

FULL NAME:	SCIENCE TEACHER:
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# 10C

## SCIENCE YEAR TEN EXAMINATION 2005

### Level C

Total time allowed for both examinations: 2 hours

**(40 marks)**

Answer all questions in the spaces provided on the paper.

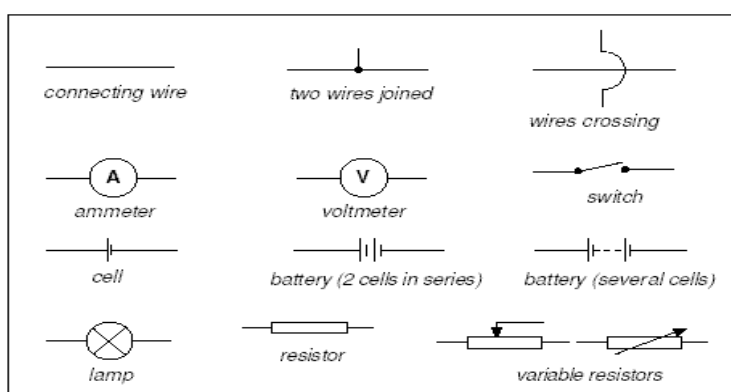
You may use a calculator. Show all your working, marks are awarded for it.

Give the units for all answers (e.g. kg or metres) unless they are already provided.

This test consists of 10 questions from pages 2 to 12.

Answers must be clearly written and demonstrate an understanding of the science ideas taught.

### Standard Circuit Symbols



Question	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total
Mark											/40



**Question One Populations [4 marks]**

You have been given the task of estimating the population of snails in a field. You are given a quadrat which is  $1\text{ m}^2$  in area. Ten quadrat samples were taken and the numbers of snails found in each sample were recorded in the table below. The area of the field being sampled is  $500\text{ m}^2$ .

Quadrat Number	Number of snails counted
1	6
2	3
3	7
4	9
5	6
6	4
7	4
8	7
9	8
10	6

- (a) Use the information provided to estimate the population of snails in the field. You must clearly show how you worked out the answer.

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- (b) When using quadrat sampling there is always a problem when animals or plants do not fall exactly within the grid. How is this problem overcome?

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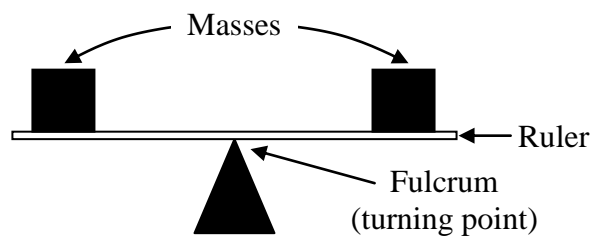
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**Question Two Levers [4 marks]**

Adults and small children can have a successful seesaw if they sit in the right place.



Tui and Sonny decided to model the sea-saw using a ruler and 50 g masses.



They put different masses on each side and moved them until the ruler was balanced. Then they recorded the mass and its distance from the turning point (fulcrum) for each side.

Here are their results:

Left-hand side		Right-hand side	
mass (g)	distance from fulcrum (cm)	mass (g)	distance from fulcrum (cm)
50	8	100	4
100	6	150	4
150	5	50	15
200	4	100	8

a) Tui said, “I can see a rule for this.” Write down a rule for balancing the ruler.

