Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Q1.

Figure 2 shows a converging lens used to produce a real image on a screen.

The apparatus is used to find the focal length, *f*, of the lens.

The screen is moved to give a clear image of the object.

The distance from the **object** to the **lens**, *a* = 20 cm.

The distance from the **image** to the **lens**, *b* = 40 cm.

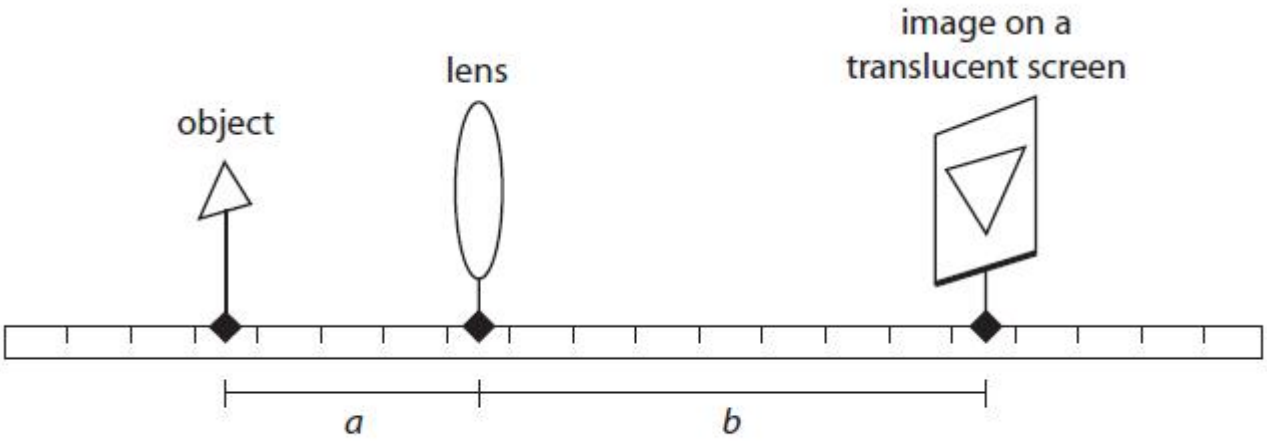


Figure 2

Calculate the focal length, *f*, of the lens.

Use the equation

$$\frac{1}{f} = \frac{a+b}{a \times b}$$

(3)

focal length *f*= ..... cm

(Total for question = 3 marks)

Downloaded from www.merit-minds.com

Q2.

The Asteroid Belt is part of our Solar System.

Vesta is an asteroid in the Asteroid Belt.

The distance between Vesta and the Sun is 2.4 AU.

1 AU is the distance between the Earth and the Sun.

The intensity of the Sun's radiation reaching the Earth is 1400 W/m^2.

1 W = 1 J/s

The intensity of the Sun's radiation at a distance, *d*, from the Sun is given by the equation

$$\text{intensity} = \frac{K}{(d)^2}$$

where *K* always has the same value.

(i) State the unit of *K*.

(1)

.....

(ii) Calculate the intensity of the radiation from the Sun at Vesta.

(3)

intensity = ... W/m^2

(Total for question = 4 marks)

Downloaded from www.merit-minds.com

Q3.

This question is about different types of electromagnetic radiation.

The human eye can detect a range of wavelengths, from violet at about 400 nm to red at about 700 nm. Figure 8 shows the relative sensitivity of the human eye to different wavelengths when inside a dark cave.

