

Name of the Student: \_\_\_\_\_

Max. Marks : 17 Marks

Time : 17 Minutes

Mark Schemes

Q1

Question Number	Answer	Additional Guidance	Mark
	<ul style="list-style-type: none"> <li>• Use of <math>\frac{1}{f} = \frac{1}{u} + \frac{1}{v}</math> and <math>P = \frac{1}{f}</math></li> <li>• Use of <math>P = P_1 + P_2</math></li> <li>• (-) 0.6 D</li> <li>• Diverging</li> </ul>	MP4 dependent on MP3  <u>Example of calculation</u>  Power of eye $P = \frac{1}{1.5 \text{ (m)}} + \frac{1}{0.024 \text{ (m)}} = 42.3 \text{ D}$  P of spectacles = 41.7 (D) – 42.3 (D) = -0.6 D diverging	4

Q2

Question Number	Acceptable answers	Additional guidance	Mark
	<ul style="list-style-type: none"> <li>• calculation of a gradient (1)</li> <li>• use gradient = <math>d/\lambda</math> (1)</li> <li>• use <math>d = 0.001 / 300</math> (1)</li> <li>• wavelength = <math>6.3 \times 10^{-7} \text{ m}</math> (1)</li> </ul>	<u>Example of calculation</u>  $\text{gradient} = \frac{4.0}{0.76} = 5.26$ $\frac{0.001}{300} = 5.26 \times \lambda$ wavelength = $6.3 \times 10^{-7} \text{ m}$	4

Q3

Question Number	Acceptable Answer	Additional Guidance	Mark
	<ul style="list-style-type: none"> <li>Photoelectric equation stated in words (1) Or <math>hf = \phi + \frac{1}{2}mv_{\max}^2</math> with <math>\phi</math> defined</li> <li>Hence <math>eV_s = hf - \phi</math> (1) Or <math>E_{k \max} = hf - \phi</math> and <math>E_{k \max} = eV_s</math></li> <li>Compare with <math>y = mx + c</math> (1)</li> <li>So plot a graph of <math>V_s</math> against <math>f</math> (1) Or plot a graph of <math>eV_s</math> against <math>f</math></li> <li>Gradient = <math>\frac{h}{e}</math> (1) Or gradient = <math>h</math></li> </ul>	<p>MP1: Accept <math>hf_0</math> for <math>\phi</math> [with <math>f_0</math> defined], and <math>E_{k \max}</math> for <math>\frac{1}{2}mv_{\max}^2</math></p> <p>MP2: <math>eV_s</math> does not have to be the subject of the equation</p> <p>MP5 is dependent upon MP4</p>	5

Q4

Question Number	Acceptable Answers	Additional guidance	Mark
(i)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> <li>Path lengths (A-O and B-O) are equal (1) Or Path difference is zero</li> <li>Will arrive in phase Or phase difference is zero (1)</li> <li>(Bright line is position of) <u>constructive</u> interference/superposition (1)</li> </ul>		3
(ii)	<ul style="list-style-type: none"> <li>600 nm Or <math>600 \times 10^{-9}</math> m Or <math>6.0 \times 10^{-7}</math> m Or one wavelength Or <math>\lambda</math> (1)</li> </ul>	<p>Do not accept <math>(n\lambda)</math></p> <p>Accept any correct equivalent value</p>	1