

Derivatives – Analysis & Valuation

1. SCRA – Securities Contract Regulation Act
2. National Securities Clearing Corporation Limited (NSCCL) is the clearing and settlement agency for all deals executed on the NSE's futures and options segment.
3. Market risk is the risk of the value of a firm's investments going down as a result of market movements. It is also referred to as price risk.
4. Price of the interest rate future and interest rate are inversely related and price will increase when interest rate falls.
5. Type of risks in financial market: Interest rate risk, exchange rate risk and market risk.
6. Types of derivatives instruments: derivatives can be classified on the basis of underlying asset, nature of contract or market mechanism.
 - a. Underlying Asset:
 - i. Commodities
 - ii. Foreign Exchange
 - iii. Equities, and
 - iv. Interest bearing financial assets
 - b. Nature of Contract
 - i. Forward Rate Contracts and Futures,
 - ii. Options, and
 - iii. Swaps
 - c. Market Mechanism
 - i. OTC products, and
 - ii. Exchange-traded products
7. Currency options are identified by the five parameters viz, time to expiration, currency pair, option type, strike and face value.
8. Implied volatility is a measure of possible fluctuations in future exchange rates. The greater the volatility measure the greater will be the benefit from calls or puts. Options in the interbank market are quoted in terms of implied volatility.
9. Hedging: it is a transaction in which an investor seeks to protect a position or anticipated position in the spot market by using an opposite position in derivatives.
 - a. Short Hedge: also known as selling hedge and it happens when the futures are sold in order to hedge the cash commodity against declining prices.
 - b. Long Hedge: also known as buying hedge and is just opposite of short hedge.
10. Speculators perform a valuable economic function by feeding information and analysis about a company into the derivatives markets. A market that rapidly translates company knowledge into stock price is an efficient market. Speculation makes the market efficient.
11. A forward contract is an agreement between two parties to buy or sell an asset at a specified point of time in the future. It is a personalized agreement between two parties. The price of the underlying instrument, in whatever form, is paid before control of the instrument changes. Forward contracts, however, are subject to default risk.
 - a. Forward contracts are traded directly between participants in OTC market,
 - b. The terms and conditions are mutually agreed
 - c. The contract will perfectly hedge an exposure.
 - d. Since forwards are only settled at the time of delivery, the profit or loss on a forward contract is only realized at the time of settlement, so the credit exposure can keep increasing. Hence, a loss resulting from a default is much greater for participants in a forward contract.
 - e. No money is swapped at the trading date so the forward contract is settled at the delivery date.

- f. When a forward contract is initiated, by market design, its value is Zero as far all the derivative instruments as neither of the parties need to pay cash to the other party.
- g. Value of a forward contract, $F = S_0 e^{(q+r)T}$
Where;
St: The spot price of the underlying commodity at time t
S0: The spot price now, which is known.
ST: The spot price at maturity of the contract and is not known when the contract is entered into.
r: The riskless rate of interest from now until maturity of the contract,
q: The cost of carry of the underlying commodity
F: The forward price for delivery at time T.
- 12.** The bid implies, the price a dealer is willing to pay for the future purchase of the asset, and the ask price is the price at which the dealer is willing to sell the asset.
- 13.** Interest Rate Forwards /Forward Rate Agreements (FRA)
- It is a forward contract Between two parties to exchange an interest rate differential on a notional principal amount at a given future date in which one party, the Long, agrees to Pay a fixed interest payment at a quoted contract rate and Receive a floating interest payment at a reference rate (Underlying rate), determined at Expiration day (Maturity).
 - Characteristics of forward rate agreements:
 - One party makes a fixed interest payment.
 - The other party makes an interest payment based on a referenced rate at the time of contract expiration.
 - The underlying is an interest rate.
 - Payments are based on the difference between the contract rate and the reference rate (e.g., LIBOR).
 - A FRA is a cash-settled forward contract on a short-term loan.
 - The FRA market is not as large as the swaps market.
 - FRA Payoff =

$$\frac{(\text{Notional Principal})[(\text{Underlying rate at expiration} - \text{Forward Rate}) (\text{Days in underlying rate}/360)]}{[1 + (\text{Underlying rate at expiration}) (\text{Days in underlying rate}/360)]}$$

