
10. Which of the following represents the reagent used in the test for reducing sugar and the correct results?

	reagent	result
A	Benedict solution	brown
B	Iodine	blue
C	Potassium	purple
D	Potassium	green

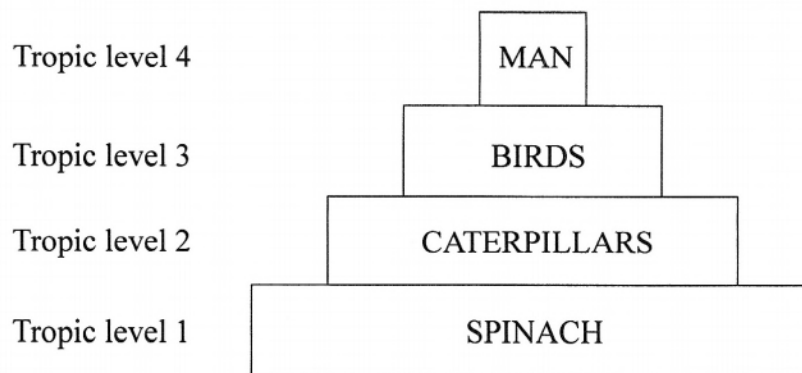
11. Which of the following features belong to dicotyledons only?
- A floral parts in 4's or 5's, fibrous roots, narrow leaves, one cotyledon
 - B floral parts in 3's, tap root, broad leaves, two cotyledons
 - C floral parts in 3's, fibrous roots, narrow leaves, one cotyledon
 - D floral parts in 4's or 5's, tap root, broad leaves, two cotyledons
12. Which is a disadvantage of using pesticides to spray crops?
- A They help to prevent the spread of malaria.
 - B They increase the production of crops.
 - C They kill pests which destroy crops.
 - D They kill some of the animals that are not pests.
13. The diagram below shows a part of a food web for organisms in a lake.



Which organism is the producer?

- A algae
- B gnat larvae
- C tadpoles
- D water fleas

14. The diagram shows the trophic levels of organisms in a spinach garden.



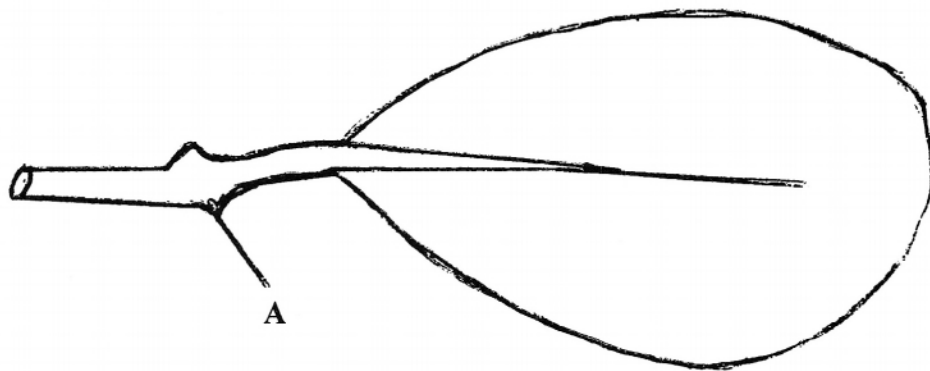
The spinach garden yields 16,000 kJ of energy. How much energy is available to the man if he eats the birds?

- A 1.6 kJ
- B 160 kJ
- C 16 kJ
- D 1660 kJ
15. Which group of animals contains only vertebrates?
- A crab, dog, frog, turtle
- B frog, seahorse, turtle, worms
- C frog, parrot, seahorse, turtle
- D frog, human, lobster, parrot
16. Which one shows a major way in which untreated sewage harms fish in the sea?
- A bacteria in sewage using up much of the oxygen the fish needs to breathe
- B decreasing the amount of food available
- C increasing the temperature of the water
- D taking up the space the fish needs to swim

17. Which of the following food substances should be eaten to make the most efficient use of energy from the sun?

A beans
B cheese
C eggs
D steak

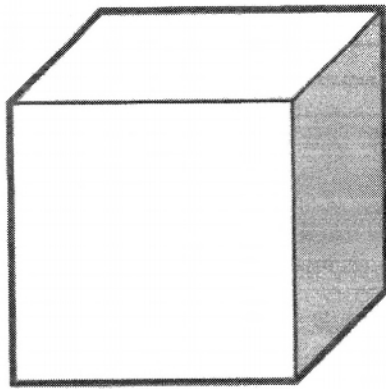
18. The diagram shows a leaf which is a part of a white mangrove plant. Ants were found near the part marked A.



What does this suggest could be a possible function of part A?

A to excrete salt
B to produce salt
C to secrete sugar
D to store water

19. The diagrams below show solid wastes found in the sea.



P
cardboard box



Q
plastic bottle

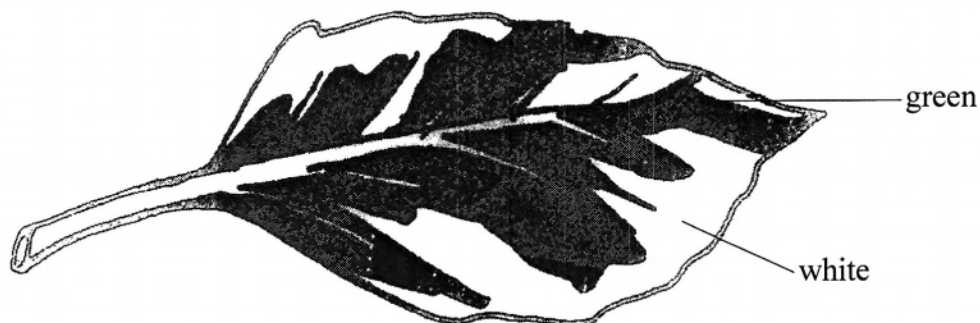
Why is **Q** more harmful than **P**?

- A** Bacteria can grow in **Q**.
 - B** **Q** is made of dangerous chemicals.
 - C** **Q** takes a long time to break down.
 - D** **Q** will trap air.
20. Which is the most important method used today to protect the mangrove ecosystem?
- A** limited collection of firewood
 - B** moving the animals to a zoo
 - C** pass laws to preserve the ecosystem
 - D** put dams around the ecosystem

21. Which piece of equipment is used mainly in clearing large, commercial farms in The Bahamas?

- A cutlass
- B hoe
- C shovel
- D tractor

22. The diagram shows a variegated leaf from a plant kept in bright light for six hours.



A leaf was removed from the plant and tested for starch using iodine solution. Which result is expected?

	green part	white part
A	blue black	white
B	blue black	yellow brown
C	green	blue black
D	green	yellow brown

23. Which leaf structure is internal?

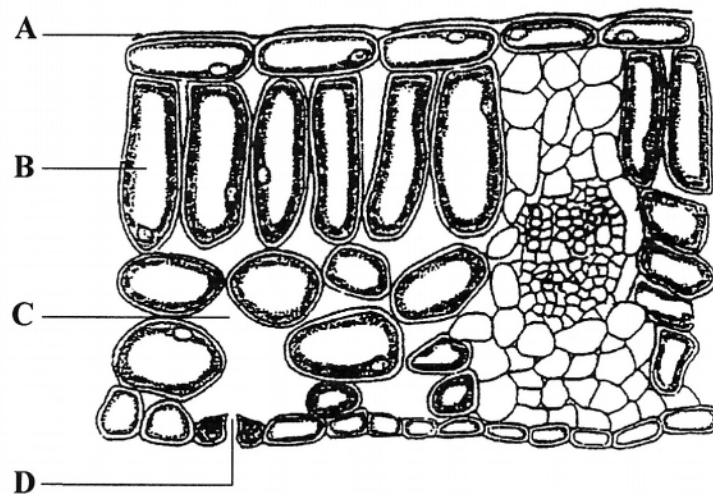
- A epidermis
- B guard cell
- C phloem
- D waxy layer

24. What do we call the specialised tissue, in plants, which transports water?

- A epidermal tissue
- B packing tissue
- C phloem
- D xylem

25. The diagram shows a cross-section of part of a leaf as seen under a light microscope.

Which structure shown allows carbon dioxide to enter the leaf?



