Q13) Given that stock price $S_0 = 50$ Rs/-
Time (T) = 2 years
Expected return, $\mu = 0.18$
Volatility, $\sigma = 30\%$

We use probability distribution of the stock price in 2 years using lognormal distribution is given by:

$$\ln S_T \sim \phi\left(\ln S_0 + \left(\mu - \frac{\sigma^2}{2}\right)T, \sigma^2 T\right)$$

$$\ln S_T \sim \phi\left(\ln 50 + \left(0.18 - \frac{0.3^2}{2}\right)(2), (0.3)^2 2\right)$$

$$\ln S_T \sim \phi(4.18, 0.423)$$

Therefore, the probability of the stock price in 2 yrs

$$\ln S_T = \phi(4.18, 0.42^2)$$

The mean of the stock price

$E[S_T]$ is given by

$$E[S_T] = S_0 e^{\mu T} = 50 e^{0.18(2)}$$
$$E[S_T] = 71.67 \text{ Rs/-}$$

The standard deviation of the stock price σ_{S_T} is given by

$$\sigma_{S_T} = S_0 e^{\mu T} \sqrt{e^{\sigma^2 T} - 1}$$

$$\boxed{\sigma_{S_T} = \text{Rs. } 31.83/-}$$

Therefore the mean stock price is ₹ 71.67 and the standard deviation of the stock price is ₹ 31.83

95% confidence intervals for $\ln S_T$ are:-

We use normal tables to find the critical values at

$\frac{\alpha}{2} = \frac{0.05}{2} = 0.025$ is 1.96

95% confidence interval for $\ln S_T$ are:-

We use normal tables to find the critical value at $\alpha/2 = 0.05/2 = 1.96$

$4.18 \pm 1.96 \times 0.42$

3.35, 5.01

Now, the corresponding 95% confidence interval for S_T are $e^{3.35}$ and $e^{5.01}$

(28.54, 150.44)