Centre Number	Candidate Number	Name

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
Cambridge Checkpoint

SCIENCE **1113/02**

Paper 2

November 2005

45 minutes

Candidates answer on the Question Paper.
No Additional Materials are required.

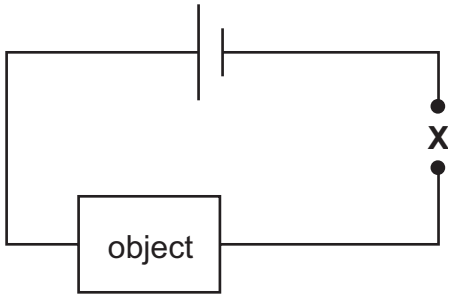
READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen in the spaces provided on the Question Paper.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
You may use a soft pencil for any diagrams, graphs or rough working.
You should show all your working in the booklet.
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **15** printed pages and **1** blank page.

1 A boy wants to test various objects to see if they conduct electricity. He sets up the circuit shown below.



(a) Name a component which the boy can connect at **X** to show whether a current passes through the circuit.

..... [1]

(b) What word is used to describe an object which does not conduct electricity?

..... [1]

(c) The boy uses this circuit to test various objects. Tick the box beside each object which conducts electricity.

brass rod	
graphite centre from a pencil	
piece of rubber tubing	
plastic ruler	
wooden casing from a pencil	

[2]

2 The table gives the names, colours and solubility in water of four compounds.

name	colour	solubility
copper carbonate	green	insoluble
iron sulphate	green	soluble
sodium chloride	white	soluble
zinc carbonate	white	insoluble

The compounds were added to separate beakers of water. Sufficient water was present for the soluble compounds to dissolve completely. The contents of each beaker were then filtered.

(a) One of the compounds left a green solid on the filter paper.

(i) What is the name of this compound?

..... [1]

(ii) What would be the colour of the filtrate?

..... [1]

(b) Describe how you would obtain pure crystals of sodium chloride from a mixture of solid sodium chloride and solid zinc carbonate.

step 1 .....

step 2 .....

step 3 ..... [3]

3 **(a)** The pictures show four different birds.

X **Y**

Use the key to identify birds **X and Y.**

1	curved beak	go to **2**
	straight beak	oystercatcher

2	beak curved upwards	avocet
	Beak curved downwards	go to **3**

3	stripe above eye	whimbrel
	no stripe above eye	curlew

X is .....

Y is ..... [2]

(b) All the pictures in **(a)** show animals which belong to the same group (birds).

Three features of birds are

they have feathers,
they lay eggs,
they have a backbone.

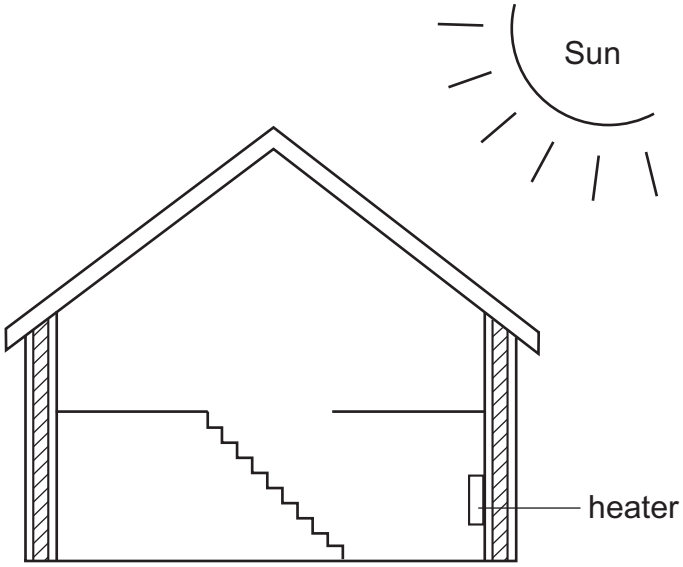
(i) Which feature is unique to birds (that is, which feature is not shared with other groups)?

..... [1]

(ii) Which feature do birds have in common with all other vertebrates?

..... [1]

4 The diagram shows a cross-section of a house.



(a) What is the name of the process by which heat energy is transferred through the walls of the house?

..... [1]

(b) What is the name for materials that do not allow heat energy to pass through them easily?