Forward rate represents the rate at which the parties agree to pay and the 'days in underlying rate' represent the number of days to maturity of the instrument on the underlying rate is based.
 - 90-day contract on 180-day LIBOR is referred as 3 X 9 which implies that the contract expires in three months and six months later, or nine months from the contract initiation date, the interest will be paid on the underlying time deposit on whose rate the contract is based.
- 14.** According to forward contract strategies
- The cost of a forward hedge can be measured by the opportunity cost.
 - The idea behind entering the currency forward market is to lock-in the rate at which the foreign currency transactions take place.
 - Most of the times when the transaction exposure is hedged, the translation exposures get automatically hedged.
- 15.** IRR =
$$\frac{[F(1 + r_f \times T/365) - S] \times 365/T}{S}$$
- F = Futures conversion rate of currency
S = Spot conversion rate of currency
T = Number of days
r_f = interest rate p.a.
- 16.** Theoretical Futures Price $F = S + S (r - d) T/365$
S = Spot price
F = Future's price
r = T-bill/ Risk Free yield

d = dividend yield

- 17.** Futures contract refers to a standardized contract to buy or sell a specified commodity of standardized quality at a certain date in the future, at a market determined price (the futures price). The price is determined by the instantaneous equilibrium between the forces of supply and demand among competing buy and sell orders on the exchange at the time of the purchase or sale of the contract. The exchange's clearinghouse acts as counterparty on all contracts, sets margin requirements, and crucially also provides a mechanism for settlement.
- a. **Margining:** a margin is collateral that the holder of a position in securities, options, or futures contracts has to deposit to cover the credit risk of his counterparty (most often his broker). Margins levied on each contract reflect the volatility of the underlying instrument and these margins are adjusted everyday depending on the changes in the prices.
 - b. **Conversion Factor (CF):** it is the price of a bond with a face value of \$1, coupon and maturity equal to that of the deliverable bond, and yield of 6%. The adjusted price of a deliverable issue is found by multiplying the conversion factor by the futures price.
 - c. **Invoice price:** it is the price the buyer must pay the seller when a Treasury bond is delivered.
 - d. **Invoice Price = (Futures settlement price X Conversion Factor) + Accrued Interest**
 - e. **Cheapest-To-Deliver (CTD) bond:** it is the one for which [Quoted price - (Futures settlement price X Conversion Factor)] is least. It has the highest implied repo rate and highest return.
 - f. **Implied repo rate = (Dollar return)/ (Cost of investment) x (360/ days)**
 - g. **Proceeds received = Converted price + Accrued interest received + Interim coupon payment + Interest for reinvesting the interim coupon payment**
 - h. **Cost of investment = Purchase price + Accrued Interest**
 - i. **Dollar return = Proceeds received - Cost of investment**
 - j. **Mark-to-market:** it is a unique feature of futures contract wherein the positions of both buyers and sellers of the contracts are adjusted everyday for the change in the settlement price that day.
 - k. **Settlement price** is an average of the prices of the last few trades of the day.
- 18.** Factors determining futures contract price
- Futures market prices bear economically important relationships to other significant observable factors
- a. **The basis and spreads:** The relationship between two prices can be analyzed by using basis and spreads. The basis is the relationship between the cash price of a product and the futures price of that product. A spread is the difference between two futures prices.
Basis represents the difference between the cash price and the future price of a single product.
$$\text{Basis} = \text{Current cash price} - \text{Futures price}$$
Here, the cash price is for a specific location, time and quality of product. The futures price is for a contract for the same time the cash price represents.
- A spread can be either intra-commodity spread or an inter-commodity spread. For the same underlying good, if there are two different prices on two different expiration dates, the underlying spread is referred as 'intra-commodity' spread (also known as a 'time spread'). If the spread is between two futures prices for two different but related commodities, such as corn oil futures and cottonseed oil futures, it is referred to as 'inter-commodity spread'. If the price difference is between two markets for the same commodity, it is known as 'inter-market spread'.
- b. **Future prices and expected spot prices**
In general, futures prices are biased predictors of future spot prices as risk premium can be transferred from holders of the asset to buyers of futures.
 - c. **Forward prices and future prices:** At expiration both contracts are settled. Hence, in this aspect both the contracts are similar. However, at any other point of time prior to expiration, futures and forward prices can be same or may differ.

