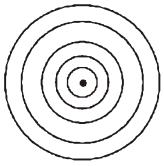
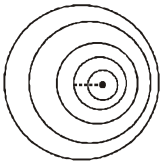
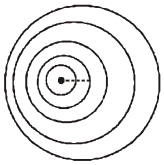
14 WAVES

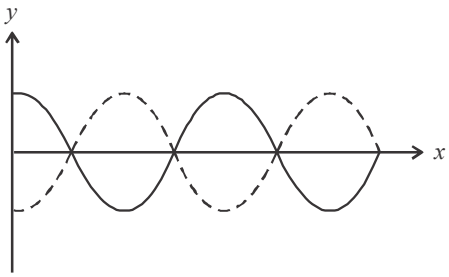
Diagram Based Questions :

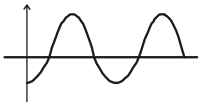
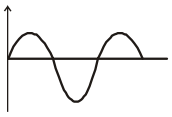
1. If the source is moving towards right, wave front of sound waves get modified to

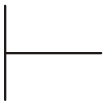
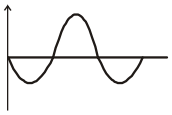
(a)  (b) 

(c)  (d) None of these

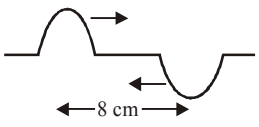
2. For the graph given, the resultant wave will be



(a)  (b) 

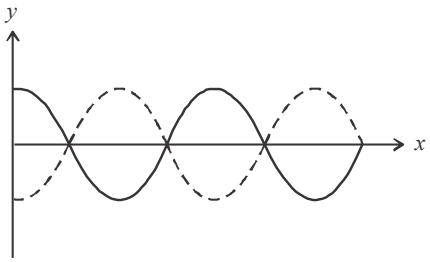
(c)  (d) 

3. Two pulses in a stretched string whose centres are initially 8 cm apart are moving towards each other as shown in the figure. The speed of each pulse is 2 cm/s. After 2 s, the total energy of the pulses will be



(a) Zero
(b) Purely kinetic
(c) Purely potential
(d) Partly kinetic and partly potential

4. For the graph given below for superposition of two waves, which of the following holds true?

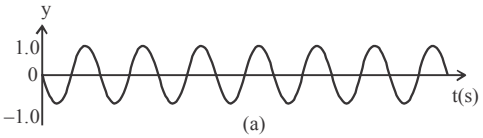


(a) Phase difference, $\phi = 0$
(b) Phase difference, $\phi = \frac{\pi}{2}$
(c) Phase difference, $\phi = \pi$
(d) Phase difference, $\phi = 2\pi$

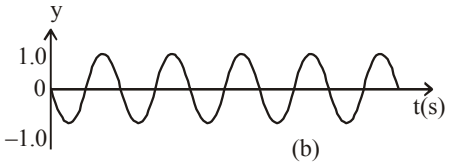
5. The fifth harmonic for vibrations of a stretched string is shown in figure. How many nodes are present here?

(a) 4 (b) 6
(c) 5 (d) 10

6. What will be the frequency of beats formed from the superposition of two harmonic waves shown below?



(a)



(b)

(a) 20 Hz (b) 11 Hz
(c) 9 Hz (d) 2 Hz

Solution

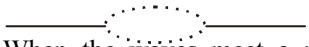
1. **(b)** For a moving source, $\lambda' < \lambda$ (normal wavelength).

2. **(c)** As two waves meet a point with opposite phase hence desctructive interference i.e., minimum sound at that point.

3. **(b)** After 2 s, the each wave travels a distance = $2 \times 2 = 4$ m.

The wave shape is shown in figure.

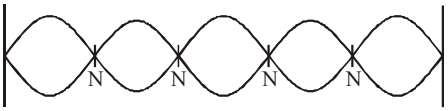
Thus energy is purely kinetic.



4. **(c)** When the waves meet a point with opposite phase, destructive interference is obtained at that point. In this case phase difference,

$$\phi = 180° \text{ or } (2n-1)\pi \quad n = 1, 2, 3, ...$$

5. **(a)**



Total no. of nodes = 4

6. **(d)** Figure**(a)** represents a harmonic wave of frequency 7.0 Hz, figure **(b)** represents a harmonic wave of frequency 5.0 Hz. Therefore beat frequency

$v_s = 7 - 5 = 2.0$ Hz.