

NAME:	SCIENCE TEACHER: (circle code)	<b>9C</b>
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## SCIENCE

Year 9 Examination 2012

9C – 40 marks

**Make sure that you have answered all the questions in paper 9B 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>7</i>	<i>8</i>	<i>Total</i>
<i>Marks gained</i>									
<i>Marks available</i>	<i>3</i>	<i>6</i>	<i>4</i>	<i>4</i>	<i>6</i>	<i>3</i>	<i>7</i>	<i>7</i>	<i>40</i>

**Question One [3 marks]**

A golfer hits a golf ball and it bounces into the hole.



- (a) Use words from the box to complete the sentences below.  
Each word may be used once, more than once, or not at all.

**chemical ● elastic ● electrical ● gravitational ● kinetic**

- (i) Each time the golf ball moves upwards, it gains ..... potential energy.
- (ii) Each time the golf ball hits the ground it changes shape and energy is stored as ..... potential energy.
- (iii) When the golf ball is moving it has ..... energy.

- (b) Each time the ball hits the ground, energy is transferred away from the ball.

- (i) How can you tell this from the diagram?


- (ii) Describe what happens to the energy that is transferred.


**Question Two [6 marks]**

This question is about the three states of matter, solid, liquid and gas.

- (a) Complete the table below which gives 3 properties of solids, liquids and gases.  
Place a tick ( ✓ ) in the correct column(s).

Property	Solid	Liquid	Gas
Takes the volume and shape of the container			
Has a definite shape			
Can be compressed			

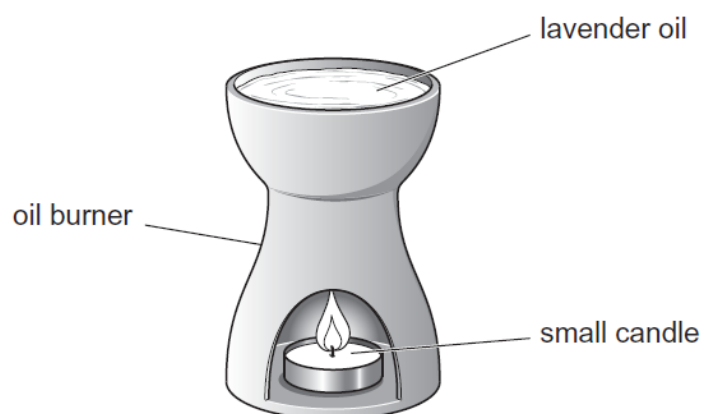
(b) The table below lists the melting points and boiling points of four substances, A, B, C and D.

Substance	Melting point ( $^{\circ}\text{C}$ )	Boiling point ( $^{\circ}\text{C}$ )
A	114	444
B	-220	-118
C	-7	59
D	3500	4827

(i) Explain how you know that substance C is a liquid at room temperature ( $25^{\circ}\text{C}$ ).


(ii) Which substance is liquid over the largest temperature range?


(c) Oil burners are used with oils, such as lavender oil, to give the air in a room a pleasant scent.



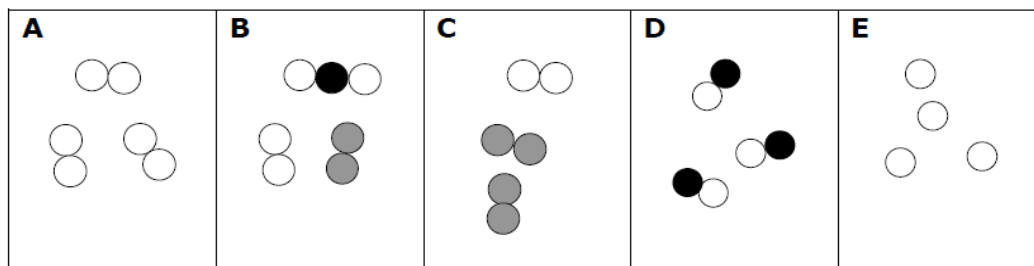
When the lavender oil is poured into the top of the burner the scent spreads around the room. When the candle is lit the scent becomes stronger.

(i) Name the process by which the scent spreads around the room.