19. According to cost-to-carry concept, the future price should be equal to the spot price of the commodity plus the carrying charges required to carry the spot commodity forward to deliver. Carrying charge is the total cost incurred in carrying a storable good forward in time which includes storage costs, insurance costs, transportation costs and financing costs.
20. The backwardation in a futures market refers to when the futures prices are lower than cash prices and the basis is positive.
21. Contango market refers to when futures prices are higher than cash prices and the basis is negative.
22. Convenience yield: when there is a shortage in commodity, there is an implied yield (return) by holding the commodity.
23. Optimal Hedge Ratio

$$\text{No of Futures Contract (NFC)} = (Q_c/Q_{fc}) \times \text{HR} \quad ; \text{HR} = Q_c / Q_f$$

Q_c = Quantity of current units being hedged
 Q_f = Quantity of futures units being hedged
 Q_{fc} = the quantity of the commodity represented by the futures contract.
24. Value of the call option is directly proportional to the price of the underlying asset, and the time to expiration and inversely proportional to the exercise price.
25. Credit derivative is the negotiable financial instrument that is designed to transfer the credit risk of the assets or issuers between two or more parties. It may be in the form of an option, forward or swap where cash flows are linked with the credit characteristics of the bonds. Return from the credit derivative instrument may be the significant part of the portfolio return.
26. CREDIT OPTION: Credit option is an instrument to protect against credit risk and is different from the standard debt option as the latter is designed to protect against interest rate risk. Credit option is of two types, one which is triggered by a decline in the value of assets and another which is triggered by a change in the asset's spread over a comparable risk-free rate.

There are two types of option writing on an underlying asset:

- Binary credit option with a predetermined pay-out
- Binary credit option based on credit rating.

In a binary credit option with a predetermined pay-out, the option seller has an obligation to pay-out a fixed sum in case of default, but in case of no default at the time of maturity, the option buyer will lose the premium. American binary option can be exercised anytime during its life whereas European binary credit option can be exercised at the time of maturity only.

Binary credit option based on credit rating is another type of option, which is exercised at the time when the credit rating falls below investment grade i.e., option buyer will get money if the credit agency downgrades the instrument below investment grade; otherwise, he will lose the premium. Thus, binary credit option deals with only two outcomes.

27. CREDIT FORWARD: Credit forward is a useful instrument for the buyer of the credit exposure and the portfolio manager who wishes to hedge the appreciated value of its portfolio. Like the credit option, credit forward may be contracted on bond value or credit spread. Portfolio managers can hedge their earnings by purchasing the credit forward. Increase in the high-yield credit spread results in increase in the value of credit forward while decreasing the portfolio yield.
28. CREDIT SWAPS: Credit swaps are also of two types like credit options — credit default swap and total return swap. The difference between the two is that the rationale of a credit default swap is to hedge the credit exposure by selling it to a credit protection seller like the credit option while the total return swap is used to increase credit exposure and assume more risk for more return. Credit insurance and swapping risky credit are the two types of credit default swap. In credit insurance, the buyer of the credit protection pays a fee to the seller of the credit protection in return for the right to receive a fixed amount in case of the default of a referenced credit. The buyer of the credit protection

continues to receive the total return on the referenced assets until the total return is negative due to default, widening credit spread or downgrading. An alternative to the credit insurance type is the investor agreeing to swap the total return on credit risky assets for fixed periodical payment from the credit protection seller; the pay-off is such that if the credit risk declines in value the investor will repay for the decline plus receive a periodical payment from the seller. This is referred to as swapping risky credit payments.

A total return credit swap is in fact used -to increase the credit exposure. It involves transferring of all of the economic exposure of the asset under consideration to the credit swap purchaser. It includes all cash flows that arise from the referenced assets and their capital appreciation or depreciation. The credit swap buyer pays a floating rate plus any depreciation of the referenced asset to the credit swap seller in return for the exposure assumed.

