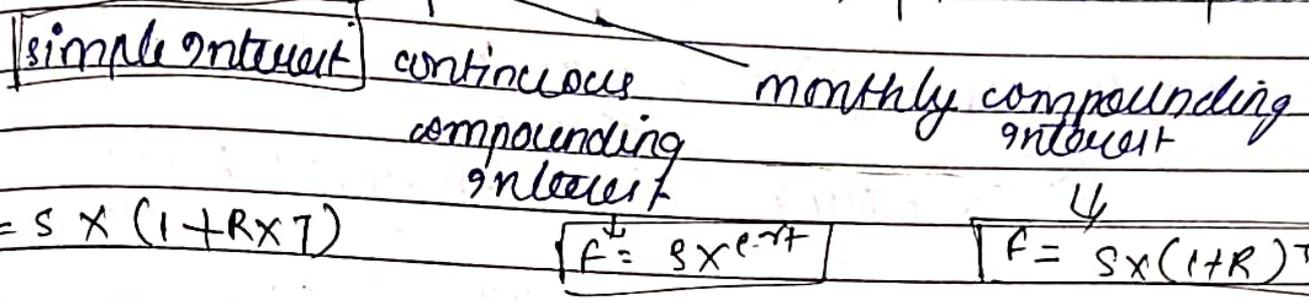
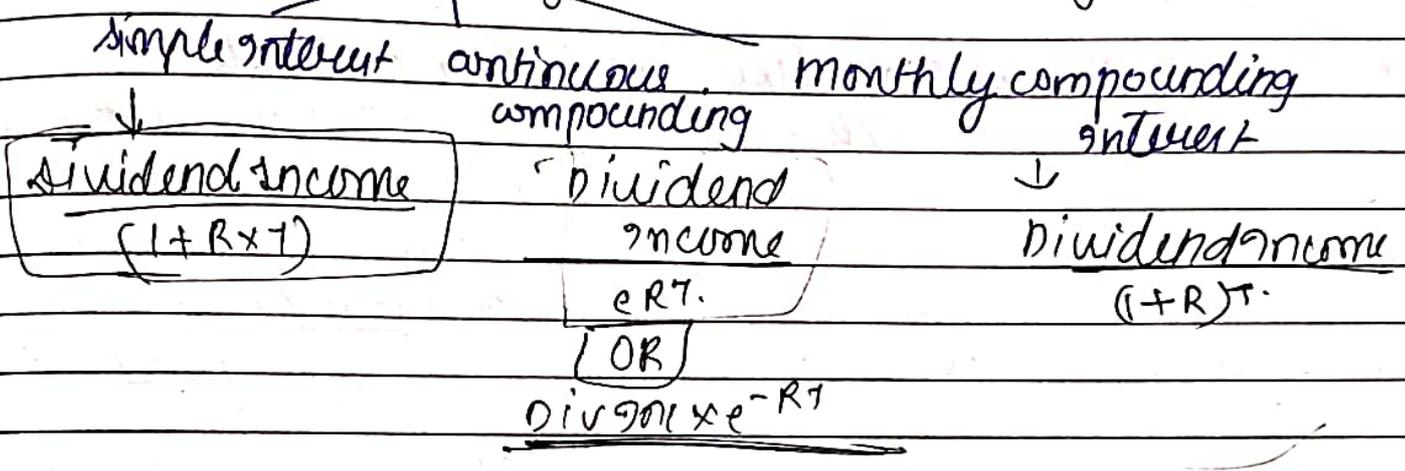


Summary of formulas:- (Read this only one day before)
Pricing of forwards & futures
① the actual value (fair value) of forwards & futures

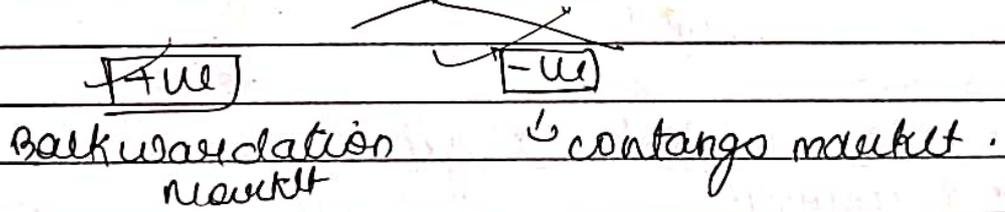


if dividend income is given then. (amt given)



(ii) If dividend income is on underlying share/index is given in question in yield % (yield rate is given) (deduct dividend yield rate from interest rate)

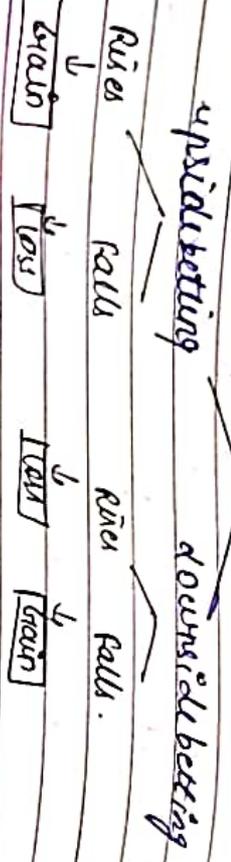
(iii) contango and backwardation market situations
Basis = S - F