26. The diagram shows a healthy potted plant.

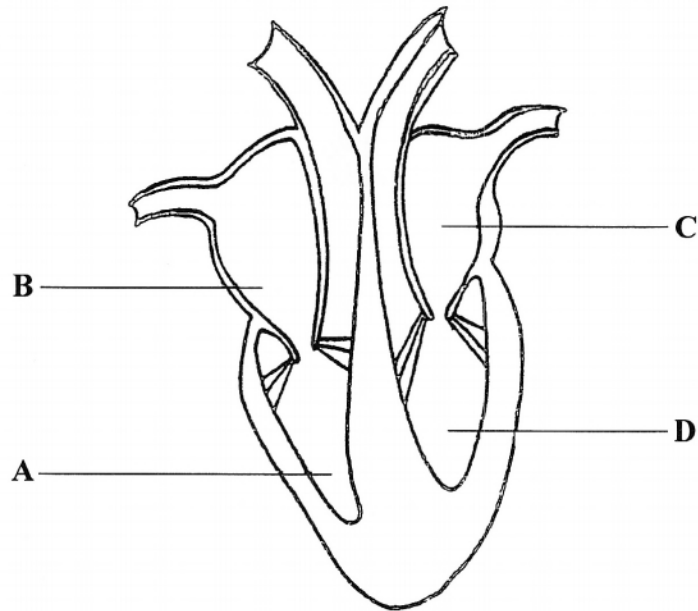


What would be the effect of growing this plant without nitrogen?

- A stunted plant growth and curled leaves
 - B stunted plant growth and pale yellow leaves
 - C thin stems and pale leaves
 - D weak stems and stunted roots
27. In a typical green plant, the rate of transpiration is affected by the behaviour of which structures?
- A guard cells
 - B palisade cells
 - C phloem cells
 - D root hair cells
28. Which animal possesses a heart with two atria and two ventricles?
- A frog
 - B lizard
 - C pig
 - D shark

29. The diagram shows a vertical section through a mammalian heart.

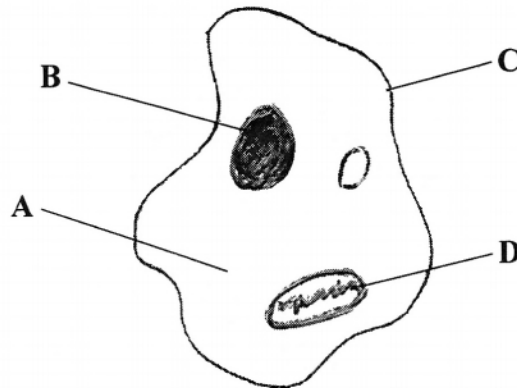
Which labelled chamber pumps out oxygenated blood?



30. One cubic millimetre of blood contains 5,000,000 blood cells with no nuclei and 10,000 blood cells with nuclei. Which statement is true?
- A There are 500 times as many red blood cells as white blood cells.
 - B There are 500 times as many white blood cells as red blood cells.
 - C There are 4,990,000 more red blood cells than white blood cells.
 - D There are 4,990,000 more white blood cells than red blood cells.

31. The diagram shows a typical animal cell.

Which part is the site of anaerobic respiration?

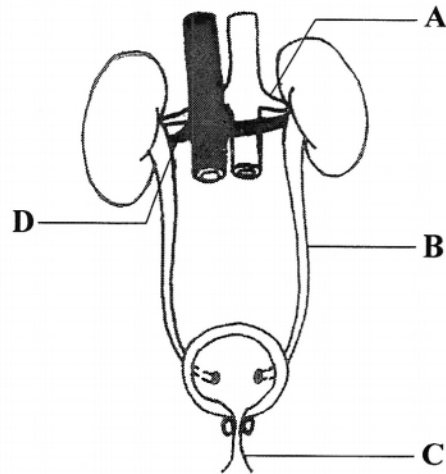


32. Which equation represents aerobic respiration in mammals?

- A glucose $\rightarrow$ alcohol + carbon dioxide
- B glucose $\rightarrow$ lactic acid + carbon dioxide
- C glucose $\rightarrow$ oxygen $\rightarrow$ carbon dioxide + alcohol
- D glucose + oxygen $\rightarrow$ carbon dioxide + water

33. The diagram represents the urinary system.

Which structure, in males, transports urine and semen?



34. More water is lost from the skin on a hot day than on a cold day.

Which statement is a correct explanation?

- A It helps to control body temperature.
- B It helps to prevent the skin from drying out.
- C It makes the skin supple.
- D It releases excess water out of the body.

35. The table shows the daily water loss from a typical human being.

water lost in	volume of water (cm ³ per day)
urine	1500
respiration	400
evaporation from skin	350
faeces	150
sweat	100

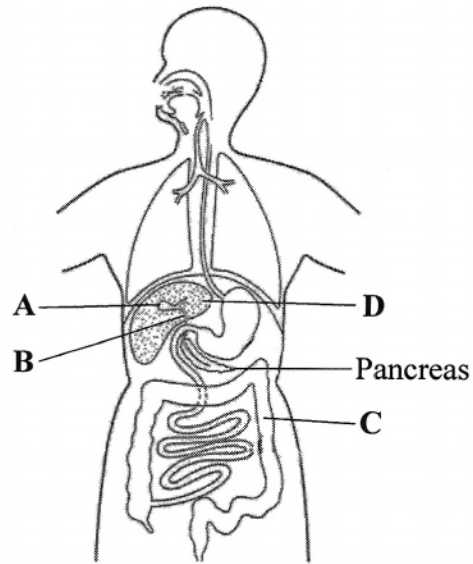
What is the difference in the amount of water lost by the kidneys and the amount lost by the skin?

- A 150 cm³
- B 350 cm³
- C 1050 cm³
- D 1400 cm³
36. The table shows hormones and their related functions. Which hormone correctly matches its function?

	hormone	function
A	adrenaline	causes the uterine lining to breakdown
B	estrogen	forces the body to release glucose from the liver
C	insulin	lowers the amount of glucose in the blood
D	testosterone	induces the mammary gland to produce milk

37. The diagram shows the pancreas and related structures.

Which group of cells is the target for the hormone released by the pancreas?



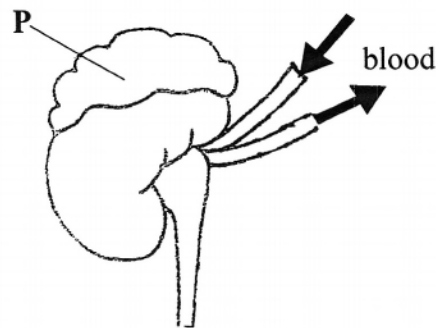
38. Which hormone is responsible for plant growth?

- A adrenaline
- B auxin
- C insulin
- D thyroxine

39. Goiters are usually caused by the malfunction of which endocrine gland?

- A adrenal
- B gonads
- C pancreas
- D thyroid

40. The diagram represents a kidney and associated structures.



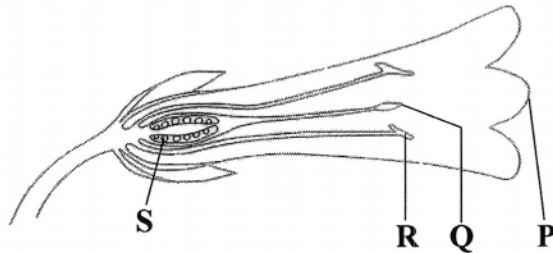
What is the name of the hormone released by structure P?

- A adrenaline
- B estrogen
- C insulin
- D thyroxin

41. Voluntary or conscious activities of the body are controlled by which part of the brain?

- A brain stem
- B cerebellum
- C cerebrum
- D medulla oblongata

42. Which term describes the rods and cones of the human eye?
- A chemo receptors
 - B mechano receptors
 - C photo receptors
 - D thermo receptors
43. Which term describes a cell that has a single set of chromosome?
- A allele
 - B diploid
 - C gene
 - D haploid
44. The diagram shows a flower of a pea plant.

