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## **4.4 Wave Behaviour**

Easy



# **PHYSICS**

## **IB HL**

# 4.4 Wave Behaviour

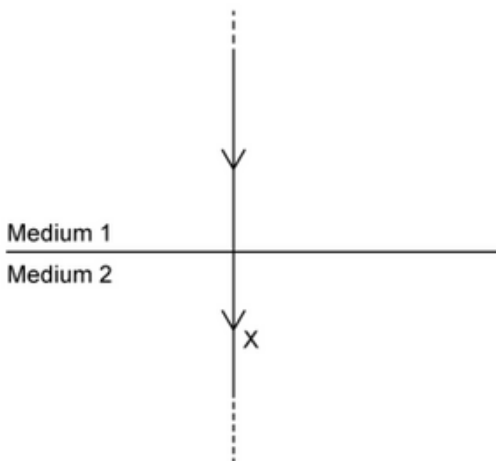
## Question Paper

Course	DP IB Physics
Section	4. Waves
Topic	4.4 Wave Behaviour
Difficulty	Easy

Time allowed: 20  
Score: /10  
Percentage: /100

## Question 1

Ray diagrams can be used to show the reflection, refraction and transmission of light at the boundary between media.



In the diagram, what feature does X represent?

- A. Reflected ray
- B. Refracted ray
- C. Transmitted ray
- D. Incident ray

[1 mark]

## Question 2

A monochromatic laser beam is shone into the surface of a tank filled with water. The effects on the laser beam due to the water are observed.

How will the properties of the light be affected by the water?

	speed	wavelength	frequency
A	no change	increases	decreases
B	decreases	decreases	no change
C	increases	decreases	no change
D	decreases	no change	increases

[1 mark]

### Question 3

Which phrase correctly completes the following sentence?

In a ray diagram showing reflection, the angle of incidence is the angle between

- A. the incident ray and the boundary surface.
- B. the incident ray and the normal.
- C. the incident ray and the reflected ray.
- D. the reflected ray and the boundary surface.

[1 mark]

### Question 4

Which property of a wave does not change as a result of refraction?

- A. Frequency,  $f$
- B. Wavelength,  $\lambda$
- C. Wave speed in the medium,  $v$
- D. Amplitude,  $A$

[1 mark]

### Question 5

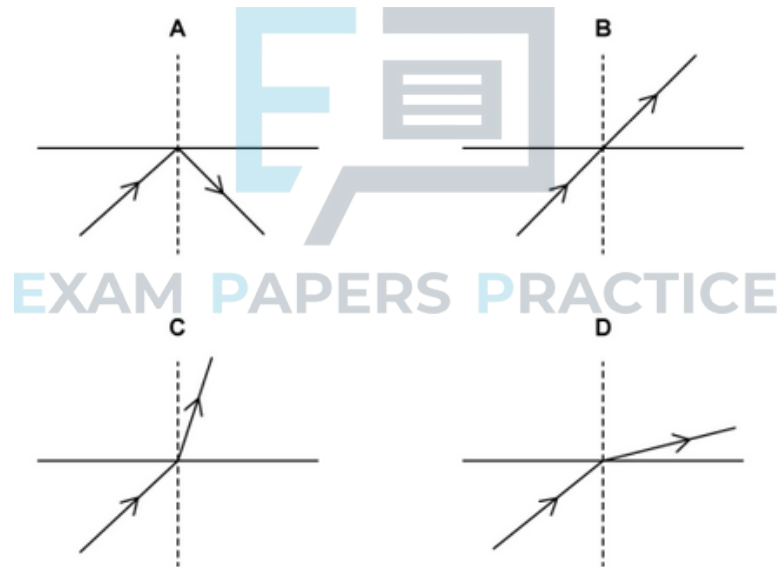
When does diffraction occur?

- A. In all waves
- B. In soundwaves only
- C. In transverse waves only
- D. In light waves only

[1 mark]

### Question 6

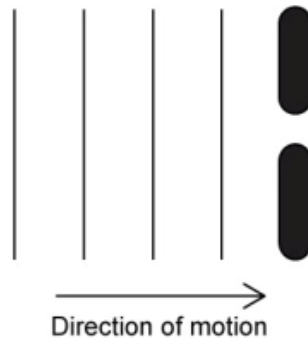
Which image shows the correct ray diagram for light passing from air into water?



