

Indian Capital Market

BASIC CONCEPTS

1. Introduction

Indian financial market consists of capital market, money market and the debt market.

2. Capital Markets/Securities Market

The capital markets are relatively for long-term (greater than one year maturity) financial instruments (e.g. bonds and stocks).

- **Primary Market:** A market where new securities are bought and sold for the first time is called the New Issues market or the IPO market.
- **Secondary Market:** A market in which an investor purchases a security from another investor rather than the issuer, subsequent to the original issuance in the primary market.

There are many similarities and differences between Primary Market and Capital Market

3. Stock Exchange and Its Operations

Stock exchange is a place where the securities issued by the Government, public bodies and Joint Stock Companies are traded.

4. Leading Stock Exchanges in India

(a) **Bombay Stock Exchange Limited (BSE):** It is the oldest stock exchange in Asia. It's index is *SENSEX*. The Exchange has a nation-wide reach with a presence in 417 cities and towns of India. The BSE's On-Line Trading System (BOLT) is a proprietary system of the Exchange and is BS 7799-2-2002 certified. The surveillance and clearing and settlement functions of the Exchange are ISO 9001:2000 certified.

(b) **National Stock Exchange (NSE):** It was promoted by leading Financial Institutions at the behest of the Government of India and was incorporated in November 1992. It uses satellite communication technology to energize participation from around 320 cities spread all over the country. NSE can handle up to 6 million trades per day in Capital Market segment. NSE is one of the largest interactive VSAT based stock exchanges in the world. Today it supports more than 3000 VSATs.

5. Leading Stock Exchanges Abroad

(a) **New York Stock Exchange (NYSE):** was established in 1792. Each day on the

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NYSE trading floor an auction takes place. Open bid and offers are managed on The Trading Floor by Exchange members acting on behalf of institutions and individual investors Buy and sell orders for each listed security meet directly on the trading floor in assigned locations. Prices are determined through supply and demand. Stocks buy and sell orders funnel through a single location, ensuring that the investor, no matter how big or small, is exposed to a wide range of buyers and sellers.

- (b) **Nasdaq:** It is known for its growth, liquidity, depth of market and the world's most powerful, forward-looking technologies. Nasdaq National Market companies include some of the largest, best known companies in the world.
- (c) **London Stock Exchange:** Established in 1760. Dealing in shares is conducted via an off-market trading facility operated by Cazenovia and Company. It provides a range of services for companies as well as for investors and also regulates the markets to give protection to investors and companies to maintain its reputation for high standards and integrity.

6. Functions of Stock Exchanges

- (a) Liquidity and Marketability of Securities;
- (b) Fair Price Determination;
- (c) Source for Long term Funds;
- (d) Helps in Capital Formation; and
- (e) Reflects the General State of Economy.

7. Stock Market Index

(a) Features

- Representative of entire Stock Market.
- Replacement of one company's share with other company's share.
- Flagship Indices- BSE Sensex and NSE Nifty

(b) Computation of Index

$$\text{Index Value} = \text{Index on Previous Day} \times \frac{\text{Total market capitalisation for current day}}{\text{Total capitalisation of the previous day}}$$

8. Settlement and Settlement Cycle

SEBI introduced a new settlement cycle known as the 'rolling settlement cycle'. This cycle starts and ends on the same day and settlement take place on the 'T+X' days where X is 2 days, which is the business days from the date of the transactions. NSE and BSE follow this cycle.

9. Clearing Houses

Charged with the function of ensuring (guaranteeing) the financial integrity of each trade.

The role of Clearing House is as under:

- It ensures adherence to the system and procedures for smooth trading.
- It minimises credit risks by being a counter party to all trades.
- It involves daily accounting of all gains or losses.
- It ensures delivery of payment for assets on the maturity dates for all outstanding contracts.
- It monitors the maintenance of speculation margins.

10. E-IPO

In addition to other requirements for public issue as given in SEBI guidelines wherever applicable, a company proposing to issue capital to public through the on-line system of the stock exchange for offer of securities has to comply with additional requirements in this regard.

