2D Wavefronts: Exam Revision Tracker

Attempt #1		Attempt #2		Attempt #3		Attempt #4		Attempt #5	
Total	Score	Total	Score	Total	Score	Total	Score	Total	Score
9		8		8		10		9	
Percentage =		Percentage =		Percentage =		Percentage =		Percentage =	

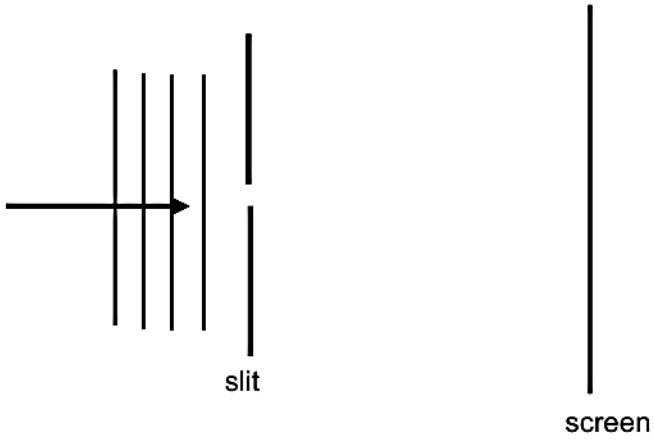
2D Wavefronts: Attempt #1

Total = 9 Marks

Diffraction provides evidence that light can behave as a wave.

1. Define the term *diffraction* in words. (2)

In the diagram below a plain wave front of light of wavelength 6 x 10^{-7} m approaches a narrow opening. Diffraction effects are observed on a screen placed some distance from the slit as shown in the diagram below.



1. Describe the pattern observed on the screen. (2)

2. Two important principles explain the diffraction pattern.

Write down the NAME of each of these principles. (2)

3. The width of the slit (opening) is increased slightly. Describe how this change will affect the:

3.1 Diffraction pattern observed (1)

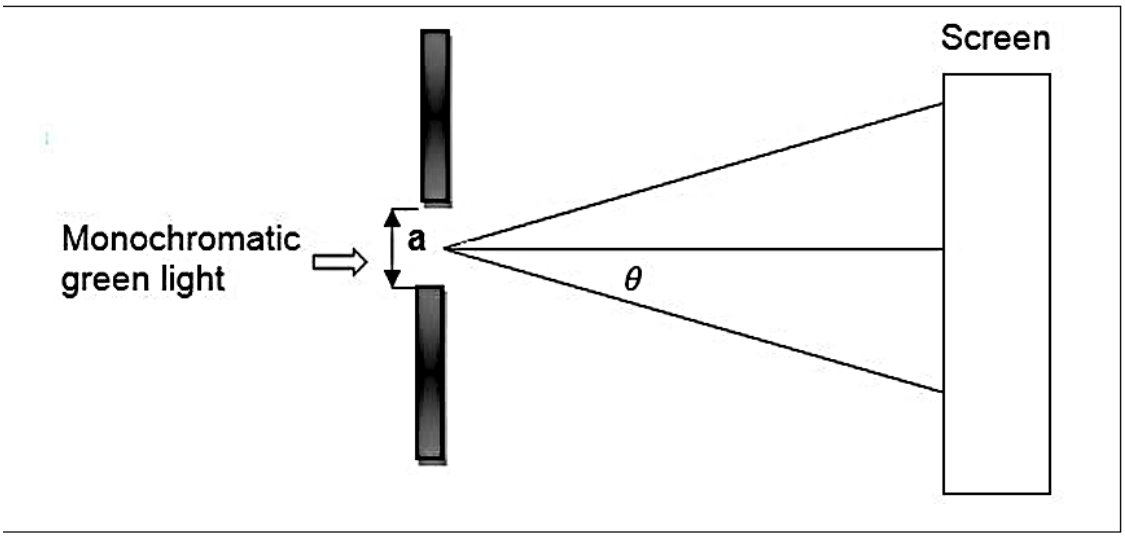
3.2 Brightness of the diffraction pattern observed (1)

4. The width of the slit is kept constant but light of wavelength 4 x 10^{-7} m is now used. Describe how this change will affect the diffraction pattern obtained. (1)

2D Wavefronts: Attempt #2

Total = 8 Marks

Learners pass a green light with wavelength 534 nm through a single slit of width $1{,}8 \times 10^{-4}$ m and shines it on a screen.
They set up the apparatus as shown in the diagram below.



1. Define the term *monochromatic light*. **(1)**

2. Draw the observed pattern and indicate the positions of constructive and destructive interferences. **(4)**

3. How will the broadness of the central band change if …

(Write only INCREASES, DECREASES or REMAINS THE SAME)

3.1 the green light is replaced by a red light? **(1)**

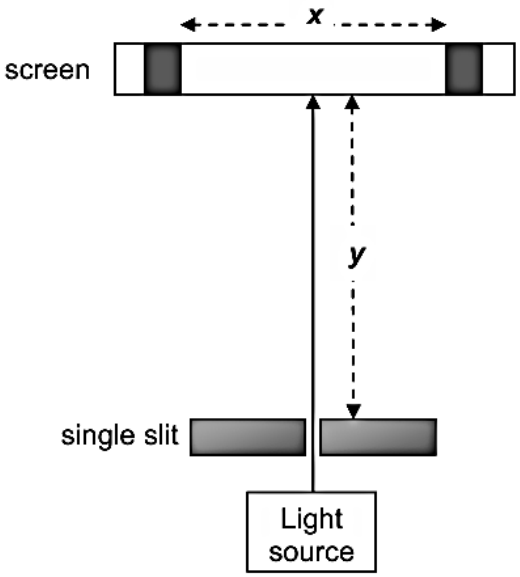
3.2 the slit width is smaller?