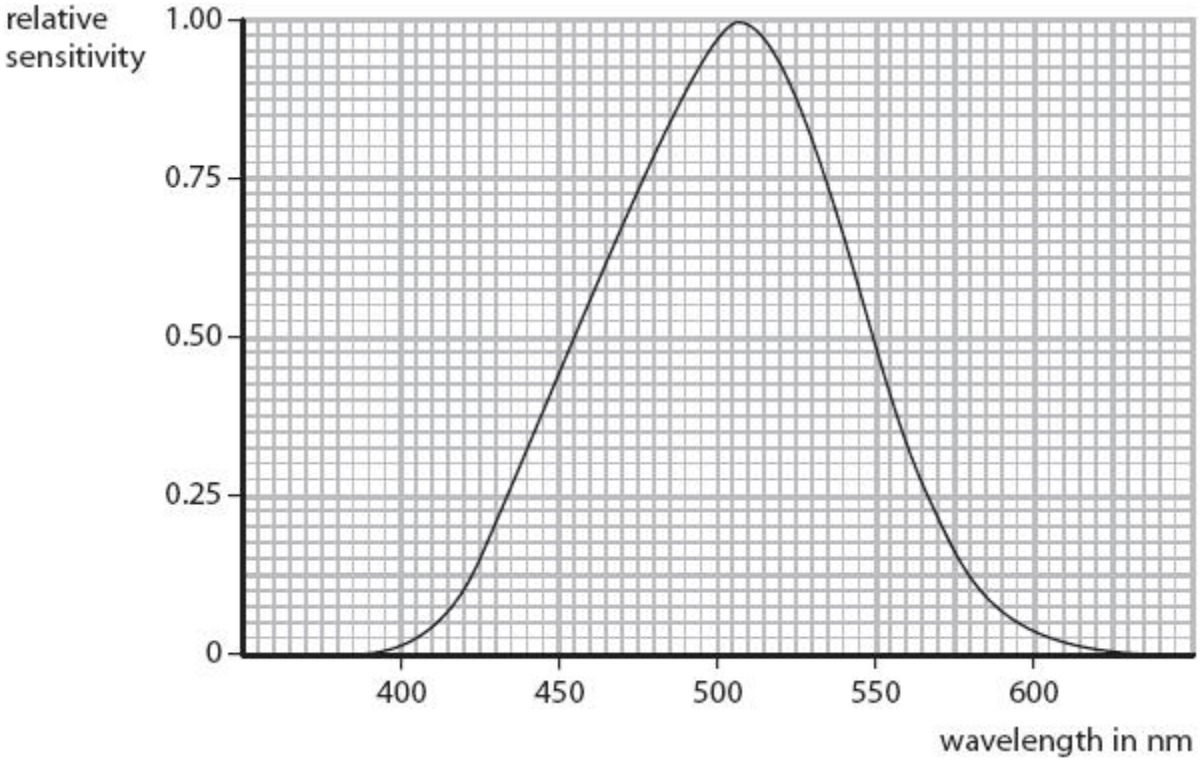


Figure 8

(i) Use the information in Figure 8 to determine the wavelength to which the eye is most sensitive inside the cave.

(1)

wavelength = ... nm

(ii) Calculate the frequency to which this wavelength corresponds. Give the unit.

The speed of light in air = 3.0×10^8 m/s.

(3)

frequency = ... unit .....

(iii) Using information from Figure 8, describe how well the eye detects different colours of the visible spectrum inside the cave.

(3)

.....

.....

.....

.....

.....

Downloaded from www.merit-minds.com

.....

(Total for question = 7 marks)

Downloaded from www.merit-minds.com

Q4.

Some questions must be answered with a cross in a box (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your new answer with a cross (☒).

This question is about waves in the electromagnetic (e.m.) spectrum.

The potential danger associated with the waves of the e.m. spectrum increases as

(1)

- ☐ **A** frequency decreases
- ☐ **B** frequency increases
- ☐ **C** velocity decreases
- ☐ **D** velocity increases

(Total for question = 1 mark)

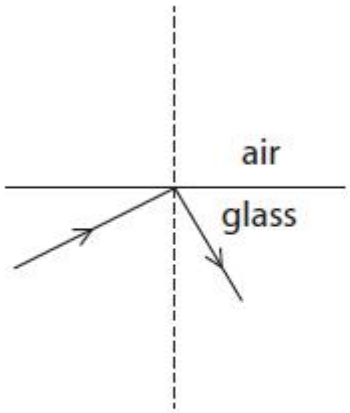
Downloaded from www.merit-minds.com

Q5.

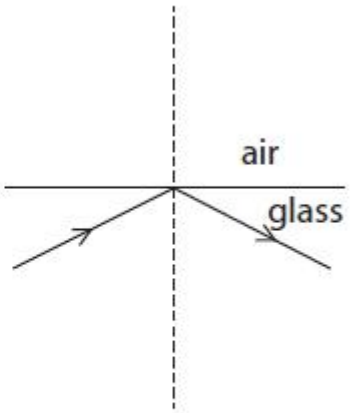
Some questions must be answered with a cross in a box (☒). If you change your mind about an answer, put a line through the box (☒) and then mark your answer with a cross (☒).

Which ray diagram shows total internal reflection at an air and glass boundary?

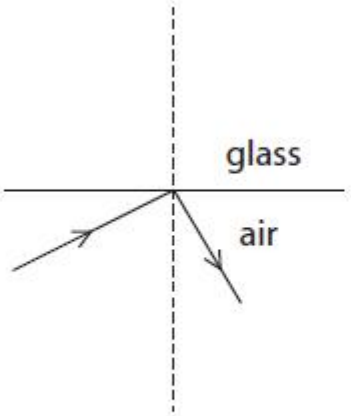
(1)



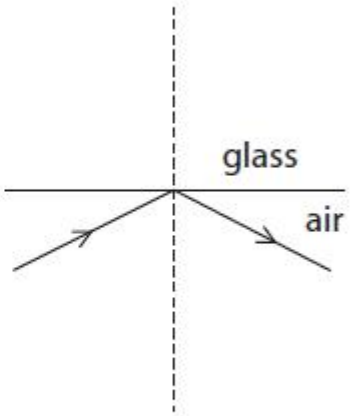
☒ **A**



☒ **B**



☒ **C**



☒ **D**

(Total for question = 1 mark)

Downloaded from www.merit-minds.com

Q6.

Radio waves and gamma radiation are at opposite ends of the electromagnetic spectrum.

Compare how these two electromagnetic radiations are produced.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for question = 6 marks)

Downloaded from www.merit-minds.com