For E-IPO, the company should enter into agreement with the stock exchange(s) and the stock exchange would appoint SEBI registered stock brokers of the stock exchange to accept applications.

11. Capital Market Instruments

- **Equity Shares:** It is a share in the ownership of a company. Stock represents a claim on the company's assets and earnings. It entitles the owner to vote at shareholders' meetings and to receive dividends.
- **Preference Shares:** These shares form part of the share capital of the company which carry a preferential right to be paid in case a company goes bankrupt or is liquidated. They do not have voting rights but have a higher claim on the assets and earnings of the company.
- **Debentures/ Bonds:** A bond is a long-term debt security. It represents "debt" in that the bond buyer actually lends the face amount to the bond issuer.

$$YTM = \frac{\text{Coupon Rate} + \text{Prorated Discount}}{(\text{Face Value} + \text{Purchase Price})/2}$$

- **American Depository Receipts (ADRs):** An American Depository Receipt (ADR) is a negotiable receipt which represents one or more depository shares held by a US custodian bank, which in turn represent underlying shares of non-issuer held by a custodian in the home country.
- **Global Depository Receipts (GDRs):** They are negotiable certificates with publicly traded equity of the issuer as underlying security. An issue of depository receipts would involve the issuer, issuing agent to a foreign depository. The depository, in turn, issues GDRs to investors evidencing their rights as shareholders. Depository receipts are denominated in foreign currency and are listed on an international exchange such as London or Luxembourg. GDRs enable investors to trade a dollar

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denominated instrument on an international stock exchange and yet have rights in foreign shares.

12. **Derivatives:** It is a financial instrument which derives its value from some other financial price. This 'other financial price' is called the underlying.

Types of Derivative Risks

- (a) **Credit risk:** Credit risk is the risk of loss due to counterparty's failure to perform on an obligation to the institution.
- (b) **Market risk:** Market risk is the risk of loss due to adverse changes in the market value (the price) of an instrument or portfolio of instruments.
- (c) **Liquidity risk:** Liquidity risk is the risk of loss due to failure of an institution to meet its funding requirements or to execute a transaction at a reasonable price.
- (d) **Operational risk:** Operational risk is the risk of loss occurring as a result of inadequate systems and control, deficiencies in information systems, human error, or management failure.
- (e) **Legal risk:** Legal risk is the risk of loss arising from contracts which are not legally enforceable (e.g. the counterparty does not have the power or authority to enter into a particular type of derivatives transaction) or documented correctly.
- (f) **Regulatory risk:** Regulatory risk is the risk of loss arising from failure to comply with regulatory or legal requirements.
- (g) **Reputation risk:** Reputation risk is the risk of loss arising from adverse public opinion and damage to reputation.

13. Types of Financial Derivatives

- **Future Contract:** It is an agreement between two parties that commits one party to buy an underlying financial instrument (bond, stock or currency) or commodity (gold, soybean or natural gas) and one party to sell a financial instrument or commodity at a specific price at a future date.
- **Stock Options:** A privilege, sold by one party to another, that gives the buyer right not an obligation, to buy (call) or sell (put) a stock at an agreed upon price within a certain period on or a specific date regardless of changes in its market price during that period.
- **Stock Index Futures:** Stock index futures may be used to either speculate on the equity market's general performance or to hedge a stock portfolio against a decline in value.
- **Stock Index Option:** A call or put option on a financial index. Investors trading index options are essentially betting on the overall movement of the stock market as represented by a basket of stocks.

14. Option Valuation Techniques

- (a) **Binomial Model:** The Binomial Model breaks down the time to expiration into

potentially a very large number of time intervals, or steps. With the binomial model it is possible to check at every point in an option's life (i.e. at every step of the binomial tree) for the possibility of early exercise (e.g. where, due to e.g. a dividend, or a put being deeply in the money the option price at that point is less than its intrinsic value).

