NAME:	SCIENCE TEACHER:	**9C**

SCIENCE

YEAR 9 EXAMINATION 2005

MAKE SURE THAT YOU HAVE ANSWERED ALL THE QUESTIONS IN THE "B" PAPER BEFORE YOU START THIS PAPER.

Total time allowed for both examinations: 2 hours

(40 marks)

Answer all questions in the spaces provided on the paper.

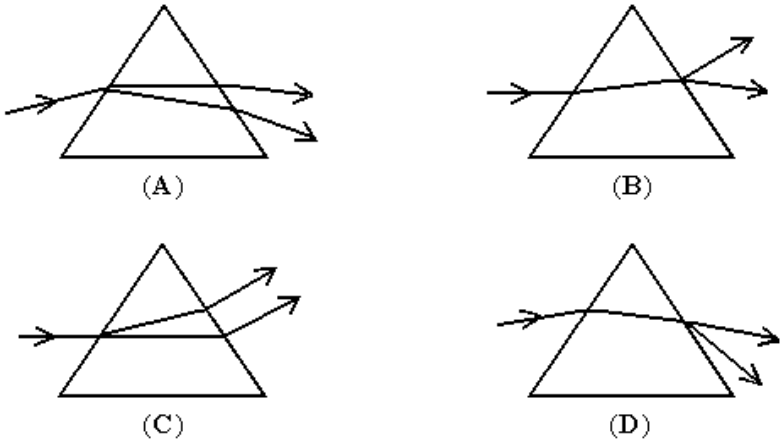
You may use a calculator.

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.

Question.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Mark													**/40**

Question One Prisms



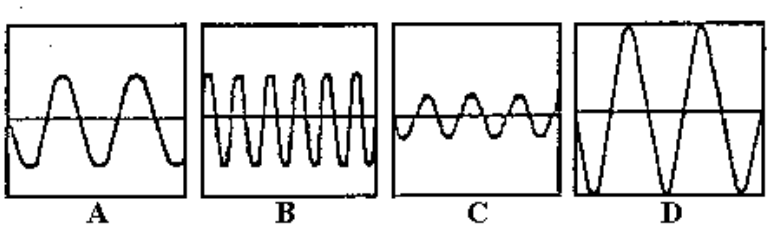
a) Which diagram **best** shows what happens to white light when it passes through a glass prism? _____

b) Describe **two** things that happen to light rays when they pass though a glass prism.

i. The light rays are _____

ii. The light rays are _____

Question Two Sound waves



The diagrams represent sound waves as seen on an oscilloscope.

a) Which shows a **high-pitched** sound? _____

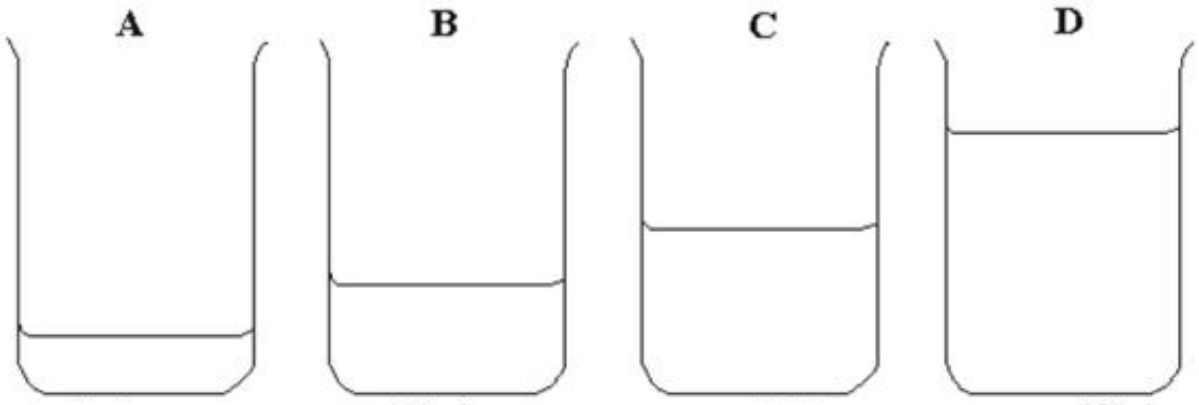
b) Which shows the **loudest** sound? _____

c) The loudness of a sound is determined by the _____ of sound waves. Circle your answer.

A frequency.
B wavelength.
C amplitude.
D rate of vibration.

Question Three Dissolving blue crystals

Four solutions of copper sulfate were made by dissolving blue copper sulfate crystals in water.



