Questions

Q1.

Answer the question with a cross in the box you think is correct (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

For total internal reflection to take place, the angle of incidence must be

☒ **A** greater than or equal to the critical angle.

☒ **B** greater than the critical angle.

☒ **C** less than or equal to the critical angle.

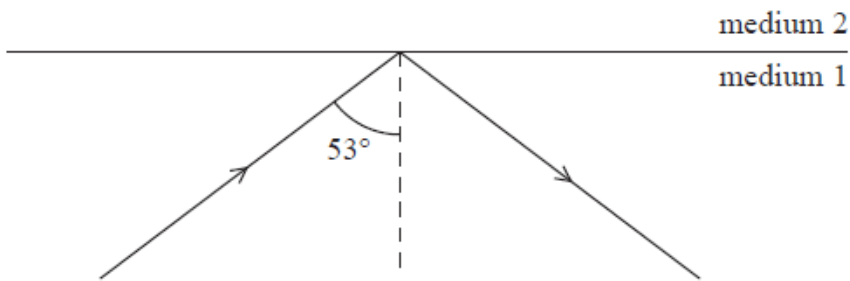☒ **D** less than the critical angle.

(Total for question = 1 mark)

Q2.   Which of the following is a base SI unit?

☒ **A** ampere

☒ **B** coulomb

☒ **C** ohm

☒ **D** volt

(Total for Question = 1 mark)

Q3.

Light in medium 1 strikes a boundary with medium 2 which is also transparent. The diagram shows what happens.

Which of the following can be deduced?

☒ **A** The critical angle for light travelling from medium 1 into medium 2 is 53°.

☒ **B** The refractive index of medium 1 is greater than the refractive index of medium 2.

☒ **C** The speed of light in medium 1 is greater than the speed of light in medium 2.

☒ **D** The frequency of light in medium 1 is less than the frequency of light in medium 2.

(Total for question = 1 mark)

Q4.   The diagram shows a ray of light incident upon the surface of a glass block.
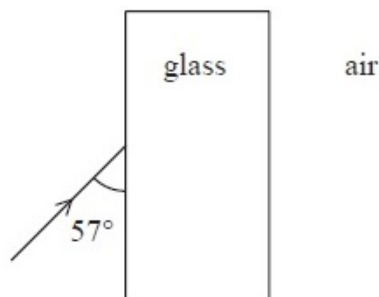
Which line could correctly show the angle of incidence and the angle of refraction?

	Angle of incidence	Angle of refraction
☒ A	33°	21°
☒ B	33°	55°
☒ C	57°	34°
☒ D	57°	38°

(Total for Question = 1 mark)

Q5.

A ray of light travels through medium 1 of refractive index n_1 and is incident at an interface with medium 2 of refractive index n_2. The ray is totally internally reflected at the interface.
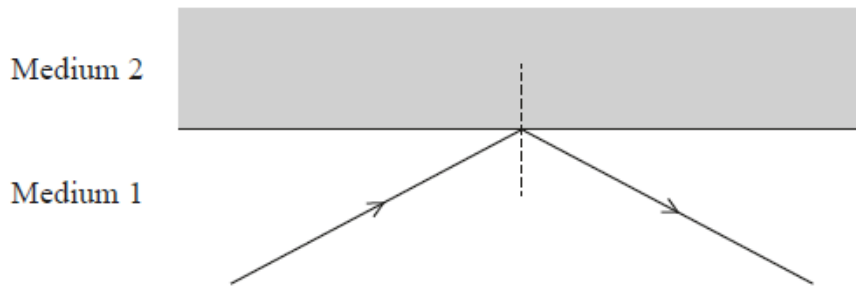
speed of the light in medium 1 = v_1

speed of the light in medium 2 = v_2

Which row of the table is correct for this situation?

☒ **A**	$v_1 > v_2$	$n_1 > n_2$
☒ **B**	$v_1 < v_2$	$n_1 > n_2$
☒ **C**	$v_1 > v_2$	$n_1 < n_2$
☐ **D**	$v_1 < v_2$	$n_1 < n_2$

(Total for question = 1 mark)

Q6.

Answer the question with a cross in the box you think is correct (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

A system of lenses consists of a converging lens and a diverging lens in contact.

The magnitude of the power of the converging lens is 9.4 D and the magnitude of the power of the diverging lens is 4.2 D.

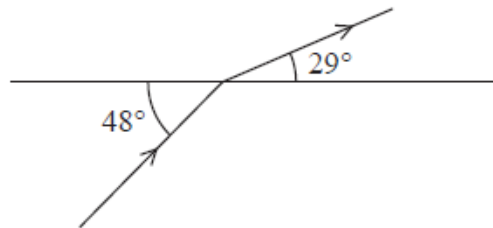Which of the following is the power of this system of lenses?

☒ **A** 13.6 D

☒ **B** 5.2 D

☒ **C** −5.2 D

☒ **D** −13.6 D

(Total for question = 1 mark)

Q7.

The diagram shows a ray of light travelling from a transparent medium into air.

The refractive index of the transparent medium is given by

☒ **A** sin 48° / sin 29°

☒ **B** sin 42° / sin 29°

☒ **C** sin 61° / sin 48°

☒ **D** sin 61° / sin 42°

(Total for question = 1 mark)

Q8.

A converging lens is used as a magnifying glass. An image is produced that is 30 cm away from the lens and twice as big as the object.

