Biyani's Think Tank

Concept based notes

Financial Derivatives

MBA-IV Sem

Anamika Sharma
Department of Management
Biyani Institute of Science and Management,
Jaipur

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Sector-3, Vidhyadhar Nagar,
Jaipur-302 023 (Rajasthan)
Ph : 0141-2338371, 2338591-95 □ Fax : 0141-2338007
E-mail : acad@biyanicolleges.org
Website :www.gurukpo.com; www.biyanicolleges.org

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Preface

I am glad to present this book, especially designed to serve the needs of the students. The book has been written keeping in mind the general weakness in understanding the fundamental concepts of the topics. The book is self-explanatory and adopts the "Teach Yourself" style. It is based on question-answer pattern. The language of book is quite easy and understandable based on scientific approach.

Any further improvement in the contents of the book by making corrections, omission and inclusion is keen to be achieved based on suggestions from the readers for which the author shall be obliged.

I acknowledge special thanks to Mr. Rajeev Biyani, *Chairman* & Dr. Sanjay Biyani, *Director* (*Acad.*) Biyani Group of Colleges, who are the backbones and main concept provider and also have been constant source of motivation throughout this Endeavour. They played an active role in coordinating the various stages of this Endeavour and spearheaded the publishing work.

I look forward to receiving valuable suggestions from professors of various educational institutions, other faculty members and students for improvement of the quality of the book. The reader may feel free to send in their comments and suggestions to the under mentioned address.

Author

Financial Derivatives M-405

Course/ Paper: 402 Max. Marks: 70 Times: 3
MBA Semester: IV Hrs.

Objective:
The course aims to develop an understanding of the importance of financial derivatives and the institutional structure of the markets on which they are traded as well as developing the analytical tools necessary to price such instruments. The course will have three main parts: First the most commonly traded derivative instruments will be introduced, and their role in the modern capital markets, in particular for risk management, explained both from a theoretical as well as practical point of view, second, there will be discussion on the institutional structure of the markets, on which such instruments are traded. Third, the pricing of the derivatives instruments and the risk characteristics of derivatives will be discussed.

SECTION 'A'

Unit No.	Particular
1	**Definition of Derivative Securities-** Brief history of derivatives, Evolution of Commodity, Currency, Stocks and interest Rate Derivatives, Structure of derivative markets, forwards, futures, and options swaps etc. Examples of more sophisticated derivatives: barrier options, compound options, options on futures, swaptions, underlying assets: equities, currencies, commodities and interest rates. Reasons for trading: risk management, speculation and arbitrage.
2	**Market Characteristics-** Futures and Options Contract specifications, underlying asset, contract size, and delivery specifications. Marking to market using margin accounts. Familiarizing with market quotes. Trading Strategies involving options and futures. Interest rate derivatives, Contractual specification: floating and fixed rat. Valuation of interest rate derivatives.
3	**Derivatives Pricing Theory-** Options Pricing: Black- Scholes formula for option pricing: derivation and properties. Volatility: estimated vs. implied, options on dividend- paying assets, warrants and convertibles. Binomial models for option prices: definitions and terminology, Continuous- Time Models Futures Pricing: Pricing by arbitrage: relationship between futures and spot price (cost of carry and reverse cost of carry), difference between futures and forward price, futures on dividend-paying assets.
4	**Risk Analysis and Management-** Risk Measurement and Management Frame

	work, option's delta, gamma, vega, theta, Rho. Hedging with futures. Derivatives Disclosure: Accounting Issues in Derivatives.
5	**Options and Futures Applications In India-** Structure of Indian Stock markets and the operational efficiency of options and futures, determination of the fair value of futures and options prices, interactions between sopt equity trading and trading in derivatives.

SECTIONS- 'B'
Case Study

Financial Derivatives

MATERIAL IN THE FORM OF QUESTIONS & ANSWERS

CONTENTS

Annexure

Unit 1

Q.1 What is a derivative?

Ans A derivative is any financial instrument, whose payoffs depend in a direct way on the value of an underlying variable at a time in the future. This underlying variable is also called the underlying asset, or just the underlying, Examples of underlyi9ng assets include

Underlying asset	for example
Financial asset	Government Bond
Commodity	Gold
Another derivative!!!	Options on Futures
Index	s & p 500
Internet rate	LIBOR rate
and many others	Weather
	Elections results

Usually, derivatives are contracts to buy or sell the underlying asset at a future time, with the price, quantity and other specifications defined today, contracts can be binding for both parties or for one party only, with the other party reserving the option to exercise of not. If the underlying asset is not traded, for example if the underlying is an index, some kind of cash settlement has to take place. Derivatives are traded in organized exchanges as well as over the counter.

Q.2 Discuss briefly history of Derivatives?

Ans Derivative contracts in general and options in particular are not novel securities. It has been nearly 25 centuries since the above abstract appeared in Aristotle's Politics, describing the purchase of a call option on oil- presses. More recently, De La Vega (1688), in his account of the operation of the Amsterdam Exchange, describes traded contracts that exhibit striking similarities to the modern traded options.

Nevertheless, the modern treatment of derivative contracts has its roots in the inspired work of the Frenchman Louis Bachelier in 1900; this was the first

attempt of a rigorous mathematical representation of an asset price evolution through time, Bachelier used the concepts of random walk in order to model the fluctuations of the stock prices, and developed a mathematical model in order to evaluate the price of options on bond futures. Although the above model was incomplete and based on assumptions that are virtually unacceptable in recent studies, its importance lies on the properties of the model and perhaps highlights its misspecifications.

The above treatment of security prices was long forgotten until the 70s, when professor samuleson and his co-workers at MIT rediscovered Bachelier's work and questioned its underlying assumptions. By Construction, the payoff of a call option on the expiration day will depend on the price of the underlying asset on that day, relative to the option's exercise price. Common reasoning declares that therefore, the price of the call option today has to depend on the probability of the stock price exceeding the exercise price. One could then argue that a mathematical model that can satisfactory explain the underlying asset's price is sufficient in order to price the call option today, just by constructing the probabilistic model of the price on the expiration day. Professors Black, Merton and Scholes recognized that the above reasoning is incorrect: Since today's price incorporates the probabilistic model of the future behavior of the asset price, the option can (and has to) be priced relative to today's price alone. They realized that a levered position, using the stock and the risk less bond that replicates the payoff of the option is feasible, and therefore the option can be priced using no-arbitrage restrictions. Equivalently, they observed that the true probability distribution for the stock price return can be transformed into one which has an expected value equal to the risk free rate, the so called risk adjusted or risk neutral distribution; the pricing of the derivative can be carried out using the risk neutral distribution when expectations are taken.

The classic papers produced by this work, namely Black and Scholes (1973) and Merton (1976) triggered an avalanche of papers on option pricing, and resulted in the 1997 Nobel Prize in economics for the pioneers of contingent claims pricing, Even today, nearly thirty years after its publication, the original Black and Scholes Paper is one of the most heavily cited in finance?

Q.3 Why do we need to have derivatives?

Ans Every Candidate underlying asset will have a value that is affected by a variety of factors, therefore inheriting risk. Derivative contracts, due to the leverage that they offer may seem to multiply the exposure to such risks; however, derivatives are rarely used in isolation. By forming portfolios utilizing a variety of derivatives and underlying assets, one can substantially reduce her risk exposure, when an appropriate strategy is considered.

Derivative contracts provide an easy and straight forward way to both reduce risk hedging, and to bear extra risk- speculating. As noted above, in any market conditions every security bears some risk. Using active derivative management involves isolating the factors that serve as the sources of risk, and attacking them in turn. In general, derivatives can be used to

- hedge risks;
- reflect a view on the future behavior of the market, speculate;
- lock in an arbitrage profit;
- change the nature of a liability;
- Change the nature of an investment.

Q.4 Define forward contract and explain its characteristics?

Ans The forward contract is an over-the-counter (OTC) agreement between two parties, to buy or sell an asset at a certain time in the future for a certain price.

- The party that has agreed to buy has a long position.
- The party that has agreed to self has a short position.

Usually, the delivery price is such that the initial value of the contract is zero. The contract is settled at maturity. For example, a long forward position with delivery price k will have the payoffs shown in figure.

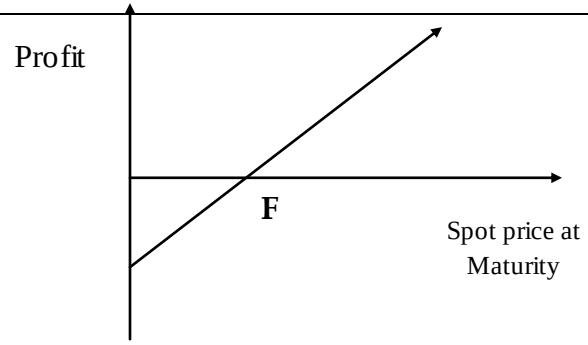


Figure: Forward contract payoffs

It is derivative is a contract or agreement whose value depends upon the price of some other (Underlying) commodity, security or index.

Characteristics:

- Forward: an agreement between 2 parties that are initiated at one point in time, but require the parties to the agreement to perform, in accordance with the terms of the agreement, at some future point in time.
- Seller/Holder of the short Position: Party obliged to deliver the Stated Asset.
- Buyer/ Holder of the Long Position: Party obliged to pay for the stated Asset.
- Deliverable item/ Underlying Asset: asset to be traded under the terms of the contract
- Settlement/ Maturity/Expiration: Time at which the contract is to be fulfilled by the trading of the underlying asset.
- Contract Size: Quantity of the underlying asset that is to be traded at the time the contract settles.
- Invoice Amount/ Forward Contract Price: Amount that must be paid for the contract size of the underlying asset by the holder of the long position at the time of the settlement.

- Forward Contracts are NOT Investments; they are simply agreements to engage in a trade at a future time and at a fixed price. Thus, it costs NOTHING to enter into such a contract; since nothing is Bought or Sold; contracts are Entered Into or Sold Out. There are THREE ways to close out (Settle) a contract
- Enter an Offsetting Transaction:
- Making/ Taking Physical Delivery of the underlying commodity under the terms & conditions specified by the contract:
- Cash Settlement.
- Over-the- Counter Forward Contracts are Flexible, but 3 major disadvantage
  - ILLIQUID: designed for specific needs
  - CREDIT RISK: No Collateral or marked to marketing, rather it is just trust
  - UNREGULATED: no formal body regulates the players in the market

Q.5 Discuss the futures contract?

Ans This contract is an agreement to buy or sell an asset at a certain time in the future for a certain price. Futures are traded in exchanges and the delivery price is always such that today's value of the contract is zero. Therefore in principle, one can always engage into a future without the need of an initial capital: the speculators heaven!

Meaning:

- Futures: Special forms of forward contracts that are designed to reduce the disadvantages associated with forward agreements. Indeed they are forwards whose terms have been STANDARDIZED to that they a be traded in a public market place. Less Flexible, but more liquid.
- Usually traded on FUTURES exchanges, who establish terms of standardization, rules or Pit trading, daily price limit, trading hours, and settlement price methods.
- Regulated by the CFTC.
- Brokers: Account Executives who take orders from customers and relay them to the floor: and Floor Brokers who operate on the floor and execute orders for others and for themselves.

- CLEARING HOUSE: interposed between each side and guarantees the contract.
- POSTING MARGIN, MARKING TO MARKET
- Capital Gains are based upon the NET DAILY SETTLEMENT gains or losses that occur in a tax period, rather than upon the net gains or losses that result form contracts that are closed out during a tax period.
- FUTURES is a ZERO sum GAME

Q.6 Discuss the Credit risk involved in forward v. Futures contract?

Ans

- To ease Credit Risk in the Futures Market, there are 3 types of protections built- in, as opposed to a mere Forward Contract.
- Daily Settlement: Unrealized Gains/ Losses must be settled with cash on a Daily basis (by way of Margin Calls & Account Crediting/ Debiting between Clearing house & Regular Accounts)
- Margin: Accounts must maintain sufficient balances in their accounts so as to be able to cover several days' worth of potential mark-to-market transfers.
- Clearinghouse: Guarantees the transactions & insures settlement of the daily mark-to-market gains & losses.

Q.7 What are the uses of futures & forwards?

Ans

1. Speculation

- Ratio of the Profit to the amount of funds that were potentially at risk, rather than the ratio of the profit to the cash that was put up on margin is the correct way to measure the return on investment.
- Advantages of Using Futures/ Forwards for Speculative Purposes:
- Lower Transaction Costs and better Liquidity
- No need for Storage or Insurance
- Can sell short in the futures/ Forwards, which may not be possible in the spot Market.
- Employs a great deal of leverage
- Disadvantages of Using Futures/ Forwards for Speculative Purposes:
- With Lots of Leverage, Huge Losses Could is incurred.

- Margin Calls means that there is a need (potentially) to have lots of free cash.

2. Hedging

- 2 Types of Hedges: the Long Hedge where the Hedger takes a long position & the Short Hedge where the Hedger takes a Short Position.
- Long Hedges: are used when one is EXPECTING to acquire an asset in the future, but there is concern that its price might rise in the meantime. To alleviate this price risk, the Hedger takes a long position in the futures contract and then if the price does rise, his profit on the Hedge can be used to offset the higher cost of purchasing the commodity. The same principal applies if the price falls. Either way, the net price paid for the commodity in the future can be fixed in the present.
- Short Hedges: Used to reduce risk associated with possible changes in the price of OWNED Assets. Same Principals.

Difficulties encountered when using futures as Hedges

- TO succeed, need to understand complex relationships.
- Might Not Work if Futures are MISPRICED
- Hedging Profits generate Tax consequences because the daily settlement cash inflows from unrealized financial gains/ losses on futures used as hedges are taxable, even though the offsetting loss incurred in the value of the commodity held long is NOT tax deductible until realized.

3. Arbitrage

- Arbitrage is an opportunity to make a risk-less profit without having to make any net investment. There is a no Arbitrage principle in Financial Theory.
- However, market imperfections allow for some arbitrage opportunities.

SOCIAL PURPOSES OF FUTURES:

- Risk Shifting from Hedgers to Speculators
- Price Discovery

Q.8 Discuss the difference between forward and future contract.

Ans Although similar in nature, these two instruments exhibit some fundamental differences in the organization and the contract characteristics. The most important differences are given in table 1.1

Table 1.1: Differences between forwards and futures contracts

	Forwards	Futures
Primary Market	Dealers	Organized Exchange
Secondary Market	None	The Primary Market
Contracts	Negotiated	Standardized
Delivery	Contracts expire	Rare delivery
Collateral	None	Initial Margin, mark-the market
Credit Risk	Depends on Parties	None (Clearing House)
Market Participants	Large Firms	Wide Variety

Q.9 Describe Options?

Ans Futures and forwards share a very important characteristic: when the delivery date arrives, the delivery must take place. The agreement is binding for both parties: the party with the short position has to deliver the goods, and the party with the long position has to pay the agreed price. Options give the party with the long position one extra degree of freedom: she can exercise the contracts if she wants to do so; where as the short party has to meet the delivery if they are asked to do so. This makes options a very attractive way of hedging an investment. Since they can be used as to enforce lower bounds on the financial losses. In addition, options offer a very high degree of gearing or leverage, which makes then attractive for speculative purposes too. The main characteristics of a Plain vanilla option contract are the following:

- The maturity T : The time in the future, up to which the contract is valid'

- The Strike or exercise price **X:** The delivery price, Remember that the long party will assess whether or not this price is better than the current market price. If so, then the option will be exercised. If not the option will be left to expire worthless;
- Call or put: The *call* Option gives the long party the right to buy the underlying security at the strike price from the short party. The put option gives the long party the right to sell the underlying security at the strike price to the short party. The short party has to obey the long party's will;

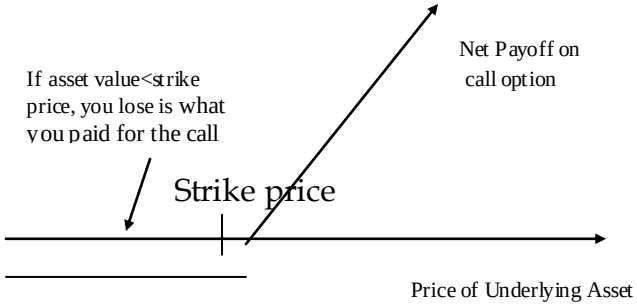
Q.10 Describe the pay off Call and Put Option?

Ans Call and Put Options: Description and payoff Diagrams

A call options gives the buyer of the option the right to buy the underlying asset at a fixed price, called the strike or the exercise price, it any time prior to the expiration date of the option. The buyer pays a price for this right. If at expiration, the value of the asset is less than the strike price, the option is not exercised and expires worthless. If, on the other hand, the value of the asset is greater than the strike price, the option is exercised- the buyer of the option buys the asset (stock) at the exercise price. And the difference between the asset value and the exercise price comprises the gross profit on the option investment. The net profit on the investment is the difference between the gross profit and the price paid for the call initially.

A payoff diagram illustrates the cash pay off on an option at expiration. For a call, the net payoff is negative (and equal to the price paid for the call) if the value of the underlying asset is less than the strike price. If the price of the underlying asset exceeds the strike price, the gross pay off is the difference between the value of the underlying asset and the strike price and the net pay off is the difference between the gross payoff and the price of the call. This is illustrated in figure A below:

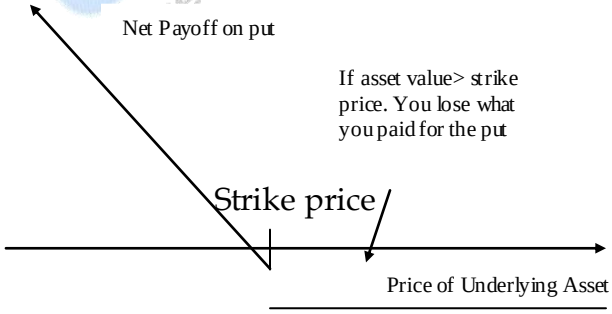
Figure A: Payoff on Call Option



Put Option:

A put option gives the buyer of the option the right to sell the underlying asset at a fixed price, again called the strike or exercise price, at any time prior to the expiration date of the option. The buyer pays a price for this right. If the price of the underlying asset is greater than the strike price, the option will not be exercised and will expire worthless. If on the other hand, the price of the underlying asset is less than the strike price, the owner of the put option will exercise the option and sell the stock a the strike price, claiming the difference between the strike price and the market value of the asset as the gross profit. Again, netting out the initial cost paid for the put yields the net profit from the transaction. A put has a negative net payoff if the value of the underlying asset exceeds then strike price, and has a gross pay off equal to the difference between the strike price and the value of the underlying asset if the asset value is less than the strike price. This is summarized in figure B below.

Figure B: Payoff on Put Option



Q.11 Who are the market participants?

Ans

Three Kinds of dealers engage in market activities; hedgers, speculators and arbitrageurs. Each type of dealer has a different set of objectives, as discussed below.

