

NAME:	SCIENCE TEACHER:	10C
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SCIENCE

Year 10 Examination 2008

10C – 40 marks

Make sure that you have answered all the questions in paper 10B before you start this paper

Time allowed for both examinations: 2 hours

Answer all questions in the spaces provided on the paper.

You may use a calculator.

Show all your working in calculations; marks are awarded for it.

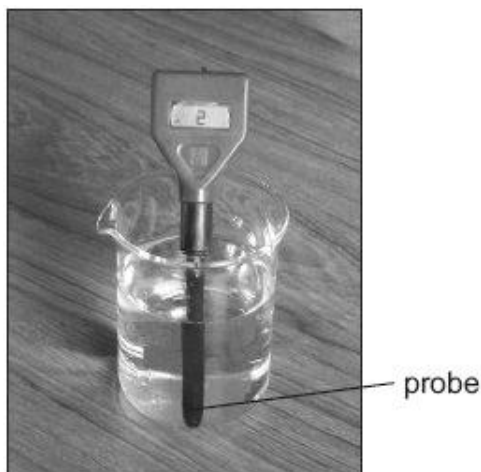
Give units for all answers (eg kg or m) unless they are already provided.

For Teacher Use

<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>Total</i>
<i>Marks gained</i>							
<i>Marks available</i>	<i>10</i>	<i>6</i>	<i>10</i>	<i>5</i>	<i>5</i>	<i>4</i>	<i>40</i>

Question 1: The Chemistry lesson

A pH sensor is a probe used to test the pH of different liquids. Molly dipped the probe of the sensor into 5 different liquids and recorded the pH value in a table.



- a) In the table below, tick **one** box for each liquid to show whether it is **acidic**, **neutral** or **alkaline**. One has been done for you.

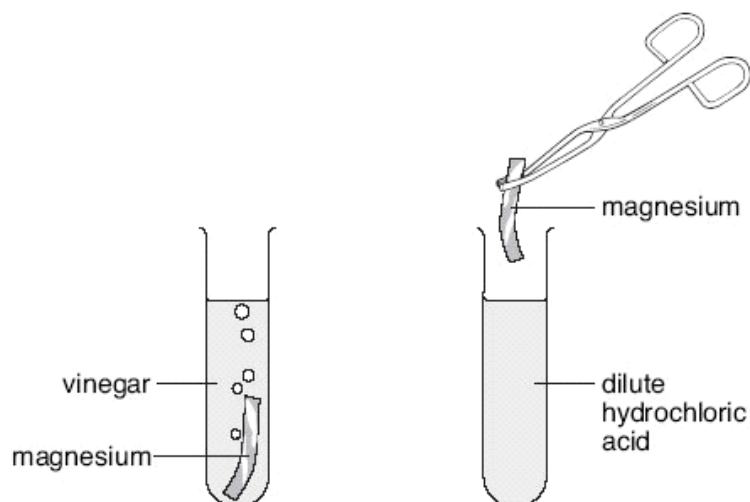
liquid	pH value	acidic	neutral	alkaline
dilute hydrochloric acid	2	✓		
alcohol	7			
distilled water	7			
vinegar	4			
sodium hydroxide solution	11			

- b) Between each test Molly dipped the probe into distilled water and swilled it gently around.
- (i) Why did she do this?

- (ii) Which other liquid in the table could Molly use between tests that would have the same effect as distilled water?

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- c) Molly put a 1 cm long piece of magnesium into a test-tube containing 20 mL of vinegar. She put another 1 cm long piece of magnesium into a test-tube containing 20 mL of dilute hydrochloric acid.



- (i) Molly thought that magnesium would react more vigorously with hydrochloric acid than with vinegar. What information in the table made Molly think this?

- (ii) How would Molly be able to tell if a more vigorous reaction took place with hydrochloric acid than with vinegar?