Choose the row that correctly identifies the nature of the image and the object distance.

		Nature of image	Object distance/cm
☒	A	real	15
☒	B	real	60
☒	C	virtual	15
☒	D	virtual	60

(Total for question = 1 mark)

Q9.

An object is placed 6.5 cm away from a lens of focal length 3.9 cm. An image is formed 9.8 cm from the lens.

Which of the following is the magnification?

(1)

☒ **A** 0.60

☒ **B** 0.66

☒ **C** 1.5

☒ **D** 1.7

(Total for question = 1 mark)

Q10.

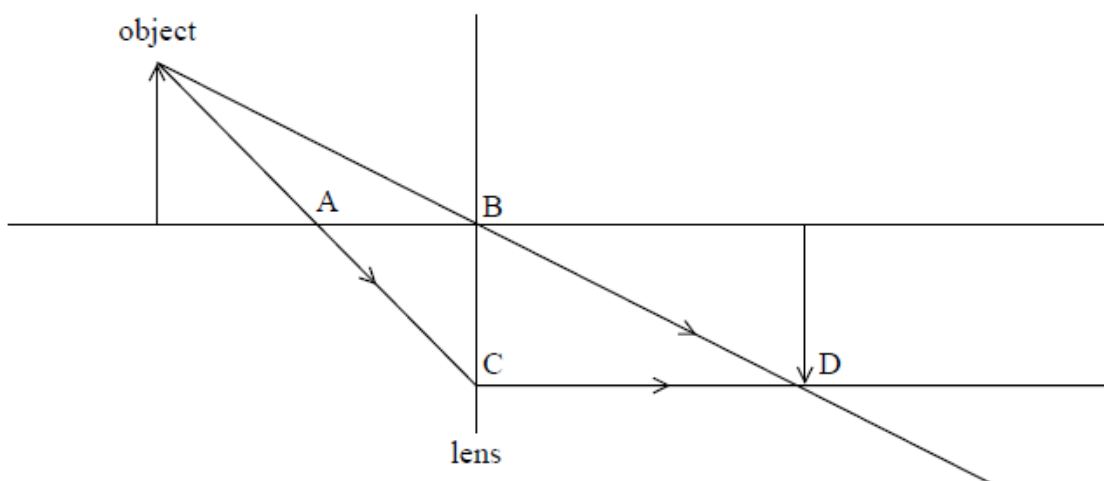A diverging lens is used to produce an image of a real object.

Select the row of the table that correctly identifies the nature of the image produced.

☑	**A**	Real	Upright
☑	**B**	Real	Inverted
☑	**C**	Virtual	Upright
☑	**D**	Virtual	Inverted

(Total for question = 1 mark)

Q11.

The diagram shows how an image is formed by an object that is placed a small distance from a thin converging lens.

Which of the labels A, B, C or D represents the focal point of the lens?

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(Total for question = 1 mark)

Q12.

Answer the question with a cross in the box you think is correct (⊠). If you change your mind about an answer, put a line through the box (⊠) and then mark your new answer with a cross (⊠).

An object is placed 6.5 cm from a lens of focal length 3.9 cm. An image is formed 9.8 cm behind the lens.

Which of the following expressions is equal to the magnification?

☒   A $\dfrac{3.9}{6.5}$

☒   B $\dfrac{6.5}{9.8}$

☒   C $\dfrac{6.5}{3.9}$

☒   D $\dfrac{9.8}{6.5}$

(Total for question = 1 mark)

Q13.

Light passes between medium X and medium Y.

Speed of light in X = 2.00×10^8 m s^{-1}

Speed of light in Y = 2.25×10^8 m s^{-1}

Which line of the table correctly shows what happens to the frequency and wavelength of the light as it passes from medium X to medium Y?

	Frequency	Wavelength
☒ A	decreases	increases
☒ B	increases	decreases
☒ C	unchanged	increases
☒ D	unchanged	decreases

(Total for question = 1 mark)

Q14.

A ray of monochromatic light passes into a glass block as shown.
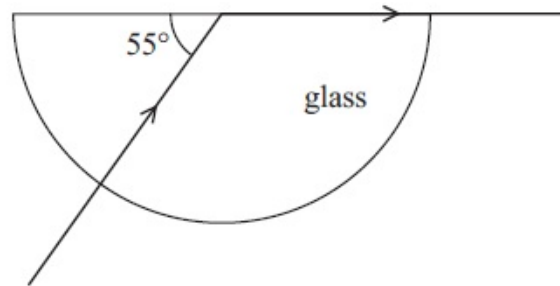
The refractive index of the glass for this light is

☒ **A**   0.57

☒ **B**   0.81

☒ **C**   1.22

☒ **D**   1.74

(Total for question = 1 marks)

Q15.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Which row of the table shows a base quantity and its base SI unit?

		Quantity	Unit
☒	A	charge	C
☒	B	length	m
☒	C	mass	g
☒	D	temperature	°C

(Total for question = 1 mark)

Q16.

A student investigated how a converging lens can be used to project a magnified image onto a whiteboard.

In a darkened room, the student placed a smartphone 9.0 cm from the converging lens. The phone's display was projected onto the whiteboard. The converging lens was 75.0 cm from the whiteboard when a clear image was produced.

The image projected onto the whiteboard was real.

State what is meant by a real image.

(1)

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(Total for question = 1 mark)