Assignment 2-2

1)

Price	Profit / Loss ($)
1400	(2050 − 1400) × 1000 = 6,50,00
1500	(2050 − 1500) × 10000 = 5,50,00
1560	(2050 − 1560) × 10000 = 4,90,0000
1600	(2050 − 1600) × 10000 = 4,50,0000
1800	(2050 − 1800) × 10000 = 2,50,00
2050	(2050 − 2050) × 10000 = 0
2200	(2050 − 2250) × 10000 = −150,000
2300	(2050 − 2300) × 10000 = −2,50,000
2400	(2050 − 2400) × 10000 = −3,50,000

2) (a) Profit = (5.80 − 5.20) × 5000 = 3000

(b) Profit = (1.6 − 1.4) × 37500 = 7500

(c) Notional value = 25 × Index point
loss = (7800 − 7500) × 25 × 40
= 3,00,000

(d) loss = (13500 − 15000) × 5 × 2
= −22,500 RMB
Profit = 22,500 RMB

3) Spot contract - Agreement to buy or sell an asset immediately at current market price.

Futures contract - A legally binding agreement to buy or sell at a predetermined price on a future date.

* Futures contracts are traded on regulated exchanges like - CME & MCX which standardizes
  - Quantity - lot size
  - Quality - grade
  - Delivery date & locations.

Commodity Exchange Roles:-

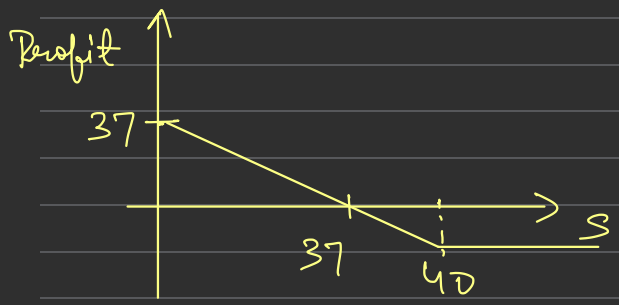
a) Standardization - Define the terms of futures contract.

b) Clearing House - Acts as a intermediary b/w buyer & seller to reduce counterparty risk.

c) Margin System - Req traders to deposit a margin

4) Premium = $3 (S) Stock Price = $42 (K) Strike Price = $40

Profit = max (K - S, 0) - Premium
= max (40 - S, 0) - 3
∴ Profit occurs when: $S < 37$
. Option is exercised when: $S < 40$



5) We have - long forward contract.
- long European Put

Terminal value

If spot Price (S_T) $< K$
- Put is exercised $\Rightarrow$ sell at K
- Forward gives asset worth S_T, sold at K
$\therefore$ Net $= K - S_T$

If $S_T > K$:
Put expires.
Forward buys at S_T $\therefore$ Net $= 0$

$\therefore$ Total Terminal value $= \max(K - S_T, 0) =$ Payoff of put

By Put - Call Parity
$P + S_0 = C + Ke^{-rT} \Rightarrow P = C$ when $K = S_0 e^{rT} = F$
$\therefore$ Value of Portfolio = Call option.

b) Call Price $C = 20$, Put price $P = 5$, $S_0 = 130$
$K = 120$ $T = 1$ year.

By Put-Call Parity

$$C - P = S_0 - K e^{-rT}$$
$$\Rightarrow 15 = 130 - 120 e^{-r}$$
$$\Rightarrow 120 e^{-r} = 115$$

$$\Rightarrow e^{-r} = \frac{115}{120} \quad \Rightarrow r = -\ln\left(\frac{115}{120}\right)$$

$$\Rightarrow r \approx -\ln(0.958)$$
$$\approx 0.0424 \simeq 4.24\%.$$