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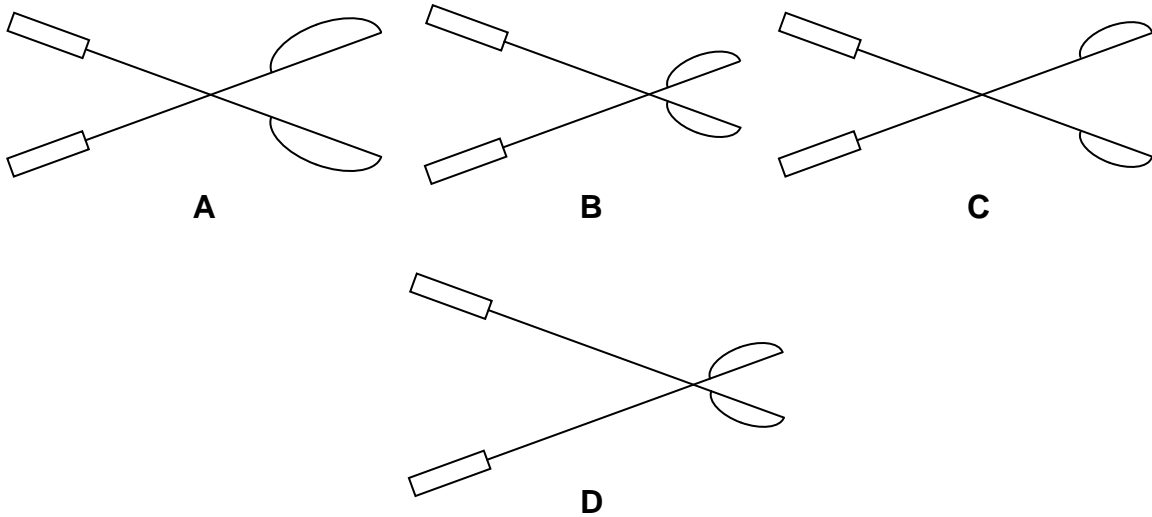
b) If 400 g is placed 10 cm from the fulcrum, how far from the fulcrum must 100 g be placed for the ruler to be balanced? (Show your working)

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c) Loppers are often used for cutting of small branches of trees.  
Alfred was buying some new loppers. He had a choice of four different types.



Which loppers would you advise him to buy?  
Explain carefully why these loppers are better.

Loppers \_\_\_\_\_

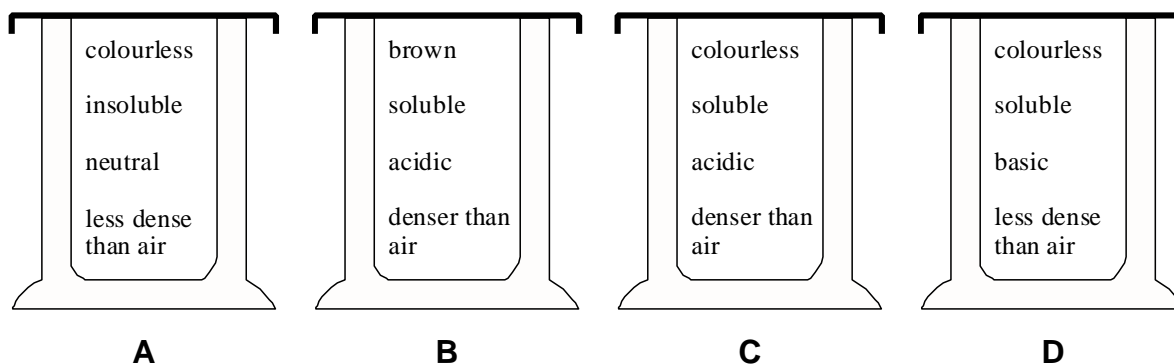
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**Question Three What a gas? [4 marks]**



**Key to identifying gases**

1. Is the gas colourless?	Yes No	go to 2 nitrogen dioxide
2. Is the gas soluble in water?	Yes No	go to 3 go to 4
3. Does the gas turn moist litmus pink?	Yes No	carbon dioxide ammonia
4. Is the gas less dense than air?	Yes No	hydrogen oxygen

Use the key to identify the gases in the jars labelled A to D.

Jar A \_\_\_\_\_

Jar B \_\_\_\_\_

Jar C \_\_\_\_\_

Jar D \_\_\_\_\_

**Question 4 More Gas [2 marks]**

Write word equations to show how the gases below can be made in the laboratory :-  
(word equations must give the correct names of all reactants and products).