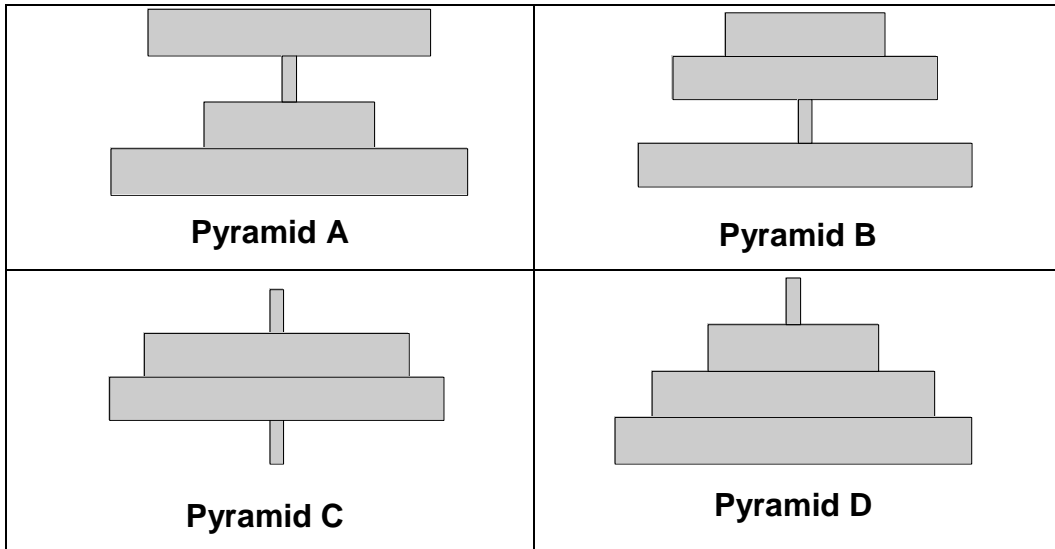
- d) (i) Complete the word equation for the reaction between magnesium and hydrochloric acid.

magnesium + hydrochloric acid \rightarrow _____ + _____

- (ii) After some time this reaction stopped. Why did the reaction stop?

Question 2: Who is eating who?

a) Below are descriptions of four food chains. Underneath each description draw the food chain for that description. Then match the food chain with its correct pyramid of numbers by writing the letter in the box provided. The first one has been done as an example.



Example

Arthropods feed on tiny algae. Sardines feed on tiny arthropods. Dolphins feed on sardines.
Food chain: tiny algae → arthropods → sardines → dolphins
Pyramid of numbers diagram - D

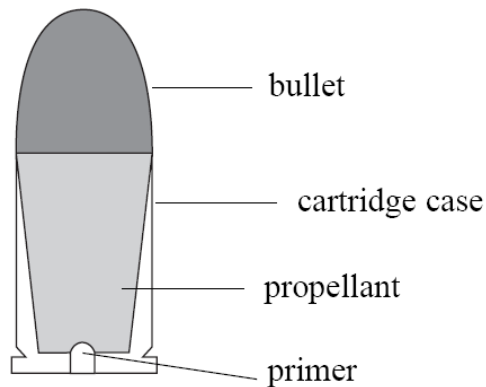
Antelope feed on grass. Lions feed on antelope. Fleas live on lions and suck their blood.
Food chain:
Pyramid of numbers diagram -

Greenflies feed on rose bushes. Ladybirds feed on greenflies. Swallows feed on ladybirds.
Food chain:
Pyramid of numbers diagram -

Zebras feed on long grass. Ticks suck the blood of zebras. Birds sit on the zebras' backs and eat the ticks.
Food chain:
Pyramid of numbers diagram -

Question 3: Forensics

The diagram below shows a 9 mm pistol cartridge.



When the pistol is fired the primer and propellant explode, showering discharge residue onto the hair, skin and clothes of the person firing the gun.

The spent cartridge case falls to the floor when it is ejected from an automatic weapon.

The position and number of spent cartridge cases found at the crime scene can give important information about the shooting.

- a) What information is given by the position of the spent cartridge cases?

The marks on the spent cartridge cases can be compared with the marks on cartridge cases from a test firing of a suspect's gun in the laboratory.

- b) Describe the best way to compare the marks on the cartridge cases.

