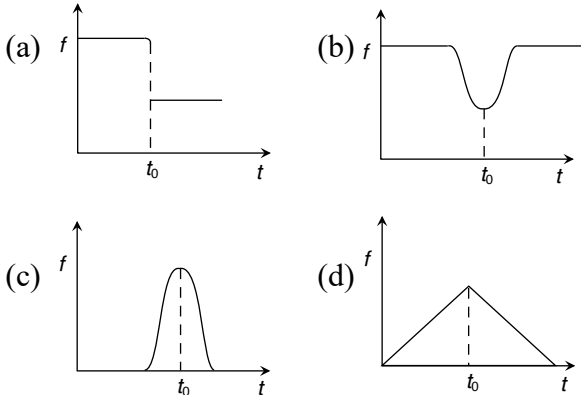
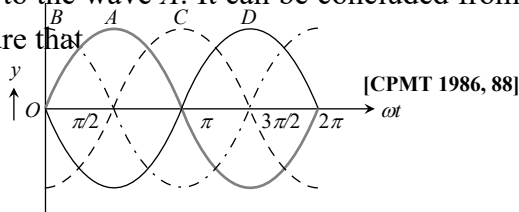


3. A man is standing on a railway platform listening to the whistle of an engine that passes the man at constant speed without stopping. If the engine passes the man at time  $t_0$ . How does the frequency  $f$  of the whistle as heard by the man changes with time

[AMU 2001; KCET 2002; MP PMT 2004]



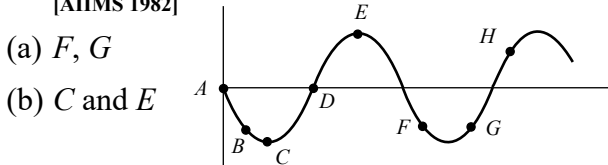
4. The figure shows four progressive waves  $A$ ,  $B$ ,  $C$ , and  $D$  with their phases expressed with respect to the wave  $A$ . It can be concluded from the figure that



[CPMT 1986, 88]

- (a) The wave  $C$  is ahead by a phase angle of  $\pi/2$  and the wave  $B$  lags behind by a phase angle of  $\pi/2$   
 (b) The wave  $C$  lags behind by a phase angle of  $\pi/2$  and the wave  $B$  is ahead by a phase angle of  $\pi/2$   
 (c) The wave  $C$  is ahead by a phase angle of  $\pi$  and the wave  $B$  lags behind by a phase angle of  $\pi$   
 (d) The wave  $C$  lags behind by a phase angle of  $\pi$  and the wave  $B$  ahead by a phase angle of  $\pi$
5. The diagram below shows the propagation of a wave. Which points are in same phase

[AIIMS 1982]

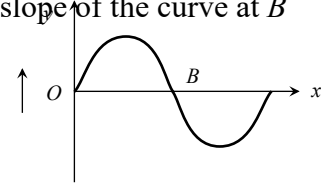


- (a)  $F$ ,  $G$   
 (b)  $C$  and  $E$

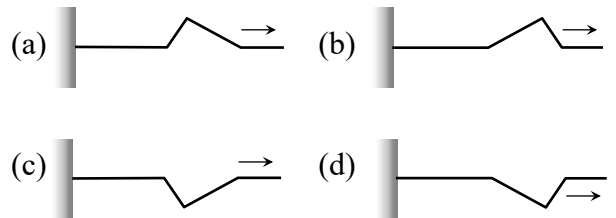
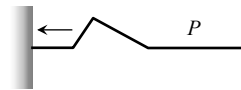
- (c)  $B$  and  $G$   
 (d)  $B$  and  $F$

6. Fig. below shows the wave  $y = A \sin(\omega t - kx)$  at any instant travelling in the +ve  $x$ -direction. What is the slope of the curve at  $B$

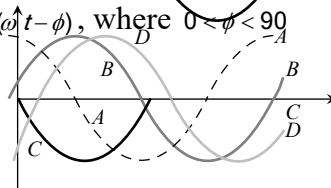
- (a)  $\omega / A$   
 (b)  $k / A$   
 (c)  $kA$   
 (d)  $\omega A$