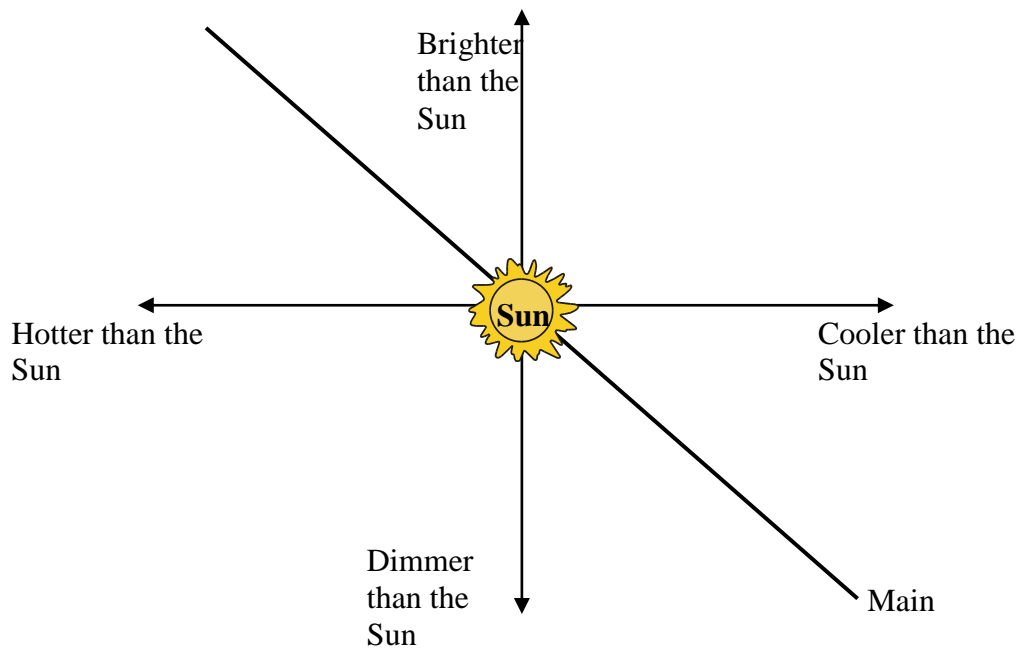
(a) **Oxygen**

\_\_\_\_\_ →

(b) **Carbon Dioxide**

\_\_\_\_\_ →

**Question Five Skills [ 5 marks]**



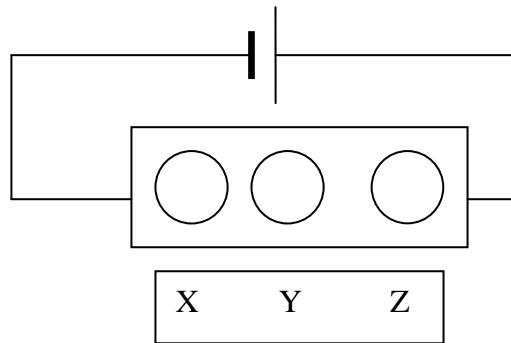
The diagram can be used to describe the relationship between the surface temperature of stars and their brightness. Most stars are on the main sequence. The Sun is shown in its position on the main sequence.

Use the information below to write the letters **A** to **E** on the diagram, to show where the different stars that are in bold, can be found.

<b>A</b>	A <b>blue star</b> is a main sequence star that is hotter than the Sun.
<b>B</b>	A <b>small main sequence star</b> is dimmer than the Sun.
<b>C</b>	A <b>white dwarf</b> is hotter than the Sun and dimmer than the Sun.
<b>D</b>	As a main sequence star cools it forms a <b>red giant</b> that is brighter than the Sun.
<b>E</b>	<b>Supergiants</b> are hotter than red giants and are the brightest stars known.

