A Level Physics Taster Questions – Waves.

Q1.

Which row correctly shows electromagnetic waves in order of decreasing wavelength?

A gamma > ultraviolet > microwave ⬭

B ultraviolet > gamma > microwave ⬭

C microwave > ultraviolet > gamma ⬭

D gamma > microwave > ultraviolet ⬭

(Total 1 mark)

Q2.

What is the correct order of increasing energy in the electromagnetic spectrum?

1 is least energy, 4 is greatest energy.

	Radio waves	**γ rays**	**Visible light**	**Infrared**	
A	1	4	3	2	⬭
B	4	1	2	3	⬭
C	1	4	2	3	⬭
D	4	1	3	2	⬭

(Total 1 mark)

Q3.

Which line, **A** to **D**, in the table shows correct relationships for the respective wavelengths, λ_L, λ_S, and frequencies, f_L, f_S, of light waves and sound waves?

	wavelengths	**frequencies**
A	$\lambda_L << \lambda_S$	$f_L >> f_S$
B	$\lambda_L << \lambda_S$	$f_L << f_S$
C	$\lambda_L >> \lambda_S$	$f_L >> f_S$
D	$\lambda_L >> \lambda_S$	$f_L << f_S$

(Total 1 mark)

Q4.

Which row shows the change in velocity, frequency and wavelength of an electromagnetic wave as it travels from an optically less dense to an optically more dense medium?

	Velocity	Frequency	Wavelength	
A	decreases	decreases	unchanged	⬭
B	increases	unchanged	increases	⬭
C	decreases	unchanged	decreases	⬭
D	increases	increases	unchanged	⬭

(Total 1 mark)

Q5.

The diagram shows a snapshot of a wave on a rope travelling from left to right.

At the instant shown, point **P** is at maximum displacement and point **Q** is at zero displacement.
Which one of the following lines, **A** to **D**, in the table correctly describes the motion of **P** and **Q** in the next half-cycle?

	P	Q
A	falls then rises	rises
B	falls then rises	rises then falls
C	falls	falls
D	falls	rises then falls

(Total 1 mark)

Q6. A source emits light of wavelength 600 nm as a train of waves lasting 0.01 μs. How many complete waves are sent out?
speed of light = 3×10^8 m/s. 1 nm = 10^{-9} m. 1 s = 10^{-6} s.

A 5×10^6

B 18×10^7

C 5×10^9

D 5×10^{22}

(Total 1 mark)

Q7.

A wave motion has period T, frequency f, wavelength λ and speed v. Which one of the following equations is **incorrect**?

A $1 = Tf$

B $T = \frac{v}{\lambda}$

C $\lambda = \frac{v}{f}$

D $Tv = \lambda$

(Total 1 mark)

Q8.

Two points on a progressive wave are one-eighth of a wavelength apart. The distance between them is 0.5 m, and the frequency of the oscillation is 10 Hz. What is the speed of the wave?

A 0.2 m/s ⬭

B 10 m/s ⬭

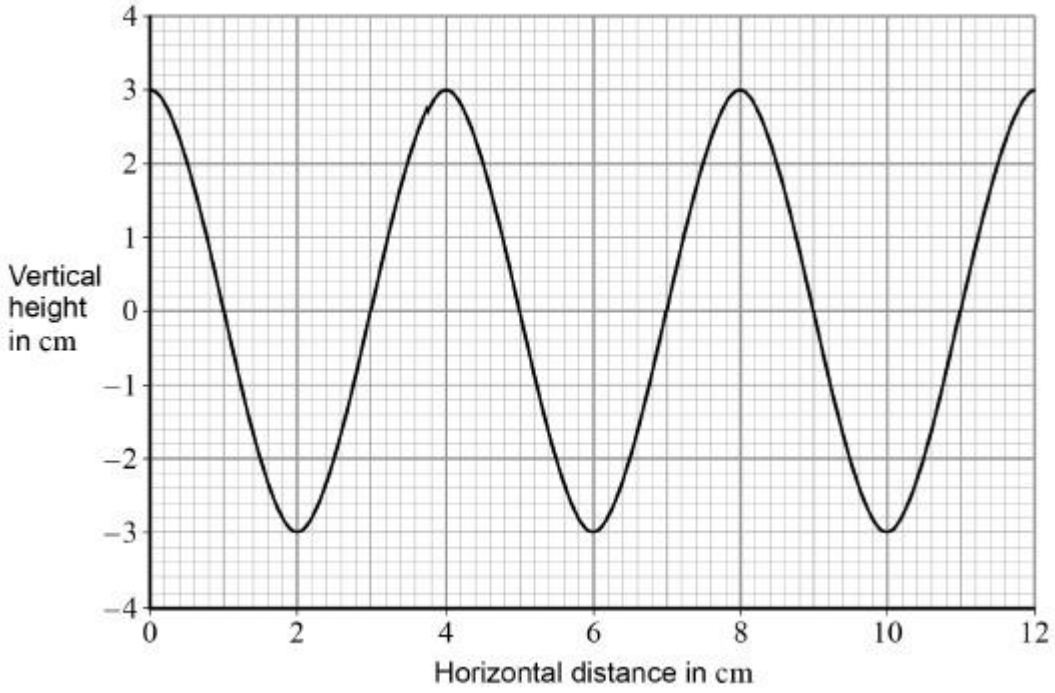
C 20 m/s ⬭

D 40 m/s ⬭

(Total 1 mark)

Q9.

The graph shows how the vertical height of a travelling wave varies with distance along the path of the wave.



The speed of the wave is 20 cm/s.

What is the period of the wave?

A 0.1 s ⬭

B 0.2 s ⬭

C 5.0 s ⬭

D 10.0 s ⬭

(Total 1 mark)

Q10.

By approximately how many times is the wavelength of audible sound waves greater than the wavelength of light waves?

A 10^{2}

B 10^{6}

C 10^{10}

D 10^{14}

(Total 1 mark)

Q11.

Which statement is **not** correct for ultrasound and X-rays?

A Both can be refracted ⬭

B Both can be diffracted ⬭

C Both can be polarised ⬭

D Both can be reflected ⬭

(Total 1 mark)

Q12.

Sound waves cross a boundary between two media X and Y. The frequency of the waves in X is 400 Hz. The speed of the waves in X is 330 m/s and the speed of the waves in Y is 1320 m/s. What are the correct frequency and wavelength in Y?

	Frequency / Hz	Wavelength / m	
A	100	0.82	⬭
B	400	0.82	⬭
C	400	3.3	⬭
D	1600	3.3	⬭

(Total 1 mark)

Mark schemes

Q1.

C

[1]

Q2.

A

[1]

Q3.

A

[1]

Q4.

C

[1]

Q5.

D

[1]

Q6.

A

[1]

Q7.

B

[1]

Q8.

D

[1]

Q9.

B

[1]

Q10.

B

[1]

Q11.

C

[1]

Q12.

C

[1]