Explain your answer. **(2)**

2D Wavefronts: Attempt #3

Total = 8 Marks

An experiment is set up, as shown below, to investigate the effect of slit width on the degree of diffraction. Distance ***y*** on the diagram represents the distance between the screen and the single slit. Distance ***x*** on the diagram represents the width of the central bright band.



1. Write down an investigative question for this experiment. (2)

2. State *Huygens' principle* in words. (2)

3. How will distance ***x*** be affected if the slit width is increased? Choose from INCREASE, DECREASE or REMAIN THE SAME. (1)

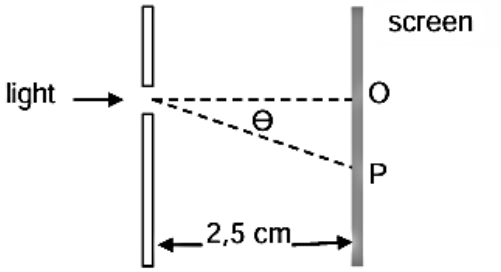
4. Explain the answer to QUESTION 7.3. (2)

5. How will distance ***x*** be affected if distance ***y*** is increased? Choose from INCREASE, DECREASE or REMAIN THE SAME. (1)

2D Wavefronts: Attempt #4 ⚡

Total = 10 Marks

A group of five learners in a Physics lesson demonstrated the diffraction of waves using a monochromatic red light of wavelength of 675×10^{-9} m. The red light was passed through the slit with a width of $3,2 \times 10^{-5}$ m and fell on a screen at a distance of 2,5 cm.



1. Define the term *diffraction*. (2)

2. Write down *Huygens's Principle*. (2)

3. On the screen, bright and dark bands were observed:

3.1 What do these bright and dark bands on the screen represent? (2)

3.2 How does the width of the central band compare to other bands? Write down only **NARROWER, BROADER** or **EQUAL**. (2)

4. A red light was replaced with a blue light. How would this change of colour affect the following?
Write down only **INCREASES, DECREASES** or **REMAINS THE SAME**.

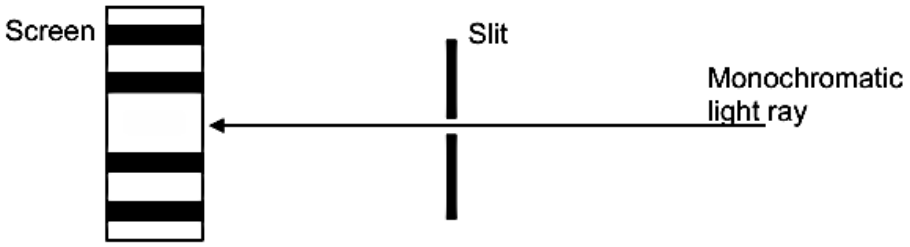
4.1 The wavelength (1)

4.2 Degree of diffraction (1)

2D Wavefronts: Attempt #5

Total = 9 Marks

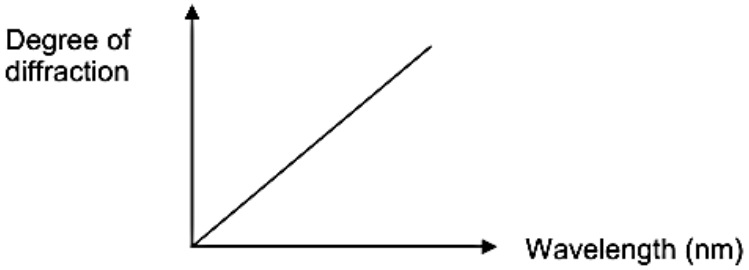
An experiment is performed to investigate the effect of wavelength on the degree of diffraction. Monochromatic light shines through a slit with a width of 0,002 mm and the pattern produced is shown on a screen.



1. Define the term *diffraction*. (2)

2. Write an investigative question for this experiment. (2)

The degree of diffraction is recorded for different colours of monochromatic light and the results are shown on the graph below.

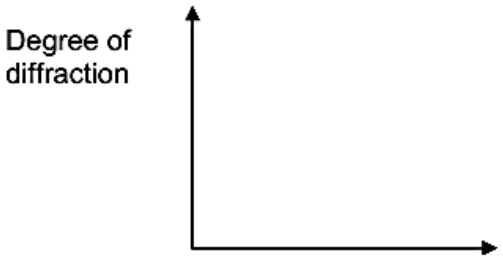


3. Write the mathematical relationship between wavelength and the degree of diffraction. (2)

4. Which colour of light, RED or GREEN, has the largest degree of diffraction? (1)

The experiment is repeated with only green light with a wavelength of 560 nm, but the slit width is changed and the degree of diffraction is recorded.

5. Copy the set of axes below into your ANSWER BOOK and draw a graph showing the relationship between slit width and degree of diffraction.



(2)