**Question Six Electrical Problems [2 marks]**

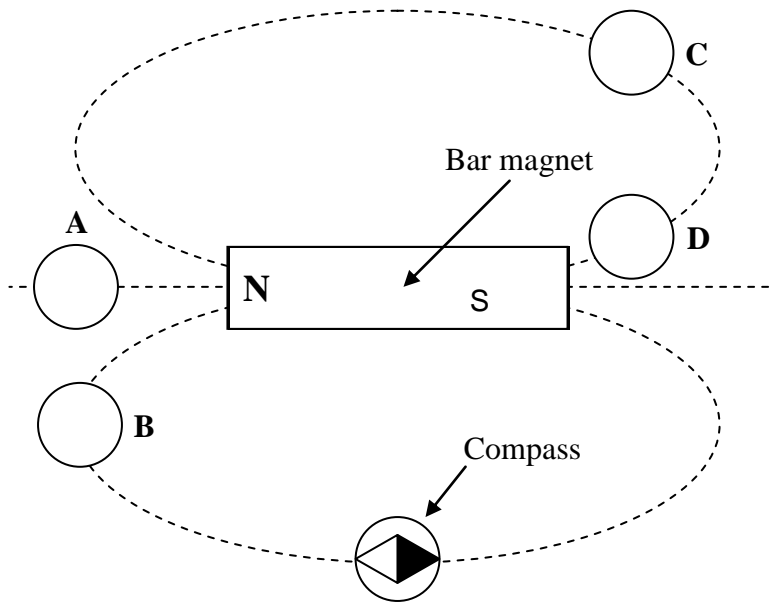
Bulbs X, Y and Z are screwed into holders on a wooden box. The lamps are wired inside the box so that you cannot see how they are connected.



A student decides to work out how the bulbs are connected. The following observations were made. Complete the circuit diagrams below so that each circuit matches the description. Label each bulb clearly. The first one has been completed for you.

<p><b>Observation One ( example)</b> When lamp X is unscrewed, lamps Y and Z go out also</p>	<p><b>Circuit Diagram</b></p>
<p><b>Observation Two</b> When lamp Z is unscrewed, X and Y stay on.</p>	<p><b>Circuit Diagram</b></p>
<p><b>Observation Three</b> When lamp Z is unscrewed, X and Y both go out.</p>	<p><b>Circuit Diagram</b></p>

**Question Seven Magnets [2 marks]**



Peter was working out a line of magnetic force using a compass as an indicator. Which compass **best** fits at each of the 4 points A, B, C, and D? Write the number of the compass you choose to show the direction of the field next to the letters A, B, C, and D below.