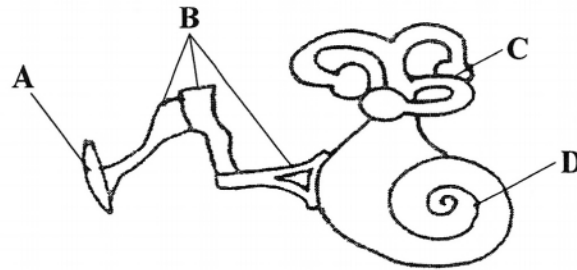


Which letters point to the structures that contain gametes?

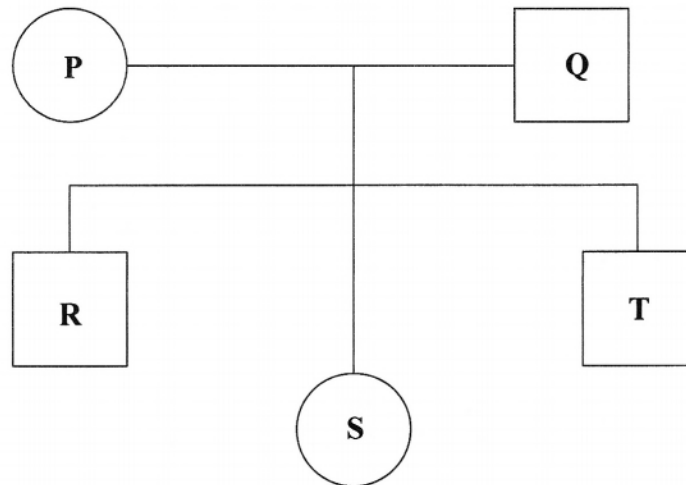
- A P and R
- B R and S
- C Q and S
- D R and Q

45. The diagram shows the structure of a human ear.

Which label identifies the structure that contains sound receptors?



46. The pedigree chart below shows a haemophiliac male with blue eyes (**P**). His wife (**Q**) is heterozygous for brown eyes with no haemophiliac trait. The gene for blue eye is recessive.



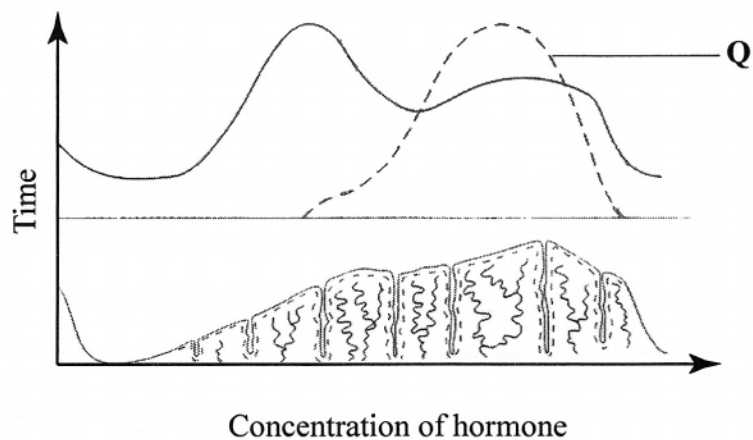
What is the probability that individual **R** is blue eyed?

- A 0.75
- B 0.50
- C 0.25
- D 0

47. Which is an example of vegetative reproduction?

- A binary fission
- B budding
- C marcotting
- D spore formation

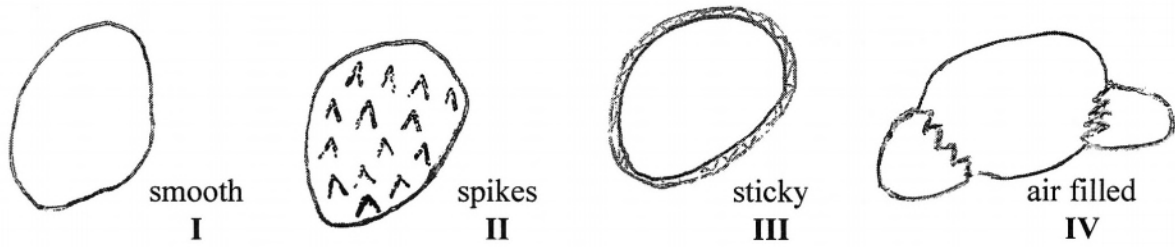
48. The diagram shows the hormones and the changes of the uterus lining in the human female menstrual cycle.



Which hormone is represented by letter Q?

- A adrenaline
- B oestrogen
- C progesterone
- D testosterone

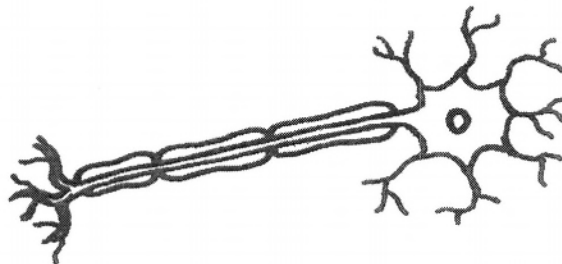
49. The diagrams below show pollen grains from four different plants.



Which option correctly identifies the method of pollination?

	I	II	III	IV
A	wind	wind	insect	wind
B	wind	insect	insect	wind
C	insect	insect	insect	wind
D	insect	insect	wind	wind

50. The diagram shows a type of nerve cell.



What role does it play in a pupillary reflex?

- A It changes the size of the pupil.
- B It detects the stimulus.
- C It transmits impulses towards the brain.
- D It transmits impulses towards the effector.

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School Number	Candidate Number
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BIOLOGY

PAPER 2 3009/2

Friday **17 MAY 2013** 10:30 A.M.–12 Noon

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS AND INFORMATION FOR CANDIDATES

Do not open this booklet until you are told to do so.

Write your school number, candidate number, surname and initials in the spaces provided above.

Answer **ALL** questions on this paper.

Read each question carefully and make sure you know what you have been asked to do before starting your answer.

Confine your answer to the lines following each question. The mark for each part-question is given in brackets [].

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

This question paper consists of 15 printed pages and 1 blank page.

1. The picture shows a section of a coral reef.



- (a) Corals need specific conditions to survive.

List **TWO** of these conditions.

1 _____

2 _____ [2]

- (b) Identify **TWO** types of corals shown in the picture.

1 _____

2 _____ [2]

- (c) (i) Explain why it is difficult to see some of the fish surrounding coral **B**.

_____ [1]

- (ii) What do we call this characteristic/feature?

_____ [1]

- (iii) How is this characteristic/feature beneficial to these organisms?

[3]

- (d) List **TWO** human threats to the coral reef ecosystem.

1

2

[2]

TOTAL MARKS [11]

2. Fats, proteins and carbohydrates are three important nutrients for humans.

(a) Name **TWO** elements that are found in all three of these nutrients.

_____ [2]

(b) Which nutrient contains the element nitrogen?

_____ [1]

(c) (i) Explain why young people need relatively large amounts of the nutrient you have named in (b).

(ii) Explain why elderly people need relatively small amounts of the nutrient you have named in (b).

_____ [2]

(d) Name **ONE** food that is a good source of each of these three nutrients.

fat _____

protein _____

carbohydrate _____ [3]

(e) Which of these **THREE** nutrients contains the most energy per gram?