..... [1]

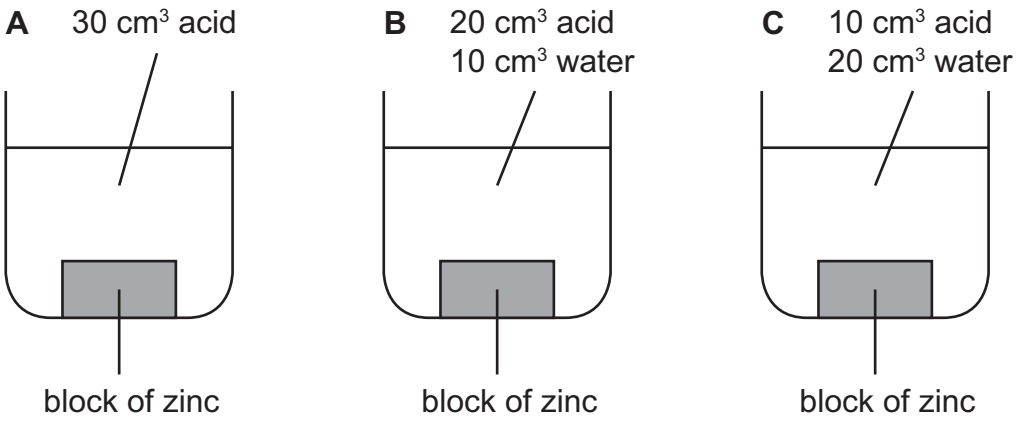
(c) Warm air often goes to the upper parts of the house.
What is the name of the process by which air moves and carries heat energy with it?

..... [1]

(d) What is the name of the process by which energy reaches the walls of the house directly from the Sun?

..... [1]

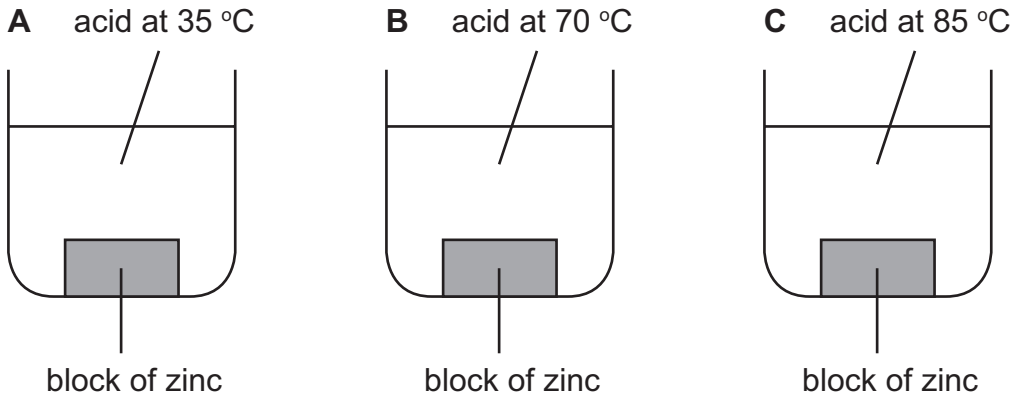
5 **(a)** A pupil investigates how quickly hydrochloric acid reacts with zinc. First she tries mixing acid from the same bottle with different amounts of water.



(i) Which reaction is the fastest, **A**, **B** or **C**?

..... [1]

(ii) Next the pupil keeps the same concentration of acid each time but tries different temperatures.



Which reaction is the fastest, **A**, **B** or **C**?

..... [1]

(b) What effects do catalysts have on chemical reactions? Tick the correct box.

Catalysts slow down chemical reactions. ☐

Catalysts reverse chemical reactions. ☐

Catalysts speed up chemical reactions. ☐ [1]

6 The diagram shows a flower that is pollinated by the wind.

(a) Give two ways in which this flower is suited for wind-pollination.

1 .....

.....

2 .....

..... [2]

(b) Pollination is followed by fertilisation.

What is meant by fertilisation?

..... [1]

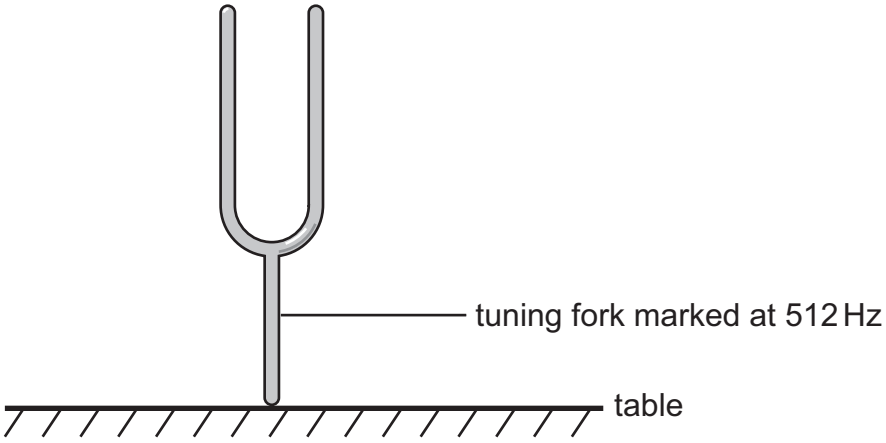
(c) Complete the following sentence.

