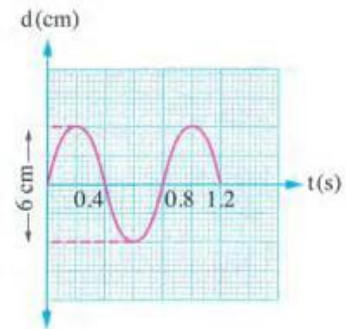


**First Choose the correct answer (1 :15)**

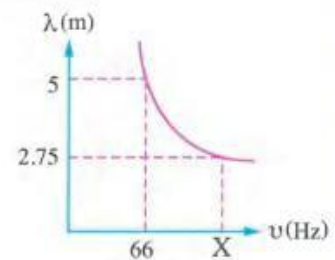
- 1 The opposite figure represents the (displacement - time) graph for a particle in a medium that transmits a transverse wave, so .....

	Amplitude (A) cm	Frequency ( $\nu$ ) Hz
(a)	6	2.5
(b)	6	0.4
(c)	3	1.25
(d)	3	0.8



- 2 The opposite graph shows the relation between the wavelength ( $\lambda$ ) and the frequency ( $\nu$ ) of the sound waves produced by a number of tuning forks that vibrate in air, so the value of X is .....

- (a) 75 Hz  
 (b) 120 Hz  
 (c) 122 Hz  
 (d) 150 Hz



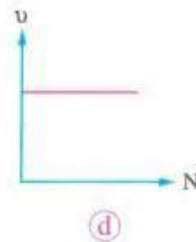
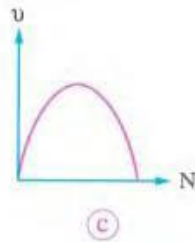
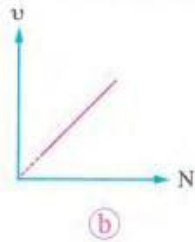
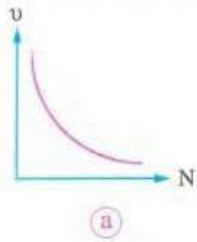
- 3 The ratio between periodic time and frequency of an oscillating object equals  $\frac{1}{289} \text{ s}^2$ , so the number of oscillations that are produced in 20 s equals ..... oscillations.

- (a) 170                      (b) 289                      (c) 340                      (d) 510

- 4 A sound wave travelled from air to a liquid, hence its wavelength got changed from 0.5 m to 2.1 m, given that the speed of sound in air is 330 m/s, then the speed of sound in that liquid is .....

- (a) 1420 m/s                      (b) 1386 m/s                      (c) 1320 m/s                      (d) 693 m/s

5 Which of the following graphs represents the relation between the frequency ( $\nu$ ) for a simple pendulum and its number of oscillations (N)?



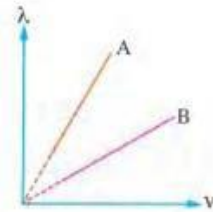
6 The opposite graph shows the relation between the wavelength ( $\lambda$ ) and the speed ( $v$ ) of two different waves (A and B) when they propagate in different media, so .....

(a)  $T_A > T_B$

(b)  $T_A < T_B$

(c)  $v_A > v_B$

(d)  $v_A = v_B$



7 When the terminal of a long spring is moved in such a way to make a longitudinal wave of wavelength 25 cm and periodic time 0.25 s, then it is moved to make a transverse wave of periodic time 0.1 s that travels at double the speed of the longitudinal wave, so the wavelength of the transverse wave is .....

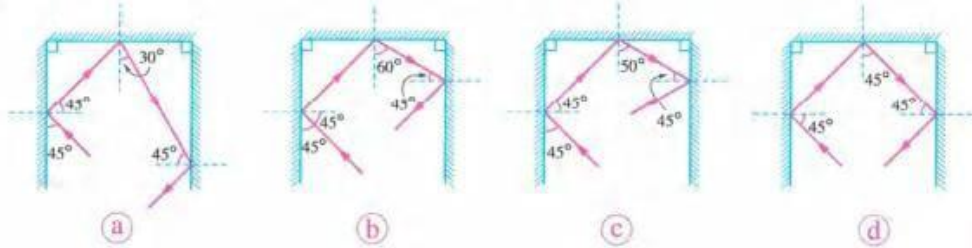
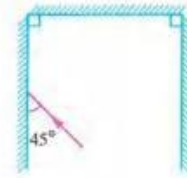
(a) 10 cm

(b) 12.5 cm

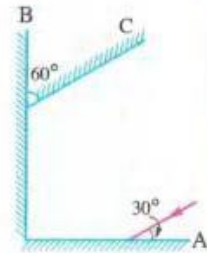
(c) 20 cm

(d) 50 cm

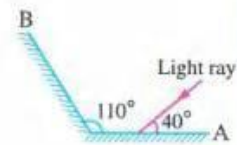
- 6 The opposite figure represents three plane mirrors forming three sides of a square. Which of the following choices shows the path of the incident light ray as it gets reflected by the three mirrors?