50mL + 10g crystals | 100mL + 25g crystals | 150mL + 45g crystals | 250mL + 60g crystals

a) Put the beakers in order from **darkest** blue to **lightest** blue solution, using the letters A, B, C, and D.

_____ → _____ → _____ → _____

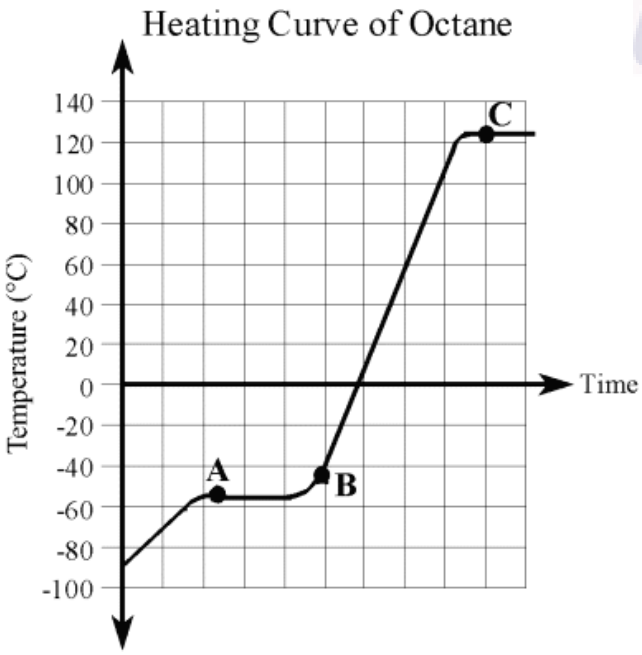
Darkest Lightest

b) Solutions A and B were then mixed together. How much water and crystals should be added to make the same colour and volume as D?

i. Water _____ mL

ii Crystals _____ g

Question Four When petrol changes state…



This is the heating curve of octane (the main component in petrol).
Octane's melting point is –57°C.

a) i. What is the temperature of the octane at the start of the investigation? _____°C

ii. Is the state of the octane a solid, liquid, or gas at the start of the investigation? _____

b) At what temperature does the octane begin boiling? _____°C

c) What two states would you observe at point A?

_____

d) What state would you observe at point B? _____

e) What two states would you observe at point C?

_____

f) In terms of the **particles**, describe what is happening when the octane is rapidly boiling.

The particles are: _____

_____

_____

_____

Question Five Finding out about the elements

Group 10	Group 11	Group 12
59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30
106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48
195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80

Use the information from this section of the Periodic Table to answer these questions.

a) i. Which element's atom has the **greatest** mass? _____

ii. Which metal has atoms that are almost **twice** the mass of nickel atoms? _____

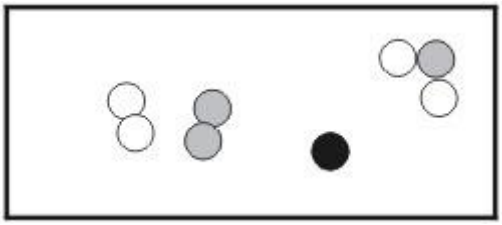
iii. How many electrons does one atom of silver have? _____

b) Cobalt is an element in **Group 9**, and is in the same row as nickel, copper, and zinc.

What is cobalt's atomic number? _____

Question Six Atoms, molecules, elements and compounds

a) In the diagram below, each circle represents one atom.



Which line of the following table shows the correct number of atoms, molecules, elements and compounds represented in the above diagram? Circle your answer.

	atom(s)	molecule(s)	element(s)	compound(s)
(**A**)	1	1	1	3
(**B**)	1	3	2	1
(**C**)	8	1	3	1
(**D**)	8	3	3	1

b) Chloroform has the formula $CHCl_3$. It contains carbon (C), hydrogen (H), and chorine (Cl). How many atoms are there in one molecule of $CHCl_3$? Circle your answer.

