
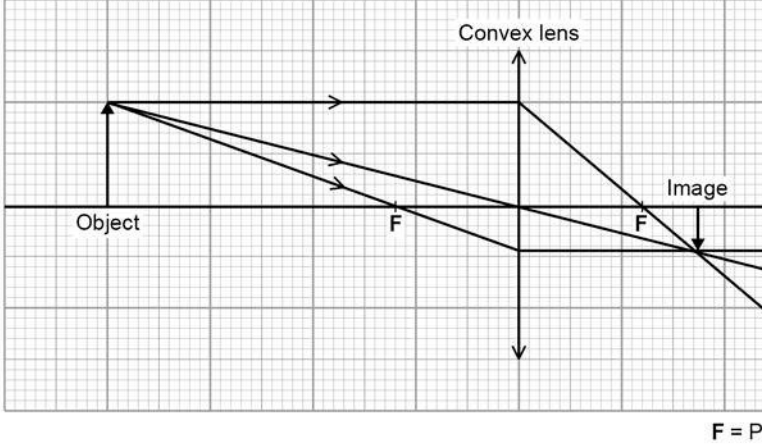


# MS LENSES AND RAY DIAGRAM 2

## QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MAR KS
(a)(i)	convex	accept diverging  do <b>not</b> accept convexed	1
(a)(ii)	(principal) focus	accept focal (point)	1
(a)(iii)	reflection	accept angle of reflection	1
(b)(i)	concave	accept converging  do <b>not</b> accept concaved	1
(b)(ii)	( ) 1.5 / ( ) 1%	<b>either</b> 30 20 (1) <b>or</b> 3 2 (1) <b>or</b> 15 10 (1)  ignore any units	2
<b>Total</b>			6
<b>QUESTION 2</b>			
<b>b)(i)</b>	inverted		1
	real		1

<b>(b)(ii)</b>	0.4	<p>allow <b>1</b> mark for correct substitution, eg</p> <p><math>\frac{8}{20}</math> (in mm)</p> <p><b>or</b> <math>0.8_2</math> (in cm)</p> <p><b>or</b> 0.0080.02 (in m)</p> <p><math>\frac{4}{10}</math> <b>or</b> (number of squares)</p> <p>ignore any units</p> <p>ignore negative sign</p>	2
<b>(c)</b>	<p>this shape ticked:</p> 		1
<b>Total</b>			6
<b>Question 3</b>			
<b>(a)</b>	<p>any <b>two</b> correct construction lines:</p> <ul style="list-style-type: none"> <li>• line passing straight through centre of lens (&amp; out other side)</li> <li>• line travelling parallel to principal axis &amp; then being refracted through principal focus (on RHS)</li> <li>• line travelling through principal focus (on LHS) &amp; then being refracted to be parallel to principal axis (on RHS)</li> </ul> <p><u>inverted</u> image drawn (with arrow) in correct location</p> <p>one arrowhead from object to image on any construction ray</p>	<p>if more than 2 construction lines treat as a list</p>	<p>2</p> <p>1</p>

		<p>conflicting arrowheads negate this mark</p>	1
<p><b>(b)</b></p>	<p>any <b>two</b> from:</p> <ul style="list-style-type: none"> <li>• inverted</li> <li>• real</li> <li>• diminished / smaller</li> </ul>	<p>accept upside down</p> <p>allow ecf if ray diagram wrongly drawn but descriptions must relate to <b>their image</b></p> <p>a converse negates mark, eg real and virtual scores zero</p>	2
<p><b>Total</b></p>			6
<p><b>Question 4</b></p>			
<p><b>(a)</b></p>	<p>The refractive index of the lens material</p>		1
<p><b>(b)</b></p>	<p>4</p>	<p>ignore any signs</p> <p>allow <b>1</b> mark for correct substitution, ie <math>0.25^1</math></p> <p>provided no subsequent step</p>	2

(c)	Cauterising open blood vessels		1
(d)	5	allow <b>1</b> mark for correct $\frac{70}{14}$ substitution, ie provided no subsequent step	2
<b>Total</b>			5
<b>Question 5</b>			
5(c)(i)	any <b>one</b> correct description: • upright • virtual • diminished	treat multiple words as a list	1
5(c)(ii)	0.25	allow <b>1</b> mark for correct substitution, ie 1 / 4 or 5/20 provided no subsequent step shown  ignore any unit	2
5(c)(iii)	Correcting short sight		1
<b>Total</b>			4