1



2



3



4



5

A: \_\_\_\_\_

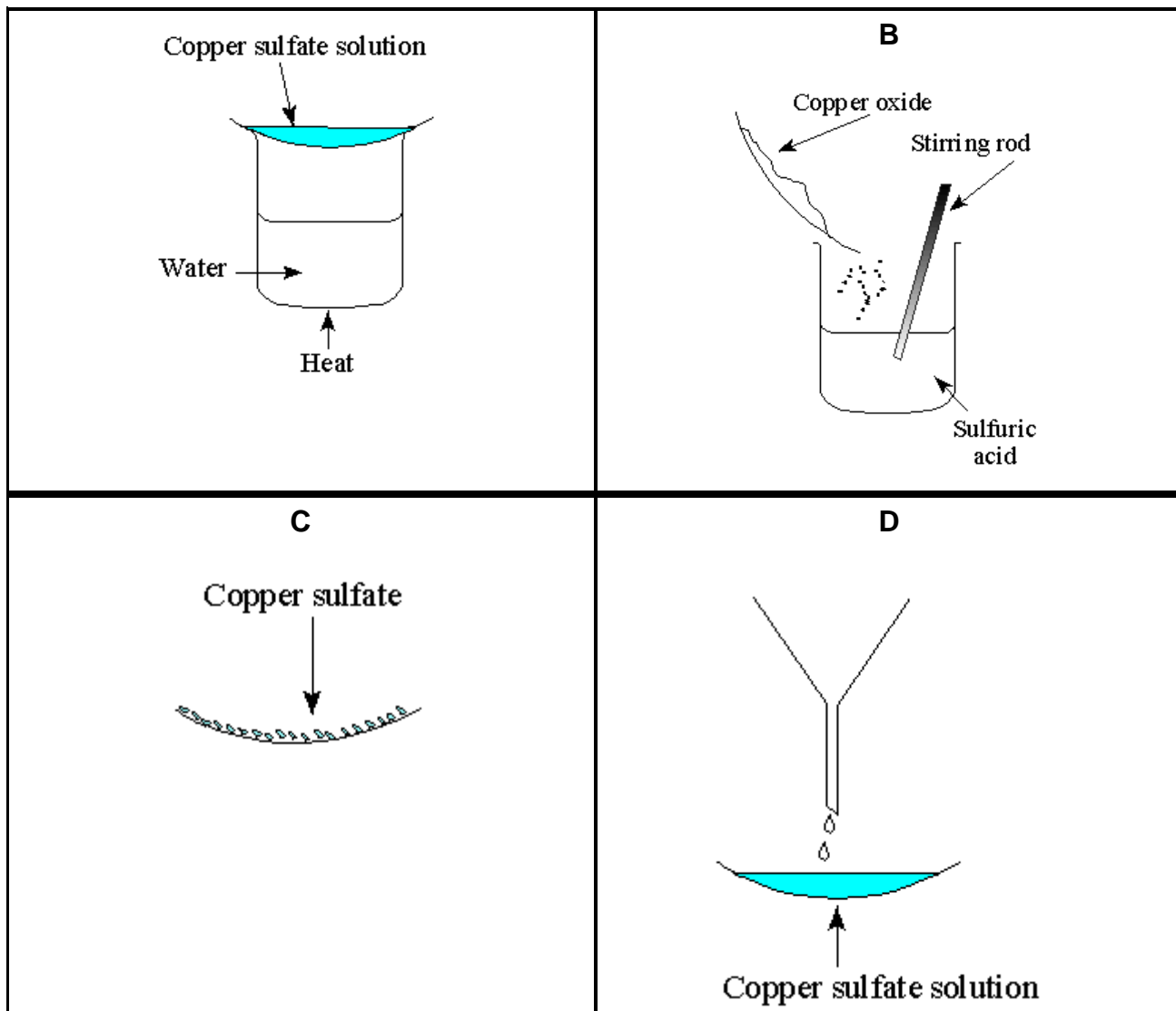
B: \_\_\_\_\_

C: \_\_\_\_\_

D: \_\_\_\_\_



**Question Eight Acids and Bases [4 marks]**



a) The steps for making copper sulfate crystals are shown above. Put them into the correct order.

\_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_

b) What is the name given to the type of reaction in **B**, where an acid and a base react together? \_\_\_\_\_

c) Explain the reason for adding the solid copper oxide to the acid, as opposed to adding the sulphuric to the solid copper oxide in a beaker.

\_\_\_\_\_  
\_\_\_\_\_

**QUESTION 9 Pond Life [7 marks]**

Amount of oxygen produced in a pond	
Location	Oxygen Produced (grams/cubic metre)
Top metre	4 grams/m <sup>3</sup>
Second metre	3 grams/m <sup>3</sup>
Third metre	1 gram/m <sup>3</sup>
Bottom metre	0 grams/m <sup>3</sup>

(a) Write a word equation for the biological process that results in the formation of the oxygen gas.

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(b) Give 3 factors that would increase the rate of oxygen production in the pond.

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(c) What pattern or trend is shown with the data in the table above?

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(d) A trout is a freshwater fish that lives in the pond.

State one biotic and one abiotic factor that can affect the numbers of trout in the pond and discuss the **link** between the factors you have chosen and the numbers of fish.

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