(**A**) 3 (**B**) 4 (**C**) 5 (**D**) 6 (**E**) 9

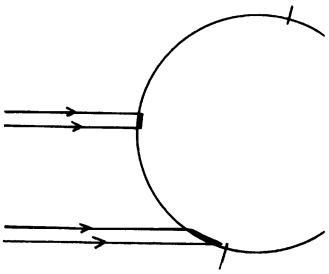
c) Methanol has the formula CH_3OH. It contains carbon (C), hydrogen (H), and oxygen (O). Which line of the following table shows how many of each type of atom there are in one molecule of CH_3OH? Circle your answer.

	carbon	hydrogen	oxygen
(**A**)	3	4	1
(**B**)	3	3	1
(**C**)	1	4	1
(**D**)	1	4	3
(E)	1	3	1

Question Seven Antarctica

Antarctica is the coldest place on Earth. The lowest temperature ever recorded in nature, was -89.6^{o}C at Vostok, the Russian base on the Antarctic plateau on July 21st 1983. The mean annual temperature at Australian bases near the Antarctic coast is -10^{o}C. Inland temperatures average -60^{o}C!

a) Use the following diagrams to explain why the Antarctic is so cold:



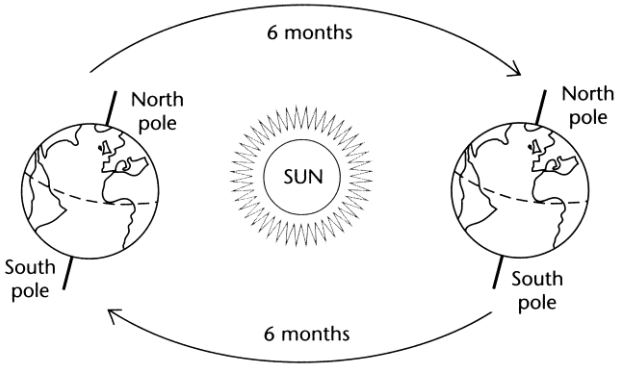


Diagram 1 Diagram 2

b) Wind chill

Antarctica has the strongest winds in the world, with gusts up to 250 km/hour. Winds increase the evaporation of moisture and ice on the body surface, and evaporation has a cooling effect. For humans in a 50 km/hour wind, a temperature of -20^{o} C feels like -50^{o}C. Hence a 50 km/hour wind is assigned a wind chill "factor" of -30^{o}C.

i. On a cold day in Wanganui, a strong wind makes you feel colder. This is called wind chill. Explain how the wind cools your body temperature.

_____

_____

_____

_____

The following table gives you the wind chill factors for different wind speeds at different temperatures:

Actual Temperature (°C)	Wind speed (kmh^{-1})								
	0	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**
		Equivalent Wind Chill Temperature (°C)							
8	8	7	5	3	1	-1	-2	-3	-4
6	6	5	3	0	-2	-4	-5	-6	-7
4	4	3	1	-2	-4	-6	-8	-9	-10
2	2	1	-1	-5	-7	-9	-11	-12	-13
0	0	-1	-3	-7	-10	-12	-13	-15	-16
-2	-2	-3	-6	-9	-12	-14	-16	-18	-19
-4	-4	-5	-8	-12	-15	-17	-19	-21	-22
-6	-6	-8	-10	-14	-17	-20	-22	-24	-25
-8	-8	-10	-12	-17	-20	-23	-25	-26	-28

Use the table on the previous page to answer the following questions.

ii. What would the equivalent wind chill temperature be at 2°C and 20 km/h?

_____

iii. State the **combinations** of wind speed and actual temperature readings, which produce an equivalent wind chill temperature of ¯10°C.

