Lenses GCSE AQA Higher Physics Past Papers Answers

01.

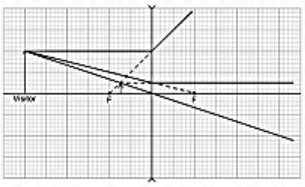
Question	Answers	Extra information	Mark	AO / Spec. Ref.
1	$\text{magnification} = \frac{\text{image height}}{\text{object height}}$		1	AO3/1b 4.6.2.5
	dividing by an object height of 1 cm gives the same (numerical) value		1	
2	accept anything practical that would work eg: use a taller object use a (travelling) microscope attach a scale to the screen and used a magnifying glass		1	AO3/3b 4.6.2.5 WS2.3/7
3	both points plotted correctly		1	AO2/2
	correct line of best fit drawn	a curve passing through all points (within ½ square), judge by eye	1	4.6.2.5 WS3.1/2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4	values of 1.4 and 0.6 extracted from the graph		1	AO2/2 4.6.2.5
	2.33 times bigger	accept any number between 2.3 and 2.5 inclusive	1	WS3.5
5	by dividing the distance between the lens and the image by the distance between the lens and the object		1	AO3/1a
	at least one correct calculation and comparison eg 100÷25 = 4 which is the same as the measured magnification		1	AO2/2 4.6.2.5 WS3.5
6	any two correct construction lines	construction lines can be dotted or solid	2	AO2/2 4.6.2.5
	upright image drawn correctly	the image line can be dotted or solid but must show correct orientation ignore any arrows drawn on construction lines	1	
Total			**12**	

02.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1	focal length	this answer only	1	AO1/1 4.6.2.5
2	one correct line drawn from the top of the object, passing through the lens and crossing or meeting given line inverted image drawn at the correct position and length	ignore any arrow drawn on the line if two lines are drawn, both must be correct arrowhead required	1 1	AO2/2 4.6.2.5
3	similarity (both are) diminished difference concave is <u>virtual</u> and convex is <u>real</u> **or** concave is upright and convex is inverted	 allow smaller for diminished a comparison must be made ignore reference to positions of images	1 1	AO3/2a 4.6.2.5
4	$6.0 = \frac{9.0}{\text{object height}}$ $\text{object height} = \frac{9.0}{6.0}$ object height = 1.5 (mm)	an answer of 1.5 (mm) scores **3** marks provided working can be seen, an attempt to convert 9.0 mm to cm or m with all other steps correct scores **2** marks	 1 1 1	AO2/1 4.6.2.5
Total			**8**	

03.

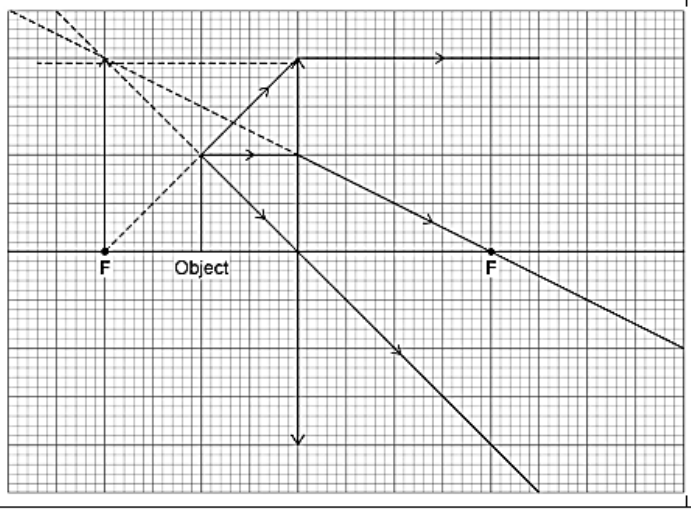
Question	Answers	Extra information	Mark	AO / Spec. Ref.
1	any **two** correct lines drawn from the top of the visitor and passing through the lens	allow construction lines that are not dashed	2	AO2 4.6.2.5
	image drawn at the correct position and with the correct orientation	mark only scores if first two marks scored. a convex lens diagram scores **0** marks 	1	
2	Decreases		1	AO3 4.6.2.5
3	Iron		1	AO1 4.7.2.1
4	there is a current in the solenoid / circuit	allow a charge flows through the solenoid / circuit	1	AO1 4.7.2.1
	creating a magnetic field	allow the solenoid / coil is magnetised	1	
	attracting the bolt		1	

5	1.50 cm = 0.015 m		1	AO2 4.5.3
	2.88 = k × 0.015	this mark may be awarded if distance is incorrectly/not converted	1	
	k = 2.88 / 0.015	this mark may be awarded if distance is incorrectly/not converted	1	
	k = 192 (N/m)	allow a correctly calculated answer using an incorrectly/not converted distance	1	

6	Any **two** from:		2	AO3 4.7.2.1
	• increase the current (in the solenoid / circuit)	allow any sensible suggestion for increasing the current such as increasing the p.d. / power of the battery **OR** using lower resistance wire in the solenoid		
	• add more turns to the solenoid	do **not** allow increase the number of coils		
	• use a spring with a lower spring constant	allow use a weaker spring		
Total			**14**	

04.

Question	Answers	Extra information	Mark	AO/ Spec. Ref
04.1	**both** answers correct virtual diminished	answers may be in either order allow a description of diminished (eg smaller / reduced)	1	AO3 4.6.2.5
04.2	any **two** correct lines drawn from the top of the object, passing through the lens and traced backwards image drawn in the correct position and with the correct orientation	allow construction lines that are not dashed allow 1 mark for **two** correct lines drawn from the top of the object, passing through the lens BUT not traced backwards mark only scores if first two marks score	2 1	AO2 4.6.2.5



04.3	(increasing the object distance) decreases the image distance more rapidly at small (object) distances / more gradually at larger (object) distances	do **not** accept inversely proportional	1	AO3 4.6.2.5

04.4	$\frac{(2.2 - 1.4)}{2}$ uncertainty = (±) 0.4 (cm)	 allow $\frac{1.9 + 1.7 + 2.2 + 1.4}{4} = 1.8$ (1) (2.2 – 1.8 =) (±) 0.4 (cm) (1)	1 1	AO3 4.6.2.5

04.5	only red is transmitted by the filter red is absorbed by the (blue) object (so) no light is reflected by the (blue) object		1 1 1	AO1 4.6.2.6

Total			**10**