(iv) Price of 1 future contract / lot:-
Actual quoted (trading) price of future x Lot size

(V) Contract value
Price of future contract / lot size x No. of contracts / lot

(vi) Gain/Loss (payoff) on future contracts (cash settlement)
contracts / lot



• Calculation of gain/loss on future contracts
No. of contracts / lot x lot size x difference between price of future on maturity (settlement) & initially contracted price

(contract value x Rise / Fall % in price of future on maturity)

(vii) Types of margin in future contracts :-
 (a) variation in initial margin amount :-
 (contract value x initial margin %)

(ii) Mark to market margin
 → $M + 30$
No. of contracts / lot x lot size x difference b/w closing future price of today's

(vii) Maintenance margin :-
calculation of maintenance margin amount :-
initial margin amount - x mth %

(viii) Hedging using futures :- FOCUS
contract value x mth %

Long position (Buy shares of a company) Short position (sell shares of a company)

(Buy shares) is (sell shares)

create short position create long position
in share futures of that company in share of a company
(sell share futures) on share futures
[Inverse Relationship] of that company
'buy' share futures

(ix) Hedging using order futures :-
kind of order futures and reverse
Buy shares sell sell shares
sell order futures buy order futures

Step 1 No. of order future contracts to be bought or sold
value of shares portfolio (existing) Required
of shares beta of
portfolio portfolio
price of a future contract

Q15 → step 1 calculate value of portfolio after rise -
 (5000 paid + 2.6%) = 5130

change → step 2 mark to maturity (5000 paid - x 2.6%) = 5091
 → step 3 value of portfolio after in diffy. (40)

step 3 calculate overall gain/loss on maturity due to hedging

Gain/loss on order future contracts x ru/ru
 Gain/loss on share portfolio x ru/ru
 Overall gain/loss on maturity = x ru/ru

Rise fall % in order (market) =
 Rise fall (%) in share portfolio
 writing beta of share portfolio

step 4 beta of total portfolio → % change in total portfolio
 Rise fall % in order (market)

1. change in total portfolio ⇒
 Overall gain/loss on maturity
 value of total portfolio at beginning x ru
 value of total portfolio at beginning & investment in share portfolio + cash balance

Q20 Hedging using futures (Answer old concept based marks)

Actual divided (writing) price of future → % actual < theoretical

Theoretical value (price) of future (overvalued) gain = undervalued
 ↓ (buy future)

gain = actual - theoretical price (Theoretical = actual)

Part III options (Equity Derivatives)

Meaning of options.

Call option premium

option buyer (Holder) → option seller (writer)

Call option Right to buy or a specified future date at a pre fixed price (strike price)
 obligation to sell underlying share on a specified future date at a pre fixed price (strike price)

Put option Right to sell underlying share on a specified future date at a pre fixed price (strike price)
 obligation to buy underlying share on a specified future date at a pre fixed price (strike price)

Q25 Features of options :-

- option premium/option price at is the amount paid by option buyer to option seller at beginning to buy the option

• strike price payable price - price at which option

can be exercised by the option buyer at maturity.

- exercise of option by option buyer.

Call option

It is the amount -

It will be exercised by option buyer if price of underlying asset at maturity > strike price under the option

Put option

It will be exercised by option buyer if price of UD (share) at maturity < strike price under option

• options can also be classified as European option and American option

→ Gain/Loss (Payoff) of option :-

1) When I am an option holder for the options holder :-

• call option

Price of underlying share at maturity

(-) strike price

(+) negative consideration

$$xxx - (xxx) = xxx$$

(-) option premium at beginning

$$\frac{(xxx) - (xxx)}{xxx}$$

Put option

strike price

(-) price of underlying share at maturity

payoff (+) negative, considered it zero

(-) option premium at beg. net payoff.

$$xxx - (xxx) = xxx$$

(2) Gain/Loss option for option seller :-

calculation gain/loss on option for the option holder.

If it is gain

put option holder

If it is loss for the option holder.

same amt will be loss for the option seller.

same amount will be gain for the option seller.

Note :-

(i) payoffs → = to or greater than (0) it cannot be (-ve)

(ii) option holder's gain can be unlimited

but its loss is limited to option premium paid

(iii) option seller's loss can be unlimited but its gain is limited upto the option premium received.

(iv) Question price of underlying share on maturity.