_____

_____

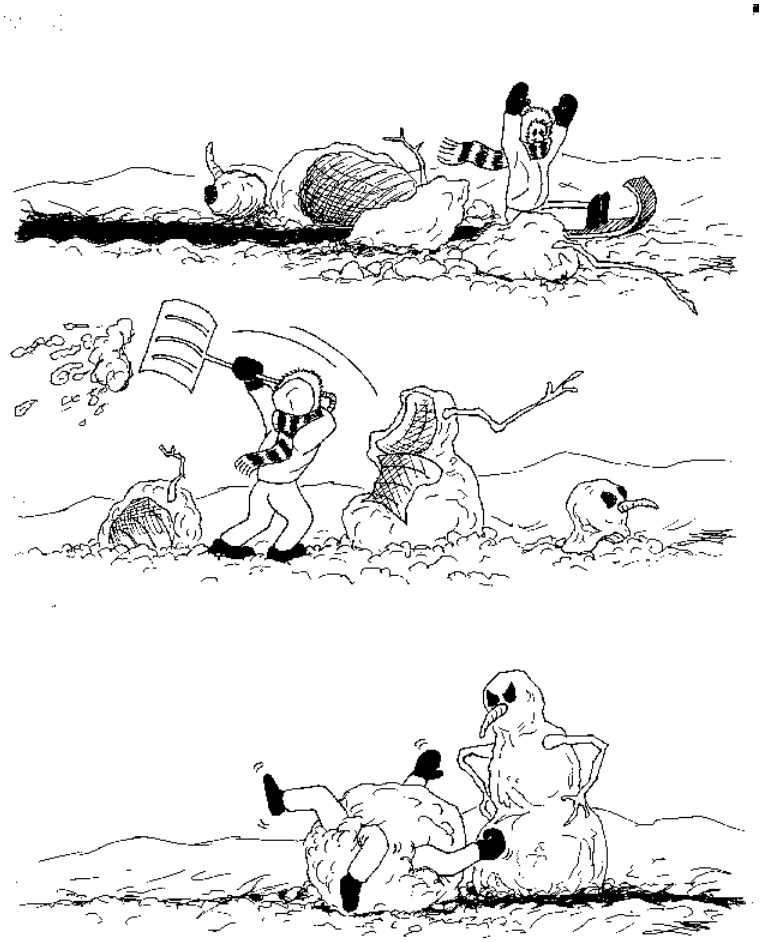
_____

iv. The effect of wind chill varies at different temperatures. For a constant wind speed of 15 km/hour, write a statement comparing the effect of the wind chill factor at 8°C and ¯8°C.

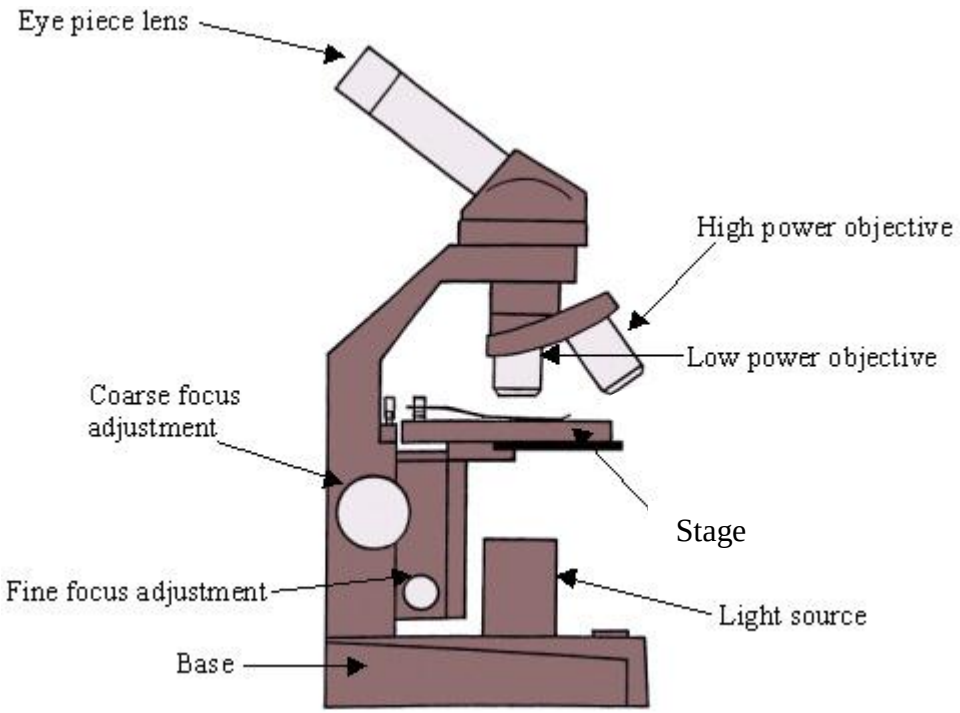
_____

_____

_____



Question Eight Microscopes

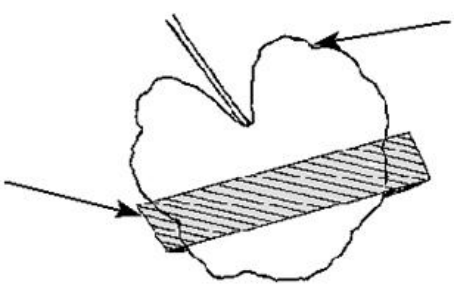


a. Belinda is having trouble using the microscope to view her slide. Under the low power objective lens everything looks dark. Using the diagram and your own knowledge write down the steps Belinda would need to go through, so she would be able to successfully view onion cells under low power.

Question Nine

Write an aim for each of these experiments involving PHOTOSYNTHESIS.

a.