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(ii) Using the idea of particles, explain why the scent is stronger when the candle is lit.


(d) Look at the diagrams below. Match the correct diagram to the description. Write the letter of the diagram. One letter won't be used.



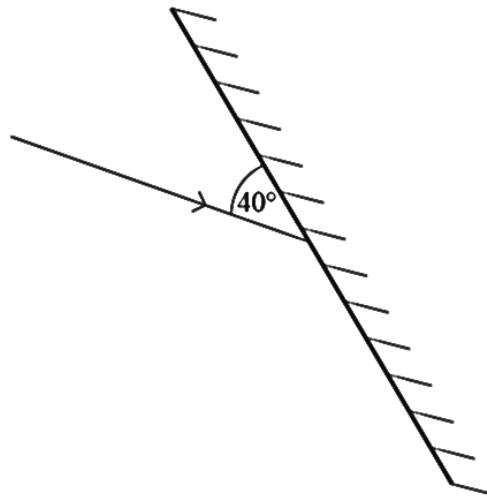
- \_\_\_\_\_ molecules of an element
- \_\_\_\_\_ molecules of one compound
- \_\_\_\_\_ a mixture of different elements
- \_\_\_\_\_ a mixture of elements and compounds

**Question Three [4 marks]**

(a) Indicate with a tick (✓) on the table below whether the object is luminous or non-luminous.

Object	Luminous	Non-luminous
Star		
Moon		
White paper		

(b) A ray of light is incident on a plane mirror as shown.

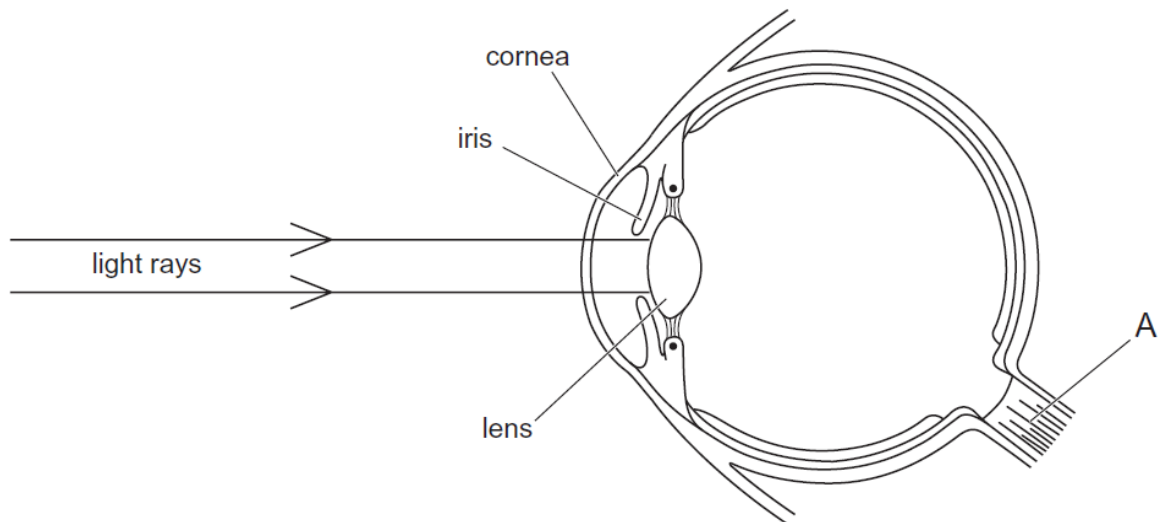


Draw and label the normal on the diagram above, and calculate the size of the angle of reflection.

(c) The diagram below shows a human eye.

(i) Continue the light rays to show where they are focused.

(ii) What is structure A?

