For Supervisor's use only

2

90768

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Level 2 Science, 2006

90768 Use physics concepts and principles to describe the behaviour of light

Credits: Four
2.00 pm Tuesday 28 November 2006

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

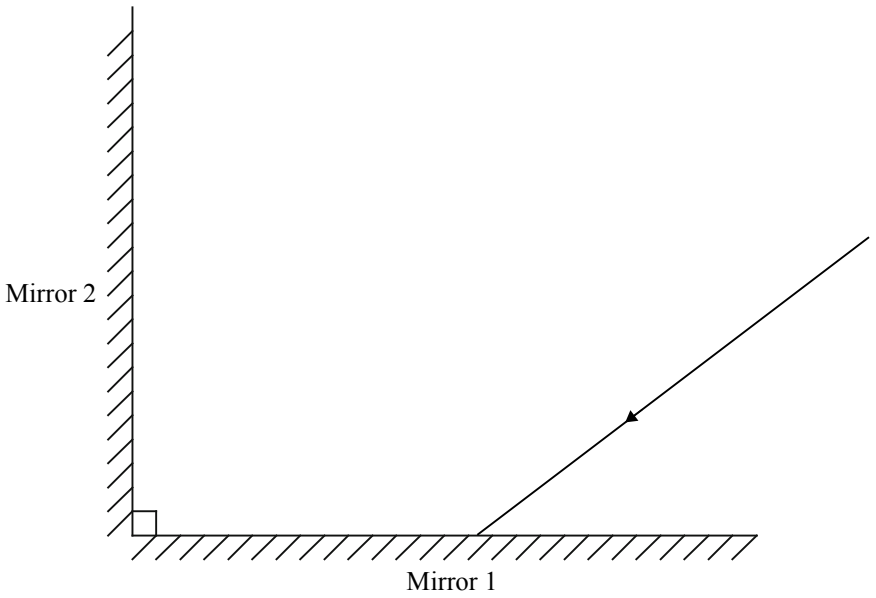
For Assessor's use only	**Achievement Criteria**		
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Use physics concepts and principles to describe the behaviour of light.	Use physics concepts and principles to explain the behaviour of light.	Use physics concepts and principles to discuss the behaviour of light.
Overall Level of Performance		

You are advised to spend 40 minutes answering the questions in this booklet.

Assessor's use only

QUESTION ONE

Two plane (flat) mirrors are fixed exactly at right angles (90º) to each other, as shown in the diagram below. A ray of light is aimed at one of the mirrors as shown.



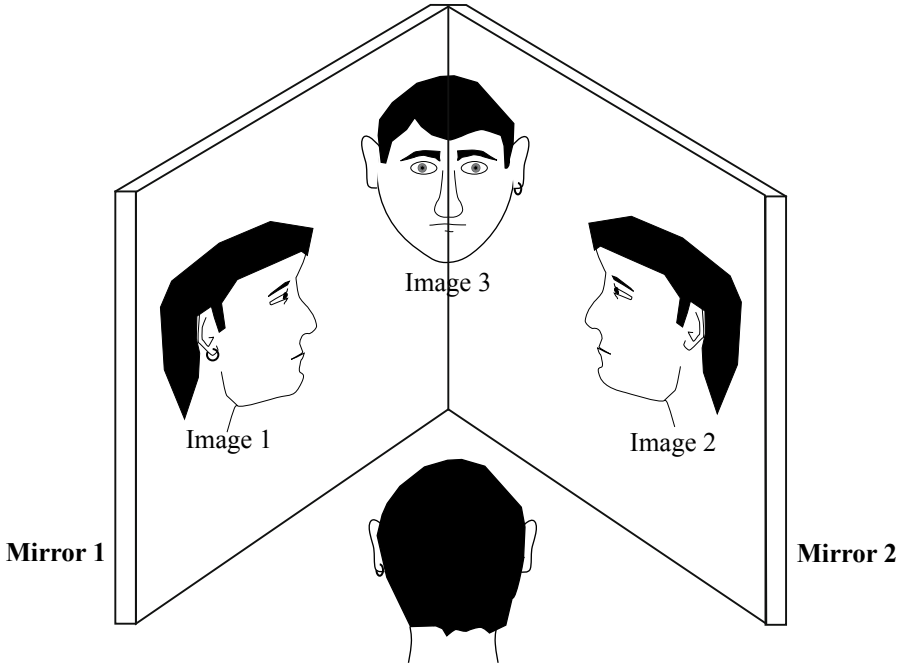
(a) On the above diagram, accurately draw rays to show how this ray reflects.

(b) Explain what would happen to the light rays if the mirrors were placed at an angle greater than 90° to each other. Use the box below to add a diagram to help with your answer.

Greater than 90°:

Assessor's use only

Darryl looks into two mirrors joined exactly at right angles. He sees three images of himself as shown in the diagram below. (NOTE: Darryl has an earring in his left ear.)



(c) Explain the **nature** of Images 1 and 2. (The mirrors and images have been numbered for your use in your answer.)

(d) Discuss how **Image 3** is formed.

QUESTION TWO

Assessor's use only

The photos in Figures 1 and 2 show a bathroom basin. In Figure 1 it is empty. In Figure 2 it is full of water. Both photos were taken from the same position.

