LEVEL -8

PHYSICS

FINAL TERM REVISION WORKSHEET -2

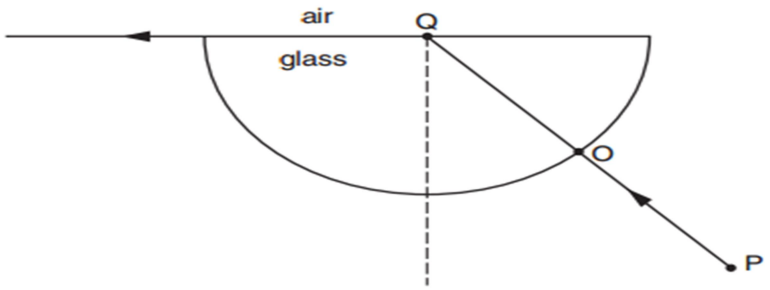
TOPIC : CHAPTER -13

LIGHT

SECTION B

1.

a) **Figure shows the results of an experiment to find the critical angle for light in a semicircular glass block.**

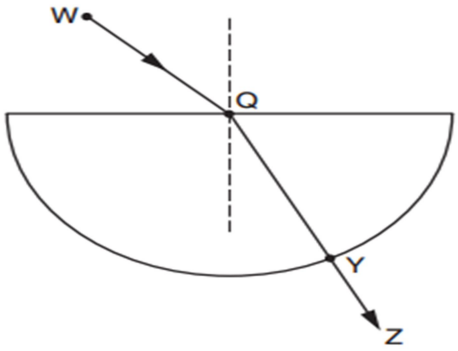


The ray of light PO hits the glass at O at an angle of incidence of 0°. Q is the centre of the straight side of the block.

i. **Measure the critical angle of the glass from Figure.**
Critical angle = ...

ii. **Explain what is meant by the critical angle of the light in the glass.**
.....
.....
.....

b) **Fig. 6.2 shows another ray passing through the same block.**



The speed of the light between W and Q is 3.0×10^8 m/s. The speed of the light between Q and Y is 2.0×10^8 m/s.

i. **State the speed of the light between Y and Z.**

Speed = ...

ii. **Write down an expression, in terms of the speeds of the light, that may be used to find the refractive index of the glass. Determine the value of the refractive index.**

Refractive index = ...

iii. **Explain why there is no change of direction of ray QY as it passes out of the glass.**

.....

iv. **What happens to the wavelength of the light as it passes out of the glass?**

....

2. **a) A ray of light in air travels across a flat boundary into glass. The angle of incidence is 51°. The angle of refraction is 29°.**

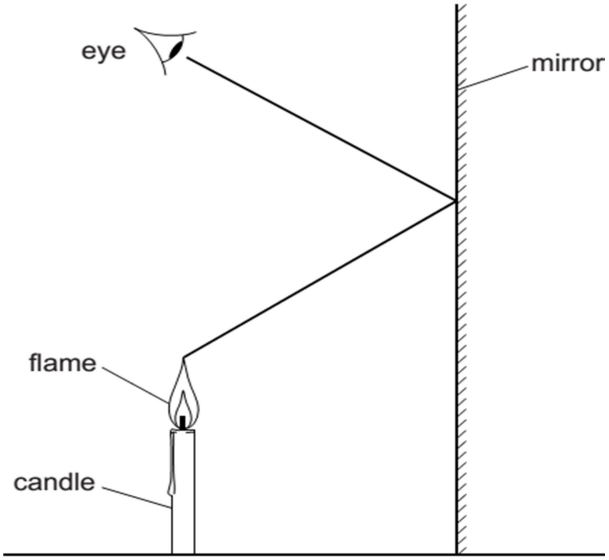
i) **Draw a labeled diagram to illustrate the given information.**

ii) **Calculate refractive index of glass.**

b) A ray of light in glass travels towards a flat boundary with air. The angle of incidence is 51° .This ray does not emerge into the air.

State and explain what happens to this ray.

3. **A student looks into a vertical mirror to see the reflection of a burning candle.**
   Figure shows one ray of light being reflected by the mirror.



(a) On the ray in Figure mark arrows to indicate the direction of travel of the light.
(b) On Figure carefully mark the position of the image of the candle flame.
(c) The candle is moved further from the mirror. State what, if anything, happens to

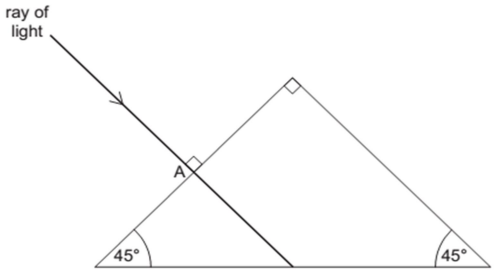
(i) The position of the image.

……..

(ii) The size of the image.

……

4. a**) A ray of light passes through one surface of a glass prism at right angles to the surface, as shown in Figure.**



(i) State why the ray is not deviated as it passes through the surface into the glass at A.

