Mark Scheme

Q1.

Question Number	Acceptable answers	Additional guidance	Mark
	The only correct answer is B because at angles less than or equal to the critical angle not all of the light is reflected internally such that angle of incidence is equal to the angle of reflection A is not correct because total internal reflection occurs at angles greater than the critical angle but at the critical angle the angle of refraction is 90 degrees, so the reflection is not total C is not correct because internal reflection is not total at angles less than the critical angle D is not correct because internal reflection is not total at angles less than the critical angle		1

Q2.

Question Number	Answer	Mark
	A	1

Q3.

Question Number	Answer	Mark
	B	1

Q4.

Question Number	Answer	Mark
	A	1

Q5.

Question Number	Answer	Mark
	B $v_1 < v_2$ $n_1 > n_2$	1
	Incorrect Answers: A – incorrect equality for speed C – incorrect equality for speed and refractive index D – incorrect equality for refractive index	

Q6.

Question Number	Acceptable answers	Additional guidance	Mark
	The only correct answer is **B** because the power of a diverging lens is negative, so the total power = 9.4 D – 4.2 D = 5.2 D A is not correct because the total power should be obtained from (9.4 D – 4.2 D), but this is (9.4 D + 4.2 D) C is not correct because this is (4.2 D – 9.4 D) using negative power for a converging lens and positive for a diverging lens where it should be the opposite so that (9.4 D – 4.2 D) is used D is not correct because – 13.6 D = – 9.4 D – 4.2 D, as if both lenses are diverging, which is not the case		1

Q7.

Question Number	Answers	Additional Guidance	Mark
	D	sin 61° / sin 42°	**(1)**

Q8.

Question Number	Acceptable answers	Additional guidance	Mark
	C		1

Q9.

Question Number	Answer	Mark
	C - 1.5	1
	Incorrect Answers: all select incorrect data from question Correct method: image distance ÷ object distance A – uses focal length ÷ object distance B – uses object distance ÷ image distance D – uses object distance ÷ focal length	

Q10.

Question Number	Acceptable answers	Additional guidance	Mark
	C		1

Q11.

Question Number	Acceptable Answers	Additional Guidance	Mark
	A		1

Q12.

Question Number	Acceptable answers	Additional guidance	Mark
	The only correct answer is **D** because magnification is numerically equal to image distance divided by object distance A is not correct because magnification is numerically equal to image distance divided by object distance, but this is focal length divided by object distance B is not correct because magnification is numerically equal to image distance divided by object distance, but this is object distance divided by image distance C is not correct because magnification is numerically equal to image distance divided by object distance, but this is object distance divided by focal length		1

Q13.

Question Number	Acceptable Answers	Additional Guidance	Mark
	C		1

Q14.

Question Number	Answer	Mark
	D	1

Q15.

Question Number	Acceptable answer	Additional guidance	Mark
	B	The only correct answer is **B** because m is the SI unit for length. A is not correct because C is not a base unit C is not correct because g is not a base unit D is not correct because °C is not a base unit	1

Q16.

Question Number	Acceptable Answers	Additional guidance	Mark
	• Light rays pass through the image **Or** Light rays converge to a point where the image is formed (1)		1