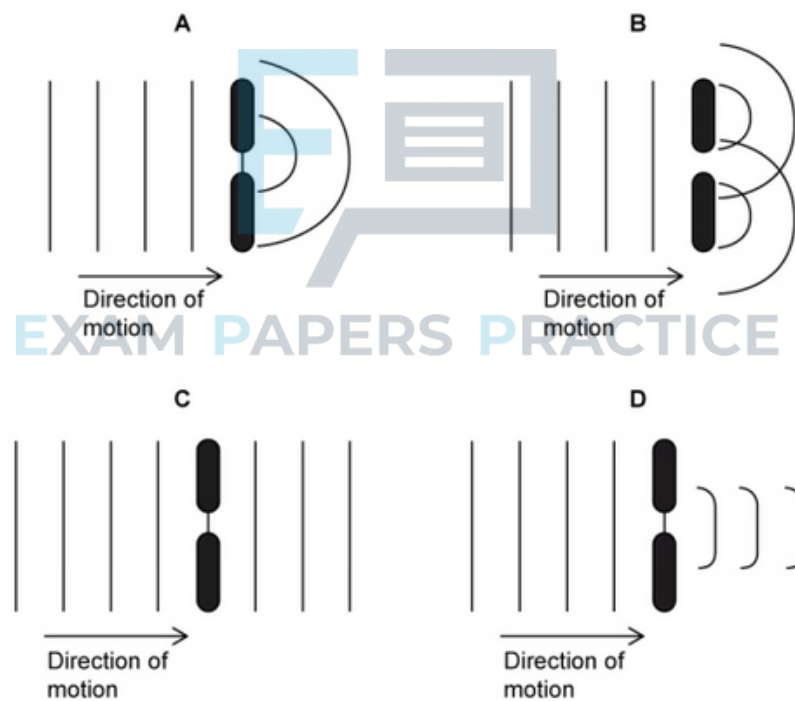
[1 mark]

### Question 7

The diagram shows a wave approaching an aperture.



Which diagram correctly shows the resulting diffraction pattern for the wave?



[1 mark]

### Question 8

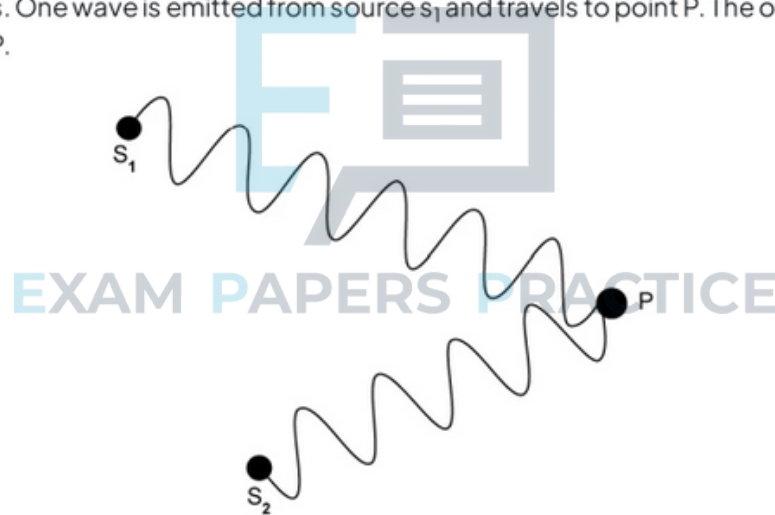
Which row correctly describes the conditions for constructive and destructive interference in a double-slit diffraction pattern?

	Constructive	Destructive
A.	Crest + crest	Trough + trough
B.	Crest + trough	Trough + trough
C.	Trough + trough	Crest + crest
D.	Crest + crest	Crest + trough

[1 mark]

### Question 9

The diagram shows two waves. One wave is emitted from source  $s_1$  and travels to point P. The other wave is emitted from source  $s_2$  and travels to point P.



What is the path difference between the waves?

- A.  $1\lambda$
- B.  $1\frac{1}{2}\lambda$
- C.  $2\lambda$
- D.  $2\frac{1}{2}\lambda$

[1 mark]

### Question 10

The double-slit equation describes the relationship between the separation distance of the fringes on the screen,  $s$ , the distance between the screen and the slits,  $D$ , the separation of the slits,  $d$ , and the wavelength,  $\lambda$ , of the light.

$$s = \frac{\lambda D}{d}$$

Which line gives the correct units for the quantities?

	$s$	$D$	$\lambda$	$d$
A.	m	m	m	m
B.	$m^{-1}$	m	$m\,s^{-1}$	m
C.	m	$m\,s^{-1}$	m	$m^{-1}$
D.	$m^2$	$m^{-1}$	m	m

[1 mark]