- *Hedgers*: Hedging includes all acts aimed to reduce uncertainty about future (Unknown) price movements in a commodity, financial security or foreign currency. This can be done by undertaking forward or futures sales or purchases of the commodity security or currency in the OTC forward or the organized futures market. Alternatively, the hedger can take out an option which limits the holder's exposure to price fluctuations.
- *Speculators*: Speculation involves betting on the movements of the market and tries to take advantage of the high gearing that derivative contracts offer, thus making windfall profits. In general, speculation is common in markets that exhibit substantial fluctuations over time. Normally, a speculator would take a ''bullish '' or ''bearish'' view on the market and engage in derivatives that will profit her if this view materializes. Since in order to buy, say, a European calls option one has to pay a minute fraction of the possible payoffs, speculators can attempt to materialize extensive profits.
- *Arbitrageurs*: They lock risk less profits by taking positions in two or more markets. They do not hedge nor speculate, since they are not exposed to any risks in the very first place. For example if the price of the same product is different in two markets, the arbitrageur will simultaneously buy in the lower priced market and sell in the higher priced one. In other situations, more complicated arbitrage opportunities might exist. Although hedging and (mainly) speculating are the reasons that have made derivatives [im] famous, the analysis of pricing them fairly depends solely on the actions of the arbitrageurs, since they ensure that price differences between markets are eliminated, and that products are priced in a consisted way. Modern option pricing techniques are often considered among the most mathematically complex of all applied areas of finance. Financial analysts have reached the point where they are able to calculate, with alarming accuracy, the value of a stock option. Most of the models and techniques employeed by today's analysts are rooted in a

model developed by Fischer Black and Myron Scholes in 1973. This paper examines the evolution of option pricing models leading up to and beyond black and scholes' model.

Q.12 Explain interest rate option?
Ans

Interest rate collar

- Cap- a series of European interest rate call options used to protect against rate moves above a set strike level.
- Floor- a series of European interest rate put options used to protect against rate moves below a set strike level.
- Recall some basic option valuation points, and apply them to caps and floors:

The buyer of a cap receives a cash payment from the seller. The payoff is the maximum of 0 or 3-month LIBOR minus 4% times the notional principal amount.

- If 3 month LIBOR exceeds 4% the buyer receives cash from the seller and nothing otherwise.
- At maturity, the cap expires.

Interest- Rate Collars for borrowers

If you buy a cap and sell a 'floor', this is known as an Interest- Rate Collar. Interest- Rate Collars will reduce the cost of protecting yourself against higher interest rates. By buying an interest- Rate Cap you will protect yourself against higher interest rates but you can also take advantage of lower rates without any limit. By selling a floor you give up some of the possible benefit of lower interest rates. How much of this benefit you give up will depend on the interest rate level at which you sell the floor. If the value of the floor you sell is the same as the cost of the cap you buy, this is known as a 'Zero –Cost Collar. The terms collar comes from the fact that your interest-rate cost will never be lower than the floor level and will never be greater than the cap level. Interest Rate Collars are a popular way of managing the risk of higher interest rates. We can tailor a collar to suit you.

OR

An Interest rate collar is an instrument that is used to ensure that the rate of interest a borrower pays will not rise above a pre-agreed level. In return for giving up some of the potential to benefit from lower rates, the borrower will pay a reduced, often to nil, premium. Based on inter bank rates of interest, collars are available in sterling and foreign currency. A collar may also be used by a depositor to protect against falls in investments income.

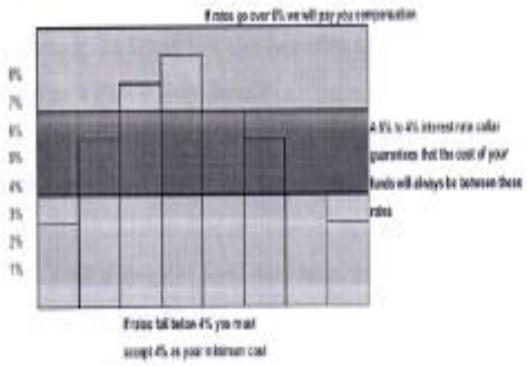
Interest Rate Collars

Customers borrowing at a margin over a floating rate of interest will incur additional costs if interest rates rise. The impact of such a rise may mean that a profitable project becomes loss making. This risk can be overcome in three ways:

- By borrowing at a fixed rate of interest or by borrowing at a floating rate of interest and swapping into a fixed rate by way of an interest rate swap
- By borrowing at a floating rate of interest and using an interest rate cap to protect against increases in interest rates, while retaining full ability to enjoy lower rates.
- By borrowing at a floating rate of interest and using an interest rate collar to protect against increases in interest rates, while retaining some ability to enjoy lower rates to enter into a (borrower's) collar you specify to us the details- the amount and currency involved, the period, whether the floating rate is against one, three or six month LIBOR (London Inter bank Offered Rate), the highest interest rate you are prepared to pay and the amount, if any, of premium that you are willing to pay. We will then calculate the best rate available to you under the collar- the lowest interest rate you may pay.

The Solution

The chart on this page shows the effect of a 3 year 6% Interest Rate Cap combined with the sale of a 4% floor. When interest rates go over the cap level we will pay you compensation. On the other hand, when interest rates fall below the level of the agreed floor, you need to pay us an amount, which will bring the cost of your funds back to the level of the floor at 4%. When interest rates settle within the range of the interest rate collar, neither of us has to pay anything. An Interest- Rate Collar allows you firm to set a range for its interest costs. In this example the cost is no greater than 6% and no less than 4%.



The benefits

- The collar reduces the cost of interest rate protection.
- The Collar provides protection against higher interest rates.
- You can sell the collar back to us at any time.

The main disadvantage of a collar is that you have to pay a certain minimum rate of interest and you lose some of the possible benefit of lower interest rates.

Features

- You can use a Collar for a loan you already have or a loan you are planning to take out in the near future.
- We provide Interest- Rate Collars in major currencies.
- We can arrange different maturities normally up to five years.
- Interest- Rate Collars are generally set against Libor but we can set them against any other index.
- We usually pay, or ask you to pay, compensation at the end of each relevant Libor period.
- The premium you pay for an interest- Rate collar may be tax allowable check with you tax advisers.
- If you have a zero cost interest- rate collar, you do not have to pay any premiums t inception.

Q.13 What are the benefits of a collar over an interest rate swap or a fixed rate loan?
Ans

The key difference between a collar and a swap or fixed rate loan is the upside potential offered by the collar. With a collar, if interest rates fall, you will pay a lower rate of interest on you loan- down to a pre-agreed level. With a swap or fixed rate loan, you are locked into an agreed rate and will not benefit if rates fall. A collar is an independent transaction, which means that you can tailor it to your particular requirements. In our example overleaf, you may have a strong view that interest rates will rise for the next three years, but fall thereafter, you could either enter into a collar for an initial three year period or alternatively you could enter into a rally cap additionally, you may prefer to hedge only part of your exposure to interest rates and cover only part of your borrowing. The collar does not need to match exactly the underlying transaction.

Summary

- A collar protects a company against adverse movements in interest rates.
- The company enjoys the benefit of rate movements in its favor, though these are

  Limited as a result of preferring to pay a reduced, or nil, premium.
- A collar offers flexibility as it is totally independent from the actual transaction.
- The company can budget more effectively.
- No principal amount changes hands.
- Compensation is made against LIBOR.

Q.14 what are sophisticated options available for risk hedger?
Ans *Compound Options*

Some options derive their value not from an underlying asset but from other options. These options are called compound options. Compound options can take any of four forms- a call on a call, a put on a put, a call on a put and a put on a call. Geske (1979) developed the analytical formulation for valuing compound options by replacing the tandard normal distribution used in a simple option model with a bivariate normal distribution in the calculation. Consider, for instance, the option to expand a project that we will consider in the next section. While we will value this option using a simple option pricing model, in reality there could be multiple stages in expansion, with each stage representing an option for the following stage. In this case, we will undervalue the option by

considering it as a simple rather than a compound option. Notwithstanding this discussion. The valuation of compound options becomes progressively more difficult as we add more options to the chain. In this case, rather than wreck the valuation on the shoals of estimation error, it may be better to accept the conservative estimate that is provided with a simple valuation model as a floor on the value.

Q.15 What is interest rate swap?

Ans

An agreement between two parties (known as counterparties) where one stream of future interest payments is exchanged for another based on a specified principal amount. Interest rate swaps often exchange a fixed payment for a floating payment that is linked to an interest rate (most often the LIBOR) a company will typically use interest rate swaps to limit or manage exposure to fluctuations in interest rates, or to obtain a marginally lower interest rate than it would have been able to get without the swap.

Interest rate swaps are simply the exchange of one set of cash flows (based on interest rate specifications) for another. Because they trade OTC, they are really just contracts set up between two or more parties, and thus can be customized in any number of ways.

Generally speaking, swaps are sought by firms that desire a type of interest rate structure that another firm can provide less expensively. For example, let's say cory's Tequila company (CTC) is seeking to loan funds at a fixed interest rate, but Tom's Sports can issue debt to investors as its low fixed rate and then trade the fixed-rate cash flow obligations to CTC for floating-rate obligations issued by TSI . Even Though TSI may have a higher floating rate than CTC, by swapping the interest structures they are best able to obtain. Their combined costs are decreased- a benefit that can be shared by both parties.

Q.16 What Does Fixed-For-Fixed Swaps Mean?

Ans An arrangement between two parties (known as counterparties) in which both parties pay a fixed interest rate that they could not otherwise obtain outside of a swap arrangement.

Fixed –For-Fixed Swaps

To understand how investors benefit from these types of arrangements, consider a situation in which each party has a comparative advantage to take out a loan at a certain rate and currency. For example, an American firm can take out a loan in the United States at a 7% interest rate, but requires a loan in yen to finance an expansion project in Japan, where the interest rate is 10%. At the same time, a Japanese firm wishes to finance an expansion project in the U.S., but the interest rate is 12% compared to the 9% interest rate in Japan.

Each Party can benefit from the others interest rate through a fixed for fixed currency swap. In this case, the U.S. firm can borrow U.S. dollars for 7%, then lend the funds to the Japanese firm at 7% The Japanese firm can borrow Japanese yen at 9% then lend the funds to the U.S. firm for the same amount.

Q.17 What Does Fixed for Floating Swap **Mean**?

Ans

An advantageous arrangement between two parties (counterparties) in which one party pays a fixed rate, while the other pays a floating rate.

Explain Fixed-For-Floating Swap

To understand how each party would benefit from this type of arrangement, consider a situation where each party has a comparative advantage to take out a loan at a certain rate and currency. For example, company a can take out a loan with a one year terms in the U.S. for a fixed rate of 8% and a floating rate of Libor +1% (which is comparatively cheaper, but they would prefer a fixed rate). On the other hand, company BH can obtain a loan on a one year terms for a fixed rate of 6% or a floating rate of Libor+3%, consequently, they'd prefer a floating rate.

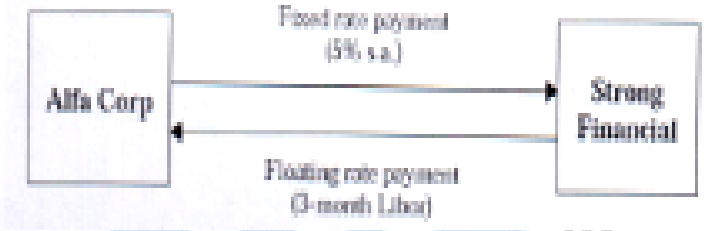
Through an interest rate swap, each party can swap its interest rate with the other to obtain its preferred interest rate

Note that swap transactions are often facilitated by a swap dealer, who will act as the required counterparty for a fee.

Example:

Terms:
Fixed rate payer: Alfa Corp
Fixed rate: 5 percent, semiannual
Floating rate payer: Strong Financial Corp
Floating rate: 3 month USD Libor
Notional amount: US$ 100 million
Maturity: 5 years

A fixed-for-floating rate swap is often referred to as a ''plain vanilla'' swap because it is the most commonly encountered structure.



Alfa corp agrees to pay 5.0% of $100 million on a semiannual basis to strong financial for the next five years. That is Alfa will pay 2.5% of $100million, or $2.5 million, twice a year. Strong Financial agrees to pay 3 month Libor (as a percent of the notional amount) on a quarterly basis to Alfa Corp for the next five years. That is, Strong will pay the 3 month Libor rate, divided by four and multiplied.
By the notional amount, four times per year. Example: if 3 month Libor is 2.4% on a reset date, Strong will be obligated to pay 2.4% /4=0.6% of the notional amount, or $600,000. Typically the first floating rate payment is determined on the trade date. In practice, the above fractions used to determine payment obligations could differ according to the actual number of days in a period. Example: if there are 91 days in the relevant quarter and market convention is to use a 360 day year, the floating rate payment obligation in the above example will be (91/360) x 2.4% x $100,000,000= $606,666.67.

Unit –2

Q.18 What is Contract Specification? Discuss in Detail?
Ans Contract Specifications

Parameter	Index Futures	Index Options	Futures on Individual Securities	Options on individual securities	Mini Index Futures	Mini Index Options	Long Terms Index Options
Underlying	5 indices	5 indices	196 Securities	196 Securities	S & P CNX Nifty	S & P CNX Nifty	S & P CNX Nifty
Security descriptor :							
Instrument	FUTIDX	OPTIDX	FUTSTK	OPTSTK	FUTIEDX	OPTIDX	OPTIDX
Underlying Symbol	Symbol of Underlying Index	Symbol of Underlying Index	Symbol of Underlying Index	Symbol of Underlying Index	MINIFTY	MINIFTY	NIFTY
Expiry Date	DD-MMM-YYYY	DD-MMM-YYYY	DD-MMM-YYYY	DD-MMM-YYYY	DD-MMM-YYYY	DD-MMM-YYYY	DD-MMM-YYYY
Option Type	-	CE/PE	-	CA/PA	-	CE/PE	CE/PE
Strike Price	-	Strike Price	-	Strike Price	-	Strike Price	Strike Price

Trading Cycle	3 month Trading Cycle- the near month (one), the next month (two) and the far month (three)						Three Quarterly Expiries (March, June, Sept & Dec Cycle) and next 8 half yearly expiries (Jun, Dec Cycle)
Expiry Date	Last Thursday of the expiry month. If the last Thursday is a trading holiday, then the expiry day is the previous trading day.						
Strike Price Intervals	-	Dependin on underlying price	-	Depending on underlying price	-	Depending on underlying price	Depending on underlying price
Permitted Lot Size	Underlying specific	Underlying specific	Underlying specific	Underlying specific	20	20	Underlying specific
Price Steps	Rs. 0.05	Rs. 0.05	Rs. 0.05	Rs. 0.05	Rs. 0.05	Rs. 0.05	Rs. 0.05
Price Bands	Operating	A Contract	Operating	A Contract	Operating	A Contact	A contract
	Range of 10% of the base price	Specific price range based on delta value is computed and	Range of 20% of the base price	Specific price range based on its delta value is computer and	Range of 10% of the base price	Specific price range based on its delta value is computed and	Specific price range based on its delta value is computed and

		updated on a daily basis		updated on a daily basis		updated on a daily basis	updated on a daily basis

S & P CNX Nifty Futures

A futures contract is a forward contract, which is traded on an Exchange; NSE commenced trading in index futures on June 12, 2000. The index futures contracts are based on the popular market benchmark S&P CNX Nifty index. (Selection Criteria for indices)

NSE defines the characteristics of the futures contract such as the underlying index, market lot, and the maturity date of the contract. The futures contracts are available for trading from introduction to the expiry date.

- Contract Specifications
- Trading Parameters

Contract Specifications

Security descriptor
The security descriptor for the S & P CNX Nifty futures contracts is:

Market Type: N
Instrument Type: FUTIDX
Underlying: NIFTY
Expiry date: Date of contract expiry
Instrument type represents the instrument i.e. Futures on Index. Underlying symbol denotes the underlying index which is S&P CNX Nifty Expiry date identifies the date of expiry of the contract.

Underlying Instrument
The underlying index is S& P CNX NIFTY.

Trading Cycle

S&P CNX Nifty futures contracts have maximum of 3 month trading cycle- the near month (one), the next month (one) the next month (two) and the far month (three). A new contract is introduced on the trading day following the expiry of the near month contract. The new contract will be introduced for a three month contract. The new contract will be introduced for three month duration. This way, at any point in time, there will be 3 contracts available for trading in the market i.e., one near month, one mid month and one far month duration respectively.

Expiry day

S&P CNX Nifty futures contracts expire on the last Thursday of the expiry month. If the last Thursday is a trading holiday, the contracts expire on the previous trading day.

Trading Parameters

Contract Size
The value of the futures contracts on Nifty may not be less than Rs. 2 lakhs at the time of introduction. The permitted lot size for futures contracts & Options contracts shall be the same for a given underlying or such lot size as may be stipulated by the Exchange from time to time.

Price Steps
The price step in respect of S&P CNX Nifty futures contracts is Re. 0.05.

Base Prices
Base Price of S&P CNX Nifty futures contracts on the first day of trading would be theoretical futures price. The base price of the contracts on subsequent trading days would be the daily settlement price of the futures contracts.

Price bands
There are no day minimum/maximum price ranges applicable for S&P CNX Nifty futures contracts. However, in order to prevent erroneous order entry by trading members, operating ranges are kept at +/-10%. In respect of orders which have come under price freeze, members would be required to confirm to the Exchange that there is no inadvertent error in the order

entry and that the order is genuine. On such confirmation the Exchange may approve such order.

Quantity freeze

Orders which may come to the exchange as quantity freeze shall be such that have a quantity of more than 15000, In respect or orders which have come under quantity freeze, members would be required to confirm to the exchange that there is no inadvertent error in the order entry and that the order is genuine. On such confirmation, the Exchange may approve such order. However, in exceptional cases, the Exchange may, at its discretion, not allow the orders that have come under quantity freeze for execution for any reason whatsoever including non-availability of turnover / exposure limit. In all other cases, quantity freeze orders shall be cancelled by the exchange.

Order type/Order book/ Order attribute
Regular lot order
Stop loss order
Immediate or cancel
Spread order

S&P CNX Nifty Options

An option gives a person the right but not the obligation to buy or sell something. An option is a contract between two parties wherein the buyer receives a privilege for which he pays a fee (premium) and the seller accepts an obligation for which he receives a fee. The premium is the price negotiated and set when the option is bought or sold. A person who buys an option is said to be long in the option. A person who sells (or writes) an option is said to be short in the option.

NSE introduced trading in index options on June 4, 2001. The options contracts are European style and cash settled and are based on the popular market benchamark S&P CNX Nifty index. (Selection criteria for indices)

- Contract Specifications
- Trading Parameters

Contract Specifications

Security descriptor

The Security descriptor for the S&P CNX Nifty options contracts is:

Market type: N
Instrument Type : OPTIDX
Underlying: NIFTY
Expiry date : Date of contract expiry
Option Type : CE/PE
Strike price : Strike price for the contract

Instrument type represents the instrument i.e. Options on index.
Underlying symbol denotes the underlying index, which is S&P CNX Nifty
Expiry date identifies the date of expiry of the contract
Option type identifies whether it is a call or a put option., CE – Call European, PE – Put European.
Underlying Instrument
The underlying index is S&P CNX NIFTY.