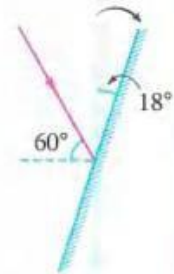
- 7 \* In the opposite figure, which of the following statements is correct?
- (a) The ray is reflected from mirror C at an angle of  $30^\circ$
  - (b) The ray is reflected from mirror C at an angle of  $45^\circ$
  - (c) The ray is reflected from mirror C at an angle of  $60^\circ$
  - (d) The ray is reflected parallel to mirror C



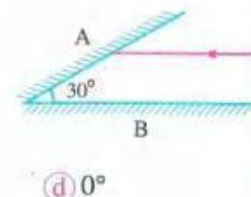
- 8 \* In the opposite figure, the angle of reflection of the light ray from mirror B equals .....
- (a)  $20^\circ$
  - (b)  $40^\circ$
  - (c)  $60^\circ$
  - (d)  $70^\circ$



- 9 \* A light ray is incident on a plane mirror with an angle of  $60^\circ$ . If the mirror has rotated by an angle of  $18^\circ$  in the clockwise direction while keeping the incident ray in the same direction as in the figure, then the angle of reflection becomes .....
- (a)  $18^\circ$
  - (b)  $42^\circ$
  - (c)  $48^\circ$
  - (d)  $78^\circ$



- 10 \* If a light ray is incident on mirror A while being parallel to mirror B as shown in the opposite figure:
- (i) The light ray gets reflected from mirror A and falls on mirror B by an angle of incidence that equals .....
  - (a)  $90^\circ$
  - (b)  $60^\circ$
  - (c)  $30^\circ$
  - (d)  $0^\circ$



22 If a light ray is incident on a surface of a cuboid that has an absolute refractive index of  $\sqrt{3}$  at an angle of incidence  $60^\circ$ , the angle of refraction of the light ray equals .....

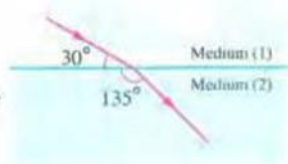
- (a)  $30^\circ$                       (b)  $45^\circ$                       (c)  $60^\circ$                       (d)  $90^\circ$

23 A light ray is incident on the boundary surface between two media. If the angle of incidence is  $60^\circ$  in medium (1) and the angle of refraction is  $30^\circ$  in medium (2), the relative refractive index from medium (1) to medium (2) equals .....

- (a) 2                              (b)  $\sqrt{3}$                               (c)  $\sqrt{2}$                               (d)  $\frac{1}{2}$

24 The opposite figure shows a light ray falling from medium (1) on the boundary surface with medium (2), so the relative refractive index from medium (1) to medium (2) equals .....

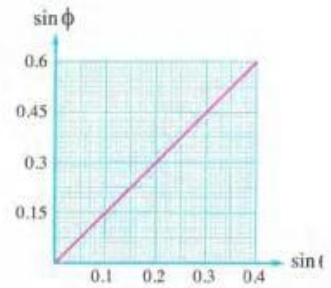
- (a) 1.52                              (b) 1.48  
(c) 1.34                              (d) 1.22



25 \* A light ray is incident from air on the surface of a glass slab at an angle of  $52^\circ$ . If the ray is deviated by an angle of  $19^\circ$ , the refractive index of glass is .....

- (a) 0.83                              (b) 1.33                              (c) 1.45                              (d) 1.65

- 28 \* The opposite graph represents the relation between the sine of the angle of incidence in a transparent medium (1) and the sine of the angle of refraction in another medium (2) when a light ray travels between them. If the speed of light in medium (1) is  $2 \times 10^8$  m/s, then:



- (i) The relative refractive index from medium (1) to medium (2) equals .....
- (a) 1.5                      (b) 0.75                      (c) 1.93                      (d) 2
- (ii) The speed of light in medium (2) equals .....
- (a)  $2.33 \times 10^8$  m/s      (b)  $2 \times 10^8$  m/s      (c)  $1.5 \times 10^8$  m/s      (d)  $1.33 \times 10^8$  m/s
- 29 When a ray of light that has wavelength  $\lambda$  and frequency  $\nu$  moves from air into another transparent medium of refractive index  $n$ , the frequency and the wavelength of that light in the transparent medium will be .....

	The frequency of the light in the medium	The wavelength of the light in the medium
(a)	$\nu$	$\lambda$
(b)	$\nu$	$\frac{\lambda}{n}$
(c)	$\frac{\nu}{n}$	$\lambda n$
(d)	$\nu n$	$\lambda$

- 30 A red light ray is incident from air on the surface of glass. If the wavelength of red light in air is  $7000 \text{ \AA}$  and the refractive index of glass is 1.5, the wavelength of red light in glass is approximately .....
- (a)  $10500 \text{ \AA}$                       (b)  $8564 \text{ \AA}$                       (c)  $5543 \text{ \AA}$                       (d)  $4667 \text{ \AA}$
- 31 \* A ray of light whose wavelength is 700 nm in air and 526 nm in water travels in water with a speed of .....
- (Take:  $c = 3 \times 10^8$  m/s)
- (a)  $2.25 \times 10^8$  m/s      (b)  $2 \times 10^8$  m/s      (c)  $1.89 \times 10^8$  m/s      (d)  $1.76 \times 10^8$  m/s