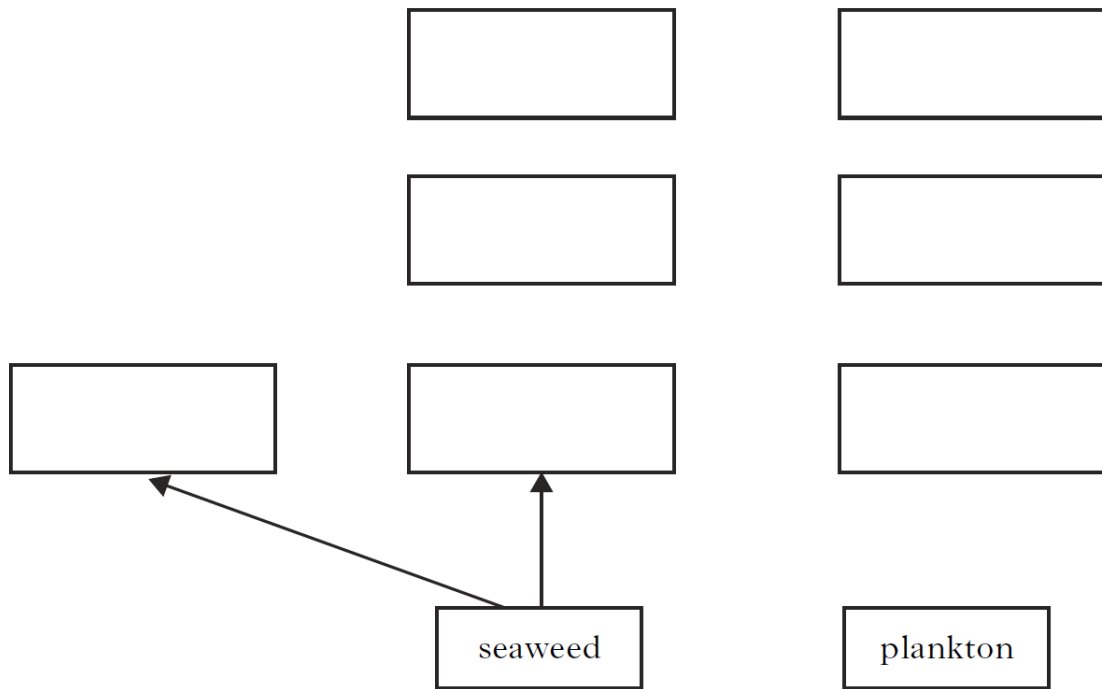


**Question Four: [4 marks]**

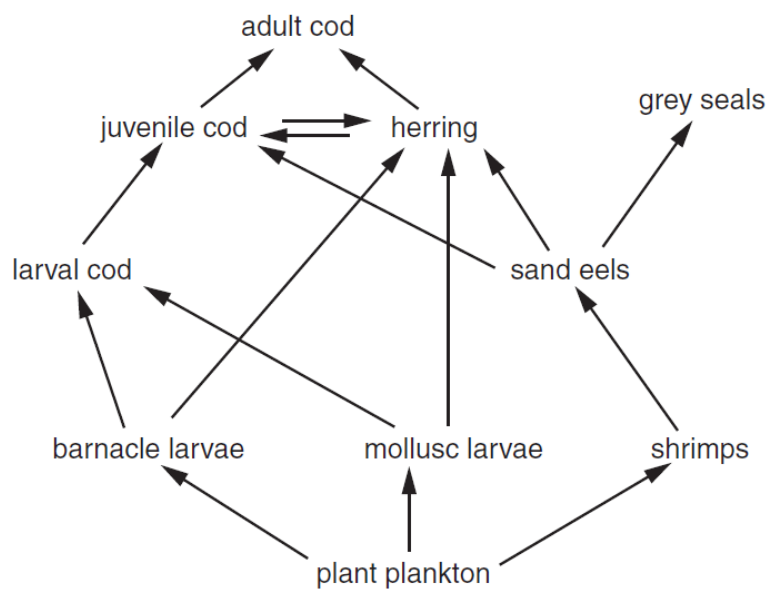
Four food chains from a sea shore are shown below.

- seaweed → sea urchin → sea otter
- seaweed → winkle → starfish → sea otter
- seaweed → winkle → crab → sea otter
- plankton → scallop → crab → octopus

(a) Use the food chains to complete the food web.



(b) Look at this food web.



Grey seals eat sand eels. Overfishing has reduced the numbers of cod and herring.

What effect will overfishing have on the seal population for this food web?

Draw **one** straight line to link the correct **effect on grey seal population** to its **explanation**.