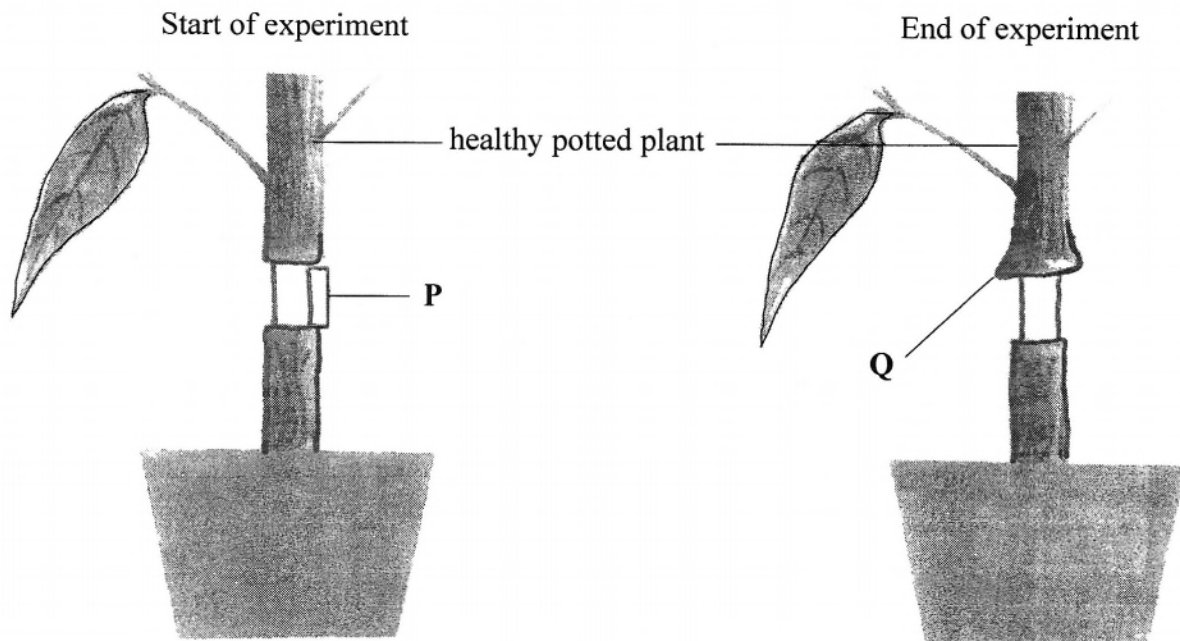
_____ [1]

(f) Which of the nutrients listed is needed in the production of enzymes?

_____ [1]

TOTAL MARKS [10]

3. The diagrams show the outer tissue layers of a healthy plant peeled off in a small area (**P**). The plant was allowed to grow for two weeks and observed at the end of this period.



- (a) Name the process affected by removing the outer tissue layers at **P**.

_____ [1]

- (b) Explain why a bulge was seen at **Q** after two weeks.

_____ [2]

- (c) Name the two types of tissue that are responsible for transporting substances in plants. State **ONE** function of each tissue.

1. Name: _____

Function: _____

2. Name: _____

Function: _____

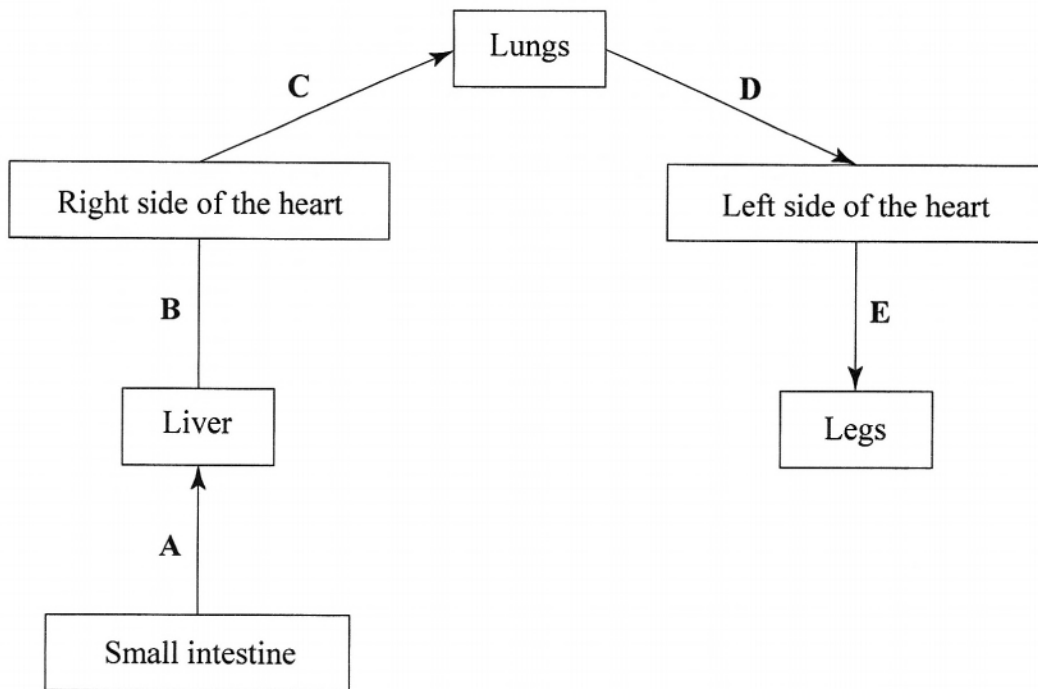
_____ [4]

- (d) Describe the type of (vegetative) reproduction method in which a ring is cut through the bark of a stem as shown in the picture.

[2]

TOTAL MARKS [9]

4. The diagram shows organs in part of the human circulatory system. The arrows show the direction of blood flow between these organs.



- (a) Name the blood vessels represented by the letters **B**, **C**, **D** and **E**.

B _____ **D** _____
C _____ **E** _____ [4]

- (b) (i) State **TWO** ways in which blood vessel **C** is different in structure from blood vessel **D**.

1 _____
2 _____ [2]

- (ii) How is blood vessel **C** an exception to the general rule regarding functions of blood vessels?

_____ [1]

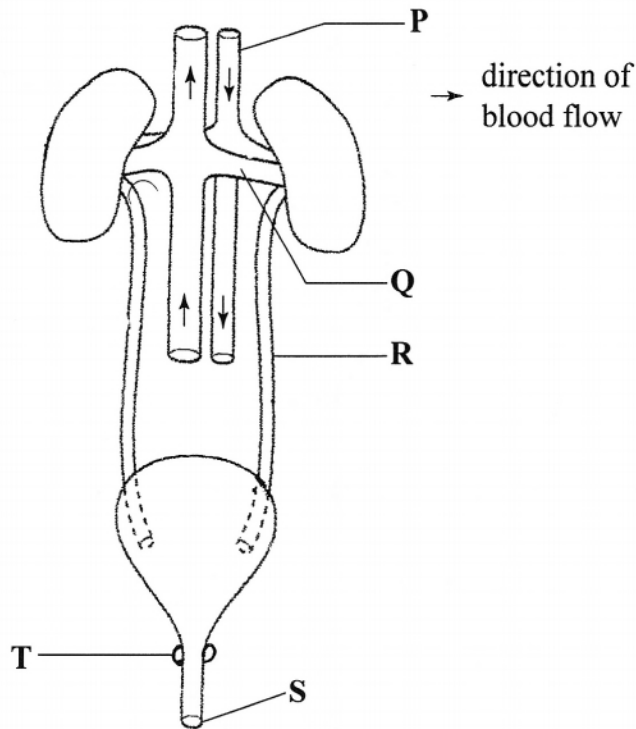
- (iii) On the diagram draw a line to the organ to which blood flows after leaving the legs and label it **Q**. [1]

- (c) Explain the term “double circulation.”

[2]

TOTAL MARKS [10]

5. The diagram shows the urinary system.



- (a) Name the parts labelled **P**, **Q**, **R** and **S**.

P _____ **R** _____

Q _____ **S** _____ [4]

- (b) On the diagram draw a line to the part that stores urine and label the line **X**.

[1]

- (c) What is the function of the part labelled **T**?

_____ [1]

- (d) Name and describe **TWO** functions of the kidney.

name: _____

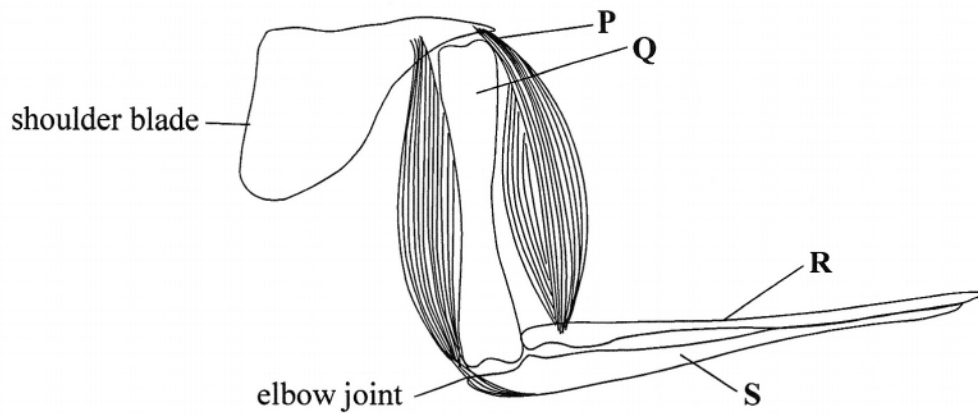
function: _____

name: _____

function: _____ [4]

TOTAL MARKS [10]

6. The diagram shows some of the structures in the upper arm and shoulder of a human.



- (a) Name the parts labelled **P**, **Q**, **R** and **S**

P _____ **R** _____

Q _____ **S** _____ [2]

- (b) Two muscles are involved in raising and lowering the arm.

