Question			Expected response	Max mark	Additional guidance
10.	(a)		Blue (light) **(1)** Shortest wavelength of light **(1)** Path difference is smaller/equals the wavelength so the spots are closer together **OR** sin θ is proportional to λ **(1)**	**3**	Look for this statement first – if incorrect or missing then **(0 marks)**. Accept: $d \sin \theta = m\lambda$ and shortest λ gives smallest sin θ (which gives smallest θ) Alternative methods: Can be shown by calculation but it must be clear the candidate has used **appropriate** wavelengths.
	(b)	(i)	$m\lambda = d \sin\theta$ **(1)** $(1\times)\lambda = 3{\cdot}3\times10^{-6}\times\sin 8{\cdot}9$ **(1)** $\lambda = 5{\cdot}1\times10^{-7}$ m (510 nm) **(1)**	**3**	Accept: $5, 5{\cdot}11, 5{\cdot}105$ Accept: $\lambda = d \sin\theta$ in this case
		(ii)	Green	**1**	Or consistent with (b)(i) but **must be** red, green or blue. If λ in (b)(i) lies outside of range of red, green or blue this mark is not accessible.

Question			Expected response	Max mark	Additional guidance
10.	(b)	(iii)	($\sin\theta = \frac{m\lambda}{d}$ so if d is greater then) angle θ will be smaller **(1)** Smaller angle more difficult to measure accurately/greater <u>percentage</u> uncertainty. **(1)**	**2**	Accept: maxima are closer together **(1)** Smaller distance between maxima more difficult to measure accurately/greater percentage uncertainty.**(1)**
11.	(a)		$n = \frac{\sin\theta_1}{\sin\theta_2}$ **(1)** $2{\cdot}42 = \frac{\sin 49{\cdot}0}{\sin\theta_2}$ **(1)** $\theta_2 = 18{\cdot}2°$ **(1)**	**3**	Accept: 18, 18·17, 18·172 Accept: $\frac{n_2}{n_1} = \frac{\sin\theta_1}{\sin\theta_2}$ **(1)** $\frac{2{\cdot}42}{1} = \frac{\sin 49{\cdot}0}{\sin\theta_2}$ **(1)** $\theta_2 = 18{\cdot}2°$ **(1)**
	(b)		$\sin\theta_c = \frac{1}{n}$ **(1)** $\sin\theta_c = \frac{1}{2{\cdot}42}$ **(1)** $\theta_c = 24{\cdot}4°$ **(1)**	**3**	Accept: 24, 24·41, 24·407
	(c)		more (sparkle) **(1)** Critical angle for moissanite is smaller than for diamond **(1)** (Total internal) reflection more likely (with moissanite). **(1)**	**3**	Look for this statement first – if incorrect or missing then (**0 marks**). Critical angle for moissanite is smaller than for diamond can be shown by calculation.