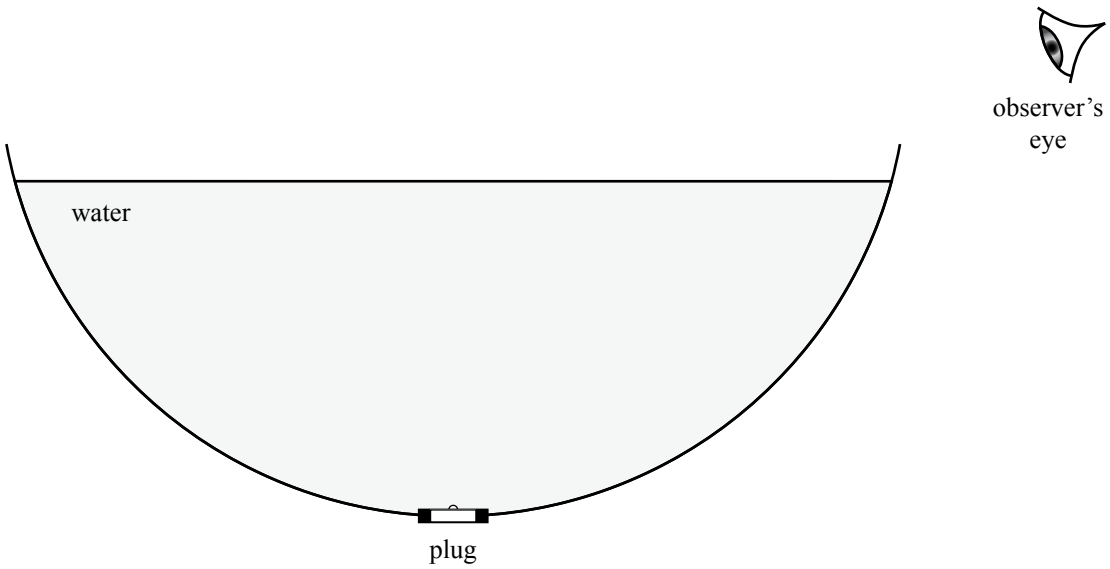
Figure 1

Figure 2

In Figure 2 the plug is visible and the basin looks shallow compared with Figure 1.

(a) Explain BOTH observations.

(b) Draw clear lines on the diagram below, to show what is happening to the light rays coming from the plug in the bottom of the basin to produce the effect in Figure 2 above.



QUESTION THREE

Assessor's use only

Sunlight is reflected off the inside of a spoon onto a piece of paper, creating a bright spot.

(a) Explain what is happening, including the significance of the distance between the spoon and paper.

A student holds the spoon so that the concave side is 100 mm from her face, which she sees reflected in the spoon. The focal length of the spoon is 18 mm. Her nose is 50 mm long.

(b) Draw a **scale** diagram so that you can find the **distance** of the image of her nose from the spoon, and the **length** and **nature** of the image.

(i) Distance of image = _____ behind / in-front-of (**circle** the correct one) the spoon.

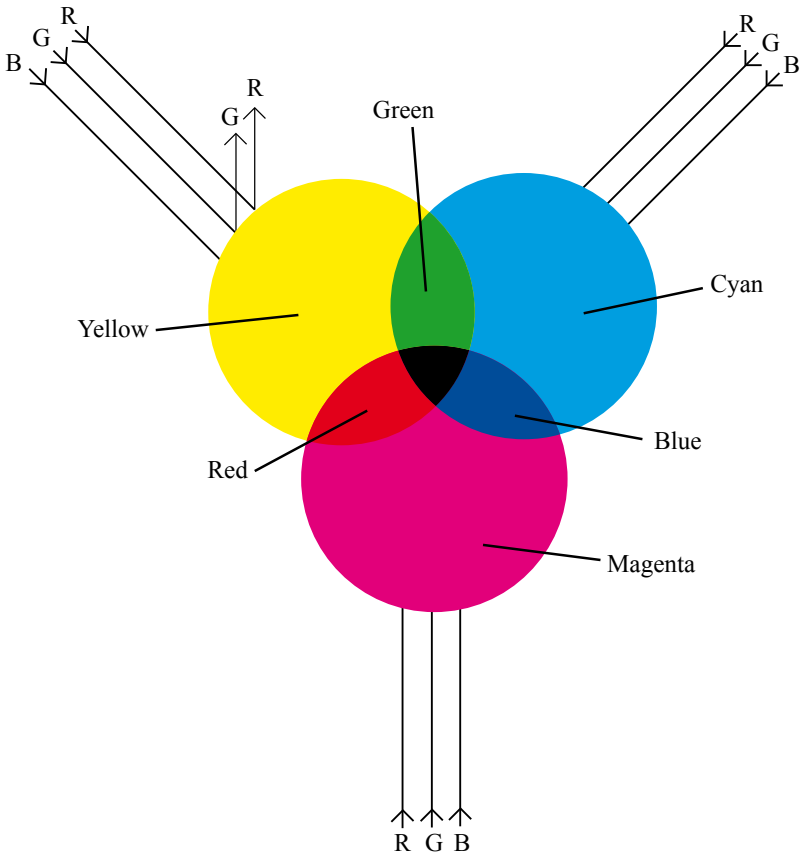
(ii) Length of image = _____ .

(iii) Nature of image: _____ , _____ , _____

QUESTION FOUR

Assessor's use only

Colour printers have three coloured inks: Cyan, Yellow and Magenta. These three inks have been used to print the circles below.



The diagram also shows rays of Red, Green and Blue light (which together make up white light) shining on the three ink colours. Only some of the light rays reflect, which is how we see the different colours.

(a) On the above diagram, draw in and label the light rays reflecting from Cyan and Magenta. Yellow has been completed for you as an example.

(b) Discuss how the colours Red, Green and Blue are formed where the circles overlap (as pictured in the diagram above).

Assessor's use only

Extra paper for continuation of answers if required.
Clearly number the question.

Assessor's use only

Question number	