- (i) Name the muscle which bends the arm and explain how this is done.

name of muscle: _____

explanation _____

_____ [3]

- (ii) What happens to the other muscle during the bending of the arm?

_____ [1]

- (iii) State the term which describes two muscles which act in this way.

_____ [1]

(c) Jeff would like to find out how long it would take for the arm muscles to become fatigued.

(i) Briefly explain how this experiment could be done.

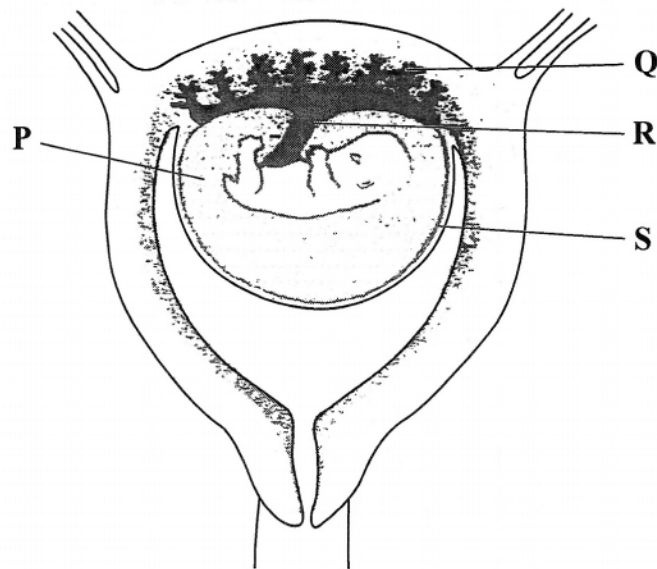
[2]

(ii) The build-up of a chemical in a working muscle causes fatigue. Name this chemical.

[1]

TOTAL MARKS [10]

7. The diagram shows a developing baby in the uterus of its mother.



- (a) State the term used to identify the developing baby at the stage shown.

_____ [1]

- (b) (i) Explain the role of the substance labelled P.

_____ [2]

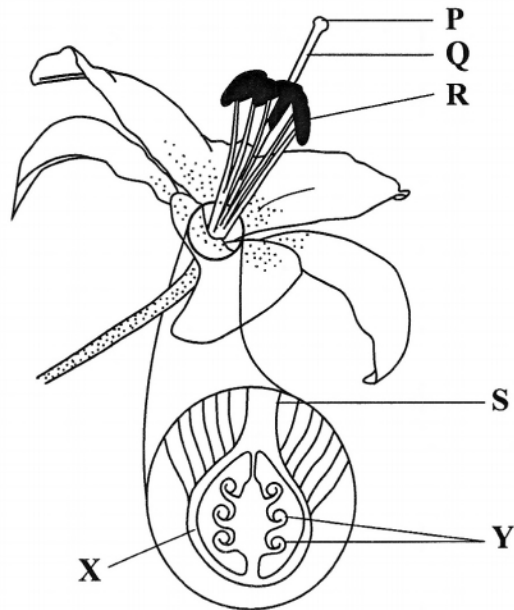
- (ii) Give **ONE** example of a situation in which this role may be important.

_____ [1]

- (c) Structure **Q** connects the mother with the developing baby.
- (i) Describe how this structure supplies the developing baby with oxygen.
- _____
- _____
- _____ [3]
- (ii) Name **TWO** substances that pass from the developing baby to its mother, through structure **Q**.
- _____
- _____ [2]
- (d) Name the blood vessel in structure **R** which transports blood towards the body of the developing baby.
- _____ [1]

TOTAL MARKS [10]

8. The diagram shows a flower.



- (a) Explain the importance of flowers to a plant.

_____ [2]

- (b) State the function of structure **R**.

_____ [1]

- (c) Name the structures which develop from the parts labelled **X** and **Y** after fertilisation.

X _____ **Y** _____ [2]

- (d) (i) What is germination?

_____ [1]

- (ii) State **TWO** environmental factors which are necessary for seeds to germinate.

_____ [2]

- (iii) Suggest **TWO** advantages to a germinating seed of having its radicle grow out first before its plumule.

1 _____

2 _____

[2]

TOTAL MARKS [10]

School Number	Candidate Number
Surname and Initials	

BIOLOGY

PAPER 3 3009/3

Thursday **23 MAY 2013** 12:30 P.M.–2:00 P.M.

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS AND INFORMATION FOR CANDIDATES

Do not open this booklet until you are told to do so.

Write your school number, candidate number, surname and initials in the spaces provided above.

Answer **ALL** questions in Section A (1–4) in the space provided.

Answer **TWO (2)** out of **THREE (3)** questions in Section B in the spaces in the question booklet. Candidates are advised to spend no more than 35 minutes on Section A.

The mark for each part-question is given in brackets [].

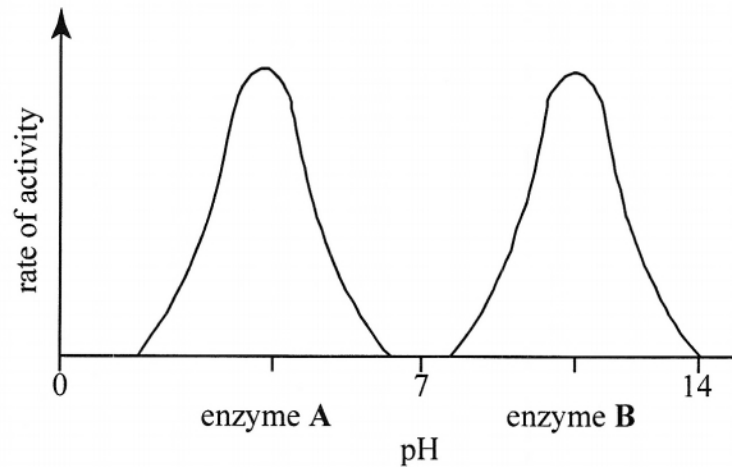
Calculators are permitted, however **NO** graphing calculators are allowed.

For Examiner's Use	
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This question paper consists of 16 printed pages.

SECTION A

1. The graph shows the effect of pH on the rate of activity of two enzymes, **A** and **B**.



- (a) Describe the effect of pH on enzyme **B**.

[2]

- (b) Which enzyme would be best suited to work in the stomach? Explain your answer.

[3]

- (c) Explain the role of the enzyme amylase, during seed germination.

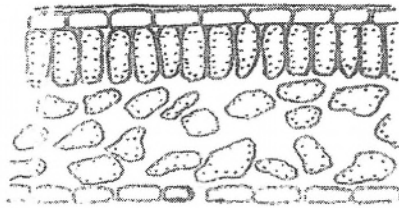
[3]

- (d) Explain the function of enzymes in laundry detergents.

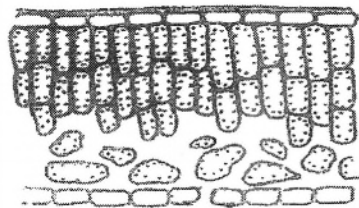
[2]

TOTAL MARKS [10]

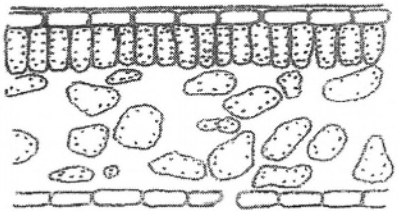
2. The diagrams show transverse sections through four leaves. Leaf A is from a plant that receives normal sunlight and normal amounts of water.