**effect on grey seal population**

it increases ●

it decreases ●

it stays the same ●

**explanation**

● cod do not eat sand eels

● fewer sand eels are eaten by other predators

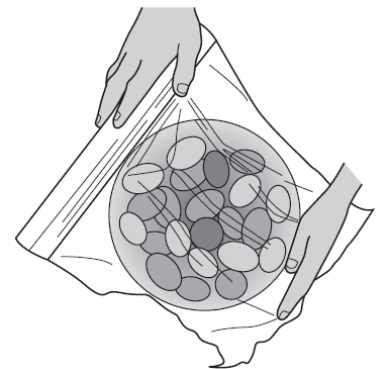
● more sand eels are eaten by other predators

● grey seals do not eat herring or cod

**Question Five: [6 marks]**

Cling film, such as Glad Wrap, is used to wrap food. Cling film is made from thin sheets of plastic. It needs to be very stretchy so that it can wrap around food. The first cling film produced was made from plastic called PVC. The table shows some information about PVC.

property	
strength	low
melting point	80 °C
flexibility	high
density	1.5 g per mL
biodegradable	no
flammability	flammable & produces toxic gases



For each question choose the property from the table that gives the best explanation.

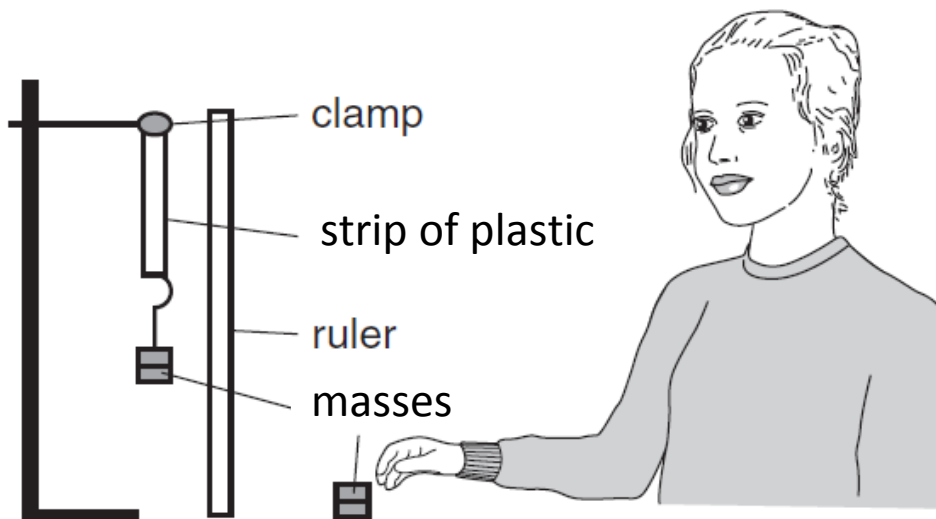
(a) Why is PVC a good choice of plastic for making cling film to wrap food?

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(b) Why is cling film made from PVC **not** used to wrap hot food?

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Liz works for the company that makes cling film. She tests some plastics to find out if they can be used to make cling film. She hangs masses onto strips of each plastic. She adds more masses until the plastic breaks.



She measures how much PVC and two other plastics stretch before they break.

The table shows her results.

plastic	average mass added when strip breaks in g	average amount of stretch in cm
PVC	60	6.0
plastic A	230	0.5
plastic B	50	5.0

(c) Write down one thing Liz would need to do to make this a fair test experiment.


(d) The company wants to find a replacement for PVC for making cling film. They decide to use plastic B. Explain fully why plastic B is a better choice than plastic A.




(e) Plastics have replaced many materials that we used in the past.

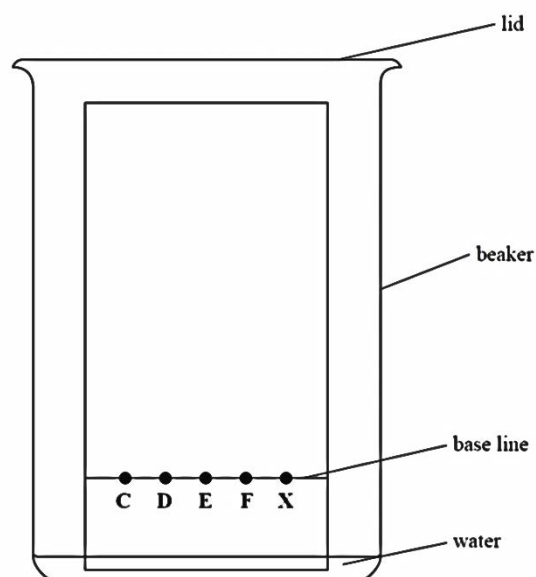
Name a material, *other than glass*, that has been replaced by a plastic.

