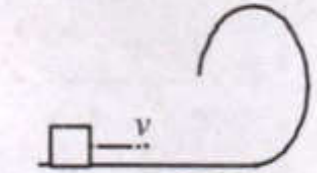
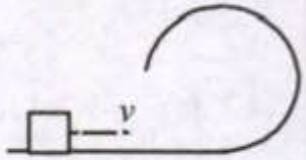
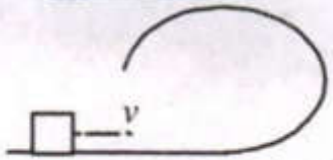
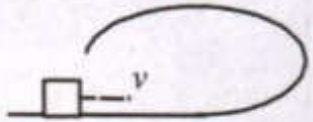
Q 5 A small block is shot into each of the four tracks as shown below. Each of the tracks rises to the same height. The speed with which the block enters the track is the same in all cases. At the highest point of the track, the normal reaction is maximum in **[2001S]**

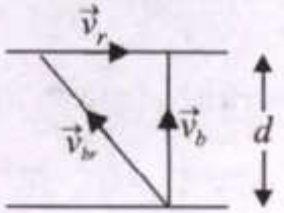
(a) 

(b) 

(c) 

(d) 

ans **(b)** Shortest route corresponds to $\vec{v}_b$ perpendicular to river flow



$$\therefore t = \frac{d}{v_b} = \frac{d}{\sqrt{v_{br}^2 - v_r^2}}$$

$$\text{or } t = \frac{d}{v_b} = \frac{1\text{km}}{\frac{1}{4}}$$

$$\text{or } \frac{1}{4} = \frac{1}{\sqrt{25 - v_r^2}}$$

$$\Rightarrow v_r = 3 \text{ km/h}$$