Trading cycle
S&P CNX Nifty options contracts have 3 consecutive monthly contracts, additionally 3 quarterly months of the cycle March / June / September / December and 5 following semi-annual months of the cycle June / December would be available, so that at any point in time there would be options contracts with atleast 3 year tenure available. On expiry of the near month contract, new contracts (monthly / quarterly / half yearly contracts as applicable) are introduced at new strike prices for both call and put options, on the trading day following the expiry of the near month contract.

Expiry day
S&P CNX Nifty options contracts expire on the last Thursday of the expiry month. If the last Thursday is a trading holiday, the contracts expire on the previous trading day.

Strike price intervals
The number of contracts provided in options on index is based on the range in previous day's closing value of the underlying index and applicable as per the following table:

Index level	Strike Interval	Scheme of strike to be introduced
upto 2000	50	4-1-4
>2001 upto 4000	100	6-1-6
>4001 upto 6000	100	6-1-6
>6000	100	7-1-7

The above strike parameters scheme shall be applicable for all Long terms contracts also.

Top

Trading Parameters

Contract size
The value of the option contracts on Nifty may not be less than Rs. 2 lakhs at the time of introduction. The permitted lot size for futures contracts & options contracts shall be the same for a given underlying or such lot size as may be stipulated by the Exchange from time to time.

Price steps
The price step in respect of S&P CNX Nifty options contracts in Re.0.05.

Base Prices
Base Prices of the options contracts, on introduction of new contracts, would be the theoretical value of the options contract arrived at based on Black-Scholes model of calculation of options premiums.

The options price for a call, computed as per the following Black Scholes.

Formula:
$C = S * N(d_1) - X * e^{-rt} * N(d_2)$

and the price for a put is : $p = * e^{-rt * N}(d_2) - S * N(-d_1)$

Where :

$d_1 = [\ 1n\ (S / X) + (r + o^2 / 2) * t] / o * sqrt\ (t)$

$d_2 = [1n\ (S / X) + (r- o^2 / 2) * t] / o * sqrt(t)$

$= d_1 \ ^{-} Q * sqrt(t)$

C = price or a call option
P = price of a put option
S = price of the underlying asset
X= Strike price of the option
r = rate of interest
t = time to expiration
o = volatility of the underlying

N represents a standard normal distribution with mean = o and standard deviation = 1
In represents the natural logarithm of a number. Natural logarithms are based on the constant e (2.71828182845904).

Rate of interest may be the relevant MIBOR rate or such other rate as may be specified.

The base price of the contracts on subsequent trading days, will be the daily close price of the options contracts. The closing price shall be calculated as follows:

- If the contract is traded in the last half an hour, the closing price shall be the last half an hour weighted average price.

- If the contract is not traded in the last half an hour, but traded during any time of the day, then the closing price will be the last traded price (LTP) of the contract.

If the contract is not traded for the day, the base price of the contract for the next trading day shall be the theoretical price of the options contract arrived at based on Black-Scholes model of calculation of options premiums.

Price bands

Quantity freeze
Orders which may come to the exchange as quantity freeze shall be such that have a quantity of more than 15000. In respect of orders which have come under quantity freeze, members would be required to confirm to the Exchange that there is no inadvertent error in the order entry and that the order is genuine. On such confirmation, the Exchange may approve such

order. However, in exceptional cases, the Exchange may, at its discretion, not allow the orders that have come under quantity freeze for execution for any reason whatsoever including non-availability of turnover / exposure limit. In all other cases, quantity freeze orders shall be cancelled by the Exchange.

- Order type / Order book / Order attributes
- Regular lot order
- Stop loss order
- Immediate or cancel
- Spread order

Q.19 Write down a contract specification Futures on Individual Securities?

Ans

A futures contract is a forward contract, which is traded on an Exchange. NSE Commenced trading in futures on individual securities on November 9, 2001. The futures contracts are available on 196 Securities stipulated by the Securities & Exchange Board of India (SEBI). (Selection Criteria_____ for _____ Securities)

NSE defines the characteristics of the futures contract such as the underlying security, market lot, and the maturity date of the contract. The futures contracts are available for trading from introduction to the expiry date.

- Contract Specifications
- Trading Parameters

Contract Specifications

Security descriptor
The security descriptor for the futures contracts is:

Market type: N
Instrument Type: FUTSTK
Underlying: Symbol of underlying security
Expiry date : Date of contract expiry
Expiry date : Date of contract expiry

Instrument type represents the instrument i.e. Futures on Index.
Underlying symbol denotes the underlying security in the Capital Market (equities) segment of the Exchange
Expiry date identifies the date of expiry of the contract
Underlying Instrument
Futures contracts are available on 196 securities stipulated by the Securities & Exchange Board of India (SEBI). These securities are traded in the Capital Market segment of the Exchange.

Trading cycle
Futures contracts have a maximum of 3-month trading cycle – the near month (one), the next month (two) and the far month (three). New contracts are introduced on the trading day following the expiry of the near month contracts. The new contracts are introduced for a three month duration. This way, at any point in time, there will be 3 contracts available for trading in the market (for each security) i.e., one near month, one mid month and one far month duration respectively.

Expiry day
Futures contracts expire on the last Thursday of the expiry month. If the last Thursday is a trading holiday, the contracts expire on the previous trading day.

Trading Parameters
Contract size
The value of the futures contracts on individual securities may not be less than Rs. 2 lakhs at the time of introduction for the first time at any exchange. The permitted lot size for futures contracts & options contracts shall be the same for a given underlying or such lot size as may be stipulated by the Exchange from time to time.

Price steps
The price step in respect of futures contracts in Re.0.05.

Base Prices
Base price of futures contracts on the first day of trading (i.e. on introduction) would be the theoretical futures price. The base price of the contracts on subsequent trading days would be the daily settlement price of the futures contracts.

Price bands

There are no day minimum / maximum price ranges applicable for futures contracts. However, in order to prevent erroneous order entry by trading members, operating ranges are kept at + / -20 %. In respect of orders which have come under price freeze, members would be required to confirm to the Exchange that there is no inadvertent error in the order entry and that the order is genuine. On such confirmation the Exchange may approve such order.

Quantity freeze

Orders which may come to the exchange as a quantity freeze shall be based on the notional value of the contract of around Rs. 5 crores. Quantity freeze is calculated for each underlying on the last trading day of each calendar month and is applicable though the next calendar month. In respect of orders which have come under quantity freeze, members would be required to confirm to the Exchange that there is no inadvertent error in the order entry and that the order is genuine. On such confirmation, the Exchange may approve such order. However, in exceptional cases, the exchange may, at its discretion, not allow the orders that have come under quantity freeze for execution for any reason whatsoever non-availability of turnover / exposure limits.

Order type / Order book / Order attribute

- Regular lot order
- Stop loss order
- Immediate or cancel
- Spread order

Trading parameters

Contract size

The value of the futures contracts on individual securities may not be less than Rs. 2 lakhs at the time of introduction for the first time at any exchange. The permitted lot size for futures contracts & options contracts shall be the same for a given underlying or such lot size as may be stipulated by the Exchange from time to time.

Be stipulated by the Exchange from time to time.

Price steps

The price step in respect of futures contracts is Re.0.05.

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Base price of futures contracts on the first day of trading (i.e.on introduction) would be the theoretical futures price. The base price of the contracts on subsequent trading days would be the daily settlement price of the futures contracts.

Price bands

There are no day minimum / maximum price ranges applicable for futures contracts. However, in order to prevent erroneous order entry by trading members, operating ranges are kept at +/-20%. In respect of orders which have come under price freeze, members would be required to confirm to the Exchange that there is no inadvertent error in the order entry and that the order is genuine. On such confirmation the Exchange may approve such order.

Quantity freeze

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Order type/Order book/Order attribute

- Regular lot order
- Stop loss order
- Immediate or cancel
- Spread order

Q.20 How Trading Takes Place at NSE regarding Future and Option?

Ans Trading

NSE introduced for the first time in India, fully automated screen based trading, It uses a modern, fully computerized trading system designed to offer investors across the length and breadth of the country a safe and easy way to invest.

The NSE trading system called 'National Exchange for Automated Trading' (NEAT) is a fully automated screen based trading system, which adopts the principle of an order driven market.

Trading System

The Futures and Options Trading System provides a fully automated trading environment for screen-based, floor-less trading on a nationwide basis and an online monitoring and surveillance mechanism. The system supports an order driven market and provides complete transparency of trading operations.

Orders, as and when they are received, are first time stamped and then immediately processed for potential match. If a match is not found, then the orders are stored in different'. books. Orders are stored in price-time priority in various books in the following sequence:

- Best price
- Within price, by time priority.

- Order Matching Rules
- Order Conditions

Order matching Rules

The best buy order will match with the best sell order. An order may match partially with another order resulting in multiple traders. For order matching, the best buy order is the one with highest price and the best sell order is the one with lowest price. This is because the computer views all buy orders available from the point of view of a seller and all sell orders from the point of view of the buyers in the market. So, of all buy orders available in the market at any point of time, a seller would obviously like to sell at the highest possible buy price that is offered. Hence, the best buy order is the order with highest price and vice-versa.

Members can pro actively enter orders in the system which will be displayed in the system till the full quantity is matched by one or more of counter-orders and result into trade(s). Alternatively members may be reactive and put in orders lying unmatched in the system are 'passive' orders and orders that come in to match the existing orders are called 'active' orders. Orders are always matched at the passive order price. This ensures that the earlier orders get priority over the orders that come in later.

Order Conditions

A Trading Member can enter various types of orders depending upon his/her requirements. These conditions are broadly classified into 2 categories: time related conditions and price-related conditions.

Time Conditions
DAY – A day order, as the name suggests, is an order which is valid for the day on which it is entered. If the order is not matched during the day, the order gets cancelled automatically at the end of the trading day.
IOC- An Immediate or Cancel (IOC) order allows a Trading Member to buy or sell a security as soon as the order is released into the market, failing which the order will be removed from the market. Partial match is possible for the order, and the unmatched portion of the order is cancelled immediately.

Price Conditions

Limit price / Order-An order that allows the price to be specified while entering the order into the system.

Market price/Order - An order to buy or sell securities at the best price obtainable at the time of entering the order.

Stop Loss (SL) Price/Order – The one that allows the Trading member to place an order which gets activated only when the market price of the relevant security reaches or crosses a threshold price. Until then the order does not enter the market.

A sell order in the Stop Loss book gets triggered when the last traded price in the normal market reaches or falls below the trigger price of the order. A buy order in the Stop Loss book gets triggered when the last traded price in the normal market reaches or exceeds the trigger price of the order.

E.g. If for stop loss buy order, the trigger is 93.00, the limit price is 95.00 and the market (last traded) price is 90.00, then this order is released into the system one the market price reached or exceeds 93.00. This order is added to the regular lot book with time of triggering as the time stamp, as a limit order of 95.00

Price Bands

There are no day minimum / maximum price ranges applicable in the derivatives segment. However, in order to prevent erroneous order entry, operating ranges and day minimum/maximum ranges are kept as below:

For Index Futures: at 10% of the base price
For Futures on Individual Securities: at 20% of the base price
For Index and stock Options: A contract specific price range based on its delta value is computed and updated on a daily basis.
In view of this, orders placed at prices which are beyond the operating ranges would reach the Exchange as a price freeze.

Q.21 How Clearing & Settlement of Derivatives takes place at NSE?

Ans

National Securities Clearing Corporation Limited (NSCCL) is the clearing and settlement agency for all deals executed on the Derivatives (Futures & Options) segment, NSCCL acts as legal counter-party to all deals on NSE's F&O segment and guarantees settlement.

A clearing Member (CM) of NSCCL has the responsibility of clearing and settlement of all ldeals executed by Trading Members (TM) on NSE, who clear and settle such deals through them.

Clearing Members

A Clearing Member (CM) of NSCCL has the responsibility of clearing and settlement of all deals executed by Trading Members (TM) on NSE, who clear and settle such deals through them. Primarily, the CM performs the following functions:

1. Clearing – Computing obligations of all his TM's i.e. determining positions to settle.
2. Settlement – Performing actual settlement. Only funds settlement is allowed at present in Index as well as Stock futures and options contracts
3. Risk Management – Setting position limits based on upfront deposits / margins for each TM and monitoring positions on a continuous basis.

Types of Clearing Members

- Trading member clearing member (TM-CM) A Clearing Member who is also a TM. Such CMs may clear and settle their own proprietary traders, their clients' trades as well as trades of other TM's & Custodial participants
- Professional Clearing Member (PCM) a Cm who is not a TM. Typically banks or custodians could become a PCM and clear and settle for TM's as well as of the Custodial Participants
- Self Clearing Member (SCM) A Clearing Member who is also a TM. Such CMs may clear and settle only their own proprietary trades and their clients' trades but cannot clear and settle trades of other TM's.

Clearing member Eligibility Norms

- Net worth of at least Rs. 300 lakhs. The net worth requirement for a CM who Clears and settles only deals executed by him is Rs. 100 lakhs.

- Deposit of Rs. 50 Lakhs to NSCCL which forms part of the security deposit of the CM

- Additional incremental deposits of Rs. 10 lakhs to NSCCL for each additional TM in case the CM undertakes to clear and settle deals for other Tms.

Clearing Mechanism

A Clearing Member's open position is arrived by aggregating the open position of all the Trading Members (TM) and all custodial participants clearing through him. A TM's open position in turn includes his proprietary open position and clients' open positions.

a. Proprietary / Clients' Open position

While entering orders on the trading system, TMs are required to identify them as proprietary (if they are own trades) or client (if entered on behalf of clients) through 'pro / Cli' indicator provided in the order entry screen. The proprietary positions are calculated on net basis (buy – sell) and client positions are calculated on gross of net positions of each client i.e., a buy trade is off-set by a sell trade and a sell trade is off-set by a buy trade.

b. Open position: open position for the proprietary positions are calculated separately from client position.

For example,
For a CM – XYZ, with TMs clearing through him – ABC and PQR

		Proprietary Position			Client 1			Client 2			Net Member
TM	Security	Buy Qty	Sell Qty	Net Qty	Buy Qty	Sell Qty	Net Qty	Buy Qty	Sell Qty	Net Qty	
ABC	NIFTY January Contract	4000	2000	2000	3000	1000	2000	4000	2000	2000	Long 6000
PQR	NIFTY January Contract	2000	3000	(1000)	2000	1000	1000	1000	2000	(1000)	Long 1000 Short 2000

XYZ's open position for Nifty January Contract is :

Member	Long Position	Short Position
ABC	6000	0
PQR	1000	2000
Total for XYZ	7000	2000

Settlement Schedule

The settlement of trades is on T+1 working day basis.

Members with a funds pay-in obligation are required to have clear funds in their primary clearing account. On or before 10.30 a.m. on the settlement day. The payout of funds is credited to the primary clearing account of the members thereafter.

Settlement price

Product	Settlement	Schedule
Futures Contracts Index Individual Security	Daily Settlement	Closing price of the futures contracts on the trading day. (closing price for a futures contract shall be calculated on the basis of the last half an hour weighted average price of such contract)
Un-expired illiquid futures Contracts	Daily Settlement	Theoretical Price computed as per formula F=s * ert
Futures Contracts on Index individual Securities	Final Settlement	Closing price of the relevant underlying index / Security in the Capital Market segment of NSE, on the last trading day of the futures contracts.
Options Contracts Individual Securities	Interim Exercise Settlement	Closing price of such underlying Security on the day of exercise of the options contract.

Options Contracts Index Individual Securities	Final Exercise Settlement	Closing price of such underlying security (or index) on the last trading day of the options contract.

Q.22 Discuss Daily Mark-to- Market Settlement?

Ans

The positions in the futures contracts for each member is marked-to-market to the daily settlement price of the futures contracts at the end of each trade day.

The profits/losses are computed as the difference between the trade price or the previous day's settlement price, as the case may be, and the current day's settlement price. The CMs who have suffered a loss are required to pay the mark-to-market loss amount to NSCCL which is passed on to the members who have made a profit. This is known as daily mark-to market settlement.

Theoretical daily settlement price for unexpired futures contracts, which are not traded during the last half an hour on a day, is currently the price computed as per the formula detailed below:

$F = S * e^{rt}$

Where:
F = theoretical futures price
S = Value of the underlying index
r = rate of interest (MIBOR)
t = time to expiration

Rate of interest may be the relevant MIBOR rate or such other rate as may be specified.

After daily settlement, all the open positions are reset to the daily settlement price.

CMs ar responsible to collect and settle the daily mark to market profits / losses incurred by the TMs and their clients clearing and settling through them. The pay-in and pay-out of the mark –to-market settlement is on T+1 days (T= Trade day). The mark to market losses or profits are directly debited or credited to the CMs clearing bank account.

Option to settle Daily MTM on T+o day

Clearing members may opt to pay daily mark to market settlement on a T+o basis. The option can be exercised once in a quarter (Jan-March, Apr-June, Jul-Sep & Oct-Dec). The option once exercised shall remain irrevocable during that quarter. Clearing members who wish to opt to pay daily mark to market settlement on T+o basis shall intimate the Clearing Corporation as per the format specified in specified format.

Clearing members who opt for payment of daily MTM settlement amount on a T+o basis shall not be levied the scaled up margins.

The pay-out of MTM settlement shall continue to be done on T+1 day basis.

Final Settlement

On the expiry of the futures contracts, NSCCL marks all positions of a CM to the final settlement price and the resulting profit / loss is settled in cash.

The final settlement of the futures contracts is similar to the daily settlement process except for the method of computation of final settlement price. The final settlement profit / loss is computed as the difference between trade price or the previous day's settlement price, as the case may be, and the final settlement price of the relevant futures contract.

Final settlement loss / profit amount is debited / credited to the relevant CMs clearing bank account on T+1 day (T= expiry day.)

Open positions in futures contracts cease to exist after their expiration day

Settlement Procedure

Daily MTM settlement on T+0 day

Clearing members who opt to pay the daily MTM settlement on a T+o basis would compute such settlement amounts on a daily basis and make the amount of funds available in their clearing account before the end of day on T+o day. Failure to do so would tantamount to non payment of daily MTM settlement on a T+o basis. Further, Partial payment of daily MTM

Settlement would also be considered as non payment of daily MTM settlement on a T+o basis. These would be construed as non compliance and penalties applicable for fund shortages from time to time would be levied.

A Penalty of 0.07% of the margin amount at end of day on T+o would be levied on the clearing members. Further the benefit of scaled down margins shall not be available in case of non payment of daily MTM settlement on a T+o basis from the day of such default to the end of the relevant quarter.

Q.23 Explain Settlement Mechanism of NSE?