- c) Give **two** other features of the cartridge cases that can be compared to prove that they were fired from the suspect's gun.

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The chemical composition of the discharge material can be determined using a sophisticated technique. It can then be matched with the discharge residue on the suspect's clothing.

d) Why is it important to test the suspect's clothing as soon as possible after the shooting?

e) Why is it important that the scientists wear gloves and special clothing when obtaining samples of discharge residue?

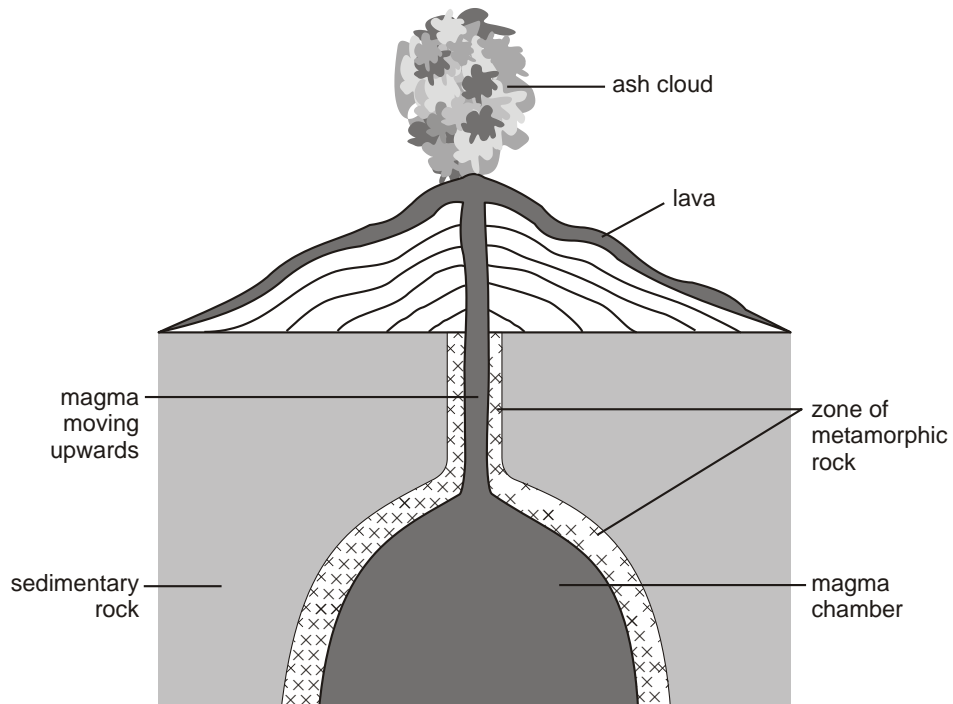
f) Suggest a method to remove and store a sample of discharge material from clothing so that it can be tested later in the laboratory.

Remove:
Store:

g) Describe how tests on the bullet removed from the victim of a shooting can help prove that the shooting was carried out using a particular gun.

Question 4: Volcanoes

The diagram below shows a section through a volcano. Magma is moving up from a magma chamber. Some of the magma erupts to form lava. The liquid lava cools and becomes solid rock.



a) Explain why magma deep underground stays liquid longer than lava on the surface.

b) As the magma cools underground, it solidifies and crystals are formed.

(i) In what way will these crystals be different from the crystals formed when lava solidifies above ground?

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(ii) Give the reason for your answer.

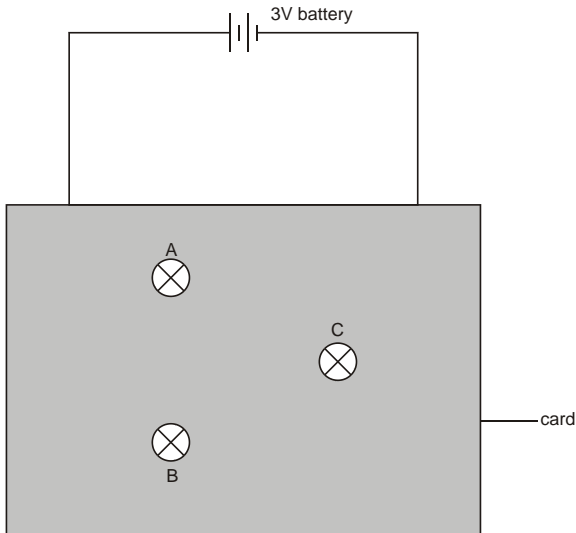
c) A zone of rock surrounding the magma has become a metamorphic rock.