7. Figure here shows an incident pulse  $P$  reflected from a rigid support. Which one of  $A$ ,  $B$ ,  $C$ ,  $D$  represents the reflected pulse correctly

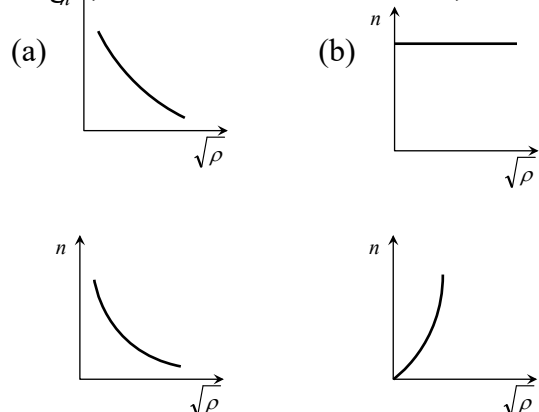


8. Which of the following curves represents correctly the oscillation given by  $y = y_0 \sin(\omega t - \phi)$ , where  $0 < \phi < 90$



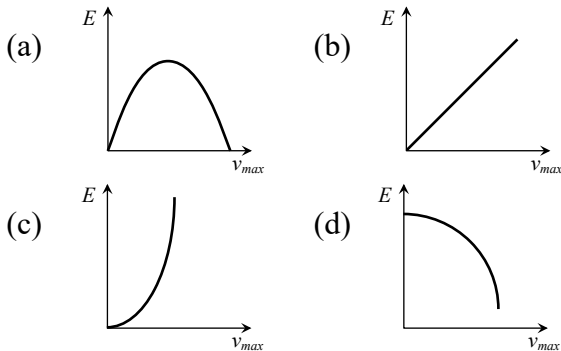
- (a)  $A$  (b)  $B$   
 (c)  $C$  (d)  $D$

9. The correct graph between the frequency  $n$  and square root of density ( $\rho$ ) of a wire, keeping its length, radius and tension constant, is

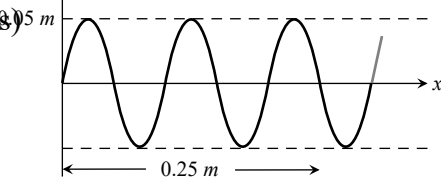


(c) (d)

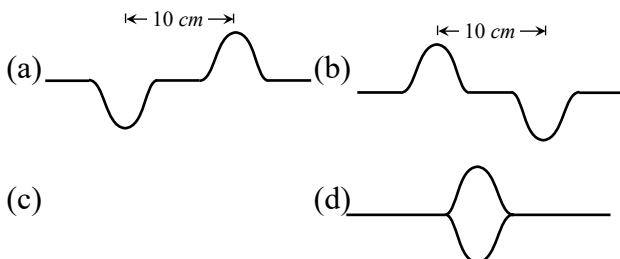
10. A sound source emits sound waves in a uniform medium. If energy density is  $E$  and maximum speed of the particles of the medium is  $v_{\max}$ . The plot between  $E$  and  $v_{\max}$  is best represented by



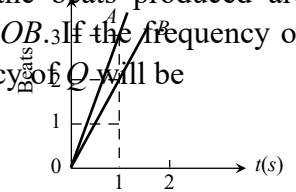
11. If the speed of the wave shown in the figure is  $330\text{m/s}$  in the given medium, then the equation of the wave propagating in the positive  $x$ -direction will be (all quantities are in M.K.S. units)



