Exam Style Questions – Waves Name ……

1. The table shows the electromagnetic spectrum.
Three types of wave have been missed out.

Gamma rays		Ultraviolet rays	Visible light		Micro-waves	

Shortest wavelength ⟷ Longest wavelength

(a) (i) Use words from the box to complete the table.

infra red rays	**radio waves**	**X-rays**

(2)

(ii) Which **one** of the following gives a use of gamma rays?

Put a tick (✓) in the box next to your choice.

to communicate with satellites ☐

to see objects ☐

to kill cancer cells ☐

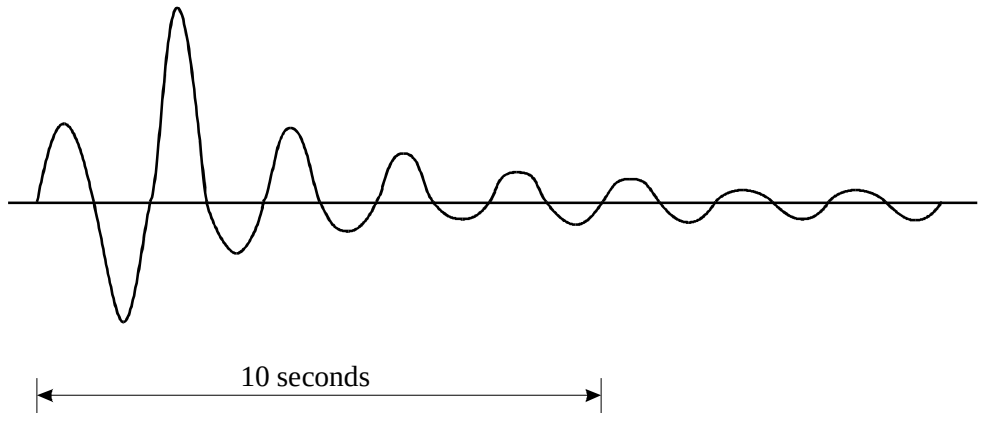
(1)

(iii) Complete the following sentence by drawing a ring around the correct word in the box.

All electromagnetic waves move [energy / gases / particles] from one place to another.

(1)
(Total 4 marks)

2. The vibration caused by a P wave travelling at 7.6 km/s has been recorded on a seismic chart.



(i) How many waves are produced in one second?

.....

(1)

(ii) Calculate the wavelength of the P wave. Show clearly how you work out your answer and give the unit.

.....

.....

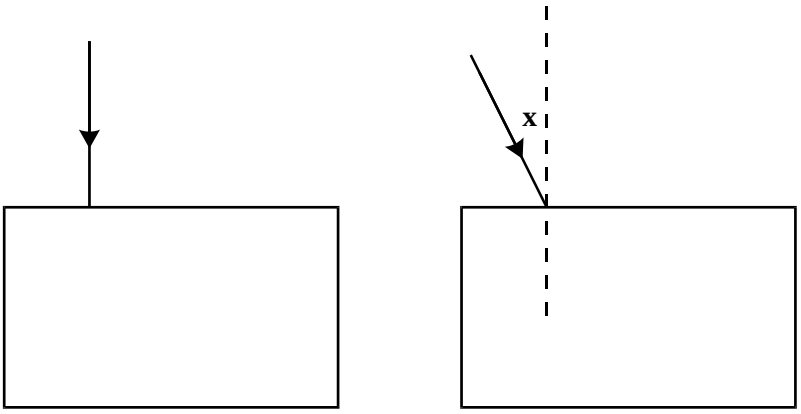
.....

Wavelength = ...

(2)

(Total 3 marks)

3. (a) The diagrams show rays of light. Each ray strikes a surface of a glass block.

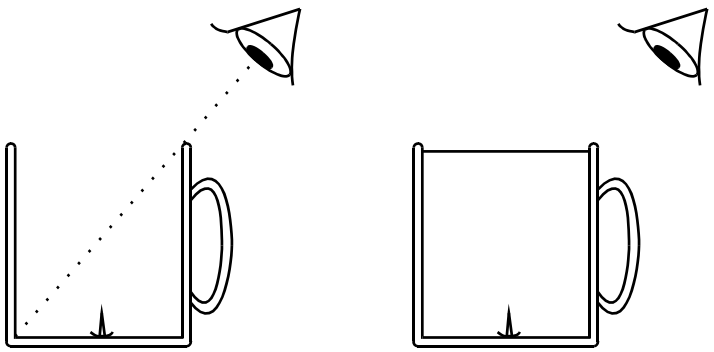


(i) On the diagram draw the path of each ray through the glass block and out into the air again.

