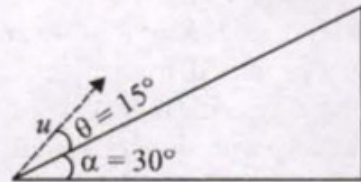


## QUES 05:-

A plane is inclined at an angle  $\alpha = 30^\circ$  with respect to the horizontal. A particle is projected with a speed  $u = 2 \text{ ms}^{-1}$ , from the base of the plane, as shown in figure. The distance from the base, at which the particle hits the plane is close to:  
(Take  $g = 10 \text{ ms}^{-2}$ ) [Main 10 April 2019 (II)]



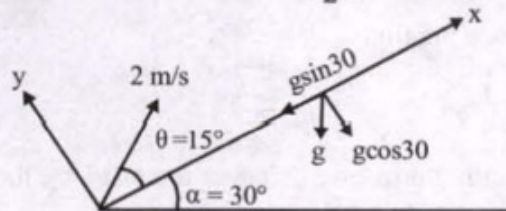
- (a) 20 cm (b) 18 cm (c) 26 cm (d) 14 cm  
(a) On an inclined plane, time of flight (T) is given by

$$T = \frac{2u \sin \theta}{g \cos \alpha}$$

Substituting the values, we get

$$T = \frac{(2)(2 \sin 15^\circ)}{10 \cos 30^\circ} = \frac{4 \sin 15^\circ}{10 \cos 30^\circ}$$

$$\text{Distance, } S = (2 \cos 15^\circ)T - \frac{1}{2} g \sin 30^\circ (T)^2$$



$$= (2 \cos 15^\circ) \frac{4 \sin 15^\circ}{10 \cos 30^\circ} - \left( \frac{1}{2} \times 10 \sin 30^\circ \right) \frac{16 \sin^2 15^\circ}{100 \cos^2 30^\circ}$$

$$= \frac{16\sqrt{3} - 16}{60} = 0.1952 \text{ m} = 20 \text{ cm}$$

ANS:-