29. Trading Strategies of Options

- a. Covered call writing: buying the underlying asset and writing a call on that asset.
- b. Protective put: buying the underlying asset and buying a put on that asset. It acts like an insurance on the stock.
- c. Straddle: A call and a put option with the same exercise price and the same expiration date. The maximum loss associated with the long straddle is the cost of two options (the premium paid for buying the options) but profit potential is unlimited.
- d. Strangle: A call and a put option with the same expiration date and different strike prices. If the strike prices of the call and the put options are X_1 and X_2 , a strangle is chosen in such a way that $X_1 > X_2$.
- e. Strips: long position in one call and two puts with the same exercise price and expiration date. The buyer of the strip believes that there will be a big stock price move but the stock price is more likely to fall than rise.
- f. Straps: long position in two calls and one put with the same exercise price and expiration date. The buyer of the strip believes that there will be a big stock price move but the stock price is more likely to rise than fall.
- g. Spreads: to exploit moderately bullish or bearish beliefs about the market. There are three types of spreads:
 - i. Vertical spreads: buying an option and selling another option of the same type and time to expiration, but with a different exercise price.
 - ii. Horizontal spread: buying an option and selling another option of the same type and with the same exercise price, but with a different time to expiration.
 - iii. Diagonal spreads: buying an option and selling another option of the same type with a different exercise price and a different time to expiration.

30. Break Even Points

- a. Straddle: (Strike price – Premium) and (Strike price + Premium)
 - b. Strangle: (Higher strike price + Premium) and (Lower strike price – Premium)
- 31.** Horizontal reverse time spread: reverse time spreads using calls involve the purchase of a call which expires in a short period of time and the writing of another call with the same exercise price, but which has a longer time period until expiration. Reverse time spreads are like writing of the naked options, but use the purchase of a shorter term contract to hedge the naked position.
- 32.** Box Spread: it is a combination of bull and bear spreads with calls and puts respectively with the same set of exercise prices. If X_1 and X_2 are strike prices available with calls and puts respectively, a box spread involves buying and selling calls with strike prices X_1 and X_2 and buying and selling puts with strike prices X_2 and X_1 respectively.
- 33.** Butterfly spread: it involves 4 identical options with the same expiration date but different exercise prices. It involves buying one option each at strike prices X_1 and X_3 and selling two options at the intermediate strike price X_2 . X_1 , X_2 and X_3 are chosen such that $X_1 < X_2 < X_3$.
- 34.** Ratio spread: two or more related options are traded in a specified proportion.

35. **Condor Spread:** it is similar to butterfly spread except that four different strike prices are involved. Two options are bought at the extreme strike prices and two are sold at two intermediate strike prices.
36. **Calendar spread (Horizontal spread):** almost similar to a butterfly spread, it is created by selling a call option with a certain strike price and purchasing another call option with longer maturity but the same strike price.
37. **Arbitrage with Options:** involves buying calls and selling puts of the same stock, with the same strike price and expiry date.
 - a. **Synthetics:** purchase of call options and writing of put options at exactly the same exercise price. If the prices go below the strike price, there is a possibility of windfall gains. If the prices go above the exercise price, the stock can be purchased at the exercise price.
 - b. **Conversions:** Holding a long position stock while creating a synthetic short position, in order to get the possibility of arbitrage profits.
 - c. **Reversals:** just opposite to conversions. They involve a short position on the stock combined with a synthetic long position.
38. **Exotic options:** these are options which are more complicated than the standard European or American options. Most of them are traded on OTC market and are designed to meet specific requirements.
39. **Asian options (average value option):** the payoff is determined by the average underlying price over some pre-set period of time. Advantage of Asian options is that these reduce the risk of market manipulation of the underlying instrument at maturity.
 - a. **Barrier options:** the option to exercise depends on the underlying crossing or reaching a given barrier level. Barrier options are always cheaper than a similar option without barrier. It is of two types – Knock-in or knock-out. A knock-in option is one that comes into existence only when the underlying asset price reaches a certain barrier. A knock-out option is one that ceases to exist when the underlying asset price reaches a certain barrier.
 - b. **A Bermudan option** is an option where the buyer has the right to exercise at a set (always discretely spaced) number of times.
 - c. **Binary / Digital option:** It is a type of option where the payoff is either some fixed amount of some asset or nothing at all. The two main types of binary options are the cash-or-nothing binary option and the asset-or-nothing binary option. The cash-or-nothing binary option pays some fixed amount of cash if the option expires in-the-money while the asset-or-nothing pays the value of the underlying security.
 - d. **Chooser option:** It gives the purchaser a fixed period of time to decide whether the derivative will be a European call or put option. It is also known as as-you-like-it options.
 - e. **Compound options:** these are options on options. There are four main types of compound options viz, a call on call; a call on a put; a put on a call; a put on a put.
 - f. **Forward start option:** It is an option that commences at some specified future date with an expiration further in the future. It is essentially a forward on an option, only the premium is paid in advance. A series of consecutive forward start options creates a cliquet / ratchet option.
 - g. **Flex option:** traders agree to non-standard terms which may involve strike prices or exercise dates.
 - h. **Lookback options:** The payoff depends on the optimal (maximum or minimum) underlying asset's price occurring over the life of the option. The option allows the holder to "look back" over time to determine the payoff. There exist two kinds of Lookback options: with floating strike and with fix strike.
 - i. **Rainbow option:** It is exposed to two or more sources of uncertainty, as opposed to a simple option that is exposed to one source of uncertainty, such as the price of underlying asset. Rainbow options are usually calls or puts on the best or worst of n underlying assets, or options which pay the best or worst of n assets.