After fertilisation the ovary becomes the .....

and the ovules become the ..... . [2]

7 The diagram shows a tuning fork which emits a single tone when it is sounded.

The tuning fork was sounded by banging the prongs and then putting the base on a table top as shown.



(a) What does the tuning fork do to produce a sound wave in the air near the fork?

.....[1]

(b) How is the sound wave carried through the air to the human ear?

.....[1]

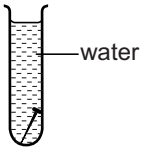
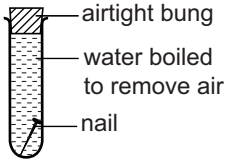
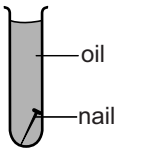
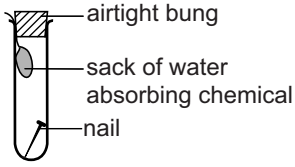
(c) Complete the following sentences by using words from the list.

amplitude **frequency** **loudness** **pitch**

The fork has a ..... of 512 Hz and the tone produced has a ..... of C.

When the fork is hit harder this increases the ..... of the wave produced and increases the ..... of the sound. [4]

8 A student set up the following experiment to investigate the conditions necessary for iron nails to rust.

tube	conditions	results after 2 weeks	
		rust present	rust absent
1			
2			
3			
4			

(a) Fill in the results you would expect by putting a ticks (✓) in the appropriate results boxes.

[2]

(b) Which gas from the air combines with iron to form rust?

.....

[1]

(c) Paint can be used to coat the surface of iron to prevent rusting. This is not appropriate for nails because the layer of paint gets scratched.
Give one other method of preventing rust forming on nails, not shown in this experiment.

.....

[1]

9 Which of the following is the correct word equation for respiration?

Tick one box.

sugar + water → carbon dioxide + oxygen ☐

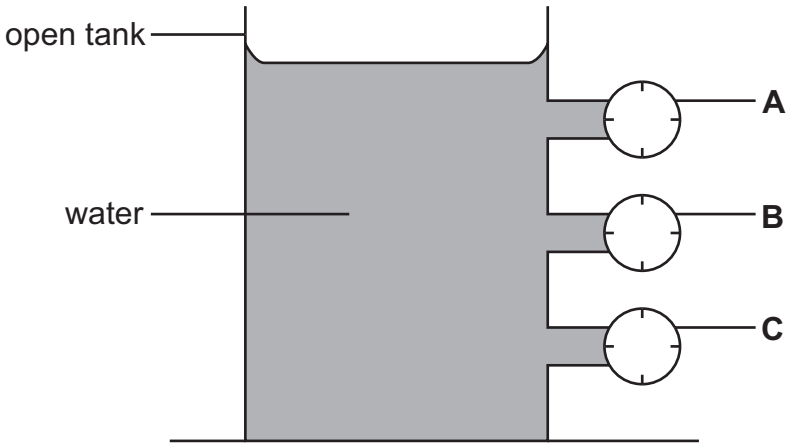
sugar + oxygen → carbon dioxide + water ☐

sugar + carbon dioxide → oxygen + water ☐

carbon dioxide + water → sugar + oxygen ☐ [1]

10 (a) The diagram shows an open tank containing water.

A, **B** and **C** are gauges which measure water pressure in the tank.



(i) Tick the statement which is correct.

☐ The water pressure is greatest at **A**.

☐ The water pressure is greatest at **B**.