- (b) **Risk Neutral Method:** The basic argument in this approach is that since the valuation of options is based on arbitrage and is therefore independent of risk preferences and assuming any set of risk we should get the same answer as by using Binomial Model.
- (c) **Black-Scholes Model:** The Black-Scholes model is used to calculate a theoretical price (ignoring dividends paid during the life of the option) using the five key determinants of an option's price: stock price, strike price, volatility, time to expiration, and short-term (risk free) interest rate.

$$OP = SN(d_1) - Xe^{-rt}N(d_2)$$

Where:

$$d_1 = \frac{\ln\left(\frac{S}{X}\right) + \left(r + \frac{v^2}{2}\right)t}{v\sqrt{t}}$$

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

The variables are:

- S = current stock price
- X = strike price of the option
- t = time remaining until expiration, expressed as a percent of a year
- r = current continuously compounded risk-free interest rate
- v = annual volatility of stock price (the standard deviation of the short-term returns over one year).

- ln = natural logarithm
- N(x) = standard normal cumulative distribution function
- e = the exponential function

- (d) **Greeks:** The Greeks are a collection of statistical values (expressed as percentages) that give the investor a better overall view of how a stock has been performing :

- (i) **Delta:** It is the degree to which an option price will move given a small change in the underlying stock price. 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 = $N(d_1)$ (see Black-Scholes formula for d_1)

- (ii) **Gamma:** It measures how fast the delta changes for small changes in the underlying stock price. It is the delta of the delta.
- (iii) **Theta:** The change in option price given a one day decrease in time to expiration. It is a measure of time decay.
- (iv) **Rho:** The change in option price given a one percentage point change in the risk-free interest rate.
- (v) **Vega:** Sensitivity of option value to change in volatility.

(e) **Pricing Future Contract**

Cost-of-Carry Model: It is an arbitrage-free pricing model. Its central theme is that futures contract is so priced as to preclude arbitrage profit.

Futures price = Spot Price + Carry Cost – Carry Return

15. Embedded Derivatives

It is a derivative instrument that is embedded in another contract - the host contract. The host contract might be a debt or equity instrument, a lease, an insurance contract or a sale or purchase contract.

16. Commodity Derivatives

Trading in derivatives first started to protect farmers from the risk of the value of their crop going below the cost price of their produce. Derivative contracts were offered on various agricultural products like cotton, rice, coffee, wheat, pepper, etc. Commodity futures and swaps are also available.

There are 25 commodity derivative exchanges in India as of now and derivative contracts on nearly 100 commodities are available for trade.

17. Commodity Exchanges in India

- (a) **National Commodity & Derivatives Exchange Limited (NCDEX):** NCDEX is a public limited company incorporated on April 23, 2003 under the Companies Act, 1956. It is the only commodity exchange in the country promoted by national level institutions. NCDEX is regulated by Forward Market Commission in respect of futures trading in commodities.
- (b) **Multi Commodity Exchange (MCX):** MCX is an independent and de-mutualised multi commodity exchange. It has permanent recognition from the Government of India for facilitating online trading, clearing and settlement operations for commodities futures market across the country.
- (c) **Indian Commodity Exchange (ICEX):** It is a screen based on-line derivatives exchange for commodities. It has robust assaying and warehousing facilities in order to facilitate deliveries.
- (d) **National Multi-Commodity Exchange of India (NMCE):** It is the first de-mutualised Electronic Multi-Commodity Exchange of India being granted the

National status on a permanent basis by the Government of India and operational since 26th November 2002.

18. OTC Derivatives

It is a derivative contract which is privately negotiated. OTC trades have no anonymity, and they generally do not go through a clearing corporation.

- **OTC Interest Rate Derivatives:** Over-the-counter (OTC) interest rate derivatives include instruments such as forward rate agreements (FRAs), interest rate swaps, caps, floors, and collars
- **FRA:** It is a forward contract that sets terms for the exchange of cash payments based on changes in the London Interbank Offered Rate (LIBOR).
- Final settlement of the amounts owed by the parties to an FRA is determined by the formula
- Payment

$$\frac{(N)(RR - FR)(dtm/DY)}{[1 + RR(dtm/DY)]}$$

Where,

- N = the notional principal amount of the agreement;
- RR = Reference Rate for the maturity specified by the contract prevailing on the contract settlement date;
- FR = Agreed-upon Forward Rate; and
- dtm = maturity of the forward rate, specified in days (FRA Days)
- DY = Day count basis applicable to money market transactions which could be 360 or 365 days.