Material	
What the material was used for	
Give two reasons why it is <u>better</u> to use a plastic for this job.	1.
	2.

**Question Six: [3 marks]**

Four separate food dyes (C, D, E and F) and a mixture of food dyes (X) were investigated using paper chromatography.

The diagram shows the apparatus used.

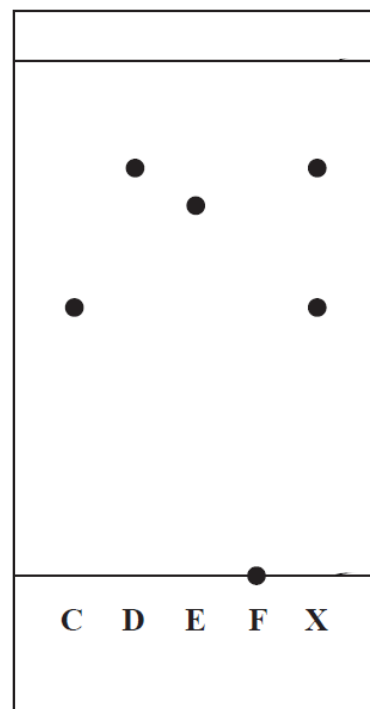


(a) Explain why the water level should be below the food dyes?


During the experiment the water rises up the paper.

The experiment is stopped just before the water reaches the top of the paper. The diagram shows the paper after it has been removed from the beaker and dried.

(b) Explain what food dye(s) make up X.

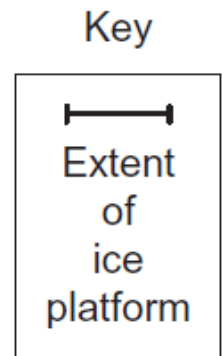
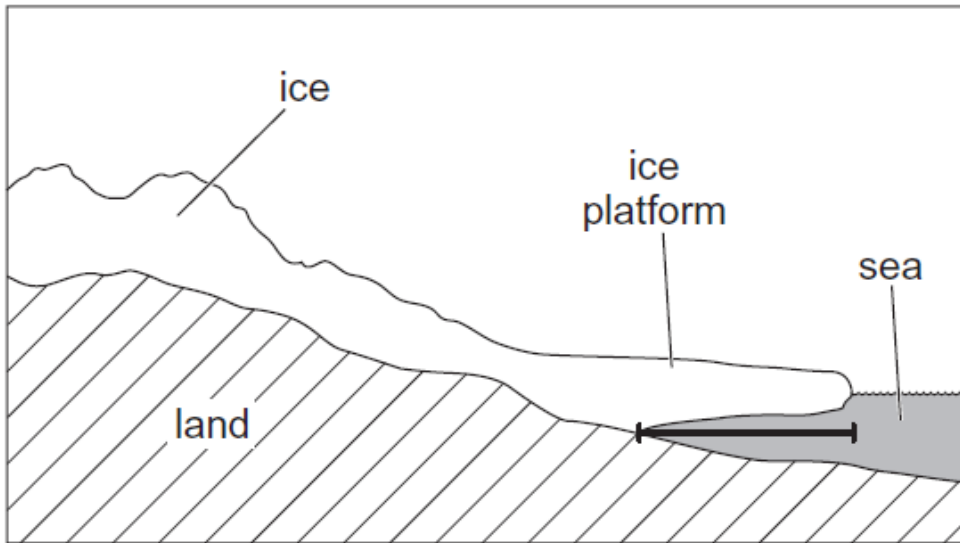



(c) Suggest why food dye F did not move up the paper during the experiment.


**Question Seven: [7 marks]**



Polar bears hunt seals from ice 'platforms'.