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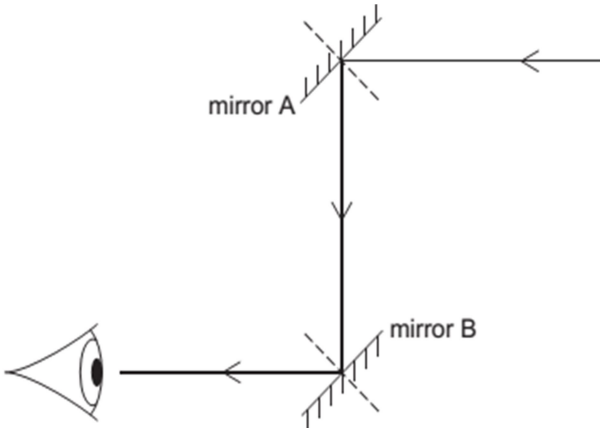
(ii) On Figure use a ruler to help you draw the rest of the path of the ray, until it has emerged again into the air.

(b) Fig. shows a periscope that uses two plane mirrors.



(i) On Fig. clearly mark the angle of incidence i and the angle of reflection r at mirror A.

(ii) State the equation linking i and r.

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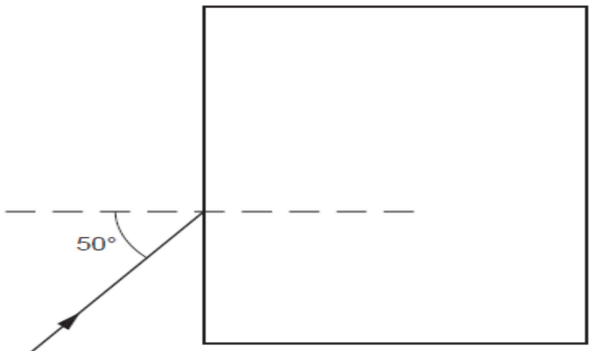
(iii) In the space below, use a ruler to redraw the periscope, but using prisms instead of mirrors at A and B.

5. (a) **Fig. shows a ray of monochromatic red light, in air, incident on a glass block at an angle of incidence of 50°.**



(i) State what is meant by *monochromatic* light.

……

(ii) For this red ray the refractive index of the glass is 1.52. Calculate the angle of refraction for the ray.

iii) Without measuring angles, use a ruler to draw the approximate path of the ray in the glass block and emerging from the block. [2]

(b) The red ray in Fig. 7.1 is replaced by a ray of monochromatic violet light. For this violet ray the refractive index of the glass is 1.54. The speed of light in air is 3.00×10^8 m/s.

(i) Calculate the speed of the violet light in the glass block.

(ii) Use a ruler to draw the approximate path of this violet ray in the glass block and emerging from the block. Make sure this path is separated from the path drawn for the red light in **(a)(iii)**. Mark both parts of this path with the letter V. [2]

(c) (i) Glass has a critical angle of 41°. What does this mean?

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(ii) Give two examples where total internal reflection is practically used.

…….

……

(d) A transparent material has a refractive index of 2.

(i) Calculate the critical angle.

(ii) If the refractive index were less than 2, would the critical angle be greater or less than before?

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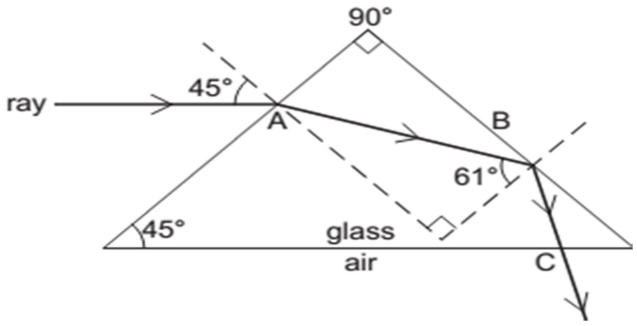
6. A ray of monochromatic light passes through the glass prism as shown in Figure .



(a) State what is meant by refractive index.

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(b) State the name given to what happens to the ray at A.

…… …….

(c) Use the values on the diagram to calculate the angle of refraction at A (The angles in a triangle add up to 180°)

(d) Calculate the refractive index of the glass.

(e) Explain why the ray does not emerge into the air at B, but does emerge at C.

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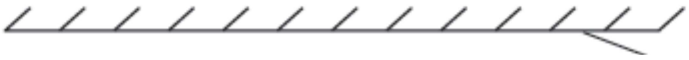
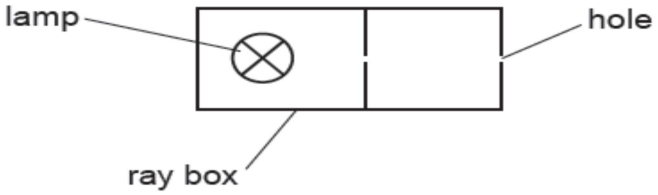
7. The IGCSE class is investigating the reflection of light by a plane mirror. Fig. shows a student's ray-trace sheet.



(a) On Figure draw a normal to the centre of the mirror.

(b) On Figure draw an incident ray at 30° to the normal and to the left of the normal.

(c) Figure shows a diagram of a ray box.



On Figure1 draw the ray box in a suitable position to produce the incident ray that you have drawn.

(d) On Figure 1 draw a reflected ray in the position you would expect it to be using the incident ray that you have drawn.

(e) State a precaution that you could take in this experiment to obtain reliable results.

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