- **Interest rate swaps:** They provide for the exchange of payments based on differences between two different interest rates;
- **Interest rate caps, floors, and collars:** They are option-like agreements that require one party to make payments to the other when a stipulated interest rate, most often a specified maturity of LIBOR, moves outside of some predetermined range.

Question 1

Write a note about the functions of merchant banker.

Answer

Functions of Merchant Bankers: The basic function of merchant banker or investment

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banker is marketing of corporate and other securities. In the process, he performs a number of services concerning various aspects of marketing, viz., origination, underwriting, and distribution, of securities. During the regime of erstwhile Controller of Capital Issues in India, when new issues were priced at a significant discount to their market prices, the merchant banker's job was limited to ensuring press coverage and dispatching subscription forms to every corner of the country. Now, merchant bankers are designing innovative instruments and perform a number of other services both for the issuing companies as well as the investors. The activities or services performed by merchant bankers, in India, today include:

- (a) Project promotion services.
- (b) Project finance.
- (c) Management and marketing of new issues.
- (d) Underwriting of new issues.
- (e) Syndication of credit.
- (f) Leasing services.
- (g) Corporate advisory services.
- (h) Providing venture capital.
- (i) Operating mutual funds and off shore funds.
- (j) Investment management or portfolio management services.
- (k) Bought out deals.
- (l) Providing assistance for technical and financial collaborations and joint ventures.
- (m) Management of and dealing in commercial paper.
- (n) Investment services for non-resident Indians.

Question 2

Write short note on Asset Securitisation.

Answer

Asset Securitisation: Securitisation is a process of transformation of illiquid asset into security which may be traded later in the open market. It is the process of transformation of the assets of a lending institution into negotiable instruments. The term 'securitisation' refers to both switching away from bank intermediation to direct financing via capital market and/or money market, and the transformation of a previously illiquid asset like automobile loans, mortgage loans, trade receivables, etc. into marketable instruments.

This is a method of recycling of funds. It is beneficial to financial intermediaries, as it helps in enhancing lending funds. Future receivables, EMIs and annuities are pooled together and transferred to an special purpose vehicle (SPV). These receivables of the future are shifted to

mutual funds and bigger financial institutions. This process is similar to that of commercial banks seeking refinance with NABARD, IDBI, etc.

Question 3

Write a note on buy-back of shares by companies.

Answer

Buyback of shares: Till 1998, buyback of equity shares was not permitted in India. But now they are permitted after suitably amending the Companies Act, 1956. However, the buyback of shares in India are permitted under certain guidelines issued by the Government as well as by the SEBI. Several companies have opted for such buyback including Reliance, Bajaj, and Ashok Leyland to name a few. In India, the corporate sector generally chooses to buyback by the tender method or the open market purchase method. The company, under the tender method, offers to buy back shares at a specific price during a specified period which is usually one month. Under the open market purchase method, a company buys shares from the secondary market over a period of one year subject to a maximum price fixed by the management. Companies seem to now have a distinct preference for the open market purchase method as it gives them greater flexibility regarding time and price.

As impact of buyback, the P/E ratio may change as a consequence of buyback operation. The P/E ratio may rise if investors view buyback positively or it may fall if the investors regard buyback negatively.

Rationale of buyback: Range from various considerations. Some of them may be:

- (i) For efficient allocation of resources.
- (ii) For ensuring price stability in share prices.
- (iii) For taking tax advantages.
- (iv) For exercising control over the company.
- (v) For saving from hostile takeover.
- (vi) To provide capital appreciation to investors this may otherwise be not available.

This, however, has some disadvantages also like, manipulation of share prices by its promoters, speculation, collusive trading etc.

Question 4

(a) Briefly explain 'Buy Back of Securities' and give the management objectives of buying Back Securities.

(b) Explain the term 'Insider Trading' and why Insider Trading is punishable.

