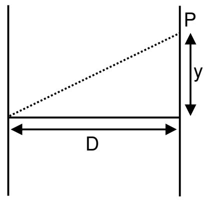
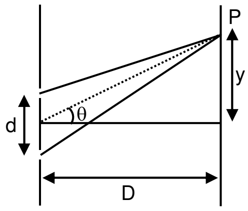
1. Which logic gate has only one input and one are put.

Ans. NOT GATE

2. In YDSE there is a point P on the screen. What is path difference at point P. Given d = 1 mm, y = 2 mm D = 1 m :-



Sol. Path difference at P



$\Delta x = d\sin\theta$

If θ is small

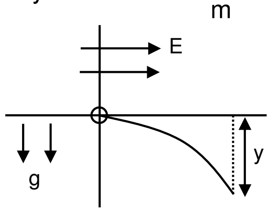
$\Delta x = d\tan\theta$

$$\Delta x = \frac{dy}{D}$$

Now d = 1 mm; y = 2 mm and Δ = 1 meter

$$\Delta x = \frac{10^{-6} \times 2 \times 10^{-6}}{1} = 2 \times 10^{-6}\text{meter}$$

3. $\frac{Q}{m} =$ was given E is given what is horizontal displacement of charge particle when it decend a distance of y meter. Given $\frac{Q}{m} = 9.6 \times 10^{7}\,c/kg$, E = 5 × 10^5 V/m , y = 84 cm, g = 10 m/s^2



Sol. Suppose particle falls down a distance y in t time

$$y = \frac{1}{2}gt^2\ ;\ t = \sqrt{\frac{2y}{g}}$$

Now for x axis

$$x = \frac{1}{2}a_x t^2 \quad \Rightarrow \quad x = \frac{1}{2}.\frac{QE}{m}.\frac{2y}{g}$$

Now $\frac{Q}{m} = 9.6 \times 10^{7}\,c/kg$ (given)

E = 5 × 10^5 V/m

Y = 84 cm

g = 10 m/sec

$$x = \frac{1}{2} \times \frac{9.6 \times 10^{7} \times 5 \times 10^{5} \times 2 \times 84 \times 10^{-2}}{10}$$

x = 403.2 × 10^{10} meter

x = 4.03 × 10^8 meter