40. Option price convexity: under normal conditions, in case there are three options with strike price equally spread apart, the premium on the middle strike price should be lower than that of the average of the first and the third strike prices else an arbitrage opportunity is created.
41. The assumptions of Black Scholes model are:
- The stock pays no dividends during the option's life
 - Markets are efficient
 - There are no transaction costs or taxes
 - Interest rates remain constant and known
 - Returns are lognormally distributed
 - European exercise terms are used.
42. Properties of Black-Scholes model
- When the stock price 'S' becomes very large, the call option is exercised.
 - When the stock price becomes very large, price of a European put option 'p' approaches zero.
 - As σ tends to zero, the put price is $\max(X, e^{-r(T-t)} - S, \sigma)$
43. The main disadvantages of the Black and Scholes model of option pricing is/are
- This model is not conducive for valuing complex derivative products.
 - This model uses all the historical data for calculating the price of option and ignores future developments.
44. Pricing of weather related options is done by simple probability distribution pricing and Gauss' distribution pricing.
45. Future contract: it is an agreement between two parties – a buyer (seller) and an established exchange or its clearing house in which the buyer (seller) agrees to take (make) delivery of an underlying asset or underlying instrument at a predetermined price at a specified date.
46. The intrinsic value of a call option is zero until the market price of the underlying stock reaches the strike price; after that point, the intrinsic value is computed by subtracting the strike price from the market price of the stock. At expiration, the option can no longer have a time premium, so its value is equal to its intrinsic value.
- Intrinsic value = Exercise price – Spot price
Time value = Premium – Intrinsic value
47. The smile effect in option pricing models shows that volatility of deep-in-the-money and out-of-the-money options is greater than those at- the-money options.
48. Sensitivity of option premiums

Factor	Change	Effect on Call Price	Effect on Put Price
Price of the underlying asset	↑ ↓	↑ ↓	↓ ↑
Volatility	↑ ↓	↑ ↓	↑ ↓
Time to expiration	↓	↓	↓

49. There are five measures of sensitivities of option premiums
- Delta (aka Hedge Ratio): The delta ratio is the percentage change in the option premium for each dollar change in the underlying. If the value of the portfolio doesn't change within a narrow range, it is said to be delta neutral. This technique is also called delta hedging. Delta of a call will always be positive and vice-a-versa for put.
 - Gamma is the change in option's delta for each unit change in the price of the underlying. The absolute magnitude of delta increases as the time to expiration of the option decreases, and as its intrinsic value increases. Gamma of a call and put will always be equal. It is a second order derivative of option premium wrt the stock prices. When delta is close to 1 or -1, then gamma is near zero, because delta doesn't change much with the price of the underlying.