Answer

(a) Buy Back of Securities: Companies are allowed to buy back equity shares or any other

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security specified by the Union Government. In India Companies are required to extinguish shares bought back within seven days. In USA Companies are allowed to hold bought back shares as treasury stock, which may be reissued. A company buying back shares makes an offer to purchase shares at a specified price. Shareholders accept the offer and surrender their shares.

The following are the management objectives of buying back securities:

- (i) To return excess cash to shareholders, in absence of appropriate investment opportunities.
 - (ii) To give a signal to the market that shares are undervalued.
 - (iii) To increase promoters holding, as a percentage of total outstanding shares, without additional investment. Thus, buy back is often used as a defence mechanism against potential takeover.
 - (iv) To change the capital structure.
- (b) **Insider Trading:** The insider is any person who accesses the price sensitive information of a company before it is published to the general public. Insider includes corporate officers, directors, owners of firm etc. who have substantial interest in the company. Even, persons who have access to non-public information due to their relationship with the company such as internal or statutory auditor, agent, advisor, analyst consultant etc. who have knowledge of material, 'inside' information not available to general public. Insider trading practice is the act of buying or selling or dealing in securities by as a person having unpublished inside information with the intention of making abnormal profit's and avoiding losses. This inside information includes dividend declaration, issue or buy back of securities, amalgamation, mergers or take over, major expansion plans etc.

The word insider has wide connotation. An outsider may be held to be an insider by virtue of his engaging himself in this practice on the strength of inside information.

Insider trading practices are lawfully prohibited. The regulatory bodies in general are imposing different fines and penalties for those who indulge in such practices. Based on the recommendation of Sachar Committee and Patel Committee, SEBI has framed various regulations and implemented the same to prevent the insider trading practices. Recently SEBI has made several changes to strengthen the existing insider Trading Regulation, 1992 and new Regulation as SEBI (Prohibition of Insider Trading) Regulations, 2002 has been introduced. Insider trading which is an unethical practice resorted by those in power in corporates has manifested not only in India but elsewhere in the world causing huge losses to common investors thus driving them away from capital market. Therefore, it is punishable.

Question 5

Write short note on Stock Lending Scheme.

Answer

Stock Lending: In 'stock lending', the legal title of a security is temporarily transferred from a lender to a borrower. The lender retains all the benefits of ownership, other than the voting rights. The borrower is entitled to utilize the securities as required but is liable to the lender for all benefits.

A securities lending programme is used by the lenders to maximize yields on their portfolio. Borrowers use the securities lending programme to avoid settlement failures.

Securities lending provide income opportunities for security-holders and creates liquidity to facilitate trading strategies for borrowers. It is particularly attractive for large institutional shareholders as it is an easy way of generating income to offset custody fees and requires little involvement of time. It facilitates timely settlement, increases the settlements, reduces market volatility and improves liquidity.

The borrower deposits collateral securities with the approved, intermediary. In case the borrower fails to return the securities, he will be declared a defaulter and the approved intermediary will liquidate the collateral deposited with it. In the event of default, the approved intermediary is liable for making good the loss caused to the lender. The borrower cannot discharge his liabilities of returning the equivalent securities through payment in cash or kind.

Current Status in India: National Securities Clearing Corporation Ltd. launched its stock lending operations (christened Automated Lending & Borrowing Mechanism – ALBM) on February 10, 1999. This was the beginning of the first real stock lending operation in the country. Stock Holding Corporation of India, Deutsche Bank and Reliance are the other three stock lending intermediaries registered with SEBI.

Under NSCCL system only dematerialized stocks are eligible. The NSCCL'S stock lending system is screen based, thus instantly opening up participation from across the country wherever there is an NSE trading terminal. The transactions are guaranteed by NSCCL and the participating members are the clearing members of NSCCL. The main features of NSCCL system are:

- (i) The session will be conducted every Wednesday on NSE screen where borrowers and lenders enter their requirements either as a purchase order indicating an intention to borrow or as sale, indicating intention to lend.
- (ii) Previous day's closing price of a security will be taken as the lending price of the security.
- (iii) The fee or interest that a lender gets will be market determined and will be the difference between the lending price and the price arrived at the ALBM session.
- (iv) Corresponding to a normal market segment, there will be an ALBM session.
- (v) Funds towards each borrowing will have to be paid in on the securities lending day.
- (vi) A participant will be required to pay-in-funds equal to the total value of the securities

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borrowed.