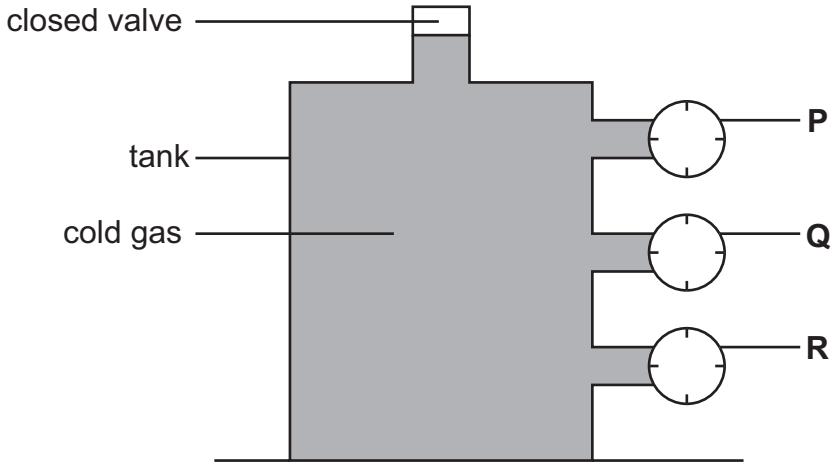
☐ The water pressure is greatest at **C**.

☐ The water pressure at **A**, **B** and **C** is the same. [1]

(ii) What happens to the readings on the gauges if more water is added to the tank?

..... [1]

(b) The diagram shows a sealed tank which contains a cold gas. It is fitted with pressure gauges at **P**, **Q** and **R**.



(i) Tick the statement which is correct.

☐ The pressure is greatest at **P**.

☐ The pressure is greatest at **Q**.

☐ The pressure is greatest at **R**.

☐ The pressure at **P**, **Q** and **R** is the same. [1]

(ii) What happens to the readings on the gauges if the gas warms up?

..... [1]

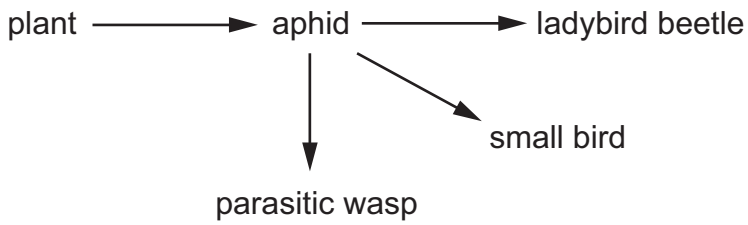
(iii) Explain how the gas particles exert pressure on the walls of the tank.

.....

..... [1]

11 Aphids are insects which suck the sugary sap from plants to obtain their food. They are a particular problem on greenhouse crops.

(a) The diagram shows feeding relationships including aphids.



Suggest one reason why aphids are more likely to increase their numbers on greenhouse crops than on those grown in open fields.

.....[1]

(b) Parasitic wasps are sold to provide biological control of aphids in greenhouses.

The wasps are supplied in containers with the following instructions:

Do not use until there are aphids in the greenhouse.
Do not use pesticides in the greenhouse.

(i) Why must there be aphids in the greenhouse before you introduce the parasitic wasps?

.....[1]

(ii) Why is it important not to use pesticides when you have introduced parasitic wasps?

.....[1]

(c) At the end of the growing season the plants will be removed from the greenhouse.

(i) What will happen to the population of wasps?

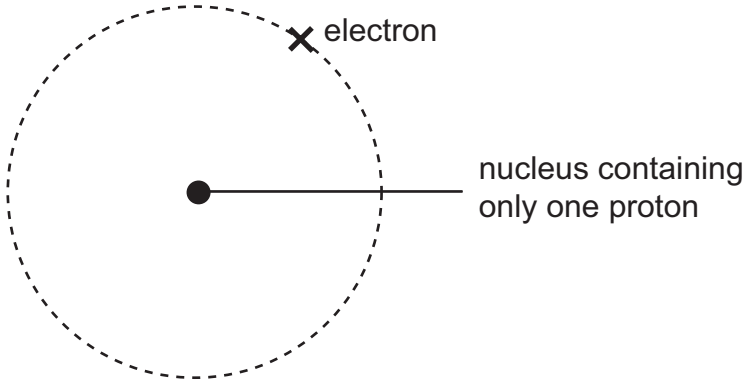
.....[1]

(ii) Explain why this method of control can be described as more environmentally friendly than the use of pesticides.

.....

.....[1]

12 The diagram shows the structure of an atom.



(a) Which element has atoms with this structure?

..... [1]

(b) Choose words from the list to complete the sentences below.

electrons **protons** **neutrons**

(i) The nucleus of an atom usually contains both

..... and ..... [1]

(ii) The particles in the atom which have a negative electrical charge

are called ..... [1]

(iii) An atom of an element contains the same number of

..... and ..... [1]

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