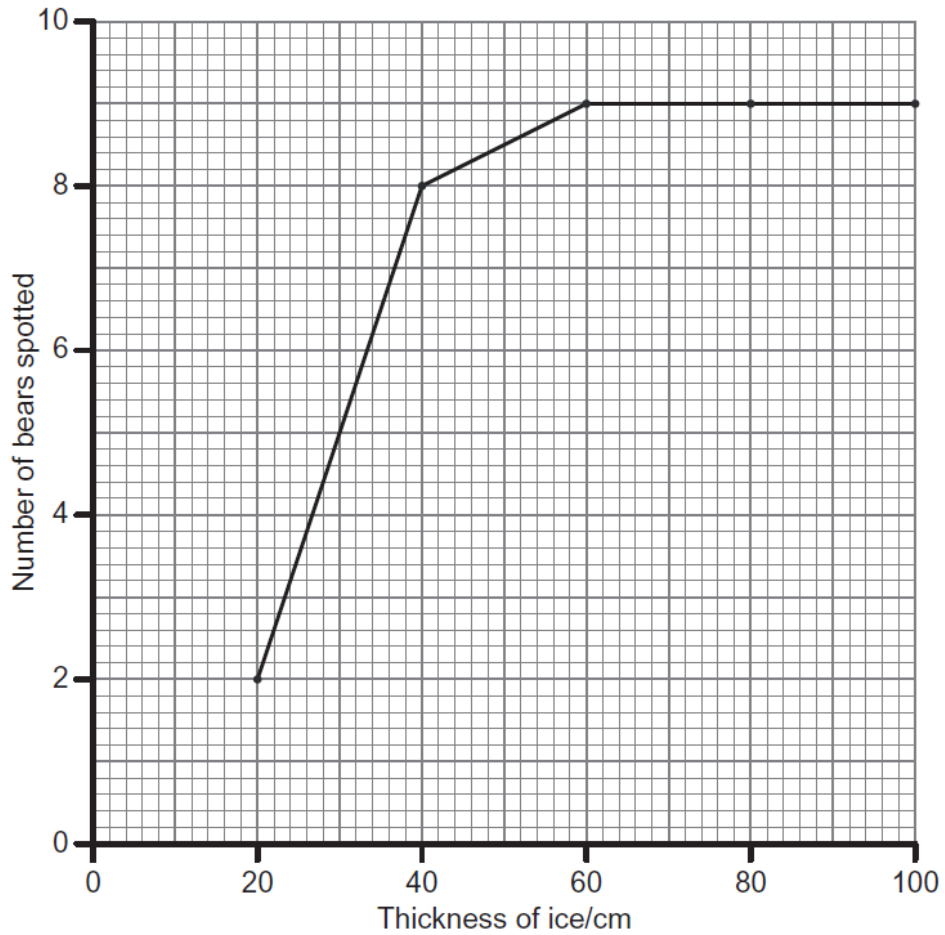


The table below shows the maximum distance that the ice platform extended beyond an island in the Arctic from 1950–2010.

Year	Extent of ice platform/km
1950	3.5
1960	3.25
1970	2.8
1980	2.6
1990	2.4
2000	2.3
2010	2.2

(a) Describe the trend (pattern) shown by the information given in the table.


Scientists also found that the platforms are getting thinner and this has affected the number of polar bears on the ice. The graph below shows the number of polar bears spotted on different thicknesses of ice.



(b) Suggest a reason why no polar bears have been spotted on ice below 20 cm in thickness.


(c) The extent and thickness of ice are examples of abiotic factors. What is meant by the term abiotic?

