Suggested Answers

Section A Multiple-choice questions (24 marks)

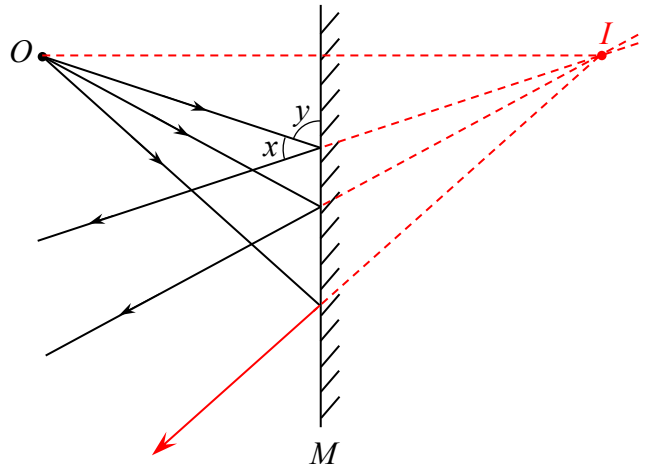
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	✓			✓		✓		✓				✓				
B			✓						✓				✓			✓
C		✓					✓								✓	
D					✓					✓	✓			✓		

Section B Fill blanks (10 marks)

(a) *mixture*	(b) *spectrum*
(c) *wavelengths*	(d) *violet*
(e) *refractive*	(f) *reflects*
(g) *absorbs*	(h) *direction*
(i) *boundary*	(j) *bend*

Section C Conventional questions (31 marks)

1.



The diagram is drawn for locating the image of a point object *O* formed by the plane mirror *M*.

(a) Produce the two reflected rays to get an intersection behind the mirror. (2 marks)

(b) Mark the point of intersection as *I*. What is *I*? (1 mark)

I is the image of O.

(c) Join *O* and *I* with a straight line. What should be the angle that this line makes with the mirror? (1 mark)

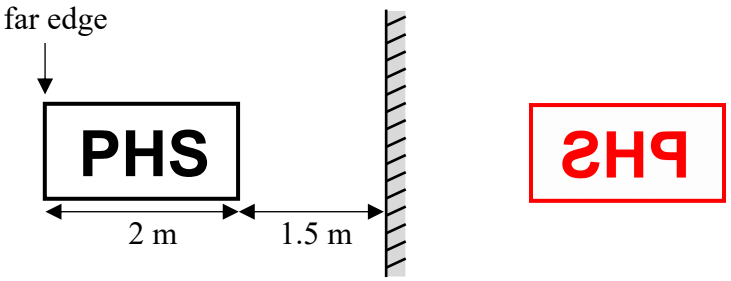
90°

(d) Add the third reflected ray. (1 mark)

(e) If $x = 38°$, find y. (1 mark)

$y = 90° - (38° / 2) = 71°$

2.



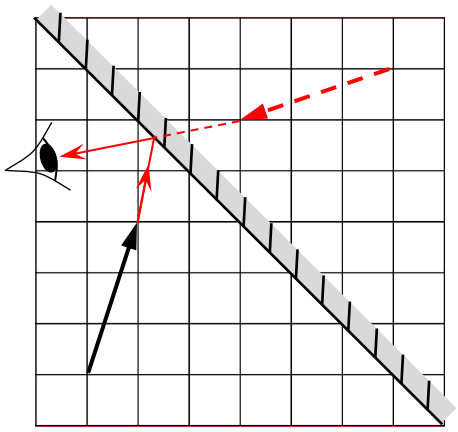
In the figure, a sign of width 2 m is placed 1.5 m away from a plane mirror.

(a) Find the distance between the far edge of the sign and its image in the mirror? (2 marks)

$(2 + 1.5) \times 2 = 7$ *m*

(b) Draw the whole image of the sign, showing all the letters, in the mirror. (3 marks)

3.

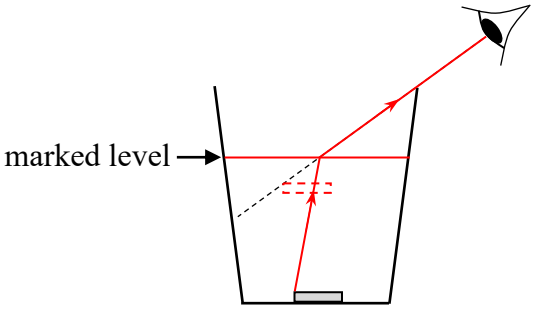


The diagram shows an object (the arrow) placed in front of a plane mirror.

(a) Draw an arrow to represent the image of the object. (2 marks)

(b) Draw light rays to show how the eye sees the tip of the object by reflection. (2 marks)

4.



In the figure, a coin is placed at the bottom of an empty paper cup. The dotted line is the line of sight of the eye.

(a) Explain why the coin cannot be seen by the eye. (2 marks)

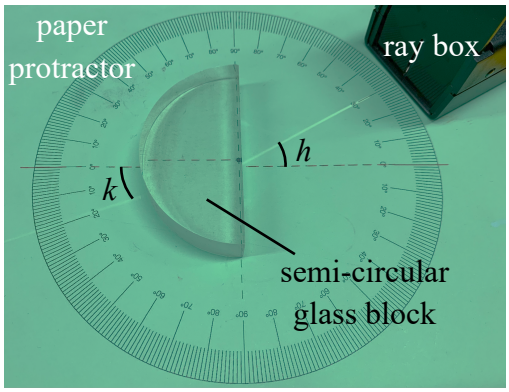
Because light travels in a straight line and the coin is off the line of sight.

(b) Suppose the coin can just be seen by the eye when the cup is filled with water up to the marked level.

(i) Add light rays to show how the coin can be seen. (2 marks)

(ii) Draw the image of the coin. (1 mark)

5.



The photo shows a setup used to study the refraction of glass.

(a) Angle of incidence = *h* Angle of refraction = *k* (1 mark)

The table below shows the results of the experiment.

h	0°	15°	*30°*	45°	60°	75°
k	*z*	10°	*20°*	29°	36°	41°

(b) Using the information found in the photo, fill the blank cells of the table. (2 marks)

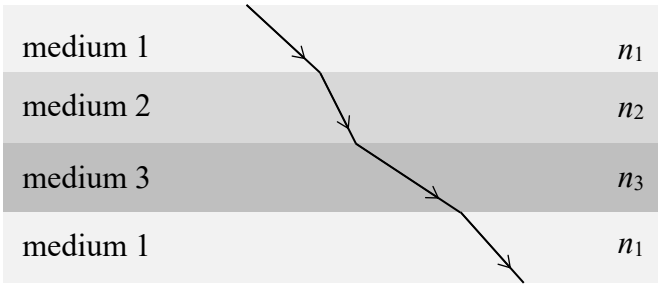
(c) What is the size of *z*? (1 mark)

0°

(d) Describe the relationship between the angles of incidence and refraction. (2 marks)

As the angle of incidence increases, the angle of refraction increases.

6.



In the figure, a light ray goes through layers of different materials. n_1 denotes the refractive index of medium 1 and so on.

(a) Is n_1 or n_2 larger? Explain briefly. (3 marks)

n_2 is larger

because the refracted ray bends towards the normal.

(b) Arrange the refractive indices in descending order. (2 marks)

n_2 > *n_1* > *n_3*