

# HSC Maharashtra Board question paper: March 2013

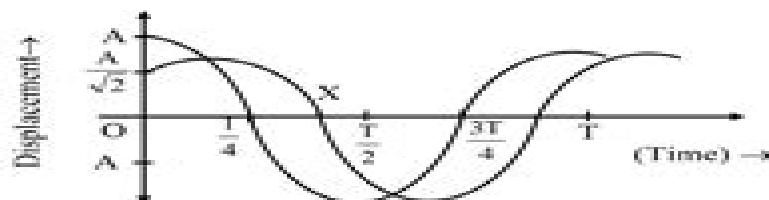
## Note:

- All question are compulsory
- Neat diagrams must be drawn wherever necessary.
- Figure to the right indicate full marks.
- Use of logarithmic table is allowed.
- All symbols have their usual meaning unless otherwise stated.

## PHYSICS: SECTION – I

**Q. 1. Select and write the most appropriate answer from the given alternatives for each sub-question: [7]**

- The moment of inertia of a thin uniform rod of mass  $M$  and length  $L$ , about an axis passing through a point, midway between the centre and one end, perpendicular to its length is \_\_\_\_\_.  
(A)  $\frac{48}{7} ML^2$  (B)  $\frac{7}{48} ML^2$  (C)  $\frac{1}{48} ML^2$  (D)  $\frac{1}{16} ML^2$
- 'n' droplets of equal size of radius  $r$  coalesce to form a bigger drop of radius  $R$ . The energy liberated is equal to \_\_\_\_\_. ( $T$  = Surface tension of water)  
(A)  $4\pi R^2 T [n^{\frac{1}{3}} - 1]$  (B)  $4\pi r^2 T [n^{\frac{1}{3}} - 1]$   
(C)  $4\pi R^2 T [n^{\frac{2}{3}} - 1]$  (D)  $4\pi r^2 T [n^{\frac{2}{3}} - 1]$
- The buckling of a beam is found to be more if \_\_\_\_\_.  
(A) the breadth of the beam is large.  
(B) the beam material has large value of Young's modulus.  
(C) the length of the beam is small.  
(D) the depth of the beam is small.
- When a transverse wave on a string is reflected from the free end, the phase change produced is \_\_\_\_\_.  
(A) zero rad (B)  $\frac{\pi}{2}$  rad (C)  $\frac{3\pi}{4}$  rad (D)  $\pi$  rad
- The number of degrees of freedom for a rigid diatomic molecule is \_\_\_\_\_.  
(A) 3 (B) 5 (C) 6 (D) 7
- Two particles perform linear simple harmonic motion along the same path of length  $2A$  and period  $T$  as shown in the graph below. The phase difference between them is \_\_\_\_\_.



- (A) zero rad (B)  $\frac{\pi}{4}$  rad (C)  $\frac{\pi}{2}$  rad (D)  $\frac{3\pi}{4}$  rad

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