Ans

Options Contracts on Index or individual Securities

Daily premium Settlement

Premium settlement is cash settled and settlement style is premium style. The premium payable position and premium receivable positions are netted across all option contracts for each CM at the client level to determine the net premium payable or receivable amount, at the end of each day.

The CMs who have a premium payable position is required to pay the premium amount of NSCCL which is in turn passed on to the members who have a premium receivable position. This is known as daily premium settlement.

CMs are responsible to collect and settle for the premium amounts from the TMs and their clients clearing and settling through them.

The pay-in and pay-out of the premium settlement is on T+1 day (T = Trade day). The premium payable amount and premium receivable amount are directly debited or credited to the CMs clearing bank account.

Interim Exercise Settlement for Options on individual Securities

Interim exercise settlement for option contracts on Individual Securities is effected for valid exercised option positions at in-the-money strike prices, at the close of the trading hours, on the day of exercise. Valid exercised option contracts are assigned to short positions in option contracts with the same series, on a random basis. The interim exercise settlement value is the difference between the strike price and the settlement price of the relevant option contract.

Exercise settlement value is debited / credited to the relevant CMs Clearing bank account on T+1 day (T= exercise date).

Open positions, in option contracts, cease to exist after they are exercised.

Final Exercise Settlement

Final Exercise settlement is effected for option positions at in the money strike prices existing at the close of trading hours, on the expiration day of an option contract. Long positions at in-the money strike prices are automatically assigned to short positions in option contracts with the same series, on a random basis.

For index options contracts, exercise style is European style, while for options contracts on individual securities, exercise style is American style. Final Exercise is Automatic on expiry of the option contracts.

Option contracts, which have been exercised, shall be assigned and allocated to Clearing Members at the client level.

Exercise settlement is cash settled by debiting / crediting of the clearing accounts of the relevant
Clearing accounts of the relevant Clearing Members with the respective Clearing Bank.

Final settlement loss/ profit amount for option contracts on index is debited / credited to the relevant CMs clearing bank account on T+1 day (T = expiry day).

Final settlement loss / profit amount for option contracts on individual Securities is debited / credited to the relevant CMs clearing bank account on T+1 day (T = expiry day).

Open positions, in option contracts, case to exist after their expiration day.

The pay-in / pay-out of funds for a CM on a day is the net amount across settlements and all TMs / clients, in F&O Segment.

Q.24 What is Securities Transaction Tax?

Ans STT Computation

As per the Finance Act 2004, and modified by Finance Act 2008 (18 of 2008) STT on the transactions executed on the Exchange shall be as under:

Sr.No.	Taxable securities transaction	New rate from 01.06.2008	Payable By
A	B	C	D
a	Sale of an option in securities	0.017 percent	Seller
b	Sale of an option in securities, where option is exercised	0.125 percent	Purchaser
c	Sale of a futures in securities	0.017 percent	Seller

a. Value of taxable securities transaction relating to an "option in securities" shall be the option premium, in case of sale of an option in securities.

b. Value of taxable securities transaction relating to an "option in Securities" shall be the settlement price, in case of sale of an option in securities, where option is exercised.

The Following procedure is adopted by the Exchange in respect of the calculation and collection of STT.

1. STT is applicable on all sell transactions for both futures and option contracts.
2. For the purpose or STT, each futures trade is valued at the actual traded price and option trade is valued at premium. On this value, the STT rate as prescribed is applied to determine the STT liability. In case of voluntary or final exercise of an option contract STT is levied on settlement price on the day of exercise if the option contract is in the money.
3. STT payable by the clearing member is the sum total of STT payable by all trading members clearing under him. The trading member's liability is the aggregate STT liability of clients trading through him.

Unit 3

Q.25 Explain in brief Option Strategy:

Ans

Option Strangle (Long Strangle)

The long strangle, also known as buy strangle or simply "strangle", is a neutral strategy in options trading that involve the simultaneous buying of a slightly out-of-the-money put and a slightly out-of-the-money call of the same underlying stock and expiration date.

Long Strangle Construction
Buy 1 OTM Call Buy 1 OTM put

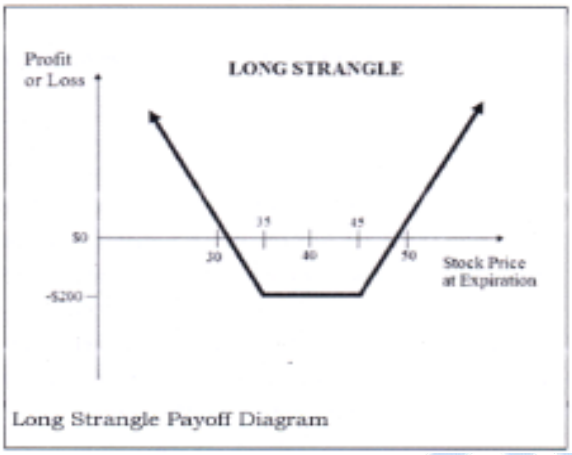
The long options strangle is an unlimited profit, limited risk strategy that is taken when the options trader thinks that the underlying stock will experience significant volatility in the near term. Long strangles are debit spreads as a net debit is taken to enter the trade.

Unlimited Profit Potential

Large gains for the long strangle option strategy is attainable when the underlying stock price makes a very strong move either upwards or downwards at expiration.

The formula for calculating profit is given below:

- Maximum profit = Unlimited
- Profit Achieved When price of Underlying > Strike Price of Long Call + Net Premium paid OR Price of Underlying < Strike Price of Long put- Net Premium paid
- Profit = Price of Underlying – Strike price of Long Call – Net Premium paid OR Strike Price of Long put – Price of Underlying – Net premium paid



Long Strangle Payoff Diagram

Limited Risk

Maximum loss for the long strangle options strategy is hit when the underlying stock price on expiration date is trading between the strike prices of the options bought. At this price, both options expire worthless and the options trader loses the entire initial debit taken to enter the trade.

The formula for calculating maximum loss is given below:

- Max Loss = Net Premium paid + Commissions paid
- Max Loss Occurs When price of Underlying is in between Strike price of Long Call and Strike price of Long put

Breakeven point(S)

There are 2 break-even points for the long strangle position. The breakeven points can be calculated using the following formulae.

- Upper Breakeven point = Strike price of Long Call + Net Premium paid
- Lower Breakeven point = Strike price of Long put – Net Premium paid

Example

Suppose XYZ stock is trading at $40 in June. An options trader executes a long strangle by buying a JUL 35 put for $ 100 and a JUL 45 Call for $ 100. The net debit taken to enter the trade is $200, which is also his maximum possible loss.
If XYZ stock rallies and is trading at $50 on expiration in July, the JUL 35 put will expire worthless but the JUL 45 call expires in the money and has an intrinsic value of &500. Subtracting the initial debit of $200, the options trader's profit comes to $300.
On expiration in july, if XYZ stock is still trading at $40, both the JuL 35 put and the JUL 45 Call expire worthless and the options trader suffers a maximum losss which is equal to the initial debit of $200 taken to enter the trade.

Short Strangle (Sell Strangle)

Short strangle, also known as sell strangle, is a neutral strategy in options trading that involve the simultaneous selling of a slightly out-of-the-money put and a slightly out-of-the –money call of the same underlying stock and expiration date.

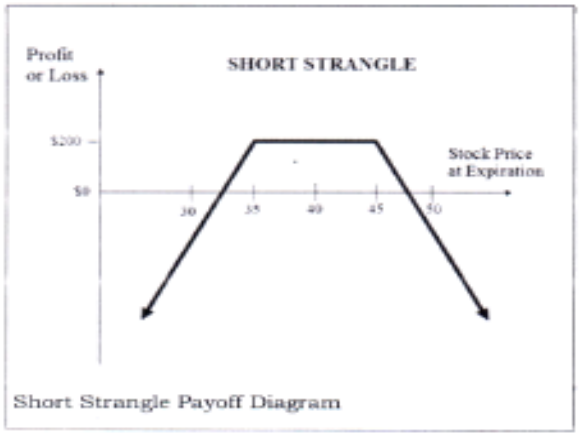
Long Strangle Construction
Sell 1 OTM Call Sell 1 OTM put

The short strangle option strategy is a limited profit, unlimited risk options trading strategy that is taken when the options trader thinks that the underlying stock will experience little volatility in the near term. Short strangles are credit spreads as a net credit is taken to enter the trade.

Limited profit

Maximum profit for the short strangle occurs when the underlying stock price on expiration date is trading between the strike prices of the options sold. At this price, both options expire worthless and the options trader gets to keep the entire initial credit taken as profit.
The formula for calculating maximum profit is given below:

- Max Profit = Net Premium Received – Commissions paid
- Max Profit Achieved When price of Underlying is in between the Strike Price of the Short Call and the Strike price of the Short put



Short Strangle Payoff Diagram

Unlimited Risk

Large losses for the short strangle can be experienced when the underlying stock price makes a strong move either upwards or downwards at expiration.
The formula for calculating loss is given below:

- Maximum Loss = Unlimited
- Loss Occurs When price of Underlying > Strike price of short call + net premium Received OR price of Underlying < Strike price of Short Put – Net Premium Received
- Loss = Price of Underlying – Strike price of Short Call – Net Premium Received OR Strike price of Short put – price of Underlying – Net Premium Received + Commissions paid

Breakeven point(s)

There are 2 break-even points for the short strangle position. The breakeven points can be calculated using the following formulae.

- Upper Breakeven point = Strike price of short call + Net premium Received
- Lower Breakeven point = Strike price of Short put – Net Premium Received

Example

Suppose XYZ Stock is trading at $40 in June. An options trader executes a short strangle by selling a JUL 35 put for $ 100 and a JUL 45 call for $100. The net credit taken to enter the trade is $200, which is also his maximum possible profit.
If XYZ stock rallies and is trading at $50 on expiration in July, the JUL 35 put will expire worthless but the JUL 45 Call expires in the money and has an intrinsic value of $500. Subtracting the initial credit of $200, the options trader's loss comes to $300.
On expiration in July, if f XYZ stock is still trading at $40, both the JUL 35 put and the JUL 45 call expire worthless and the options trader gets to keep the entire initial credit of $200 taken to enter the trade as profit.

Strip

The strip is a modified, more bearish version of the common straddle. IT involves buying a number of at-the-money calls and twice the number of puts of the same underlying stock, striking price and expiration date.

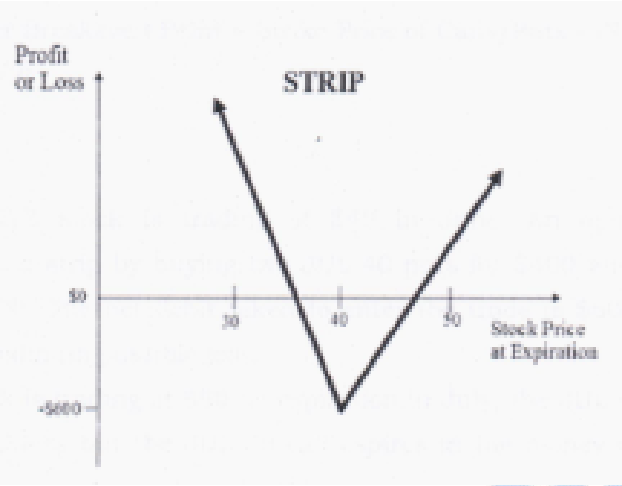
Strip Construction
Buy 1 ATM Call Buy1 ATM Puts

Strips are unlimited profit, limited risk options trading strategies that are used when the options trader thinks that the underlying stock price will experience significant volatility in the near term and is more likely to plunge downwards instead of rallying.

Unlimited Profit Potential

Large profit is attainable with the strip strategy when the underlying stock price makes a strong move either upwards or downwards at expiration, with greater gains to be made with a downward move.
The formula for calculating profit is given below:

- Maximum profit = Unlimited
- Profit Achieved when price of underlying > Strike Price of Calls/Puts + Net Premium Paid OR Price of Underlying < Strike Price of Calls / Puts – (Net Premium Paid / 2)
- Profit = Price of Underlying – Strike Price of Calls – Net Premium paid OR 2 x (Strike price of puts of underlying) – Net



Strip Payoff Diagram

Limited Risk

Maximum loss for the strip occurs when the underlying stock price on expiration date is trading at the strike price of the call and put options purchased. At this price, all the options expire worthless and the options trader loses the entire initial debit taken to enter the trade. The formula for calculating maximum loss is given below:

- Max Loss = Net Premium paid + Commissions Paid
- Max Loss Occurs When Price of Underlying = Strike Price of Calls / Puts

Breakeven Point(S)

There are 2 break-even points for the strip position. The breakeven points can be calculated using the following formulae.

- Upper Breakeven point = Strike Price of Calls / Puts + Net Premium paid
- Lower Breakeven point = Strike Price of Calls / Puts – (Net Premium paid /2)

Example

Suppose XYZ stock is trading at $40 in June. An options trader implements a strip by buying two JUL 40 puts for $400 and a JUL 40 Call for $200. The net debit taken to enter the trade is $600, which is also his maximum possible loss.

If XYZ stock is trading at $50 on expiration in July, the JUL 40 puts will expire worthless but the JUL 40 call expires in the money and has an intrinsic value of $1000. Subtracting the initial debit of $600, the strip's profit comes to $400.
If XYZ stock price plunges to $30 on expiration in JULY, the JUL 40 call will expire worthless but the two JUL 40 puts will expire in-the-money and possess intrinsic value of $1000 each. Subtracting the initial debit of $600, the strip's profit comes to $1400.
On expiration in July, If XYZ stock is still trading at $40, both the JUL 40 puts and the JUL 40 call expire. Worthless and the strip suffers its maximum loss which is equal to the initial debit of $600 taken to enter the trade.

Strap

The strap is a modified, more bullish version of the common straddle. It involves buying a number of at-the-money puts and twice the number of calls of the same underlying stock, striking price and expiration date.

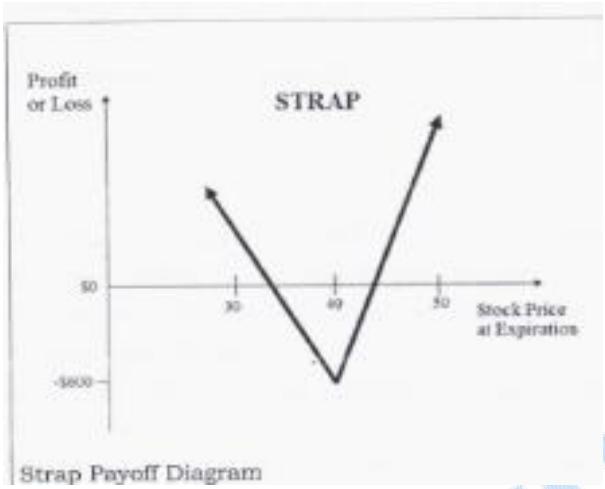
Strip Construction
Buy 1 ATM Call Buy1 ATM Put

Straps are unlimited profit, limited risk options trading strategies that are used when the options trader thinks that the underlying stock price will experience significant volatility in the near term and is more likely to rally upwards instead of plunging downwards.

Unlimited Profit Potential

Large profit is attainable with the strap strategy when the underlying stock price makes a strong move either upwards of downwards at expiration, with greater gains to be made with an upward move.
The formula for calculating profit is given below:

- Maximum Profit = Unlimited
- Profit Achieved When Price of Underlying > Strike Price of Calls/Puts +(Net Premium Paid/2) OR Price of Underlying < Strike Price of Calls/Puts –Net Premium Paid
- Profit = 2 x (Price of Underlying – Strike Price of Calls) – Net Premium Paid OR Strike price of Puts – Price of Underlying –Net Premium paid



Limited Risk

Maximum loss for the strap occurs when the underlying stock price on expiration date is trading at the strike price of the call and put options purchased. At this price, all the options expire worthless and the options trader losses the entire initial debit taken to enter the trade. The formula for calculating maximum loss is given below:

- Max Loss = Net Premium Paid + Commissions Paid
- Max Loss Occurs When Price of Underlying = Strike price of Calls/Puts

Breakeven Pont (s)

There are 2 break-even points for the strap position. The breakeven points can be calculated using the following formulae.

- Upper Breakeven Point = Strike Price of Calls /Puts + (Net Premium Paid / 2)
- Lower Breakeven point = Strike Price of Calls / Puts – Net Premium paid

Example

Suppose XYZ stock is trading at $40 in June. An options trader implements a strap by buying two JUL 40 Calls for $400 and a JUL 40 put for $200. The net debit taken to enter the trade is $600, which is also his maximum possible loss.
If XYZ stock price plunges to $30 on expiration in JUL 40 calls well expire worthless but the JUL 40 put will expire in-the-money and possess intrinsic value of $1000. Subtracting the initial debit of $600, the strap's profit comes to $400.
If XYZ stock is trading at $50 on expiration in July, the JUL 40 put will expire worthless but the two JUL 40 calls expires in the money and has an intrinsic value of $1000 each. Subtracting the initial debit of $600, the strap's profit comes to $1400.
On expiration in July, if XYZ stock is still trading at $40, both the JUL 40 put and the JUL 40 calls expire worthless and the strap suffers its maximum loss which is equal to the initial debit of $600 taken to enter the trade.

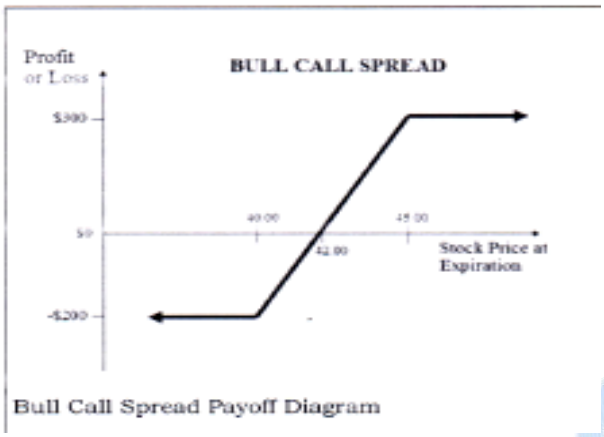
Bullish Trading Strategies
Bullish strategies in options trading are employed when the options trader expects the underlying stock Price to move upwards. It is necessary to assess how high the stock price can go and the timeframe in which the rally will occur in order to select the optimum trading strategy.

Bull Call Spread
The bull call spread option trading strategy is employed when the options trader thinks that the price of the underlying asset will go up moderately in the near term.

Bull call spreads can be implemented by buying an at-the-money call option while simultaneously writing a higher striking out-of-the-money call option of the same underlying security and the same expiration month.

Strip Construction
Buy 1 ATM Call Sell 1 OTM Call

By shorting the out-of-the-money call, the options trader reduces the cost of establishing the bullish position but forgoes the chance of making a large profit in the event that the underlying asset price skyrockets. The bull call spread option strategy is also known as the bull call debit spread as a debit is taken upon entering the trade.