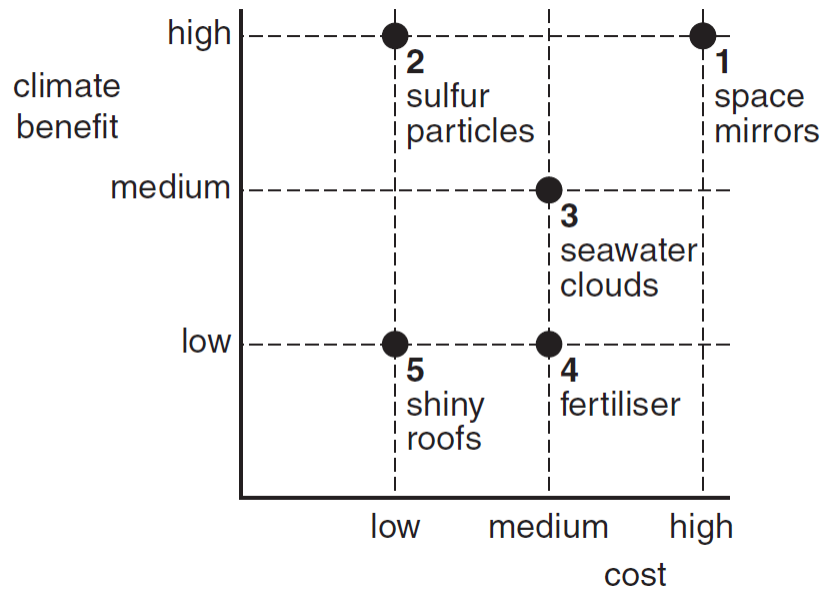

(d) It is thought that the change in the ice platform is due to global warming. Explain fully the cause of global warming and how this information could be evidence that it is happening.


(e) Read this article about geoengineering.

**Geoengineering**  
A new approach to stopping global warming has been suggested – known as geoengineering. Five different methods have been suggested.

1. Put huge mirrors into orbit above the atmosphere.
2. Put fine sulfur particles high in the atmosphere to reflect some of the solar radiation.
3. Build special ships to squirt seawater high into the air to form clouds.
4. Add fertilisers to the sea to encourage the growth of tiny plants.
5. Make house roofs of light-coloured, shiny materials.

For each of these methods, both the benefit to the climate and the financial cost need to be considered. This is shown in the following “graph”.



(i) Which one of five methods could easily be done by a typical NZ family?

(ii) Which one of these methods would be the **most** cost effective (most effect for least cost)? Circle your answer.

1 2 3 4 5

(iii) How would adding fertilisers to the sea decrease the amount of carbon dioxide in the atmosphere?

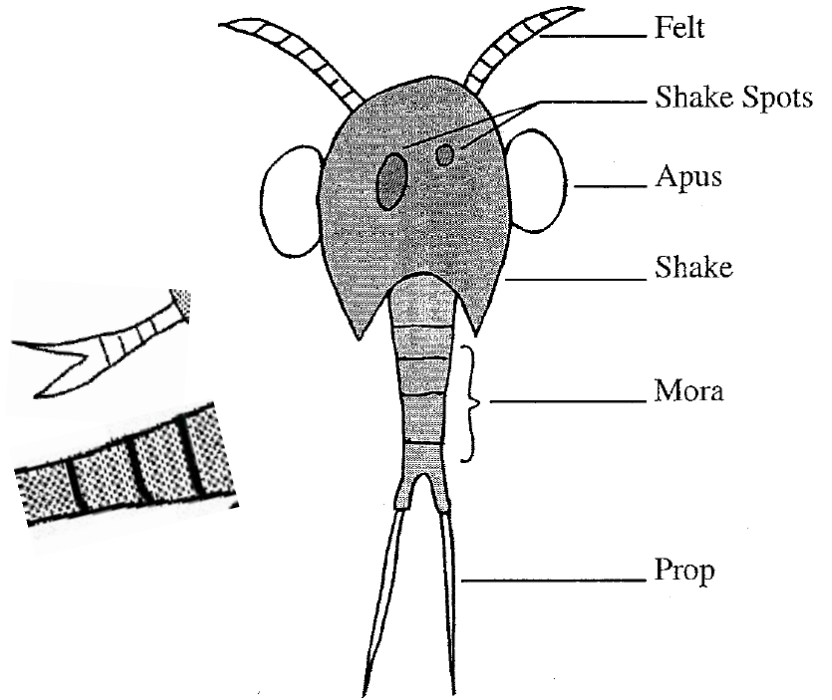

**Question Eight: [7 marks]**

Study the basic anatomy of a Norit .

“Spiked” means pointed.

“Bifurcated” means divided into two branches.