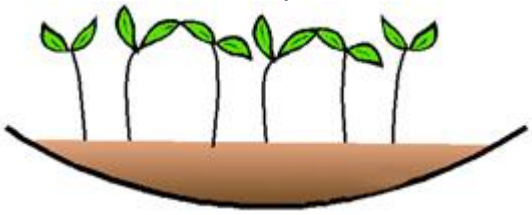


Aim: _____

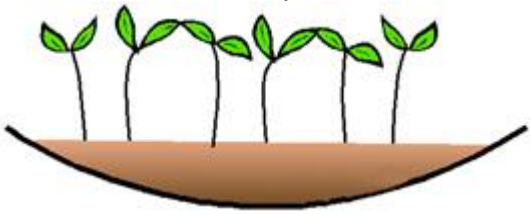
_____

b.

box allowing only blue light to reach plants



box allowing only red light to reach plants



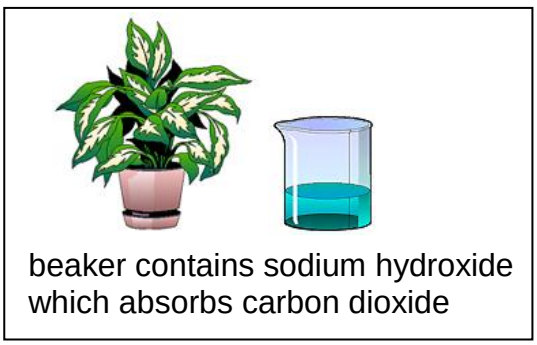
Aim: _____

_____

c.

sealed glass container

sealed glass container



Aim: _____

_____

Question Ten

a. Hamish found this animal skull. He thought that it was the skull of a herbivore.

Give two features of this skull that suggest it came from a herbivore.

i. _____

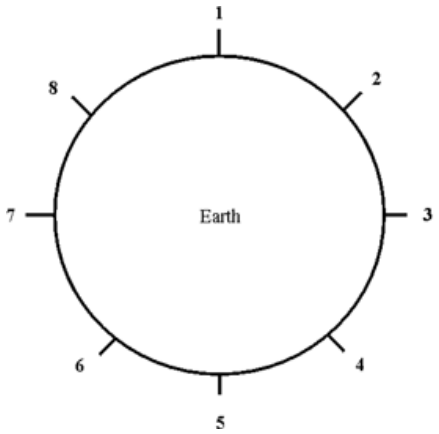
ii. _____

b. Hemi had a lion's skull.

How would the teeth and jaw of the lion's skull be different from the herbivore's skull?

Question Eleven

a. High tides in the sea are caused by the movement of the Earth and the Moon



There are two places on the Earth that would have a high tide when the Moon is in the position shown in this diagram.

There would be a high tide at position number _____

b. High tides occur approximately (circle the correct answer)

A once every 24 hours
B twice every 24 hours
C once every lunar month
D once every year

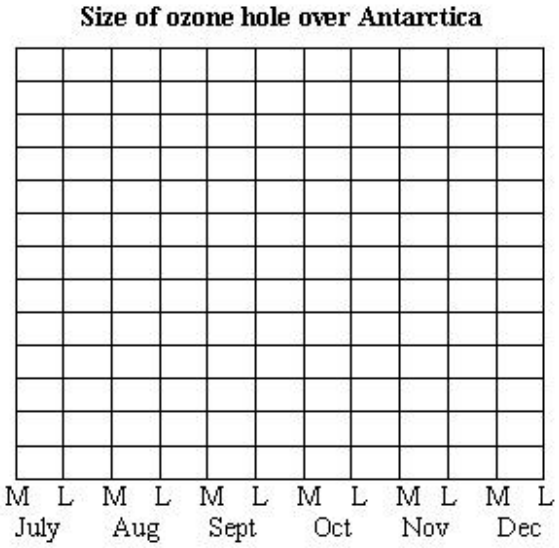
Question Twelve

Each year an ozone hole develops over Antarctica. An ozone hole is defined as an area in which the concentration of ozone is less than 220 Dobson Units.
The following data was recorded in one year.

Size of Ozone Hole in Millions of Square Kilometres by Month

Month	Mid July	Late July	Mid Aug	Late Aug	Mid Sept	Late Sept	Mid Oct	Late Oct	Mid Nov	Late Nov	Mid Dec
Size of ozone hole (million km^2)	0	1	3	12	22	23	16	11	8	4	0

a. Draw a **line** graph for this data on the grid below.



b. When does the ozone hole first appear? _____

c. Write a statement summarising what the graph shows.

_____

_____

_____

d. Sometimes an ozone hole develops faster, covers the same area, and disappears more slowly than the ozone hole you graphed above. Draw a line on your graph (in a different colour) to show this.

e. Give **two** reasons why the development of an ozone hole is of concern to New Zealanders.

_____

_____

_____

End of Examination.