Bull Call Spread Payoff Diagram

Limited Upside profits

Maximum gain is reached for the bull call spread options strategy when the stock price move above the higher strike price of the two calls and it is equal to the difference between the strike price of the two call option's minus the initial debit taken to enter the position.
The formula for calculating maximum profit is given below:

- Max Profit = Strike Price of Short Call – Strike Price of Long Call –Net Premium Paid – Commissions Paid
- Max Profit Achieved When Price of Underlying >= Strike price of Short Call

Limited Downside risk

The bull call spread strategy will result in a loss if the stock price declines at expiration. Maximum loss cannot be more than the initial debit taken to enter the spread position.

The formula for calculating maximum loss is given below:

- Max Loss = Net Premium Paid + Commissions Paid
- Max Loss Occurs When Price of Underlying <= Strike Price of Long Call

Breakeven point(s)

The underlie price at which break-even is achieved for the bull call spread position can be calculated using the following formula.

- Breakeven Point = Strike Price of Long Call + Net Premium Paid

Bull Call Spread Example

An options trader believes that XYZ stock trading at $42 is going to rally soon and enters a bull call spread by buying a JUL 40 call for $300 and writing a JUL 45 Call for $100. The net investment required to put on the spread is a debit of $200.
The stock price of XYZ begins to rise and closes at $46 on expiration date. Both options expire in-the-money with the JUL 40 call having an intrinsic Value of $600 and the JUL 45 Call having an intrinsic value of $100. This means that the spread is now worth $500 at expiration. Since the trader had a debit of $200 when he bought the spread, his net profit is $300.
If the price of XYZ had declined to $38 instead, both options expire worthless, The trader will lose his entire investment of $200, which is also his maximum possible loss.
Note: While we have covered the use of this strategy with reference to stock options, the bull call spread is equally applicable using ETF options, index options as well as options on futures.

Bull Put Spread
The bull put spread option trading strategy is employed when the options trader thinks that the price of the underlying asset will go up moderately in the near term. The bull put spread options strategy is also known as the bull put credit spread as a credit is received upon entering the trade.

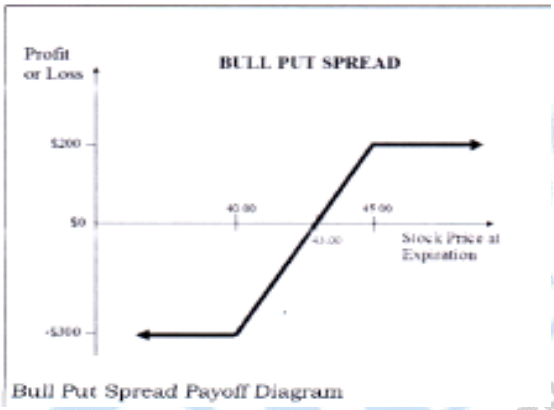
Bull Put Strip Construction
Buy 1 OTM Call Sell 1 ITM Put

Bull put spreads can be implemented by selling a higher striking in-the-money put option and buying a lower striking out-of-the-money put option on the same underlying stock with the same expiration date.

Limited Upside Profit

If the stock price closes above the higher strike price on expiration date, both options expire worthless and the bull put spread option strategy earns the maximum profit which is equal to the credit taken in when entering the position.
The formula for calculating maximum profit is given below:

- Max Profit = Net Premium Received – Commissions Paid
- Max Profit Achieved When price of Underlying >= Strike price of Short put



Bull Put Spread Payoff Diagram

Limited Downside Risk

If the stock price drops below the lower strike price on expiration date, then the bull put spread strategy incurs a maximum loss equal to the difference between the strike prices of the two puts minus the net credit received when putting on the trade.

- Max Loss = Strike Price of Short Put – Strike Price of Long Put Net Premium Received + Commissions Paid
- Max Loss Occurs When Price of Underlying <= Strike Price of Long put

Breakeven Point(s)

The underlier price at which break-even is achieved for the bull put spread position can be calculated can be calculated using the following formula.

- Breakeven Point = Strike price of Short Put - Net Premium Received

Bull Put Spread Example

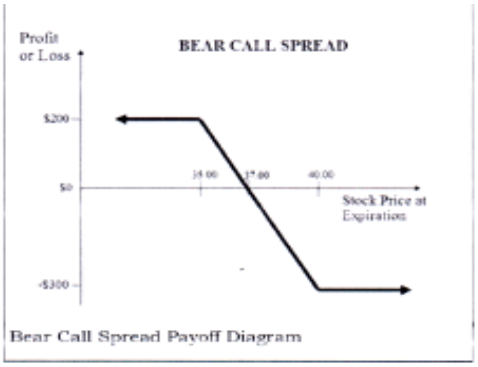
An options trader believes that XYZ stock trading at $43 is going to rally soon and enters a bull put spread by buying a JUL 40 put for $100 and writing a JUL 45 put for $300. Thus the trader receives a net credit of $200 when entering the spread position.
The stock price of XYZ begins to rise and closes at $46 on expiration date. Both options expire worthless and the options trader keeps the entire credit of $200 as profit, which is also the maximum profit possible. If the price of XYZ had declined to $38 instead, both options expire in-the-money with the JUL 40 Call having an intrinsic value of $200 and the JUL 45 Call having an intrinsic value of $700. This means that the spread is now worth $500 at expiration. Since the trader had received a credit of $200 when he entered the spread, his net loss comes to $300.
This is also his maximum possible loss.
Note: While we have covered the use of this strategy with reference to stock options, the bull put spread is equally applicable using ETF options, index options as well as options on futures.

Bearish Trading Strategies
Bearish strategies in options trading are employed when the options trader expects the underlying stock price to move downwards. It is necessary to assess how low the stock price can go and the timeframe in which the decline will happen in order to select the optimum trading strategy.

Bear Call Spread
He bear call spread option trading strategy is employed when the options trader thinks that the price of the underlying asset will go down moderately in the near term.
The bear call spread option strategy is also known as the bear call credit spread as a credit is received upon entering the trade.

Bear Call Spread Construction
Buy 1 OTM Call Sell 1 ITM Call

Bear Call Spreads can be implemented by buying call options of a certain strike price and selling the same number of call options of lower strike price on the same underlying security expiring in the same month.



Bear Call Spread Payoff Diagram

Limited Downside Profit

The maximum gain attainable using the bear call spread options strategy is the credit received upon entering the trade. To reach the maximum profit, the stock price needs to close below the strike price of the lower striking call sold at expiration date where both options would expire worthless.
The formula for calculating maximum profit is given below:

- Max Profit = Net Premium Received – Commissions Paid
- Max Profit Achieved When Price of Underlying <= Strike Price of Short Call

Limited Upside Risk

If the stock price rise above the strike price of the higher strike call at the expiration date, then the bear call spread strategy suffers a maximum loss equals to the difference in strike price between the two options minus the original credit taken in when entering the position.
The formula for calculating maximum loss is given below:

- Max Loss = Strike Price of Long Call – Strike Price of Short Call – Net Premium Received + Commissions Paid
- Max Loss Occurs When Price of Underlying >= Strike Price of Long Call

Breakeven Point(s)

The underlier price at which break-even is achieved for the bear call spread position can be calculated using the following formula.

- Breakeven Point = Strike Price of Short Call + Net Premium Received

Bear Call Spread Example

Suppose XYZ stock is trading at $37 in June. An options trader bearish on XYZ decides to enter a bear call spread position by buying a JUL 40 Call for $100 and selling a JUL 35 Call for $300 at the same time, giving him a net $200 credit for entering this trade.

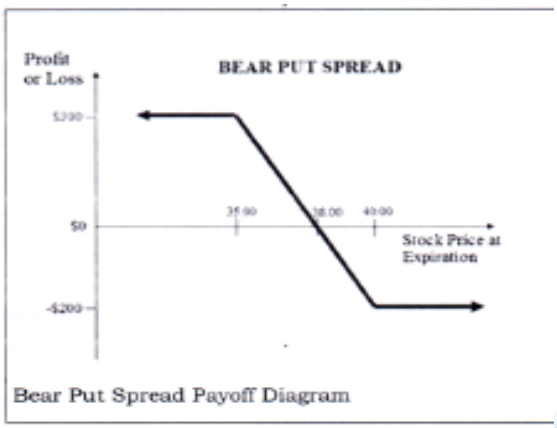
The price of XYZ stock subsequently drops to $34 at expiration. As both options expire worthless. The options trader gets to keep the entire credit of $200 as profit.
If the stock had rallied to $42 instead, both calls will expire in-the-money with the JUL 40 call bought having $200 in intrinsic value and the JUL 35 Call sold having $700 in intrinsic value. The spread would then have a net value of $500 (the difference in strike price). Since the trader have to buy back the spread for $500, this means that he will have a net loss of $300 after deducting the $200 credit he earned when he put on the spread position.

Bear Put Spread

The bear put spread option trading strategy is employed when the options trader thinks that the price of the underlying asset will go down moderately in the near term.
Bear put spreads can be implemented by buying a higher striking in-the-money put option and selling a lower striking out-of-the-money put option of the same underlying security with the same expiration date.

Bear Put Spread Construction
Buy 1 ITM Call Sell 1 OTM Call

By shorting the out-of-the-money put, the options trader reduces the cost of establishing the bearish position but forgoes the chance of making a large profit in the event that the underlying asset price plummets. The bear put spread options strategy is also know as the bear put debit spread as a debit is taken upon entering the trade.



Bear Put Spread Payoff Diagram

Limited Downside Profit

To reach maximum profit, the stock price need to close below the strike price of the out-of-the-money puts on the expiration date. Both options expire in the money but the higher strike put that was purchased will have higher intrinsic value than the lower strike put that was sold. Thus, maximum profit for the bear put spread option strategy is equal to the difference in strike price minus the debit taken when the position was entered.
The formula for calculating maximum profit is given below:

- Max Profit = Strike Price of Long Put – Strike Price of Short Put – Net Premium Paid – Commissions Paid
- Max Profit Achieved When Price of Underlying <= Strike Price of Short Put

Limited Upside Profit
If the stock price rise above the in-the-money put option strike price at the expiration date, then the bear put spread strategy suffers a maximum loss equal to the debit taken when putting on the trade.
The formula for calculating maximum loss is given below:

- Max Loss = Net Premium Paid + Commissions Paid
- Max Loss Occurs When Price of Underlying >= Strike Price of Long Put

Breakeven Point(s)

The underlier price at which break-even is achieved for the bear put spread position can be calculated using the following formula.

- Breakeven Point = Strike Price of Long Put – Net Premium Paid

Bear Put Spread Example

Suppose XYZ stock is trading at $38 in June. An option trader bearish on XYZ decides to enter a bear put spread position by buying a JUL 40 put for $300 and sell a JUL 35 put for $100 at the same time, resulting in a net debit of $200 for entering this position.
The Price of XYZ stock subsequently drops to $34 at expiration. Both puts expire in-the-money with the JUL 40 Call bought having $600 in intrinsic Value and the JUL 35 Call sold having $100 in intrinsic Value. The spread would then have a net value of $5 (the difference in strike price). Deducting the debit taken when he placed the trade, his net profit is $300. This is also his maximum possible profit.
If the stock had rallied to $42 instead, both options expire worthless, and the options trader loses the entire debit of $200 taken to enter the trade.
This is also the maximum possible loss.
Note: While we have covered the use of this strategy with reference to stock options, the bear put spread is equally applicable using ETF options, index options as well as options on futures.

Covered Calls
The covered call is a strategy in options trading whereby Call options are written against a holding of the underlying security.

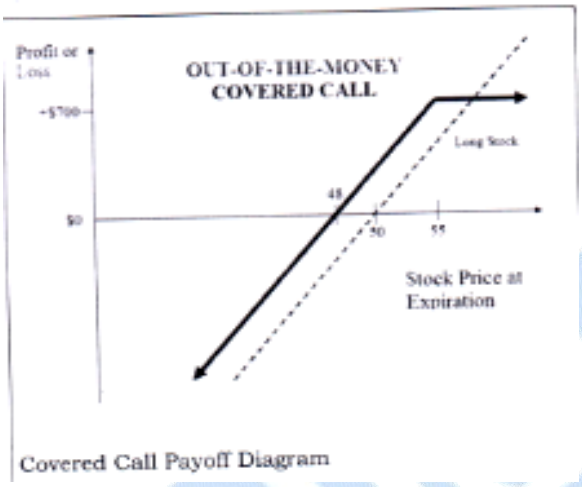
Covered Call (OTM) Construction		
Long	100	Shares
Sell 1 Call		

Using the covered call option strategy, the investor gets to earn a premium writing calls while at the same time appreciate all benefits of underlying stock ownership, such as dividends and voting rights, unless he is assigned an exercise notice on the written call and is obligated to sell his shares.
However, the profit potential of covered call writing is limited as the investor had, in return for the premium, given up the chance to fully profit from a substantial rise in the price of the underlying asset.

Out-of-the-money Covered Call

This is a covered call strategy where the moderately bullish investor sells out-of-the-money calls against a holding of the underlying shares. The OTM covered call is a popular strategy

as the investor gets to collect premium while being able to enjoy capital gains (albeit limited) if the underlying stock rallies.



Covered Call Payoff Diagram

Limited Profit Potential

In addition to the premium received for writing the call, the OTM covered call strategy's profit also includes a paper gain if the underlying stock price rises, up to the strike price of the call option sold.
The formula for calculating maximum profit is given below:

- Max Profit = Premium Received – Purchase Price of Underlying + Strike Price of Short Call – Commissions paid
- Max Profit Achieved When price of Underlying >= Strike Price of Short Call

Unlimited Loss Potential

Potential losses for this strategy can be very large and occurs when the price of the underlying security falls. However, this risk is no different from that which the typical stockowner is exposed to. In fact, the covered Call writer's loss is cushioned slightly by the premiums received for writing the calls.
The formula for calculating loss is given below:

- Maximum Loss = Unlimited

- Loss Occurs When price of Underlying < Purchase price of underlying – Premium Received
- Loss = Purchase Price of Underlying – Price of Underlying – Max Profit + Commissions Paid

Example

An options trader purchases 100 shares of XYZ stock trading at $50 in June and writes a JUL 55 out-of-the-money call for $2. So he pays $5000 for the 100 shares of XYZ and receives $200 for writing the call option giving a total investment of $4800.
On expiration date, the stock had rallied to $57. Since the striking price of $55 for the call option is lower than the current trading price, the call is assigned and the writer sells the shares for a $500 profit. This brings his total profit to $700 after factoring in the $200 in premiums received for writing the call.
It is interesting to note that the buyer of the call option in this case has a net profit of zero even though the stock had gone up by 7 points.
However, what happens should the stock price and gone down 7 points to $43 instead? Let's take a look.

At $43, the call writer will incur a paper loss of $700 for holding the 100 shares of XYZ. However, his loss is offset by the $200 in premiums received so his total loss is $500. In comparison, the call buyer's loss is limited to the premiums paid which is $200.

Protective Call

The protective call is a hedging strategy whereby the trader, who has an existing short position in the underlying security, buys call options to guard against a rise in the price of that security.

Protective Call Construction

Short	100	Shares
Buy 1 ATM Call		

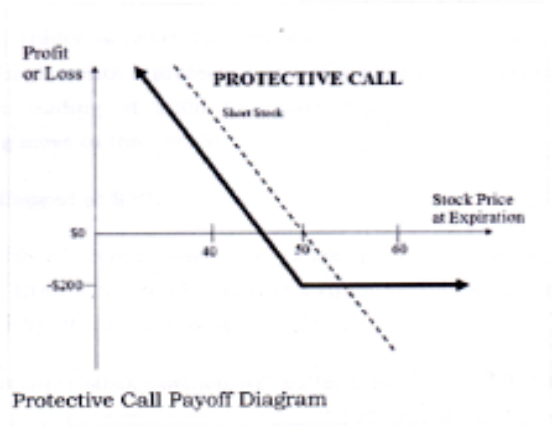
A protective call strategy is usually employed when the trader is still bearish on the underlying but wary of uncertainties in the near term. The call option is thus purchased to protect unrealized gains on the existing short position in the underlying.

Unlimited Profit Potential

The protective call is also known as a synthetic long put as its risk/reward profile is the same that of a long put's. Like the long put strategy, there is no limit to the maximum profit attainable using this strategy?

The formula for calculating profit is given below:

- Maximum Profit = Unlimited
- Profit Achieved When Price of Underlying < Sale Price of Underlying- Premium Paid
- Profit = Sale Price of Underlying – Price of Underlying – Premium Paid



Protective Call Payoff Diagram

Limited Risk

Maximum loss for this strategy is limited and is equal to the premium paid for buying the call option.

The formula for calculating maximum loss is given below:

- Max Loss = Premium Paid + Call Strike Price – Sale Price of Underlying + Commissions Paid
- Max Loss Occurs When Price of Underlying <= Strike Price of Long Put

Breakeven Point(s)

The underlier price at which break-even is achieved for the protective call position can be calculated using the following formula

- Breakeven Point = Sale Price of Underlying + Premium Paid

Example

An options trader is short 100 shares of XYZ stock trading at $50 in June. HE implements a protective call strategy by purchasing a SEP 50 call option trading at $200 to insure his position against a devastating move to the upside.

Max Loss Capped at $200

Maximum loss occurs when the stock price is $50 or higher at expiration. Even if the stock rallies to $70 on expiration, his max loss is capped at $200. Let's see how this works out.

At $70, his short stock position will suffer a loss of $2000. However, his SEP 50 call will have an intrinsic value of $2000 and can be sold for that amount. Including the initial $200 paid to buy the call option his net loss will be $2000-$2000+$200 = $200.

Unlimited Profit Potential

There is no limit to the profits attainable should the stock price head south. Suppose the stock price crashes to $30, his short position will gain $2000. Excluding the $200 paid for the protective call, his net profit is $1800.

Protective Put
The protective put, or put hedge, is a hedging strategy where the holder of a security buys a put to guard against a drop in the stock price of that security.

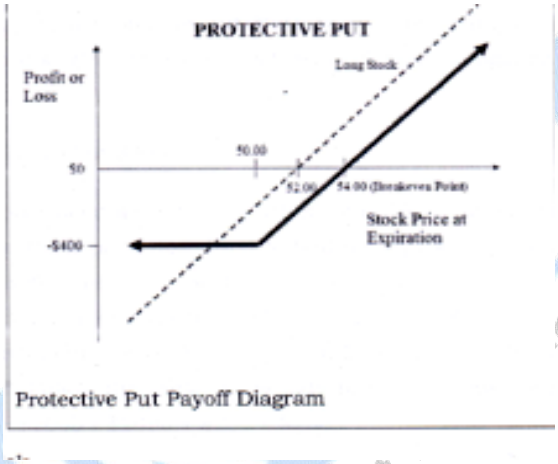
Protective Put Construction		
Long	100	Shares
Buy 1 ATM Put		

A Protective put strategy is usually employed when the options trader is still bullish on a stock he already owns but wary of uncertainties in the near term. It is used as a means to protect unrealized gains on shares from a previous purchase.