(ii) Label another angle on the diagram which is equal to the angle marked **X**. Label this angle **Y**.

(4)

(b) The diagrams show two beakers. Both beakers have a drawing pin inside as shown.



The first beaker is empty. The eye cannot see the drawing pin.
The second beaker is full of water and the eye can see the drawing pin.

Explain how the eye is able to see the drawing pin in the second beaker. You may add to the diagram if it helps your answer.

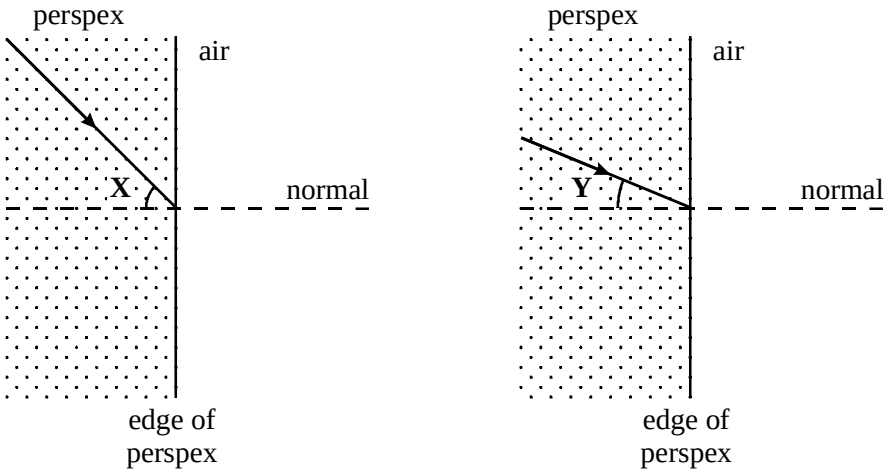
.....

.....

.....

(3)
(Total 7 marks)

4. (a) The diagrams show rays of light. They are travelling inside perspex and striking its edge.



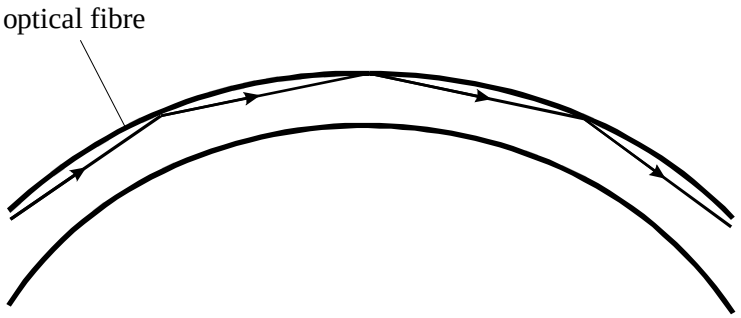
(i) Angle **X** is bigger than the critical angle for perspex. Complete the path of the ray as it leaves the edge of the perspex.

(1)

(ii) Angle **Y** is smaller than the critical angle for perspex. Complete the path of the ray as it leaves the edge of the perspex.

(1)

(b) The diagram shows a ray of light passing through an optical fibre.



Explain why the ray of light stays in the optical fibre.

.....

.....

(2)
(Total 4 marks)

5. Radio waves, ultra-violet, visible light and X-rays are all types of electromagnetic radiation.

(a) Choose wavelengths from the list below to complete the table.

3×10^{-8} m 1×10^{-11} m 5×10^{-7} m 1500 m

TYPE OF RADIATION	WAVELENGTH (m)
Radio waves	
Ultra-violet	
Visible light	
X-rays	

(4)

(b) Microwaves are another type of electromagnetic radiation.

Calculate the frequency of microwaves of wavelength 3 cm.
(The velocity of electromagnetic waves is 3×10^8 m/s.)

.....

.....

.....

.....

(4)

(c) Which type of electromagnetic radiation is used:

(i) to send information to and from satellites;

.....

(ii) in sunbeds;

.....

(iii) to kill harmful bacteria in foods?

.....

(3)
(Total 11 marks)