What 2 conditions are needed to form metamorphic rock?

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Question 5 Electricity

Lucy built a puzzle circuit with three identical bulbs and a 3V battery. She covered the connections to the bulbs with a piece of card as shown below. The bulbs could be seen through holes in the card.



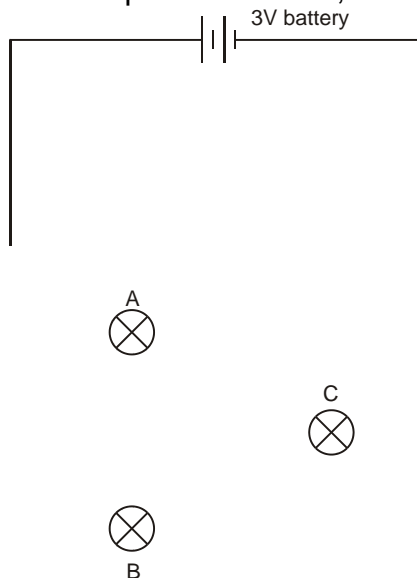
All the bulbs were on but their brightness was different.

Lucy removed bulbs A, B and C in turn. Before connecting each bulb back into the circuit she observed the effect on the other two bulbs.

She recorded her observations in the table below.

bulb removed	observations
A	B and C stayed on
B	C went off, A stayed on
C	B went off. A stayed on

- a) Complete the circuit diagram below to show how the three bulbs could be connected. Use your knowledge of series and parallel circuits, and the observations in the table to help you.



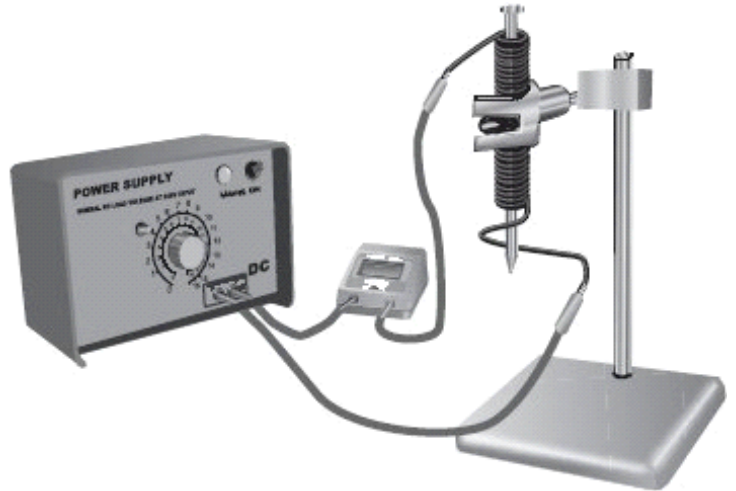
- b) Explain why, when bulb B was removed, bulb C went out but bulb A stayed lit.

- c) Lucy added one switch to the circuit so that she could turn all three bulbs on and off at the same time.

Place a letter **S** on your circuit diagram where this switch could be placed.

Question 6 Electromagnets

Alex made an electromagnet. He wound insulated wire around an iron nail. He connected the wire to a power supply. He used the electromagnet to pick up some steel paper-clips.



This was his prediction.

The more turns of wire around the iron nail the stronger the electromagnet becomes.

- a) (i) What **one** factor will he change in order to test her prediction?

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- (ii) Give **one** factor he should keep the same.

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- (iii) Describe how he could use the paper-clips to measure the strength of the electromagnet.

- b) Alex wrote a report of his investigation.

My report.
My results are accurate because I can't see any odd results.

What would an odd result suggest?

END OF PAPER