Unlimited Profit Potential

There is no limit to the maximum profit attainable using this strategy. The protective put is also known as a synthetic long call as its risk / reward is the same that of a long call's.
The formula for calculating profit is given below:

Maximum Profit = Unlimited
Profit Achieved When Price of Underlying > Purchase Price of Underlying + Premium Paid
Profit = Price of Underlying – Purchase Price of Underlying premium paid



Limited Risk

Maximum loss for this strategy is limited and is equal to the premium paid for buying the put option.
The formula for calculating maximum loss is given below:

- Max Loss = Premium Paid + Purchase Price of Underlying – Put Strike + Commissions Paid
- Max Loss Occurs When Price of Underlying <= Strike Price of Long Put

Breakeven Point(s)

The underlier price at which break-even is achieved for the protective put position can be calculated using the following formula.

- Breakeven Point = Purchase Price of Underlying + Premium Paid

Example

An options trader owns 100 shares of XYZ stock trading at $50 in June. He implements a protective put strategy by purchasing a SEP 50 put option priced at $200 to insure his long stock position against a possible crash.

Max Loss Capped at $200

Maximum loss occurs when the stock price is $50 or lower at expiration. Even if the stock price nosedived to $30 on expiration, his max loss is capped at $200. Let's see how this works out.
At $30, his long stock position will suffer a loss of $2000. However, his SEP 50 put will have an intrinsic value of $2000 and can be sold for that amount. Including the initial $200 paid to buy the put option, his net loss will be $2000-$2000+$200=$200.

Unlimited Profit Potential

There is no limit to the profits attainable should the stock price goes up. Suppose the stock price rallies to $70, his long stock position will gain $2000. Excluding the $200 paid for the protective put, his net profit is $1800.

Butterfly Spread

The butterfly spread is a neutral strategy that is a combination of a bull spread and a bear spread. It is a limited profit, limited risk options strategy. There are 3 striking prices involved in a butterfly spread and it can be constructed using calls or puts.

Butterfly Spread Construction			
Buy	1	ITM	Call
Sell	2	ATM	Calls
Buy 1 OTM Call			

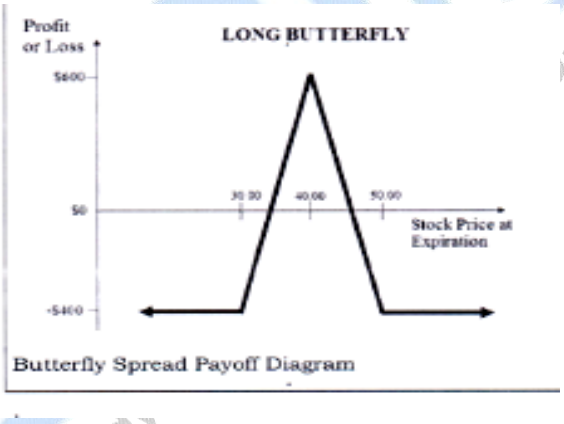
Long Call Butterfly

Long butterfly spreads are entered when the investor thinks that the underlying stock will not rise or fall much by expiration. Using calls, the long butterfly can be constructed by buying one lower striking in-the-money call, writing two at-the-money calls buying another higher striking out-of-the-money call. A resulting net debit is taken to enter the trade.

Limited Profit

Maximum profit for the long butterfly spread is attained when the underlying stock price remains unchanged at expiration. At this price, only the lower striking call expires in the money.
The formula for calculating maximum profit is given below:

Max Profit = Strike Price of Short Call – Strike Price of Lower Strike Long Call – Net Premium Paid – Commissions paid
Max Profit Achieved When price of Underlying = Strike price of Short Calls



Limited Risk

Maximum loss for the long butterfly spread is limited to the initial debit taken to enter the trade plus commissions.
The formula for calculating maximum loss is given below:

- Max Loss = Net Premium Paid + Commissions Paid

- Max Loss occurs when price of underlying < = Strike price of Lower Strike Long CallOR Price of Underlying >= Strike Price of Higher Strike Long Call

Breakeven Point(s)

There are 2 break-even points for the butterfly spread position. The breakeven points can be calculated using the following formulae.

- Upper Breakeven Point = Strike price of Higher Strike Long Call – Net premium Paid
- Lower Breakeven Point = Strike price of Lower Strike Long Call + Net Premium Paid

Example

Suppose XYZ stock is trading at $40 in June. An options trader executes a long call butterfly by purchasing a JUL 30 call for $ 1100, Writing two JUL 40 Calls for $400 each and purchasing another Jul 50 call for $ 100. The net debit taken to enter the position is $400, which is also his maximum possible loss.

On expiration in July, XYZ stock is still trading at $40, The JUL 40 Calls and the JUL 50 Call expire worthless while the JUL 30 call still has an intrinsic value of $1000. Subtracting the initial debit of $400, the resulting profit is $600, which is also the maximum profit attainable.
Maximum loss results when the stock is trading below $30 or above $50. At $30, all the options expire worthless. Above $50, any "profit" from the two long calls will be neutralized by the "loss" from the two short calls. In both situations, the butterfly trader suffers maximum loss which is the initial debit taken to enter the trade.

Long Put Butterfly
The long put butterfly spread is a limited profit, limited risk options trading strategy that is taken when the options trader thinks that the underlying security will not rise or fall much by expiration.

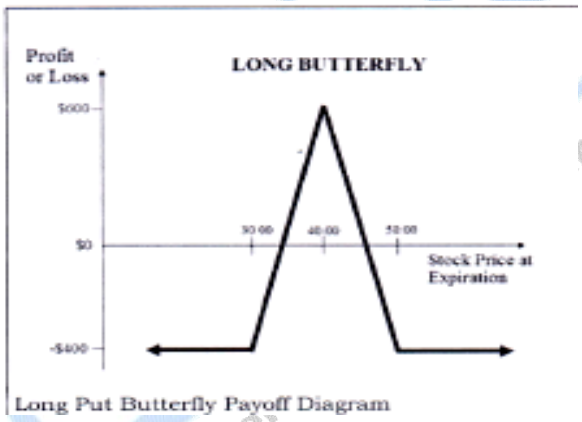
Long Put Butterfly Construction			
Buy	1	OTM	Put
Sell	2	ATM	Puts
Buy 1 ITM Put			

There are 3 striking prices involved in a long put butterfly spread and it is constructed by buying one lower striking put, writing two at-the-money puts and buying another higher striking put for a net debit.

Limited Profit

Maximum gain for the long put butterfly is attained when the underlying stock price remains unchanged at expiration. At this price, only the highest striking put expires in the money.
The formula for calculating maximum profit is given below:

- Max Profit = Strike price of Higher Strike kLong Put - Strike price of Short Put – Net Premium Paid - Commissions Paid
- Max Profit Achieved When price of underlying = Strike price of Short put



Long Put Butterfly Payoff Diagram

Limited Risk

Maximum loss for the long put butterfly is limited to the initial debit taken to enter the trade plus commissions.
The formula for calculating maximum loss is given below:

- Max Loss = Net Premium Paid + Commissions Paid
- Max Loss Occurs When Price of Underlying <= Strike Price of Lower Strike Long Put OR Price of Underlying >= Strike Price of Higher Strike Long Put

Breakeven Point(s)

There are 2 Break-even points for the long put butterfly position. The breakeven points can be calculated using the following formulae.

- Upper Breakeven Point = Strike Price of Highest Strike Long Put – Net Premium Paid
- Lower Breakeven Point = Strike Price of Lowest Strike Long Put + Net Premium Paid

Example

Suppose XYZ stock is trading at $40 in June. An options trader executes a long put butterfly by buying a JUL 30 Put for $100, writing two JUL 40 puts for $400 each and buying another JUL 50 put for $1100. The net debit taken to enter the trade is $400, which is also his maximum possible loss.
On expiration in July, XYX stock is still trading at $40. The JUL 40 puts and the JUL 30 put expire worthless while the JUL 50 put still has an intrinsic value of $1000. Subtracting the initial debit of $400, the resulting profit is $600, which is also the maximum profit attainable.
Maximum loss results when the stock is trading below $30 or above $50. at $50, all the options expires worthless. Below $30, any "profit" form the two long puts will be neutralized by the "loss" from the two short puts. In both situations, the long put butterfly trader suffers maximum loss which is equal to the initial debit taken to enter the trade.

Option Straddle (Long Straddle)

The long straddle, also known as buy straddle or simply "straddle", is a neutral strategy in options trading that involve the simultaneously buying of a put and a call of the same underlying stock, striking price and expiration date.

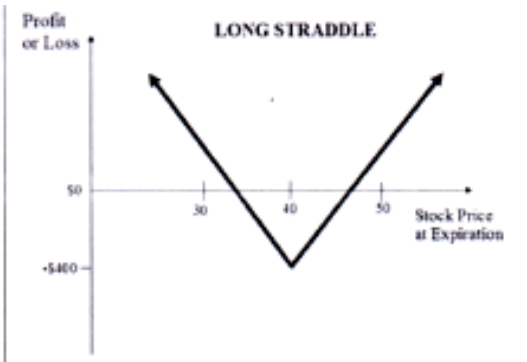
Long Straddle Construction
Buy 1 ATM Call Buy 1 ATM Put

Long straddle options are unlimited profit, limited risk options trading strategies that are used when the options trader thinks that the underlying securities will experience significant volatility in the near term.

Unlimited Profit Potential

By having long positions in both call and put options, straddles can achieve large profits no matter which way the underlying stock price heads, provided the move is strong enough.
The formula for calculating profit is given below:

- Maximum Profit = Unlimited
- Profit Achieved When price of Underlying > Strike Price of Long Call + Net Premium Paid OR Price of Underlying < Strike Price of Long Put – Net Premium Paid
- Profit = Price of Underlying – Strike Price of Long Call – Net Premium Paid OR Strike price of Long Put – Price of Underlying – Net Premium paid



Long Straddle Payoff Diagram

Limited Risk

Maximum loss for long straddles occurs when the underlying stock price on expiration date is trading at the strike price of the options bought. At this price, both options expire worthless and the options trader loses the entire initial debit taken to enter the trade.
The formula for calculating maximum loss is given below:

- Max Loss = Net Premium Paid + Commissions Paid
- Max Loss Occurs When price of Underlying = Strike price of Long Call / Put

Breakeven Point(s)

There are 2 break-even points for the long straddle position. The breakeven points can be calculated using the following formulae.

- Upper Breakeven Point = Strike Price of Long Call + Net Premium Paid

- Lower Breakeven Point = Strike Price of Long Put – Net Premium paid

Example

Suppose XYZ stock is trading at $40 in June. An options trader enters a long straddle by buying a JUL 40 Put for $200 and a JUL 40 call for $200. The net debit taken to enter the trade in $400, which is also his maximum possible loss.
If XYZ stock is trading at $50 on expiration in July, the JUL 40 put will expire worthless but the Jul 40 Call expires in the money and has an intrinsic value of $1000. Subtracting the initial debit of $400, the long straddle trader's profit comes to $600.
On expiration in July , if XYZ stock is still trading at $40, both the JUL 40 put and the JUL 40 call expire worthless and the long straddle trader suffers a maximum loss which is equal to the initial debit of $400 taken to enter the trade

Short Straddle (Sell Straddle)

The short straddle – a.k.a sell straddle or naked straddle sale – is a neutral options strategy that involve the simultaneous selling or a put and a call of the same underlying stock, striking price and expiration date.

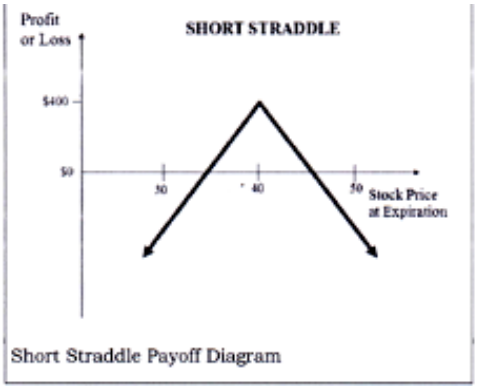
Short Straddle Construction
Sell 1 ATM Call Sell 1 ATM Put

Short Straddle are limited profit, unlimited risk options trading strategies that are used when the options trader thinks that the underlying securities will experience little volatility in the near term.

Limited Profit

Maximum profit for the short straddle is achieved when the underlying stock price on expiration date is trading at the strike price of the options sold. At this price, both options expire worthless and the options trader gets to keep the entire initial credit taken as profit.
The formula for calculating maximum profit is given below:

- Max Profit = Net Premium Received – Commissions Paid
- Max Profit Achieved When Price of Underlying = Strike Price of Short Call/Put



Short Straddle Payoff Diagram

Unlimited Risk

Large losses for the short straddle can be incurred when the underlying stock price makes a strong move either upwards or downwards at expiration, causing the short call or the short put to expire deep in the money.

The formula for calculating loss is given below:

Maximum Loss = Unlimited
Loss Occurs When Price of Underlying > Strike Price of Short Call + Net Premium Received OR Price of Underlying < Strike Price of Short Put – Net Premium Received
Loss = Price of Underlying – Strike Price of Short Call – Net Premium Received OR Strike Price of Short Put – Price of Underlying – Net Premium Received + Commissions Paid

Breakeven Point(s)

There are 2 break-even points fot the short straddle position. The breakeven points can be calculated using the following formulae.

- Upper Breakeven Point = Strike Price of Short Call + Net Premium Received
- Lower Breakeven Point = Strike Price of Short Put – Net Premium Received

Example

Suppose XYZ stock is trading at $40 in June. An options trader enters a Short straddle by selling a JUL 40 put for $200 and a JUL 40 call for $200. The net credit taken to enter the trade is $400, which is also his maximum possible profit.
If XYZ stock rallies and is trading at $50 expiration in July, the JUL 40 put will expire worthless but the JUL 40 Call expires in the money and has an intrinsic value of $1000. Subtracting the initial credit of $400, the short straddle's loss comes to $600.
On expiration in July, if XYZ stock is still trading at $40, both the JUL 40 put and the JUL 40 Call expire worthless and the short straddle trader gets to keep the entire initial credit of $400 taken to enter the trade as profit.

Q.26 What are the determinants of option Pricing Model?
Ans

Determinants of Option Value
The value of an option is determined by a number of variables relating to the underlying asset and financial markets.
1. Current Value of the Underlying Asset: Options are assets that derive value from an underlying asset. Consequently, changes in the value of the underlying asset the value of the options on that asset. Since Calls provide the right to buy the underlying asset at a fixed price, an increase in the value of the asset will increase the value of the calls. Puts, on the other hand, become less valuable as the value of the asset increase.

2. Variance in Value of the Underlying Asset: The buyer of an option acquires the right to buy or sell the underlying asset at a fixed price. The higher the variance in the value of the underlying asset at a fixed price. The higher the variance in the value of the underlying asset, the greater will the value of the option be1. This is true for both calls and puts. While it may seem counter-intuitive that an increase in a risk measure (variance) should increase value, options are different from other securities since buyers of options can never lose more than the price they pay for them: in fact, they have the potential to earn significant returns from large price movements.

3. Dividends Paid on the Underlying Asset: The value of the underlying asset can be expected to decrease if dividend payments are made on the asset during the life of the option. Consequently, the value of a call on the asset is a decreasing function of the size of expected dividend payments, and the value of a put is an increasing function of expected dividend payments. There is a more intuitive way of thinking about dividend payments, for call options. It is a cost of delaying exercise on in-the-money options. To see why, consider an option on a traded stock. Once a call option is in the money, i.e, the holder of the option will make a gross payoff by exercising the option, exercising the call option will provide the

holder with the stock and entitle him or her to the dividends on the stock in subsequent periods. Failing to exercise the option will mean that these dividends are foregone.

4. *Strike Price of Option*: A Key Characteristic used to describe an option is the strike price. In the case of calls, where the holder esquires the right to buy at a fixed price, the value of the call will decline as the strike price increases. In the case of puts, where the holder has the right to sell at a fixed price, the value will increase as the strike price increases.

5. *Time To Expiration On Option*: Both calls and puts become more valuable as the time to expiration increases. This is because the longer time to expiration provides more time for the value of the underlying asset to move, increasing the value of both types of options. Additionally, in the case of a call, where the buyer has to pay a fixed price at expiration, the present value of this fixed price decreases as the life of the option increases, increasing the value of the call.

6. *Riskless Interest Rate Corresponding To Life Of Option*: Since the buyer of an option pays the price of the option up front, an opportunity cost is involved. This cost will depend upon the level of interest rates and the time to expiration on the option. The riskless interest rate also enters into the valuation of options when the present value of the exercise price is calculated, since the exercise price does not have to be paid (received) until expiration on calls (puts). Increases in the interest rate will increase the value of calls and reduce the value of puts.

Table 5.1 below summarizes the varables and their predicted effects on call and put prices.

Table 5.1: Summary of Variables Affecting Call and Put Prices

	Effection	
Factor	*Call Value*	*Put Value*
Increase in underlying asset's value	Increases	Decreases
Increase in strike price	Decrease	Increases
Increase in variance of underlying asset	Increases	Increases
Increase in time to expiration	Increases	Increases
Increase in interest rates	Increase	Decreases
Increase in dividends paid	Decreases	Increases

Q.27 Discusss briefly Option Pricing Model?

Ans

What is an option:

The idea of option is certainly not new. Ancient Romans, Grecians, and Phoenicians traded options against outgoing cargoes from their local seaports. When used in relation to financial instruments, options are generally defined as a "contract between two parties in which one party has the right but not the obligation to do something, usually to buy or sell some underlying asset". Having rights without obligations has financial value, so option holders must purchase these rights, making them assets. This asset derives their value from some other asset, so they are called derivative assets. Call options are contracts giving the option holder the right to buy something, while put options, and conversely entitle the holder to sell something. Payment for call and put options, takes the form of a flat, up-front sum called a premium. Options can also be associated with bonds (i.e. convertible bonds and callable bonds), where payment occurs in installments over the entire life of the bond, but this paper is only concerned with traditional put and call options.

The Black and Scholes Model:

The Black and scholes Option pricing Model didn't appear overnight, in fact fisher Black started out working to create a valuation model for stock warrants. This work involved calculating a derivative to measure how the discount rate of a warrant varies with time and stock price. The result of this calculation held a striking resemblance to a well-known heat transfer equation. Soon after this discovery, Myron Scholes joined Black and the result of their work is a strartlingly accurate option pricing model. Black and Scholes can't take all credit for their work, in fact their model is actually an improved version of a previous model developed by A. James Boness in his Ph.D. dissertation at the University of Chicago. Black and Scholes' improvements on the Boness model come in the form of a proof that the risk-free interest rate is the correct discount factor, and with the absence of assumptions regarding investor's risk preferences.