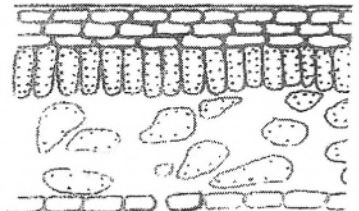
A



B



C



D

- (a) (i) Suggest which leaf comes from a plant that is adapted to grow in conditions where water is in short supply.

_____ [1]

- (ii) Explain why you chose this leaf.

_____ [1]

- (iii) Explain how the structure of this leaf would help the plant to survive in dry conditions.

_____ [1]

- (b) Which leaf is adapted to make the most food? Give a reason for your answer.

Leaf: _____

Reason: _____

_____ [2]

- (c) State **TWO** uses of water for a plant.

_____ [2]

- (d) Which factor, other than light and water, if increased could cause an increase in the rate of photosynthesis?

_____ [1]

- (e) Explain the importance of light and chlorophyll to the process of photosynthesis.

Light: _____

Chlorophyll: _____

_____ [2]

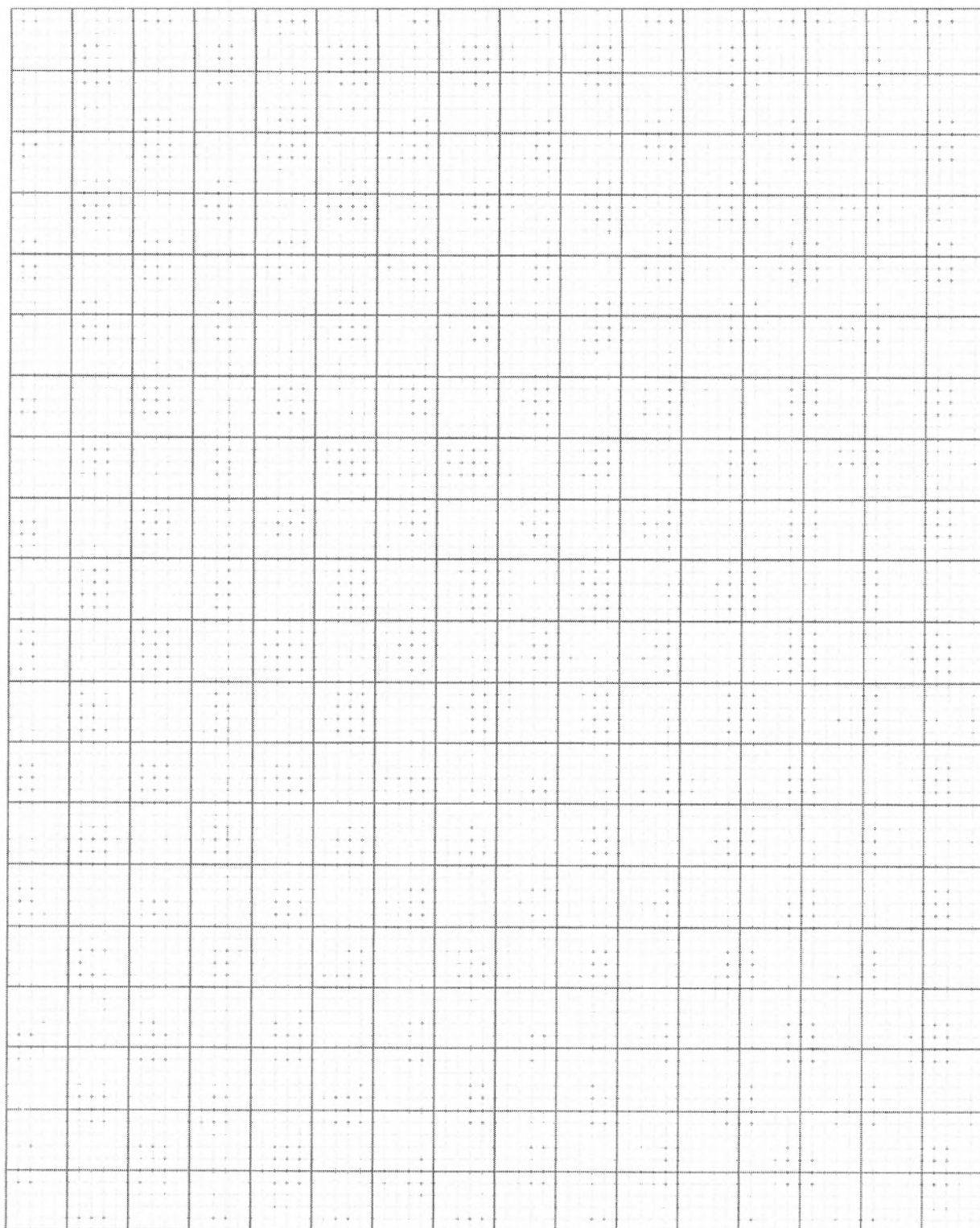
TOTAL MARKS [10]

3. A student conducted an investigation on the effect of temperature on yeast activity. He counted the number of bubbles given off per minute at different temperatures. The table shows his results.

Temperature/°C	Number of bubbles per minute
10	12
20	14
30	38
40	50
50	20
60	5
70	2

(a) Plot a line graph of the results.

[4]



(b) Name the gas produced.

[1]

- (c) (i) State the temperature at which the activity of the yeast was highest.

[1]

- (ii) Explain why the activity is greater at this temperature than at lower temperatures.

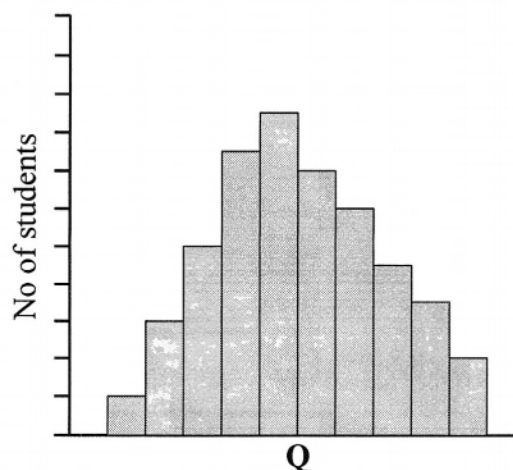
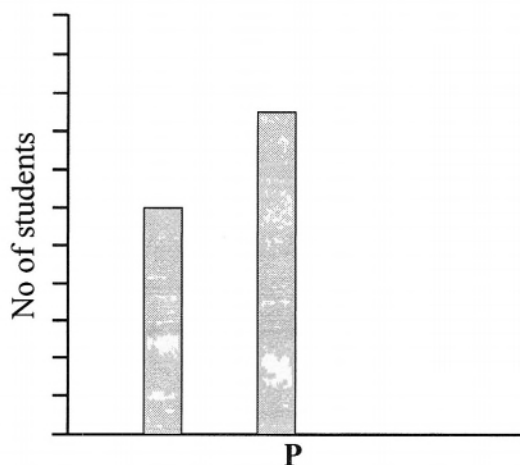
[2]

- (iii) Explain why the activity is greater at this temperature than at higher temperatures.

[2]

TOTAL MARKS [10]

4. The diagram shows two bar charts which represent two types of variation.



- (a) (i) Define the term variation as it relates to living organisms.

 _____ [1]

- (ii) Give the correct terms for the type of variation shown in bar charts **P** and **Q**.

P _____ **Q** _____ [2]

- (b) (i) The table lists four examples of variation. For each example, state which bar chart, **P** or **Q** could represent it. [2]

examples of variation	bar chart P or Q
height	
blood groups	
sex/gender	
intelligence	

- (ii) State **TWO** factors which may affect variation.

 _____ [2]

- (c) Outline how artificial selection could be used to produce a variety of cows with high milk yield?

[3]

TOTAL MARKS [10]

SECTION B

Instruction: Answer any **TWO** of the **THREE** questions in this section.