- c. Theta is a measure of this time decay, and is expressed as the loss of time value per day. Theta is very little for a long-term option, and increases as expiration nears. Theta is also greatest when the option is at the money, because this is the price where the time value is greatest, and, thus, has a greater potential to decay. A short position in options is said to have positive position theta. The theta for a long call or put will be negative while the opposite can be said for the short call and put.
 - d. Rho is the amount of change in premiums due to a 1% change in the prevailing risk-free interest rate. Call option is positively related to interest rate hence Rho of any call will be always positive. It will be lower for deep out-of-the-money call.
 - e. Vega measures the change in the option premium due to changes in the volatility of the underlying, and is always expressed as a positive number. Because volatility only affects the time value of an option premium, Vega tends to vary like the time value of an option—greatest when the option is at the money and least when the option is far out of the money or in the money. It will be the highest for near the money option.
- 50.** Dynamic portfolio insurance is a technique that creates an option-like return by increasing or reducing the position in the underlying security or futures, options, or forward contract. The intent is to simulate the delta change in the value of an option position. One example of dynamic hedging is increasing or decreasing a short stock index futures position (selling stock index futures that you don't own) to create a synthetic put on a portfolio. This will create a return that is similar to portfolio insurance.
- 51.** Investors are compensated only for holding systematic risk. They cannot be compensated for being long or short volatility, because this is zero-sum. No one is required to hold volatility risk, so no one should pay to get rid of it.
- 52.** A swaption is an option granting its owner the right but not the obligation to enter into an underlying swap. Although options can be traded on a variety of swaps, the term "swaption" typically refers to options on interest rate swaps. There are two types of swaption contracts:
- a. A payer swaption gives the owner of the swaption the right to enter into a swap where they pay the fixed leg and receive the floating leg.
 - b. A receiver swaption gives the owner of the swaption the right to enter into a swap where they will receive the fixed leg, and pay the floating leg.
- 53.** Swaps: a swap is a derivative in which two counterparties agree to exchange one stream of cash flow against another stream. These streams are called the legs of the swap. The cash flows are calculated over a notional principal amount, which is usually not exchanged between counterparties. The price of the swap is the difference between the values of the two cash flows.
- a. Commodity Swaps: the counter-parties make payments based on the price of a fixed amount of a certain commodity in which one party pays a fixed price for the good and the other party pays a market rate over the swap period. Types of commodity swaps: fixed-floating or commodity-for-interest. Fixed floating swaps are just like the fixed-floating swaps in the interest rate swap market with the exception that both the indices are commodity-based indices. Commodity-for-interest swaps are similar to the equity swap in which a total return on the commodity in contract is exchanged for some money market rate (plus or minus a spread)
 - b. Basis swap: a stream of floating interest rates is swapped against another stream of floating interest rates.
 - c. Forward swap / deferred swap: the commencement date is set at a future date, and it helps in locking the swap rates and use them later as and when needed.
 - d. Accreting swaps: can be used to convert floating rate payments into fixed rate payments. if the principal amount increases every time additional loan is availed.
 - e. Circus swaps: combination of two fixed-floating currency swaps to form a fixed currency swap.
 - f. Currency Swap: it is a mutual understanding of parties for exchange of interest payments (either fixed or floating) on loan in one currency to an equivalent loan in another currency. This may or may

not involve initial exchange of principal. It is a combination of two positions: one spot and one forward with an exchange of currencies taking place at predetermined exchange rates.

