

(Q.1)

$$\text{Profit/Loss} = (\text{Forward Price} - \text{Spot Price}) \times 1000$$

(Contract size = 1000)

Spot price (\$)	Profit/Loss (\$)
1400	$(2050 - 1400) \times 1000 = 650,000$
1500	550,000
1560	490,000
1600	450,000
1800	250,000
2050	0
2200	-150,000
2300	-250,000
2400	-350,000

+ve = profit -ve = loss

(Q.3) Future v/s spot contract

- A spot contract is for immediate buying/selling of commodity.
- A future contract is an agreement to buy/sell a commodity at a predetermined price on a future date.

How future works on exchange of commodity.

- Traded on exchanges like CME, NYMEX, etc.
- Standardized contracts
- Daily price settlement & margin requirement
- Profit/Loss settled daily.

Role of commodity exchange:

- Act as an intermediary to ensure fair trading
- Guarantees performance via a clearing house, reduce counterparty risk.

Q.2.

(a) Position \rightarrow long

lot size = 5000 bushels

Strike price = \$5.2

close " = \$5.8

$$\text{Profit} = (5.8 - 5.2) 5000 = \$3000$$

(b) position \rightarrow short

lot size = 37500 pounds

Strike price = \$1.6 / pound

close " = \$1.4 / pound

$$\text{profit} = 0.2 \times 37500 \\ = \$7,500$$

(c) Position \rightarrow short

Contract size = \$25 per index point

Contract = 40

initial price = 7500

final price = 7800

$$\text{Loss} = 40 \times 7500 = \$300,000$$

(d) position \rightarrow long

contract \rightarrow 5 metric tonnes

no. of contract \rightarrow 3

initial price = 15,000 per tonne

final price = 15,800 " "

$$\text{Profit} = 12000$$

Q.4

premium paid = \$3
stock price = \$42 (S)
strike price = \$40 (K)

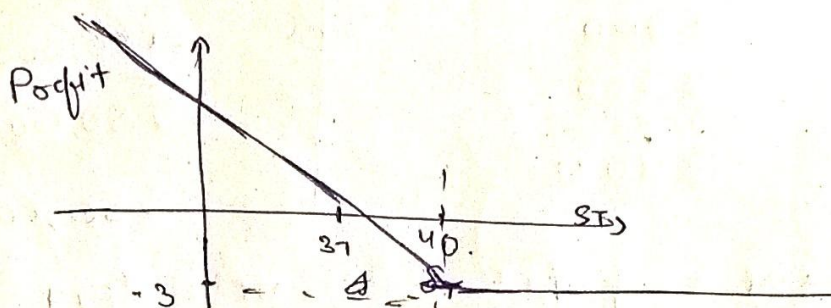
(a) $\text{Profit} = \max(K - S_T, 0) - \text{premium}$
to make profit

$$\max(K - S_T, 0) > 3 \Rightarrow K - S_T > 3 \Rightarrow S_T < 37$$

the investor makes a profit when stock price at maturity is less than \$37.

(b) the option will be exercised when stock is less than \$40

(c)



Q.5

Portfolio:

- long forward contract on asset
- long european put option on asset
- strike price = forward price
- maturity = same as forward.

let, forward price = F ; Asset price at maturity = S_T

Terminal value of portfolio,

- forward payoff: $S_T - F$
- put payoff: $\max(F - S_T, 0)$

Total value: $(S_T - F) + \max(F - S_T, 0)$

now consider two cases:

• Case I: $S_T \geq F \rightarrow$ put expires worthless
 $\rightarrow \text{value} = S_T - F$

• Case II: $S_T < F \rightarrow$ put exercised
 $\rightarrow \text{value} = S_T - F + (F - S_T) = 0$

So, the terminal value is,
 $\max(S_T - F, 0)$.

(6.6)

Call price = \$20

put price = \$5

stock price = \$130

strike price = \$120

maturity = 1 year.

risk free rate :

$$C - P = S - K e^{-r}$$

$$20 - 5 = 130 - 120 e^{-r}$$

$$r = 4.25\% \text{ per annum.}$$