- (vii) The same amount of securities has to be returned at the end of the ALBM settlement on the day of the pay-out of the ALBM settlement.
- (viii) The previous day's closing price is called the lending price and the rate at which the lending takes place is called the lending fee. This lending fee alone is determined in the course of ALBM session.
- (ix) Fee adjustment shall be made for any lender not making full delivery of a security. The lender's account shall be debited for the quantity not delivered.
- (x) The borrower account shall be debited to the extent of the securities not lend on account of funds shortage.

Question 6

Write a short note on 'Book building'.

Answer

Book Building: Book building is a technique used for marketing a public offer of equity shares of a company. It is a way of raising more funds from the market. After accepting the free pricing mechanism by the SEBI, the book building process has acquired too much significance and has opened a new lead in development of capital market.

A company can use the process of book building to fine tune its price of issue. When a company employs book building mechanism, it does not pre-determine the issue price (in case of equity shares) or interest rate (in case of debentures) and invite subscription to the issue. Instead it starts with an indicative price band (or interest band) which is determined through consultative process with its merchant banker and asks its merchant banker to invite bids from prospective investors at different prices (or different rates). Those who bid are required to pay the full amount. Based on the response received from investors the final price is selected. The merchant banker (called in this case Book Runner) has to manage the entire book building process. Investors who have bid a price equal to or more than the final price selected are given allotment at the final price selected. Those who have bid for a lower price will get their money refunded.

In India, there are two options for book building process. One, 25 per cent of the issue has to be sold at fixed price and 75 per cent is through book building. The other option is to split 25 per cent of offer to the public (small investors) into a fixed price portion of 10 per cent and a reservation in the book built portion amounting to 15 per cent of the issue size. The rest of the book-built portion is open to any investor.

The greatest advantage of the book building process is that this allows for price and demand discovery. Secondly, the cost of issue is much less than the other traditional methods of raising capital. In book building, the demand for shares is known before the issue closes. In

fact, if there is not much demand the issue may be deferred and can be rescheduled after having realised the temper of the market.

Question 7

Explain the term "Offer for Sale".

Answer

Offer for sale is also known as bought out deal (BOD). It is a new method of offering equity shares, debentures etc., to the public. In this method, instead of dealing directly with the public, a company offers the shares/debentures through a sponsor. The sponsor may be a commercial bank, merchant banker, an institution or an individual. It is a type of wholesale of equities by a company. A company allots shares to a sponsor at an agreed price between the company and sponsor. The sponsor then passes the consideration money to the company and in turn gets the shares duly transferred to him. After a specified period as agreed between the company and sponsor, the shares are issued to the public by the sponsor with a premium. After the public offering, the sponsor gets the shares listed in one or more stock exchanges. The holding cost of such shares by the sponsor may be reimbursed by the company or the sponsor may get the profit by issue of shares to the public at premium.

Thus, it enables the company to raise the funds easily and immediately. As per SEBI guidelines, no listed company can go for BOD. A privately held company or an unlisted company can only go for BOD. A small or medium size company which needs money urgently chooses to BOD. It is a low cost method of raising funds. The cost of public issue is around 8% in India. But this method lacks transparency. There will be scope for misuse also. Besides this, it is expensive like the public issue method. One of the most serious short coming of this method is that the securities are sold to the investing public usually at a premium. The margin thus between the amount received by the company and the price paid by the public does not become additional funds of the company, but it is pocketed by the issuing houses or the existing shareholder.

Question 8

Explain the terms ESOS and ESPS with reference to the SEBI guidelines for The Employees Stock Option Plans (ESOPs).