- g. Equity Swaps: It means an exchange of dividends earned and capital gains on a portfolio, which is based on a stock index against periodic interest payments. It is similar to an interest rate swap, having a fixed period, a fixed rate payer and a floating rate payer.
 - h. Interest rate swaps: agreement between two or more counter-parties who agree to exchange interest payments over a specific time period on agreed terms. The rate of interest may be fixed or floating.
 - i. A plain vanilla currency swap is a fixed-fixed currency swap in which each party pays a fixed payment on the loan taken by them.
 - j. Extendible swap: the floating rate payer gets the right to extend the swap maturity date. If the interest rate rise and are expected to rise further then, fixed rate payer stands to gain as he is required to pay less than the current rate.
 - k. Amortizing swap: useful for managing the associated interest rate risk arising from mortgage loans.
 - l. Roller Coaster swap: used to shift the interest rate risk by converting a floating rate liability to a fixed rate liability, or vice-a-versa.
 - m. Coupon swaps are those swaps where fixed rate obligations are exchanged for floating rate obligations over a specified period of time on a notional principal.
 - n. Weather swaps are privately negotiated financial contracts that allow two parties to exchange specific weather risk exposures over a period of time.
 - o. Swap coupon is the fixed rate of interest on the swap.
 - p. Par Swap Rate: fixed rate at which the swap has zero present value.
- 54.** Short term swaps have maturity period of less than 3 years, medium term 3 – 5 years and long term more than 5 years.
- 55.** Quality spread is the difference between the borrowing powers of two parties in the market. This mostly arises because of the difference in the credit ratings of the two firms.
- 56.** The average of bid and ask rates exchanged for floating is referred to as swap rate. The average excess of the fixed rate in a swap agreement over the corresponding risk-free rate is known as swap spread.
- 57.** Warehousing: Most of times, it takes time to match the swap offer of one company with the requirements of the other. Many financial institutions (swap dealers) benefit from this situation by entering into a swap with the offering company and hedging the interest risk till counterparty is found. This is known as warehousing.
- 58.** Under the Actual/360 and Actual/365 convention, the actual number of days is counted between previous fixed day payment date and forthcoming fixed day payment date, including previous fixed date and excluding forthcoming fixed date.
- 59.** Credit Enhancement: it encompasses a variety of provisions that may be used to reduce the credit risk of an obligation. There are two types of credit enhancement structures:
- a. External Credit Enhancement: It is in the form of third-party guarantees which protect against losses up to a particular fixed level. This is available in the form of a corporate guarantee, a letter of credit from a bank or bond insurance. Some of the techniques are:
 - i. Collateralization
 - ii. Third party loan guarantees
 - iii. Credit insurance
 - iv. Letters of credit
 - v. Special purpose vehicle
 - b. Internal credit enhancements
 - i. Reserve Funds
 - ii. Over Collateralization
 - iii. Senior/Subordinated Structures

- 60.** Netting: In general, netting means to allow a positive value and a negative value to set-off and partially or entirely cancel each other out. Netting decreases credit exposure, increases business with existing counterparties, and reduces both operational and settlement risk and operational costs. In the context of credit risk, there are at least three specific types of netting:
- a. Close-out netting: All transactions or all of a given type are netted at market value.
 - b. Netting by novation: The legal obligations of the parties to make required payments under one or more series of related transactions are cancelled and a new obligation to make only the net payments is created.
 - c. Settlement or payment netting: For cash settled trades, this can be applied either bilaterally or multilaterally and on related or unrelated transactions.
- 61.** Benefits of asset backed securities
- a. Predictability of cash flows – the cash flows from asset backed securities can be predicted with certainty, as the pool of underlying assets is known. Moreover, there is certainty with respect to time period when the cash flow will take place
 - b. Better yield- asset-backed securities provide better yield than the bonds or mortgage-backed securities of similar quality and maturity
 - c. Better credit quality - The presence of collateral as guarantee for payment increases the creditworthiness of such securities.
 - d. Diversification and internal diversification - The investors of such securities have the opportunity to diversify investments as they have additional avenue to invest their funds.
 - e. Reduced Event Risk: these are several unforeseen and unpredictable events like mergers, acquisitions, restructuring of the company etc.
- 62.** Classification of ABS on the basis of underlying assets
- a. Installment Contract: close to mortgage pass-through security where an investor is given an undivided interest in a pool of assets that are being utilized for securitization. Some of types are:
 - i. Auto Loan-Backed Securities (ALBs)
 - ii. Home Equity Loans (HELs)
 - iii. Manufactured Housing-Backed Securities (MHBs)
 - b. Revolving lines of credit: they require issuers to modify the structures used to securitize the assets. The principal payments made by credit card borrowers are retained by the trustee, for a specific period known as lock-out period or revolving period to be reinvested in additional receivables.
 - c. Other Assets: Auto leases, small-business loans, short-term auto dealer inventory loans or dealer floor-pan loans and trade receivables.
- 63.** The different structures used in amortization of credit card receivables are
- a. Pass-through structure
 - b. The controlled-amortization structure; and
 - c. The bullet payment structure
- 64.** The lock-out period for credit card borrowers varies from 18 months to 10 years. The period after the lock-out period during which the principal is paid to the investors is called principal-amortization period.
- 65.** Manufactured Housing-Backed securities are backed by loans on manufactured homes. There are also referred as mobile homes as they are built in factory premises, and then moved into a different location.
- 66.** An asset backed security can have one of the following three attributes:
- a. Characteristic a: No prepayment option. i.e. security backed by credit card receivables.
 - b. Characteristic b: Prepayment option is available but borrowers do not show any intention of prepaying when refinancing rates fall below the loan rate. i.e. security backed by auto mobile loans.
 - c. Characteristic c: Prepayment option is available and borrowers are willing to prepay when refinancing rates fall below the loan rate. i.e. Closed-end home equity loans taken by high quality borrowers.