Price of underlying share on maturity or which there is no gain or loss

Call options

Strike price to option premium

↓

option holder can gainfully exercise the call option on any price above this

breakdown price of underlying share on maturity

strike price
+ 10% of premium
strike price of share

Put options

Strike price -

↓

option holder can gainfully exercise the

put option on any price below this

breakdown price of underlying share on maturity

Expected value of option at maturity

If multiple expected price of share on maturity is given in question, then expected value of option at maturity is calculated as follows

Expected value of option at maturity = $\text{Payoff}_1 \times P_1 + \text{Payoff}_2 \times P_2 + \dots + \text{Payoff}_n \times P_n$

Payoff + Payoff on expected price of underlying share on maturity.

Value of option at Beg (Fair option premium / Fair value of option)

① Binomial model:-

Price of underlying shares on maturity will either move up or move down. Only 2 expected price of up & down

② Single period Binomial model:-

Step 1) Draw a binomial tree. (1 period / maturity)

o' time
current price of underlying share
↓
(1) expected price of underlying share (in up) nodes
(1-p) expected price of underlying share (in down) nodes

nodes
nodes

on day, weekly, monthly, quarterly, half yearly, annually

Step 1] calculate probabilities
 probability of price moving up
 (in decimals)

$$p = \frac{e^{rt} - d}{u - d} \quad \text{OR} \quad \frac{1 + R_T - d}{u - d}$$

if continuous compounding interest

Step 2] expected price of end share 1st period
 current price of share \times option

d) expected price of 1st share 1st period
 (more down)

current market price of oil at 1st period

$R =$ interest rate per

$T =$ No of months till 1st period end

Period of price moving down (downward)

Step 3] calculate payoff on each node of 2nd period (maturity)

Step 4] calculate value of option at each node of 1st period

Value of option at node a =
 expected value of option at 2nd period (maturity)
 considering node 'a' & 'c'

$$e^{-rt} [e^{rt} (1 + R_T)]$$

Value of option at node c :-

expected value of option at 2nd period (maturity) considering node 'c' & 'd'

$$e^{-rt} [e^{rt} (1 + R_T)]$$

Step 5]

Value of option at beginning
 value of option at node a $\times p +$

$$e^{-rt} [e^{rt} (1 + R_T)]$$

example \rightarrow actual notes

Notes :- 1) which types of interest is to be applied
 simple or compounding) specially giving

2) If period of move up & down given then separate
 each probability and calculate risk neutral prob. to apply binomial model

3) Expected rate of return on option :-
 expected value of option - value of option at maturity considering prob at beg $\times r_{f,0}$
 value of option at beg

(iv) Determine composition of Riskless Hedge Portfolio
is combination of share and option to have a perfect hedge

$\Delta \rightarrow$ strike delta calculation kano:-

payoff at node "B" - payoff at Node "C"

expected price of stock at node "B"

what is Δ ? underlying shares at node "B"

Requirements, what is to be bought by option seller for setting a call option to have a perfect hedge?

Q2) Black scholes model:-

Q2) calculation of value of call option at beginning current price of US $\times N(d_1) -$ strike price $\times N(d_2)$

$N(d_1)$
 $N(d_2)$

$d_1 = \left(\frac{r + \sigma^2}{2} \right) \rightarrow \ln \left(\frac{\text{current price}}{\text{strike price}} \right) + (R + \frac{\sigma^2}{2}) \times T$

$d_2 = (r + \sigma^2) \rightarrow d_1 - \sigma \sqrt{T}$

call value of put option at beginning

if any dividend is given for PV \times rate
1.01 \times average

Q30) current price $\times N(d_1) -$ strike price $\times N(d_2)$

strike price - current price of call option or payoff

Part IV swaps (equity derivatives)

Q31) calculation of amount on a particular date for fixed amount - occurs in same as follows

AMT payable on National Principal equivalent to Return % in equity

at fixed % on National Principal

National Principal \times Return % in equity

Part IV commodity derivatives

for hedging commodity using commodity futures

(Bought commodity) sold commodity (short)

seller sells (short) or buys (buy) on commodity future

Reverse relationship b/w commodity & comm future

Q34) role of No of amount of comm future to buy or sell for perfect hedge:-

Part 1) calculate optimal hedge ratio

$H = \frac{\sigma_{CF}}{\sigma_{F}}$

Step ② No of commodity future contract to be bought or sold = $\frac{\text{total qty of commodity} \times H}{\text{future contract size}}$

Step ③ Amt of commodity future contract to be bought or sold :- $(\text{No of commodity of future contract} \times \text{Future} \times \text{spot price of commodity})$

Calculation of Effective price Realised from sale of commodity after Hedging through comm future

Step ① calculate Net cash Recd on maturity $\times X_0$
 (Total Qty of comm \times Actual spot price)
 (+) Gain (loss) on commodity future contracts
 $(\text{No of future contracts} \times \text{Future contract size} \times \text{diff b/w FP of maturity} \times X_0 / (X_0))$
 (-) Future price on initial CO)

Step ② calculate effective realised price of commodity

$\frac{\text{Net cash Recd on maturity}}{\text{total qty of commodity}}$