The Model:

$C = SN(d_1) - Ke^{(-rt)}N(d_2)$

C = Theoretical call premium

S = Current Stock price

t = time until option expiration

K = option striking price

r = risk - free interest rate

N = Cumulative standard normal distribution

e = exponential term (2.7183)

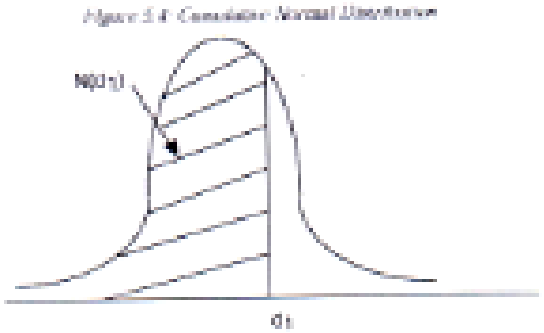
$$d_1 = \frac{\ln(S/K) + \left(r + s^2/2\right)t}{s\sqrt{t}}$$

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

s = standard deviation of stock returns

ln = natural logarithm

In order to understand the model itself, we divide it into two parts. The first part, SN(d1), derives the expected benefit from acquiring a stock outright. This is found by multiplying stock price [S] by the change in the call premium with respect to a change in the underlying stock price [N(d1)]. The second part of the model, Ke(-rt)N(d2), gives the present value of paying the exercise price on the expiration day. The fair market value of the call option is then calculated by taking the difference between these two parts.



In approximate terms, these probabilities yield the likelihood that an option will generate

Positive cash flows for its owner at exercise, i.e., when S>K in the case of a call option and when K>S in the case of a put option. The portfolio that replicates the call option is created by buying N(d1) units of the underlying asset, and borrowing Ke-rtN(d2). The portfolio will have the same cash flows as the call option and thus the same value as the option. N(d1), which is the number of units of the underlying asset that are needed to create the replicating portfolio, is called the option delta.

Assumptions of the Black and Scholes Model:

1) The stock pays no dividends during the option's life
Most companies pay dividends to their share holder, so this might seem a serious limitation to the model considering the observation that higher dividend yields elicit lower call premiums. A common way of adjusting the model for this situation is to subtract the discounted value of a future dividend from the stock price.

2) European exercise terms are used
European exercise terms dictate that the option can only be exercised on the expiration date. American exercised at any time during the life of the option, making American options more valuable due to their greater flexibility. This limitation is not a major concern because very few calls are ever exercised before the last few days of their life. This is true because when you exercise a call early, you forfeit the remaining time value on the call and collect the intrinsic value. Towards the end of the life of a call, the remaining time value is very small, but the intrinsic value is the same.

3) Markets are efficient
This assumption suggests that people cannot consistently predict the direction of the market or an individual stock. The market operates continuously with share prices following a continuous Ito process. To understand what a continuous Ito process is, you must first know that a Marko0v process is "one where the observation in time period t depends only on the preceding observation." An Ito process is simply a Markov process in continuous time. If you were to draw a continuous process you would do so without picking the pen up form the piece of paper.

4) No commissions are charged
Usually market participants do have to pay a commission to buy or sell option. Even floor traders pay some kind of fee, but is usually very small. The fees that individual investor's pay is more substantial and can often distort the output of the model.

5) Interest rates remain constant and known
The Black and Scholes model uses. The risk-free rate to represent this constant and known rate. In reality there is no such thing as the riskfree rate, but the discount rate on U.S, Government Treasury Bills with 30 days left until maturity is usually used to represent it.

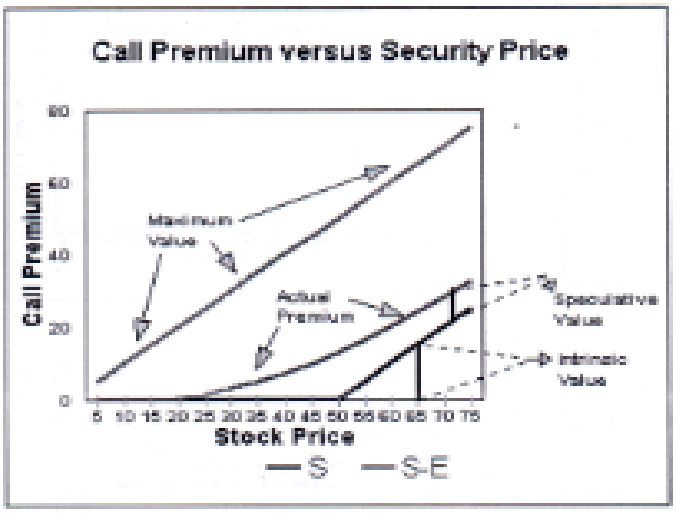
During periods of rapidly changing interest rates, these 30 day rates are often subject to change, thereby violating one of the assumptions of the model.

6) Returns are log normally distributed
This assumption suggests, returns on the underlying stock are normally distributed, which is reasonable for most assets that offer options.

Graphs of the Black and Scholes Model:

This following graphs show the relationship between a call's premium and the underlying stock's price.

The first graph identifies the Intrinsic Value, Speculative Value, Maximum Value, and the Actual premium for a call.



The following 5 graphs show the impact of deminishing time remaining on a call with:

S = $48

E = $50

r = 6%

sigma = 40%

Graph # 1, t = 3 months

Graph # 2, t = 2 months

Graph # 3, t = 1 month

Graph # 4, t = .5 months

Graph # 5, t = .25 months

Graph #1

Graph #2

Graph #3

Graph #4

Graph #5

Graphs # 6 - 9, show the effects of a changing Sigma on the relationship between Call premium and Security Price

S = $48

E = $50

r = 6%

sigma = 40%

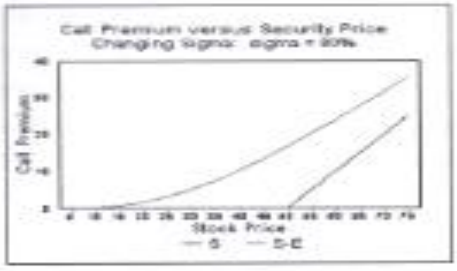
Graph # 6, sigma = 80%

Graph # 7, sigma = 40%

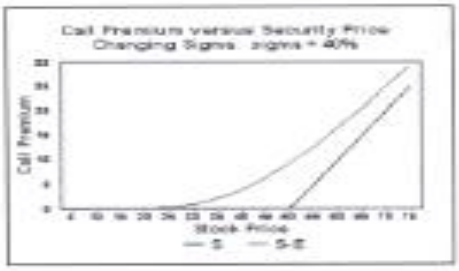
Graph # 8, sigma = 20%

Graph # 9, sigma = 10%

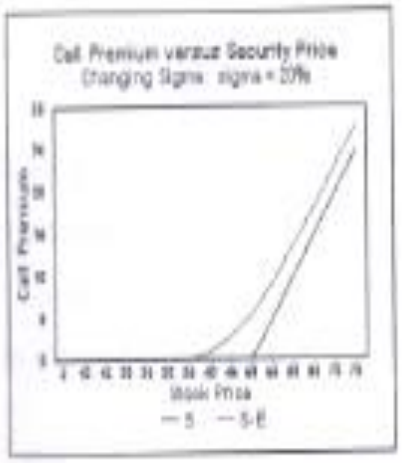
Graph #6



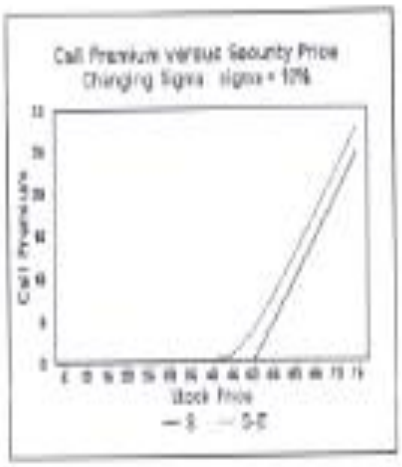
Graph #7



Graph #8



Graph #9



After the Black and Scholes Model:

Since 1973, the original Black and Scholes Option Pricing Model has been the subject of much attention. Many financial scholars have expanded upon the original work. In 1973, Robert Merton relaxed the assumption of no dividends. In 1976, Jonathan Ingression went one step further and relaxed the the assumption of no taxes or transaction costs. In 1976, Merton responded by removing the restriction of constant interest rates. The results of all of this attention, that originated in the autumn of 1969, are alarmingly accurate valuation models for stock options.

Numerical:

Valuing an option using the Black-Scholes Model
On March 6, 2001, Cisco Systems was trading at $13.62 we will attempt to value a july 2001 call option with a strike price of $15, trading on the CBOT on the same day for $2.00. The following are the other parameters of the options":
The annualized deviation in Cisco Systems stock price over the previous year was 81.00% This standard deviation is estimated using weekly stock prices over the year and the resulting number was annualized as follows:
Weekly standard Deviation = 1.556%
Annualized standard deviation = 1.556%*52=81%

The option expiration date is Friday, July 20, 2001. There are 103 days to expiration.

. The annualized Treasury bill rate corresponding to this option life is 4.63%

The inputs for the Black-Scholes model are as follows:
Current Stock Price (S) = $ 13.62
Strike Price on the option = $15.00
Option Life = 103/365 = 0.2822
Standard Deviation in In(stock prices) = 81%
Riskless rate = 4.63%
Inputting these numbers into the model, we get

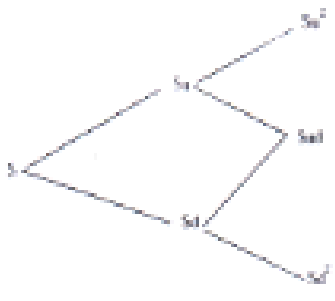
N(d1) = 0.5085
N(d2) = 0.3412
The value of the call can now be estimated:
Value of Cisco Call = S N (D1) –K e-rt N(d2)
=(13.62)(0.5085)-15 e-(0.0463)(0.2822)(0.3412)=1.81
Since the call is trading at $2.00, it is slightly overvalued, assuming that the estimate

Of standard deviation used is correct.

Q.28 Explain Binomial Option Pricing Model?:

Ans The binomial option pricing model is based upon a simple formulation for the asset price process in which the asset, in any time period, can move to one of two possible prices. The general formulation of a stock price process that follows the binomial is shown in figure 5.3.

Figure 5.3: General Formulation for Binomial Price Path



In this figure, S is the current stock price; the price moves up to Su with probability p and down to Sd with probability $1 - p$ in any time period.

Creating A Replicating Portfolio

The objective in a replicating portfolio is to use a combination of risk-free borrowing/lending and the underlying asset to create a portfolio that has the same cash flows as the option being valued. The principles of arbitrage apply here and the value of the option must be equal to the value of the replicating portfolio. In the case of the general Formulation above, where stock prices can either move up to Su or down to *Sd* in any time period, the replicating portfolio for a call with strike price K will involve borrowing $\$B$ and acquiring of the underlying asset, where:

where,

Δ = Number of units of the underlying asset bought = $\frac{C_u - C_d}{Su - Sd}$

Cu = Value of the call if the stock price is *Su*

Cd = Value of the call if the stock price is *Sd*

In a multi-period binomial process, the valuation has to proceed interactively, i.e., starting with the last time period and moving backwards in time until the current point in time. The portfolios replicating the option are created at each step and valued, providing the values for the option in that time period. The final output from the binomial option pricing model is a

statement of the value of the option in terms of the replicating portfolio, composed of shares (option delta) of the underlying asset and risk-free borrowing / lending

Q.29 What do you understand from Volatility and other types of Volatility
Ans

This is the most critical parameter for option pricing – option prices are very sensitive to changes in volatility. Volatility however cannot be directly observed and must be estimated.

Whilst implied volatility – the volatility of the option implied by current market prices – is commonly used the argument that this is the "best" estimate is somewhat circular. Skilled options traders will not rely solely on implied volatility but will look behind the estimates to see whether or not they are higher or lower than you would expect form historical and current volatilities, and hence whether options are more expensive or cheaper than perhaps they should be.

It's slight over simplification, but basically implied volatility will give you the price of an option: historical volatility will give you an indication of its value. It's important to understand both. For instance, if your forecast of volatility based on historical prices is greater than current implied volatility (options under valued) you might want to buy a straddle: if you historical forecast is less than implied volatility you might want to sell a straddle.

Q. 30 Discuss briefly cost of carry model for determining future prices.
Ans

Coast of Carry Model
Cost of carry model is an arbitrage free pricing model. Its central theme is that futures contract is so priced as to preclude arbitrage profit. In other words, investors will be indifferent to spot and futures market to execute their buying and selling of underlying asset because the prices they obtain are effectively the same. Expectations do influence the price, but they influence the spot price and through it, the futures price. They do not directly influence the futures price. They do not directly influence the future price. If the investor does no book a futures contract, the alternative form to him is to buy at the spot market and hold the underlying asset. In such a contingency he would incur a cost equal to the spot price + the cost of carry. The theoretical price of a futures contract is spot price of the underlying plus the cost of carry. The futures are not about predicating future prices of the underlying assets.
This model stipulated that future prices of the underlying assets.
This model stipulated that future prices equal to sum of spot prices and carrying costs involved in buying and holding the underlying asset, and less the carry return (if any). We

use fair value calculation of futures to decide the no-arbitrage limits on the price of a futures contract.

According to the cost of carry model, the futures price is given by:

Futures price = Spot price+ Carry Cost – Carry Return.

Carry cost (CC) is the interest cost of holding the underlying asset (purchased in spot market) until the maturity of futures contract. Carry return (CR) is the income (e.g., dividend) derived form underlying asset during the holding period.

Thus, the futures price (F) should be equal to spot price (S) plus carry cost minus carry return.

This can also be expressed as:

$F_0 = S_0 (1+r)^t$

Where, r is the cost of financing,

t is the time till expiration.

The cost of carry for a physical asset equals interest cost plus storage costs less convenience yield, that is:

Carry costs=Cost of funds + Storage cost – Convenience yield.

For a financial asset such as a stock or a bond, storage costs are negligible. Moreover, income (yield) accrues in the form of quarterly cash dividends or semi-annual coupon payments. The cost of carry for a financial asset is:

Carry costs = Cost of funds – Income.

Carry costs and benefits are modeled either as continuous rates or as discrete flows. Some costs / benefits such as the cost of funds (i.e., the risk-free interest rate) are best modeled continuously.

With compounding, the above equation will change to

$G_o = S_o (1+r)^T - D (1+r)^t$

Alternately, using the continuous compounding or discounting

$F_o = S_o e^{n-} De^{-rt}$

Where, F_o = future price

S_o = spot price

R= risk free interest rate (p.a.)

D= cash dividend from underlying stock

t= period (in years) after which cash dividend will be paid

T= maturity of futures contract (in years)

There are two good reasons why continuous compounding is preferable to discrete compounding. First it is computationally easier in a spreadsheet. Second, it is internally consistent. For example, interest rate is always quote on an annual basis but the compounding frequency may be different in different markets.

Thus, it makes no difference whether we buy or sell the underlying asset in spot or futures market. If we buy it in spot market, we require cash but also receive cash distributions (e.g., dividend) from the asset. If we buy it in futures market, the delivery is postponed to a latter day and we can deposit the cash in an interest-bearing account but will also forego the cash distributions from the asset. However, the difference in spot and futures price is just equal to the interest cost and the cash distributions.

REVERSE COST OF CARRY MODEL

It Leads to profit if the future yield is too high futures price too low given cash market yield.

For example, ABC ltd. Trades at Rs. 1000. One – month ABC futures trade at Rs. 965 and interest rate 10% An arbitrageur can make risk less profit by entering into the following set of transactions.

- On day one, sell the security in the cash / spot market at 1000.
- Make delivery of the security.
- Simultaneously, buy the futures on the security at 965
- Invest this funds for one month at 10%
- The result is a risk less profit of Rs. 35 and interest (1000x1.105) – 1000=105. on the futures position.

If the investor gets return by investing in risk less instruments is more then the return from the arbitrage trades, it makes sense for him to arbitrage. This is termed as reverse-cash and carry arbitrage. It is this arbitrage activity that ensures that the spot and futures prices stay in line with the cost of carry.

Unit 4

Q.31 Discuss briefly Greek Words?
Ans The Delta

A by-product of the Black-Scholes model is the calculation of the delta: the degree to which an option price will move given a small change in the underlying stock price. For example, an option with a delta of 0.5 will move half a cent for every full cent movement in the underlying stock.

A deeply out-of-the-money call will have a delta very close to zero; a deeply in-the-money call will have a delta very close to 1.

The formula for a delta of a European call on a non-dividend paying stock is:

Delta = N(d1) (see Black- Scholes formula above for d1)

Call deltas are positive; put deltas are negative, reflecting the fact that the put option price and the underlying stock price are inversely related. The put delta equals the call delta -1.

The delta is often called the hedge ratio: If you have a portfolio short n options (eg you have written n calls) then n multiplied by the delta gives you the number of shares (ie units of the underlying) you would need to create a riskless position – ie a portfolio which would be worth the same whether the stock price rose by a very small amount or fell by a very small amount. In such a "delta neutral" portfolio any gain in the value of the shares held due to a rise in the share price would be exactly offset by a loss on the value of the calls written, and vice versa.

Note that as the delta changes with the stock price and time to expiration the number of shares would need to be continually adjusted to maintain the hedge. How quickly the delta changes with the stock price is given by gamma.

Gamma:

The Black and Scholes Model:

$$\text{Gamma} = \frac{d^2C}{dS^2} = \frac{e^{(-d^2/2)}}{S\sigma\sqrt{1\pi T}}$$

Gamma is a measure of the calculated delta's sensitivity to small changes in share price.

Gamma: It measures how fast the delta changes for small changes in the underlying stock price. ie the delta of the delta.

If you are hedging a portfolio using the delta-hedge technique described under "Delta", then you will want to keep gamma as small as possible as the smaller it is the less often you will have to adjust the hedge to maintain a delta neutral position. If gamma is too large a small change in stock price could wreck your hedge. Adjusting gamma, however, can be tricky and is generally done using options -- unlike delta, it can't be done by buying or selling the underlying asset as the gamma of the underlying asset is, by definition, always zero so more or less of it won't affect the gamma of the total portfolio.

Vega:

$$\text{Vega} = \frac{S\sqrt{T}}{\frac{e^{(d^2/2)}}{\sqrt{2\pi}}}$$

Vega measures the calculated option value's sensitivity to small changes in volatility.

Vega: The change in option price given a one percentage point change in volatility. Like delta and gamma, vega is also used for hedging.

Theta:

$$\text{Theta} = \frac{dC}{dt} = \frac{\frac{S\sigma}{(\sigma\sqrt{2})}}{\frac{t}{2\sqrt{2\pi T}}} \cdot \frac{rE}{e^{rt}} * N(d-\sigma\sqrt{T})$$

Theta: The change in option price given a one day decrease in time to expiration. Basically a measure of time decay. Unless you and your portfolio are travelling at close to the speed of light the passage of time is constant and inexorable. Thus hedging a portfolio against time decay, the effects of which are completely predictable, would be pointless. Theta measures the calcualted option value's sensitivity to small changes in time till maturity.

Rho:

$$\text{Rho} = \frac{TE}{e^{rt}} N(d-\sigma\sqrt{T})$$

Rho: The change in option price given a one percentage point change in the risk-free interest rate.

Q.32 What is put- call Parity?