5. A mahogany tree growing in the park is infested with an insect parasite. It was suggested that the tree be cut down and burnt.
- (a) Discuss the importance of trees to man and the environment. [10]
 - (b) Explain why burning the tree would not be the best solution and give an alternative to burning. [6]
 - (c) State **TWO** benefits of allowing the tree to rot. [2]
 - (d) Name the group of organisms responsible for the rotting process and give one example of the group. [2]

TOTAL MARKS [20]

- 6.
- (a) Define the term homeostasis. [2]
 - (b) List **THREE** conditions in the human body that are under homeostatic control. [3]
 - (c) Name the two systems in the body that are involved in coordinating homeostatic control. [2]
 - (d) Describe **FOUR** differences between the ways in which the two systems named in (c) function. [8]
 - (e) Explain how the skin helps to regulate the body temperature when the body becomes hot. [5]

TOTAL MARKS [20]

- 7.
- (a) Describe the composition of the lymphatic system and state **FOUR** main functions of this system. [6]
 - (b) Explain how the body's circulatory system and lymphatic system are related. [3]
 - (c) Describe the process of phagocytosis. [5]
 - (d) Summarise the blood clotting process mentioning the roles of platelets and fibrin. [6]

TOTAL MARKS [20]

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Question
Write on both sides of the paper

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[Turn over

Question
Write on both sides of the paper

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School Number	Candidate Number
Surname and Initials	

BIOLOGY

ALTERNATIVE TO PRACTICAL

PAPER 5 3009/5

Thursday **23 MAY 2013** 2:15 P.M.–3:15 P.M.

MINISTRY OF EDUCATION NATIONAL EXAMINATIONS
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BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS AND INFORMATION FOR CANDIDATES

Do not open this booklet until you are told to do so.

Write your school number, candidate number, surname and initials in the spaces provided above.

Answer **ALL** questions on this paper.

Read each question carefully and make sure you know what you have been asked to do before starting your answer.

Confine your answer to the lines following each question and drawings should be in the spaces provided.

No additional sheets of paper should be placed in this book.

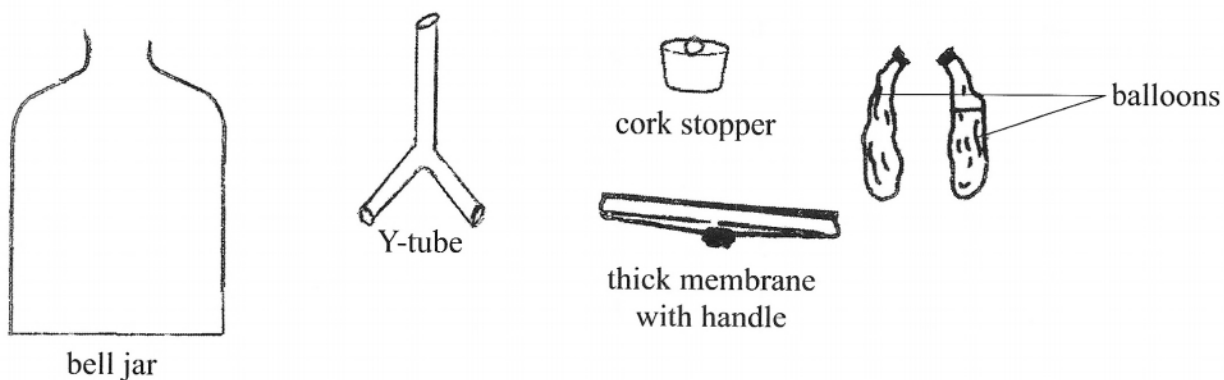
Calculators are permitted, however **NO** graphing calculators are allowed.

For Examiner's Use	
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This question paper consists of 9 printed pages and 3 blank pages.



1. The diagram shows the apparatus used to construct a model of the breathing structures in humans.



- (a) Draw a diagram to show how the apparatus could be used to construct a model of the human breathing structures.

[4]

- (b) On the diagram, draw a line to the structure which represents the air passages in humans and label it **X**. [1]

- (c) What action needs to be taken to inflate the balloons?

[1]

- (d) Name the breathing movement in humans which is equivalent to the action in (c).

[1]

- (e) What action would cause the balloons to deflate?

_____ [1]

- (f) Describe **TWO** ways the model differs from the parts of the human breathing system.

1 _____

2 _____

_____ [2]

TOTAL MARKS [10]

2. A student carried out an experiment to investigate the effect of moisture and light on the growth of mould.

A slice of dry bread was placed into each of four glasses.

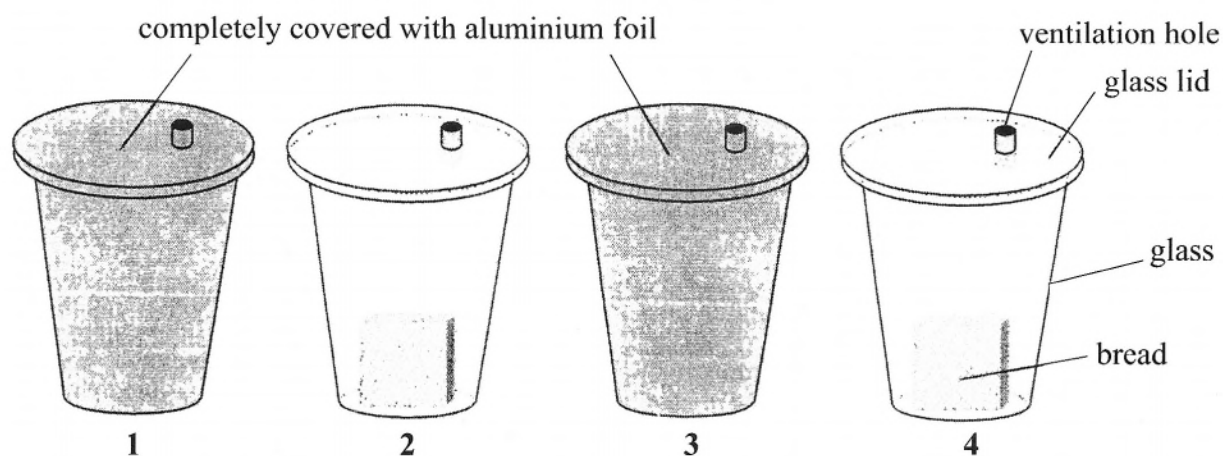
All of the glasses were left in the open for 15 minutes.

Five drops of water were added to glasses 1 and 2.

A glass lid with a small aluminium ventilation hole was placed on each glass.

Glasses 1 and 3 were completely covered with aluminium foil, making sure that the vent was not blocked.

The diagram shows the four glasses.



- (a) Here are the results that the student wrote down.

glass 1 – much growth

glass 2 – much growth

glass 3 – no growth

glass 4 – no growth

Construct a table showing the conditions in each glass and the results. Use the terms: wet, dry, dark and light. [4]

- (b) What can be concluded from the results that the student obtained?

_____ [2]

- (c) State **THREE** factors that the student kept the same or should have kept the same, in her experiment.

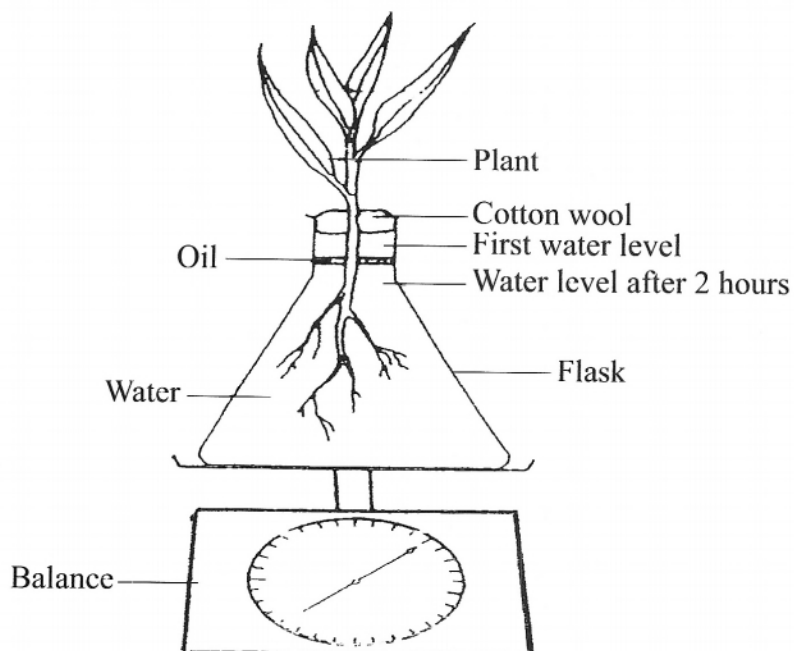
_____ [3]

- (d) The mould grows and feeds on the bread. What is the biological term for a substance on which an organism such as mould grows and feeds?

