

(2) Timing option [Now or one year later]

Option I Install Now $NPV = PVC_I - PVC_O$

* take discounting rate "coc" while calculating NPV

Option II 1 year later

Step 1 Binomial Tree & calculate NPV year end

Step 2 Risk Neutral probability [take $r = R_f$]

Step 3 Calculate NPV using expected NPV & probability

(3) BSM

Step 1 Calculate d_1 & d_2

$$d_1 = \frac{\ln \frac{S_0}{E} + \left[(r - y) + \frac{\sigma^2}{2} \right] t}{\sigma \sqrt{t}}$$

$$d_2 = d_1 - \sigma \sqrt{t}$$

S_0 = PV of CI

E = Cost of project

$y = \frac{1}{\text{Life of Patent}}$

Step 2 $N(d_1)$ & $N(d_2)$ [Always cumulative Area]

Step 3 Value of patent

$$\frac{S_0}{e^{yt}} \times N(d_1) - \frac{E}{e^{rt}} \times N(d_2)$$

1 Dirty Power

Value, $\sqrt{12 \text{ times}}$, -1 , $\times \text{Power}$, $+1$, $\times = 12 \text{ times}$

2. Continuous compounding

Value, $\div 4096$, $+1$, $\times = 12 \text{ times}$.

3 Natural log [Ln]

Value, $\sqrt{12 \text{ times}}$, -1 , $\times 4096$

(II) Future Contracts

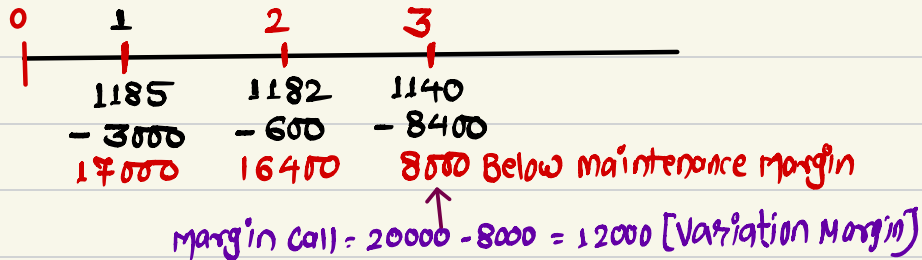
(1) Basics

price rise $\rightarrow$ Contract to buy $\rightarrow$ long position

price fall $\rightarrow$ Contract to sell $\rightarrow$ short position

2 Margin

F = 1200T, 200 shares, Initial Margin = 20,000 MM = 15,000



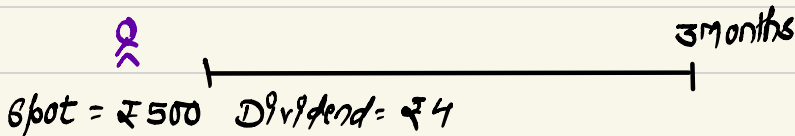
Initial margin is calculated as under if data available

Initial margin = Avg daily absolute change + 3σ

3 Theoretical future price & Arbitrage



3 months future



12% p.a.
Bank

Theoretical future price

$$F = S(1+r) - D$$

$$= ₹500(1.03) - 4 = ₹511$$