Ans

The value of a put can be derived from the value of a call with the same strike price and the same expiration date. C – P = S – K e-rt where C is the value of the call and P is the value of the put. This relationship between the call and put values is called put-call parity and any deviations from parity can be used by investors to make riskless profits. To see why put-call parity holds, consider selling a call and buying a put with exercise price K and expiration date t, and simultaneously buying the underlying asset at the current price S. The payoff from this position is riskless and always yields K at expiration t. To see this, assume that the stock

price at expiration is S*. The payoff on each of the positions in the portfolio can be written as follows:

Position	Payoffs if $S^* > K$	Payoffs if $S^* < K$
Sell call	$-(S^* - K)$	0
Buy put	0	$K - S^*$
Buy stock	S^*	S^*
Total	K	K

Since this position yields K with certainty, the cost of creating this position must be equal to the present value of K at the riskless rate ($K e^{-rt}$).

$$S + P - C = K e^{-rt}$$

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

Substituting the Black Scholes equation for the value of an equivalent call into this equation, we get:

$$\text{Value of put} = K e^{-rt}(1 - N(d_2)) - S e^{-yt}(1 - N(d_1))$$

where

$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + \left(r - y + \frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$$

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

Thus, the replicating portfolio for a put is created by selling short (1-N(d1)) shares of stock and investing Ke-rt(1-N(d2)) in the riskless asset.

Example

Consider the call that we valued on Cisco in Illustration 5.2. The call had a strike price of $15, 103 days left to expiration and was valued at $1.87. The stock was trading at $13.62 and the riskless rate was 4.63%. We could value the put as follows:

Put Value = C – S + K e^{-rt} = $1.87 - $13.62 + $15 $e^{-0.0463(103/365)}$ = $3.06

The put was trading at $3.38.

We also valued a long term call on AT&T in Illustration 5.4. The call had a strike price of $20, 1.8333 years left to expiration and a value of $6.63. The stock was trading at $20.50 and was expected to maintain a dividend yield of 2.51% over the period. The riskless rate was 4.85%. The put value can be estimated as follows:

Put Value = C – S e^{-yt} + K e^{-rt} = $6.63- $20.5 $e^{-0.0251(1.8333)}$ + $20 $e^{-0.0485(1.8333)}$ = $5.35

The put was trading at $3.80.

Unit 5

Q.33 What are various accounting and taxation issues for Derivatives in India?

Ans

Internationally accounting for derivatives and hedging activity is dealt as per Financial Accounting Standards Board Statement No. 133. For accounting of derivatives in Indian perspective is given by institute of Chartered Accountants of India which has issued Guidance Note on Accounting for Equity Index and Equity Stock futures and options in 2003. Also, Accounting for forward exchange contracts is discussed under Accounting Standard 11 (revised 2003) issued by ICAI. Following are the abstracts from the guidance note issued by ICAI.

Accounting Treatment in Books of the Client

1. Accounting for Initial Margin

Accounting for payments/ recepts in respect of initial margin is common for all types of Equity Derivative Instruments contracts.

Every Client is required to pay to the Trading Members/ Clearing member, initial margin, computed as per SPAN, for entering into an Equity Derivative Instruments contract. Such initial margin paid / payable should be debited to an appropriate account, say initial margin-Equity derivative Instruments Account'. Any amount paid/ received subsequently on account of initial margin is also debited/ credited to the account.

At the balance sheet date, the balance in the 'Initial Margin-Equity Derivative Instrument s Account' should be shown separately under the head' Current Assets'. Where instead of paying initial margin in cash, the Client provides bank guarantees or lodges, securities with the member, a disclosure in respect of outstanding equity Derivative Instruments contracts at the year-end should be made separately for each type of Instrument in the notes to the financial statements of the Client.

Sometimes, the Client may deposit a lump sum amount with the Clearing / Trading Member in respect of margin money instead of paying / receiving margin money on daily basis. The amount so paid is in the nature of a deposit and should be debited to and appropriate account, say, 'Deposit for Margin Money Account'. The amount of initial margin received into/ paid from such account should be debited / credited to the 'Deposit for Margin Money Account' with a corresponding credit / debit to the 'Initial Margin – Equity Derivative Instruments Account'. At the year-end, any balance in the 'Deposit for Margin Money Account' should be shown as a deposit under the head' Current Assets'.

2. Accounting for Equity index futures and Equity Stock Futures

2.1 Accounting for payment / Receipt of Marks – to- Market Margin

Payments made or received on account of mark-to-market margin by the Client would be

Credited / debited to the bank account and the corresponding debit or credit for the same Should be made to an appropriate account, say, 'Mark-to-Market Margin equity Index Futures Account' or 'Mark –to-Market margin- equity Stock Futures Account', as the case may be.

The amount of Mark-to-Market Margin received into / paid from lumpsum deposit with the Clearing / Trading Member should be debited / credited to the 'Deposit for Margin Money Account' with a corresponding credit / debit to the 'Mark-to-Market Margin – Equity Index Futures Account', or the 'Mark-to-Market Margin – Equity Stock Futures Account', as the Case may be.

2.2 Accounting for Open Interests in Futures Contracts as on the Balance Sheet Date

The debit / credit balance in the 'Mark-to-Market margin-Equity Index Futures Account' or the 'Mark-to-Market Margin-Equity Stock Futures Account', as the case may be, represents the net amount paid to / received from the Clearing / Trading Member on the basis of movement in the prices of equity ilndex futures or equity stock futures till the balance sheet date in respect of open futures contracts. In case the said account(s) has a debit balance on the balance sheet date, the same should be shown as a current asset. On the other hand, in case the said account(s) has a credit balance on the balance sheet date, the same should be shown as a current liability.

Keeping in view 'prudence' as a consideration for the preparation of financial statements, a provision for the anticipated loss in respect of open futures contracts should be made. For this purport, the net amount paid / received on account of Mark-to-Market Margin on open futures contracts on the balance sheet date should be determined Index wise / Scrip – wise. Where the Index-wise / Scrip-wise balance is a debit balance representing the net amount paid, provision should be made for the said amount. However, where the Index-wise / Scripwise balance is a credit balance representing the net amount received, the same should be ignored keeping in view the consideration of 'prudence'. To facilitate these computations, the Mark-to-Market Margin account(s) may be maintained indexwise/ Scrip-wise.

The provision as created above should be credited to an appropriate account, say, 'Provision electrician

2.3 Accounting at the Time of Final Settlement or Squiring-up

2.3.1 Index futures and cash-settled stock futures contracts

At the expiry of a series of equity index futures/equity stock futures, the profit/loss, on final Settlement of the contracts in the series, should be calculated as the difference between the final Settlement prece and the contract prices of all the contracts in the series. The profit / loss. Account by corresponding debit / credit to the

'Mark-to-Market Margein-Equity Index Future Account' or the 'Mark-to-Market – Equity Stock futures Account', as the case may be.

The same accounting treatment as recommended above should be made when a contract is squared-up by entering into a reverse contract. If more than one contract in respect of the relevant series of equity indeed futures/equity stock futures contract to which the squared-up contract pertains is outstanding at the time of the squaring up of the contract, the contract price of the contract up of the contract, the contract price of the contract so squared-up should be determined using Weighted Average Method for calculating profit/ loss on squaring up.

2.3.2 Delivery-settled stock futures contracts

Undeer the delivery settled stock futures contracts, at the time of final settlement, securities will be transferred in consideration for cash at the contract price. In such a case, irrespective of the security on the Settlement Date, the same will be reflected in the books at its original contract price. Thus, the relevant securities account is debited or credited for long and short futures contract, respectively, by the contract price, by a corresponding credit / debit to 'Mark-to-Market Margin-Equity Stock Futures Account', and cash/ bank account.

When a client defaults in making payment in respect of Mark-to-Market Margin, the contract is closed out. The amount not paid by the Client is adjusted against the initial margin already paid by him. In the books of the Client, the amount of Mark-to-Market Margin so adjusted should be debited to the' Mark-to-Market Margin-Equity Index future Account' or the 'Mark-to-Market Margin-Equity stock Futures Account', as the case may be, with a corresponding credit to the' Initial Margin-Equity Derivative Instruments Account'. In case, the amount to be paid on account of Mark-to-Market Margin exceeds the initial margin, the excess is a liability and should be shown as such under the head' Current Liabilities and Provisions, if it continues to exist on the blance sheet date. The amount of profit or loss on the contract so closed out should be calculated and recongnized in the profit and loss account in the manner described for index futures and cash- settled stock futures contracts above.

3. Accounting for Equity Index Options and Equity Stock Options

3.1 Accounting for payment/Receipt of the Premium

At the time of enter4ing into an options contract, the buyr/holder of the option is required to pay the premium. In the bookds of the buyer/hoder, such premium should be dibited to an appropriate account, say, 'Equity Index Option Premium Account' or 'Equity Stock Option Premium Account', as the cse may be. In the vbooks of the seller / writer, such premium received should be credited to and appropriate account, say, 'Equity Index Option Premium Account' or 'Equity Stock Option Premium Account', as the case may be.

3.2 Accounting for Open Interest in options Contracts as on the Balance Sheet Date

The 'Equity Index Option Premium Account' and the 'Equity Stock Option Premium Account' should be shown under the head' current Assets' or Current Liabilities', as the case may be. In case of multiple options, entries recommended for accounting for payment / receipt of the premium above may be made in one 'Equity Index Options Premium Account' or 'Equity Stock Options Premium Account', in respect of Options of all indexes/scrips. The balance of this composite account should be shown under the head 'Current Assets' or 'Current Liabilities, as the case may be. In the books of the buyer/holder, a provision should be made for the amount by which the premium paid for the option exceeds the premium prevailing on the balance sheet date since the buyer/holder can reduce his loss to the extent of the premium prevailing in the market, by squaring-up the transaction. The provision so created should be credited to an appropriate account, say,' Provision so created should be credited to an appropriate account, say, 'Provision for Loss on Equity Index Option Account', as the case may be. The provision made as above should be shown as a deduction from the balance of the' Equity Index Option Premium Account' or the 'Equity Stock Option Premium Account' Which is shown under the head 'Current Assets'. The excess of premium prevailing in the market on the balance sheet date over the premium paid is not recognized keeping in view the consideration of prudence.

In the books of the seller/writer, a provision should be made for the amount by which premium on the balance sheet date exceeds the premium received for that option. This provision should be credited to 'provision for Loss on Equity Index Option Account' Equity index Option premium Account' or 'Equity Stock option premium Account' and Provision for loss on equity index option Account or provision for loss on equity stock option account' should be shown under the head 'Current Liabilities and provision'. The excess of premium received over the premium prevailing on the balance sheet date is not recognized keeping in view the consideration of prudence.

In case of multiple open options at the year-end, a index-wise/Scrip- wise provision should be made considering all the open options of any Strike Price and any expiry Date under that index/scrip taken together as illustrated below:

For Stock Options of ABC Limited Situations	**In**		
	A D Rs. Rs.	B Rs.	C Rs.
Bought Total premium paid on all open options bought 1,00,000 Less: Total premium Prevailing on Balance Sheet	2,00,000	1,00,000	1,00,000

Date for all open option bought 1,50,00	3,00,000	50,000	80,000
X	-1,00,000	50,000	20,000
-50000 Sold Total premium prevailing On the Balance sheet date For all open options sold 1,30000 Less: Total Premium received On all open options sold 1,80,000	2,50,000 1,00,000	2,00,000 3,00,000	1,50,000 1,00,000
Y	1,50,000	-1,00,000	50,000
50,000	1,50,000	-1,00,000	50,000
Provision required =X+Y (if positive)			

The amount of provision required in respect of each scrip or index as illustrated above should be aggregated and a composite 'Provision for Loss on Equity Stock Options Account' or 'Provision for Loss on Equity Index Options Account' should be credited by debiting the profit and loss account.

In case of any opening balance in the 'Provision for Loss on Equity Stock Options Account' or the provision for Loss on Equity index Options Account', the same should be adjusted against the provision required in the current year and he profit and loss account be debited /credited with the balance provision required to be made/excess provision written back.

In case of multiple open options at the year-end, the 'provision for Loss on Equity Stock Options Account' or the 'Provision for Loss on Equity Index options Account; as the case may be, should be shown as a deduction form the 'Equity Stock Options Premium Account' and the deduction form the 'Equity Stock Options Premium Account' and the' Equity Index options premium Account' and the 'Equity index options Premium Account' respectively, if these have a debit balance and are disclosed under the head 'current Assets'. In cash the 'Equity Stock options Premium Account' and the 'Equity Index Options Premium Account', have a credit balance and are disclosed under the head 'Current Liabilities', the respective provision account should be shown under 'Provisions, under the head ' Current Liabilities and Provisions'.

3.3 Accounting at the Time of Final Settlement

3.3.1 Index options and cash settled stock options contracts

In the books of the buyer/holder: On exercise of the Option, the buyer / holder will recognize premium as an expense and debit the profit and loss account by crediting the 'Equity index Option Premium Account' or the 'Equity Stock Option premium

Account; Apart from the above, the buyer / holder will receive favorable difference, if any, between the final Settlement price as on the exercise/expiry Date and the Strike price, which will be recognized as income.

In the books of the seller / writer : On exercise of the Option, the seller/ writer will recognize premium as an income and credit the profit and loss account by debiting the 'Equity Index Option Premium Account' or the 'Equity Stock Option Premium Account'. Apart from the above, the seller/writer will pay the adverse difference, if any, between the final settlement price as on the Exercise/Expiry Date and the Strike Price. Such payment will be recognized as a loss. Delivery-settled stock options contracts

If an option expires unexercised, the accounting entries will be the same as those in case of cash-settled options. It the option is exercised, securities will be transferred in consideration of cash at the Strike Price. In such a case, the accounting treatment should be as recommended in the following:

In case of buyer/holder: For a call Option, the buyer / holder will receive the security for which the call option was entered into; the buyer/holder should debit the relevant security account and credit cash/book. For a put option, the buyer / holder will deliver the security for which the put option was entered into. The buyer / holder should credit the relevant the premium paid should be transferred to the profit and loss account, the accounting entries for which should be the same as those in case settled options.

In case of seller/writer: For a call option, the seller/writer will deliver the security for which the call option was entered into. The seller/writer should credit the relevant security account and debit cash/bank. For a put option, the seller/writer will receive the security for which the put option was entered in to. The seller/writer should debit the relevant security account and credit cash/bank. In addition to this entry, the premium received should be transferred to the profit and loss account, the accounting entries for which should be the same as those in case of cash settled options.

3.3.2 Accounting at the time of squaring-up of an option contract

When an options contract is squared-up by entering into a reverse contract, the difference between the premiums paid and received, after adjusting the brokerage charged, on the squared-up transactions should be transferred to the profit and loss account.

3.3.3 Method for determination of profit /loss in multiple options situation

For working out profit or loss in case of outstanding multiple options of the same scrip / index with the same Strike price and the same Expire Date, weighted average method should be followed on squaring up of transactions, Similarly, for working out profit or loss in case of outstanding multiple equity stock options of the same scrip with the same strike price and the same Expiry Date, weighted average method should be followed where such option(s) is / are exercised before the Expiry Date.

Disclosure

The enterprise should disclose the accounting policies and the methods adopted, including criteria for recognition and the basis of measurement applied for various Equity Derivative Instruments.

Where initial margin is paid by way of a bank guarantee and / or lodging or securities, the amount of such bank guarantee / bookvalue and market value of the securities in respect of outstanding Equity Derivative Instrument Contracts at the year-end, should be disclosed separately for each type of instrument.

The enterprise should give the details as illustrated below in respect of futures contracts outstanding at the year-end (Open Interests) for each Equity Index / Stock Futures:

Name of Equity No. of Index /stock Futures Unit	No. of Contracts
Long Short	
XYZ Limited PQR Limited	

Note: All open index/stock futures interests should be added together, irrespective of the contract price and series for each equity index/stock for the purpose of disclosure.

The buyer / holder and the seller / writer of the option should give the details as illustrated below in respect of option contracts outstanding as at the year-end for each Equity Index/Stock option:

Name of Equity as at the Option Index / Stock (Rs.)	Total Premium carried forward Year end net of provisions made
XYZ Limited PQR Limited	2,00,000 1,50,000

Note: - All open options should be added together, irrespective of the Strike price and the expiry Date for each equity index/stock for the purpose of disclosure.

Taxation of Derivative Transaction in Securities

Taxation of Profit/Loss on Derivatives Transaction in Securities

Prior to Financial Year 2005-06, transaction in derivatives were considered as speculative transactions for the purpose of tax liability under the income tax Act. This is in view of section 43(5) of the income tax Act which defined speculative transaction as a transaction in which a contract for purchase or sale of any commodity, including stocks and shared, is periodically or ultimately settled otherwise than by the actual delivery or transfer of the commodity or scrips. However, such transactions entered into by hedgers and stock exchange members in course of jobbing or arbitrage activity were specifically excluded from the purview of definition of speculative transaction.

In view of the above provision, most of the transaction entered into in derivatives by investors and speculators were considered as speculative transactions. The tax revisions provided for differential treatment with respect to set off and carry forward of loss on such transactions. Loss on derivative transactions could be set off only against other speculative income and the same could not be set off against any other income. This resulted in payment of higher taxes by an assesses.

Finance Act, 2005 has amended section 43(5)so as to exclude transactions in derivatives carried out in a "recognized stock exchange" for this purpose. This implies that income or loss on derivative transactions which are carried out in a "recognized stock exchange" is not taxed as speculative income or loss. Thus, loss on derivative transactions can be set off against any other income during the year. In case the same cannot be set off, it can be carried forward to 135 subsequent assessment year and set off against any other income of the subsequent year. Such losses can be carried forward for a period of 8 assessment year. It may also be noted that securities transaction tax paid on such transactions is eligible as deduction under income-tax Act, 1961.

Securities Transaction Tax on Derivatives Transactions

As per Chapter VII of the Finance (No.2) Act, 2004, Securities Transaction Tax (STT) is levied on all transactions of sale and /of purchase of equity shares and units of equity oriented fund and sale of derivatives entered into in a recognized stock exchange.

As per Finance Act2008, the following STT rates are applicable w.e.f 1st June, 2008 in relation to sale of a derivative, where the transaction of such sale in entered into in a recognized stock exchange. Sr. No. Taxable securities transaction Rate payable by

a) Sale of an option in securities 0.017% seller
b) Sale of an option in securities, where option is exercised 0.125% Purchaser
c) Sale of a futures in securities 0.017% seller

Consider an example, Mr. A. Sells a futures contract of M/s. XYX Ltd. (Lot Size: 1000) expiring on 29 Sep 2005 for Rs. 300.

The spot price of the share is Rs. 290. The Securities transaction tax thereon would be calculated as follows:

1. Total futures contract value = 1000x300=Rs. 3,00,000
2. Securities transaction tad payable thereon 0.017% = 3,00,000 x 0.017% =Rs. 51

Note: - No tax on such a transaction is payable by the buyer of the future of the futures contract

Bibliography

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