_____ [1]

TOTAL MARKS [10]

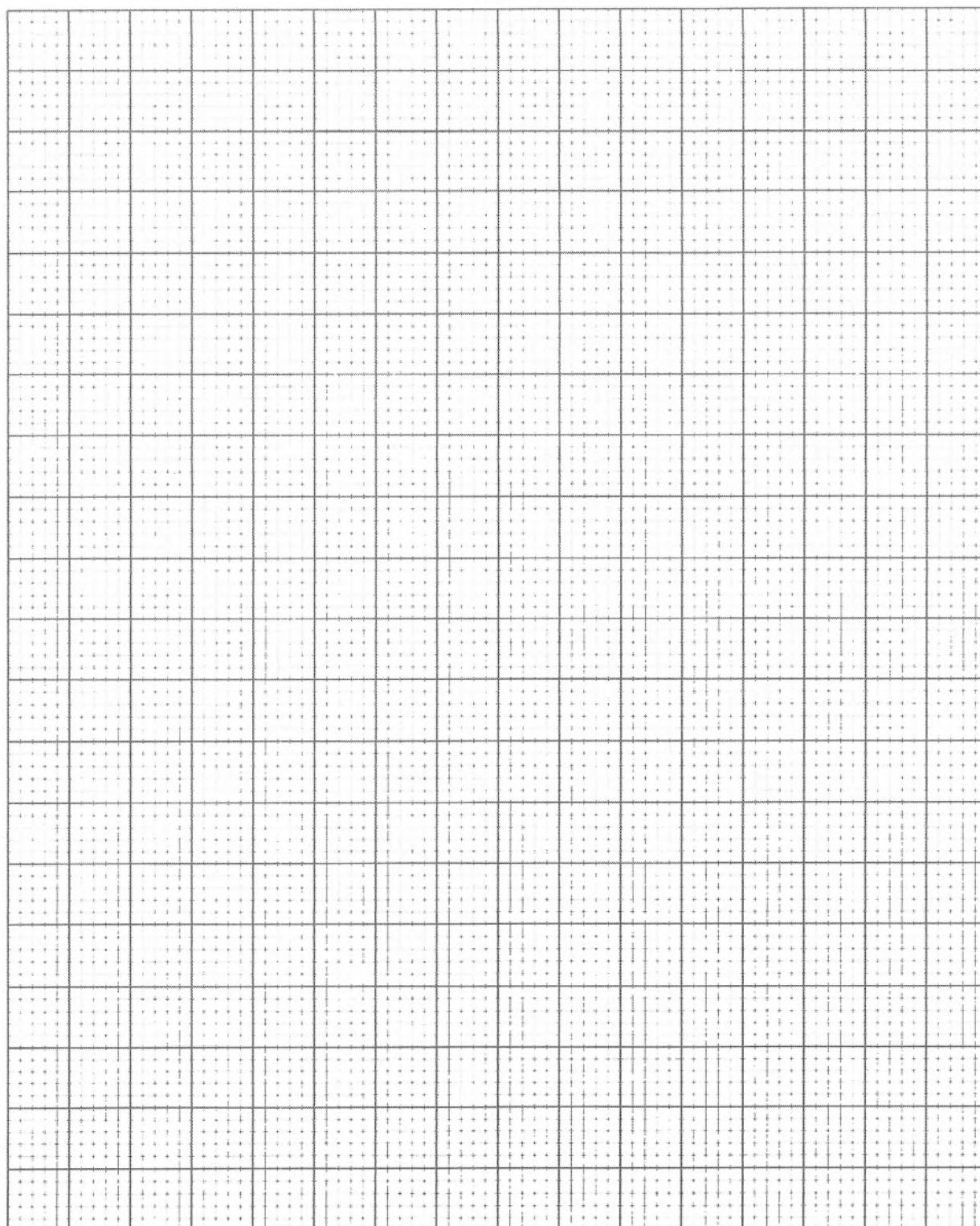
3. The apparatus shown in the diagram was set up in a well lit room. At intervals of 20 minutes, the mass of the apparatus was recorded. The results are given in the table below.



Time/minutes	Mass of apparatus/g
0	56.8
20	56.7
40	56.4
60	56.2
80	55.8
100	55.3
120	55.1

(a) Plot a line graph using the data in the table.

[3]



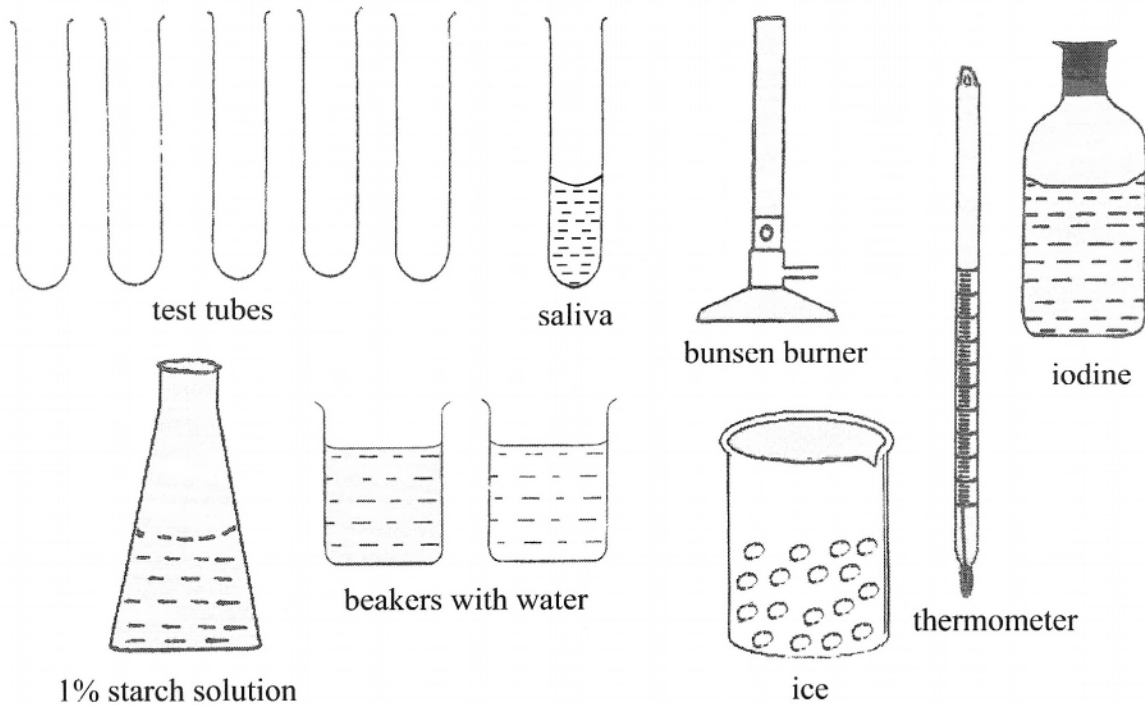
(b) Name the process responsible for the loss in mass during this experiment.

[1]

- (c) What is the purpose of each of the following?
- (i) cotton wool _____
- (ii) layer of oil _____ [2]
- (d) (i) Calculate the loss in mass during the first hour.
(Show your working).
- [2]
- (ii) Between which 20 minutes interval is water loss greatest?
- _____ [1]
- (iii) Calculate the mass of water that would need to be added to the flask after 2 hours, in order to restore the water in the flask to its original level. [1]

TOTAL MARKS [10]

4. Explain how you would use the following apparatus to design an experiment to investigate the effect of varying temperature on enzyme action. You may use diagrams, labels on the diagrams provided and words to give your answer.



TOTAL MARKS [10]

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