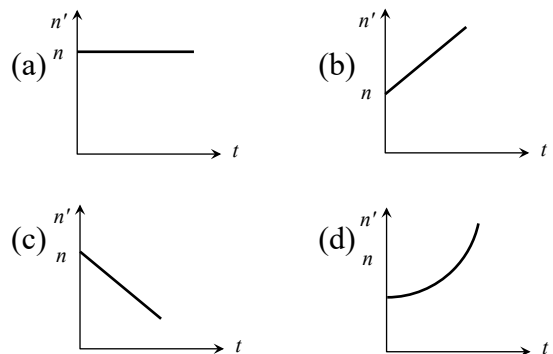
- (a)  $y = 0.05 \sin 2\pi(4000 t - 12.5 x)$   
 (b)  $y = 0.05 \sin 2\pi(4000 t - 122.5 x)$   
 (c)  $y = 0.05 \sin 2\pi(3300 t - 10 x)$   
 (d)  $y = 0.05 \sin 2\pi(3300 x - 10 t)$
12. Two pulses travel in mutually opposite directions in a string with a speed of  $2.5\text{ cm/s}$  as shown in the figure. Initially the pulses are  $10\text{ cm}$  apart. What will be the state of the string after two seconds



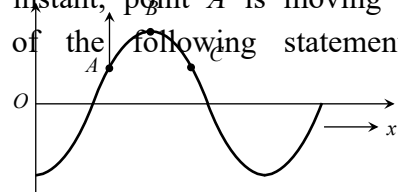
13. Two tuning forks  $P$  and  $Q$  are vibrated together. The number of beats produced are represented by the straight line  $OA$  in the following graph. After loading  $Q$  with wax again these are vibrated together and the beats produced are represented by the line  $OB$ . If the frequency of  $P$  is  $341\text{ Hz}$ , the frequency of  $Q$  will be



- (a)  $341\text{ Hz}$   
 (b)  $338\text{ Hz}$   
 (c)  $344\text{ Hz}$   
 (d) None of the above
14. An observer starts moving with uniform acceleration  $a$  toward a stationary sound source emitting a whistle of frequency  $n$ . As the observer approaches source, the apparent frequency, heard by the observer varies with time as



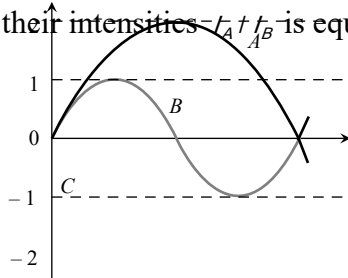
15. A wave is travelling along a string. At an instant, shape of the string is as shown in fig. At this instant, point  $A$  is moving upwards. Which of the following statements is/are correct



- (a) The wave is travelling to the right  
 (b) Displacement amplitude of the wave is equal to displacement of  $B$  at this instant  
 (c) At this instant velocity of  $C$  is also directed upwards

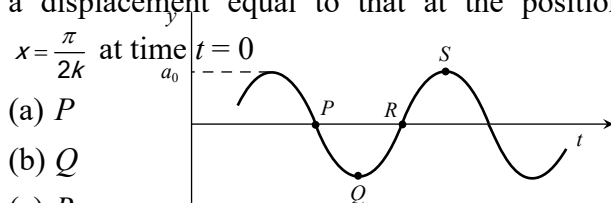
(d) Phase difference between  $A$  and  $C$  may be equal to  $\frac{\pi}{2}$

16. The displacement-time graphs for two sound waves  $A$  and  $B$  are shown in the figure, then the ratio of their intensities  $I_A : I_B$  is equal to



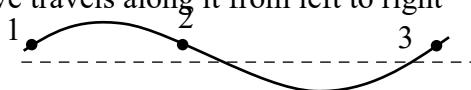
- (a) 1 : 4                      (b) 1 : 16  
(c) 1 : 2                      (d) 1 : 1

17. A wave motion has the function  $y = a_0 \sin(\omega t - kx)$ . The graph in figure shows how the displacement  $y$  at a fixed point varies with time  $t$ . Which one of the labelled points shows a displacement equal to that at the position  $x = \frac{\pi}{2k}$  at time  $t = 0$



- (a) P  
(b) Q  
(c) R  
(d) S

18. The diagram below shows an instantaneous position of a string as a transverse progressive wave travels along it from left to right



Which one of the following correctly shows the direction of the velocity of the points 1, 2 and 3 on the string

- |     |   |   |   |
|-----|---|---|---|
|     | 1 | 2 | 3 |
| (a) | → | → | → |
| (b) | → | ← | → |
| (c) | ↓ | ↓ | ↓ |
| (d) | ↓ | ↑ | ↓ |