“Segmented” means divided into small sections.



(a) Identify the Norits shown below, using the Dichotomous Key to Norits on the opposite page.

Norit A has been done as an example.

A	B	C	D

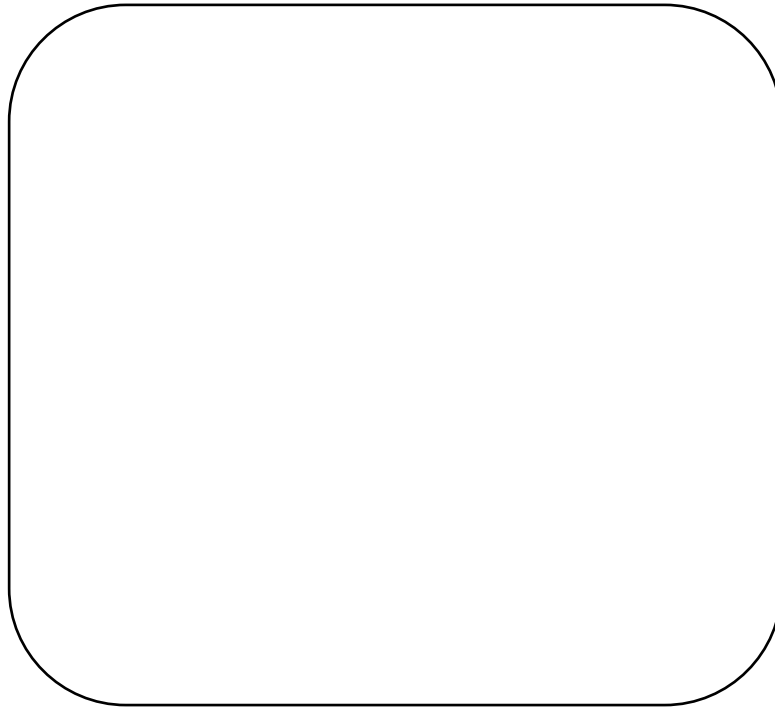
Organism	Key Pathway	Organism Name
A	2, 3, 4	<i>Nortis aveous</i>
B		
C		
D		

Dichotomous Key to identify Norits		
1.	If organism has a segmented mora, go to... If organism has an unsegmented mora, go to...	2 9
2.	If organism has a single felt, go to... If organism has more than one felt, go to...	3 5
3.	If organism has spiked props... If organism has feather-like or bifurcated props, go to ...	<i>Nortis unicornus</i> 4
4.	If organism has feather-like props... If organism has bifurcated props...	<i>Nortis aveous</i> <i>Nortis jeticus</i>
5.	If organism has two felts, go to... If organism has more than two felts, go to...	6 7
6.	If organism has rounded apus... If organism has pointed apus, go to...	<i>Nortis apis</i> 8
7.	If organism has 3 felts... If organism has more than 3 felts...	<i>Nortis triops</i> <i>Nortis multiops</i>
8.	If organism has all spiked felts... If organism has any felts that are bifurcated...	<i>Nortis biapis</i> <i>Nortis multiapis</i>
9.	If organism has single felt, go to... If organism has more than one felt, go to...	10 12
10.	If organism has spiked props... If organism has feather-like or bifurcated props, go to...	<i>Rossi unicornis</i> 11
11.	If organism has feather-like props... If organism has bifurcated props	<i>Rossi aveous</i> <i>Rossi rockus</i>
12.	If organism has two felts, go to... If organism has more than two felts, go to	13 14
13.	If organism has rounded apus... If organism has pointed apus, go to	<i>Rossi apus</i> 15
14.	If organism has three felts... If organism has more than 3 felts	<i>Rossi triops</i> <i>Rossi multiops</i>
15.	If organism has all felts spiked... If organism has any felts bifurcated...	<i>Rossi biapis</i> <i>Rossi multiapis</i>

(b) What does the term classifying mean?


(c) Why might the key to classify Norits change in the future?


(d) (i) Draw a picture of what a *Rossi biapis* might look like.



(i) What feature(s) of *Rossi biapis* can you NOT be sure about?


**END OF EXAMINATION – CHECK YOUR ANSWERS**