

**SOLUTION (OBJECTIVE)**  
**LEVEL - I**

1. (c)
2. (c)
3. (b)
4. (b)
5. (a)
6. (a)
7. (d)
8. (d)
9. (c)
10. (a)
11. (c)
12. (b)
13. (a)
14. (a)
15. (c)

**LEVEL - II**

1. (c)
2. (d)
3. (c)
4. (a)
5. (b)
6. (b)
7. (d)
8. (c)
9. (b)
10. (d)
11. (c)
12. (d)
13. (b)
14. (a)
15. (a)



10. (a)  $S = \frac{V_0^2}{2\mu_k g}$   
 (b) 43.7 m

### LEVEL - III

1. (a)  $\vec{v}_{cm} = \frac{m_1 \vec{v}_1 + m_2 \vec{v}_2}{m_1 + m_2}$                       (b)  $\text{K.E.} = \frac{1}{2} \frac{m_1 m_2}{m_1 + m_2} (v_1 - v_2)^2$ .
2.  $S = \frac{mg + \rho \left( \frac{h}{\sin \alpha} \right) \left( r - \frac{h}{2} \right)}{\rho r}$
4.  $v = \sqrt{2gh \log_e \frac{l}{h}}$
5. (a)  $u = 8 \text{ m/s}$   
 (b) horizontal displacement = 8m  
 sphere hits the ground 1s after breaking off the spring
6.  $mg(h + kl)$
7.  $v = 1.7 \text{ m/s}$
8.  $w = 0.09 \text{ Joule}$
9.  $mgR \left[ \frac{\mu}{\sqrt{2}} - \frac{\pi}{4} + 1 - \frac{1}{\sqrt{2}} \right] + \frac{K\pi^2 R^2}{32}$
10.  $(10)^{1/2} \text{ m/s}$   
 $\sqrt{\frac{10g(5 - 2\sqrt{5})}{11}} \text{ m/s}$

## LEVEL - IV

1. 
$$u = \sqrt{gL \left( 2 + \frac{3\sqrt{3}}{2} \right)}$$

2. (a)  $V_0 = 2.5 \text{ m/s}$

(b)  $L = 0.32 \text{ m}$

3. (a)  $N = 3 mg \cos \theta - 2 mg$

