4.5 Standing Waves

Question Paper

Course	DP IB Physics
Section	4. Waves
Topic	4.5 Standing Waves
Difficulty	Easy

Time allowed: 20

Score: /9

Percentage: /100

Question 1

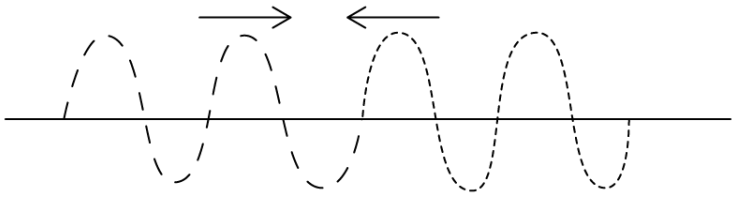
Identify the line which makes up a correct description of the conditions for superposition.

A.	One wave	travelling in water	with a constant speed
B.	Two waves	travelling in opposite directions	with the same frequency
C.	Two waves	travelling near each other	with the same frequency
D.	Three or more waves	travelling in the same direction	with different frequency and speed

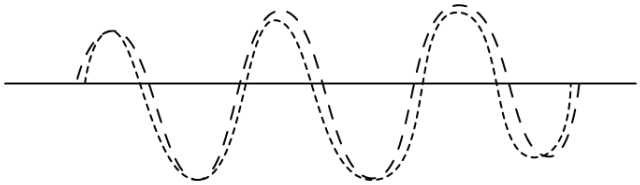
[1 mark]

Question 2

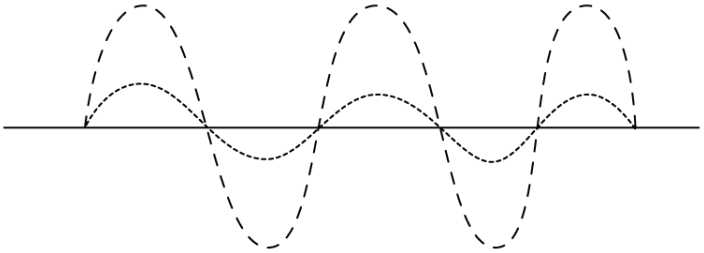
For the two waves shown, identify the correct possible result after they superpose.



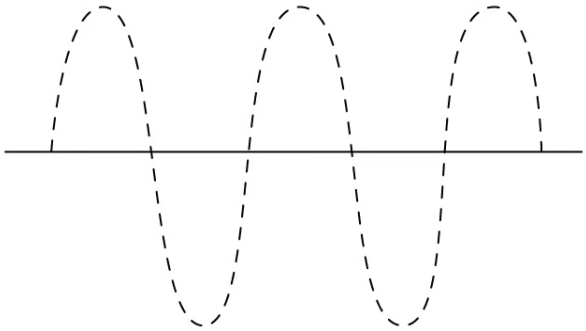
A.



B.



C.



D.

[1 mark]

Question 3

Identify the pair of statements which both correctly describe properties of standing waves.

A.
- All points have the same amplitude in turn
- Points which are one wavelength apart are in phase

B.
- Each point has a different amplitude
- Points between nodes are in phase

C.
- All points have the same amplitude in turn
- Points between nodes are in phase

D.
- Energy is moved from one point to another
- The wave has nodes and antinodes

[1 mark]

Question 4

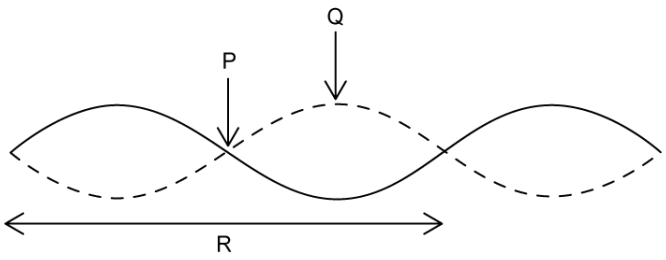
For the wave shown, how many nodes, and how many anti-nodes are present?

	Nodes	Anti-nodes
A.	2	6
B.	2	3
C.	4	6
D.	4	3

[1 mark]

Question 5

The diagram shows a stationary wave. Which line correctly identifies the labelled sections?



	P	Q	R
A.	antinode	node	length of string
B.	node	antinode	wavelength
C.	node	antinode	frequency
D.	wavelength	wavelength	length of string

[1 mark]

Question 6

A stationary wave is formed in a pipe which is open at both ends.

Which statement must be correct?

A. Nodes form at the ends of the wave.

B. Antinodes form at both ends of the wave.

C. Displacement is a maximum at the nodes.

D. Displacement is at a minimum at the antinodes.

[1 mark]

Question 7

A stationary wave forms on a string of length L. Which harmonic has a wavelength where $\lambda = \frac{2}{3}L$?

A. First harmonic.

B. Second harmonic.

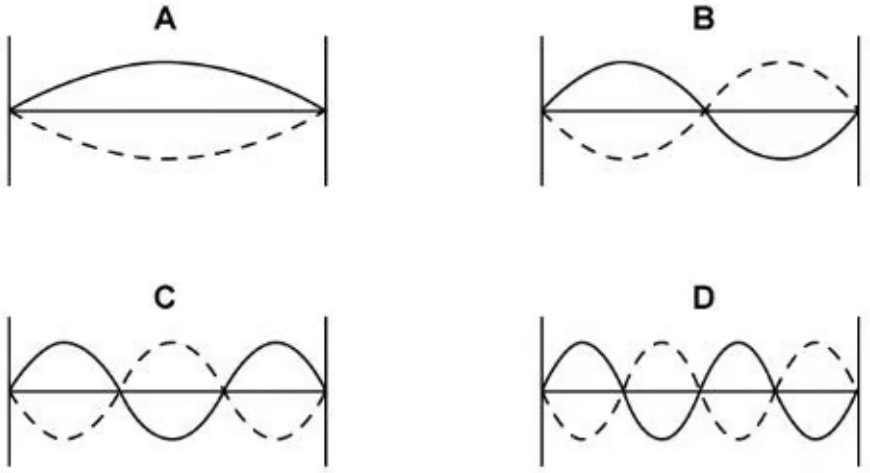
C. Third harmonic.

D. Fourth harmonic.

[1 mark]

Question 8

Which diagram shows the first harmonic on a string?



[1 mark]

Question 9

Which is the correct general equation for the wavelength of the *n*th harmonic in a pipe of length L which is open at one end?

A. $f_n = \frac{nv}{2L}$

B. $\lambda_n = \frac{2L}{n}$

C. $v = f\lambda$

D. $\lambda_n = \frac{4L}{n}$

[1 mark]