$$= \int e^t dt, \qquad \left[\text{let } \tan^{-1} x = t,\ \frac{1}{1+x^2} dx = dt\right]$$

$$= e^t = e^{\tan^{-1} x}.$$ **Ans.**

Q. 11. Evaluate $\int \frac{dx}{1-\sin x}$.

Sol. Let $I = \int \frac{dx}{1-\sin x} = \int \frac{(1+\sin x)}{(1+\sin x)(1-\sin x)} dx$

$$= \int \frac{(1+\sin x)}{(1-\sin^2 x)} dx = \int \frac{1+\sin x}{\cos^2 x} dx = \int \frac{1}{\cos^2 x} dx + \int \frac{\sin x}{\cos^2 x} dx$$

$$= \int \sec^2 x\, dx + \int \tan x \sec x\, dx = \tan x + \sec x.$$ **Ans.**

Q. 12. Evaluate $\int \frac{\log x}{x} dx$.

Sol. Given : $I = \int \frac{\log x}{x} dx$ ...(1)

Let $\log x = t \Rightarrow \frac{1}{x} dx = dt$

$\therefore$ $I = \int t\, dt = \frac{t^2}{2} + c = \frac{(\log x)^2}{2} + c.$ **Ans.**

Q. 13. (A) Evaluate $\int \frac{dx}{1-\cos x}$.

Sol. Let $I = \int \frac{dx}{1-\cos x} = \int \frac{dx}{2\sin^2 \frac{x}{2}} = \frac{1}{2}\int \operatorname{cosec}^2 \frac{x}{2} dx = \frac{1}{2}\left[\frac{-\cot \frac{x}{2}}{\frac{1}{2}}\right] = -\cot \frac{x}{2} + c.$

Ans.

Q. 13. (B) Evaluate $\int \frac{dx}{1+\cos x}$.

Sol. Let $I = \int \frac{dx}{1+\cos x}$

$$= \int \frac{dx}{2\cos^2 \frac{x}{2}} = \frac{1}{2}\int \sec^2 \frac{x}{2} dx = \frac{1}{2} \cdot \tan \frac{x}{2} \cdot 2 + c = \tan \frac{x}{2} + c.$$ **Ans.**