- 67. Approaches to valuing asset backed securities**
- a. Z Spread Approach: uses the spot interest rate plus zero-volatility spread to discount the cash flows and arrive at the value of ABS. this approach does not consider the prepayment option. Therefore it is suitable for characteristic a and characteristic b type of ABS.
 - b. Option Adjusted Spread: Used in valuing the securities having embedded options. In this case, the option is expected to be exercised if it makes economic sense to the borrower in doing so. Thus, OAS approach is used in valuing characteristic c type ABS and Monte-Carlo simulation model is used as prepayment option are dependent on interest rate path. It is a measure of the yield spread (expressed in basis points) which can be used to convert differences between the values and the prices. It is the spread that will make the theoretical value equal to the market price.
- 68.** Under 'Interest Rate Futures', moneylenders stand to lose if the interest rates go down in future and the money borrowers stand to lose if the interest rates go up in future.
 - 69.** Borrowers options and lenders options are OTC call and put options on short-term loans and deposits respectively. They are known as interest rate guarantees.
 - 70.** Hedging through currency of invoicing involves eliminating transaction and translation exposure by invoicing all receivables and payables in the domestic currency. Hence the importer covers the forex exposure.
 - 71.** Covered interest arbitrage: if the forward rate in a market is not equal to the forward rate given by the interest rate parity, it could result in an arbitrage transaction.
 - 72.** The quotation for a forward rate agreement as: US\$ 6/9 months 4.25% / 4.50% p.a. means that the interest on a 3 month US \$ deposit after six months is 4.25%.
 - 73.** Cross hedge: if a related commodity on which a future is traded is used for hedging an asset on which no futures contract is traded.
 - 74.** Open Interest: the number of futures contracts which have been traded already but pending for delivery.
 - 75.** Chicago Mercantile Exchange established the International Monetary Market in 1972 to trade futures contracts in foreign currencies.
 - 76.** Cash and carry strategy involves purchase of an instrument and simultaneously selling a futures contract against it in order to create a synthetic short-term instrument.
 - 77.** Hedge ratio between futures and cash instrument is defined as spot price variation divided by the futures price variation.
 - 78.** Going long on a currency and short on a call option results in the pay-off profile of a put option writer.
 - 79.** Going short on a currency and long on a call option results in the pay-off profile of a put option buyer.
 - 80.** Going long on a currency and long on a put option results in the pay-off profile of a call option buyer.
 - 81.** The buyer of a call option can earn profit if there is a fall in interest rates and rise in bond prices.
 - 82.** In interbank market, options are quoted in terms of implied volatility.
 - 83.** The binomial option-pricing model uses discrete time whereas the Black-Scholes model uses continuous time and further assumes that the underlying asset's volatility is constant and that closed-form computational methods are used to derive the option prices.
 - 84.** For a put option, premium is directly proportional to the strike price.
 - 85.** The probability of one's portfolio can be measured under different levels/ scenarios by using Monte-Carlo simulation, stress testing and value at risk.
 - 86.** A synthetic long call is a combination of long call + short stock.