Answer

ESOS and ESPS

	ESOS	ESPS
1.	Meaning	
	Employee Stock Option Scheme means a scheme under which the company grants option to employees.	Employee Stock Purchase Scheme means a scheme under which the company offers shares to employees

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		as a part of public issue.
2.	Auditors' Certificate	
	Auditors' Certificate to be placed at each AGM stating that the scheme has been implemented as per the guidelines and in accordance with the special resolution passed.	No such Certificate is required.
3.	Transferability	
	It is not transferable.	It is transferable after lock in period.
4.	Consequences of failure	
	The amount payable may be forfeited. If the option is not vested due to non-fulfillment of condition relating to vesting of option then the amount may be refunded to the employees.	Not applicable.
5.	Lock in period	
	Minimum period of 1 year shall be there between the grant and vesting of options. Company is free to specify the lock in period for the shares issued pursuant to exercise of option.	One year from the date of allotment. If the ESPS is part of public issue and the shares are issued to employees at the same price as in the public issue, the shares issued to employees pursuant to ESPS shall not be subject to any lock in.

Question 9

What is the procedure for the book building process? Explain the recent changes made in the allotment process.

Answer

The modern and more popular method of share pricing these days is the **BOOK BUILDING** route. After appointing a merchant banker as a book runner, the company planning the IPO, specifies the number of shares it wishes to sell and also mentions a price band. Investors place their orders in Book Building process that is similar to bidding at an auction. The willing investors submit their bids above the floor price indicated by the company in the price band to the book runner. Once the book building period ends, the book runner evaluates the bids on the basis of the prices received, investor quality and timing of bids. Then the book runner and the company conclude the final price at which the issuing company is willing to issue the stock and allocate securities. Traditionally, the number of shares is fixed and the issue size gets determined on the basis of price per share discovered through the book building process.

Public issues these days are targeted at various segments of the investing fraternity. Companies now allot certain portions of the offering to different segments so that everyone

gets a chance to participate. The segments are traditionally three -qualified institutional bidders (QIBs), high net worth individuals (HNIs) and retail investors (general public). Indian companies now have to offer about 50% of the offer to QIBs, about 15% to high net worth individuals and the remaining 35% to retail investors. Earlier retail and high net worth individuals had 25% each. Also the QIBs are allotted shares on a pro-rata basis as compared to the earlier norm when it was at the discretion of the company management and the investment bankers. These investors (QIB) also have to pay 10% margin on application. This is also a new requirement. Once the offer is completed, the company gets listed and investors and shareholders can trade the shares of the company in the stock exchange.

Question 10

Explain briefly the advantages of holding securities in 'demat' form rather than in physical form.

Answer

Advantages of Holding Securities in 'Demat' Form: The Depositories Act, 1996 provides the framework for the establishment and working of depositories enabling transactions in securities in scripless (or demat) form. With the arrival of depositories on the scene, many of the problems previously encountered in the market due to physical handling of securities have been to a great extent minimized. In a broad sense, therefore, it can be said that 'dematting' has helped to broaden the market and make it smoother and more efficient.

From an individual investor point of view, the following are important advantages of holding securities in demat form:

- It is speedier and avoids delay in transfer.
- It avoids lot of paper work.
- It saves on stamp duty.

From the issuer-company point of view also, there are significant advantages due to dematting, some of which are:

- Savings in printing certificates, postage expenses.
- Stamp duty waiver.
- Easy monitoring of buying/selling patterns in securities, increasing ability to spot takeover attempts and attempts at price rigging.

Question 11

Write short notes on the Stock Lending Scheme – its meaning, advantages and risk involved.

Answer

Stock Lending Scheme: Stock lending means transfer of security. The legal title is temporarily transferred from a lender to a borrower. The lender retains all the benefits of

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ownership, except voting power/rights. The borrower is entitled to utilize the securities as required but is liable to the lender for all benefits such as dividends, rights etc. The basic purpose of stock borrower is to cover the short sales i.e. selling the shares without possessing them. SEBI has introduced scheme for securities lending and borrowing in 1997.

Advantages:

- (1) Lenders to get return (as lending charges) from it, instead of keeping it idle.
- (2) Borrower uses it to avoid settlement failure and loss due to auction.
- (3) From the view-point of market this facilitates timely settlement, increase in settlement, reduce market volatility and improves liquidity.
- (4) This prohibits fictitious Bull Run.

The borrower has to deposit the collateral securities, which could be cash, bank guarantees, government securities or certificates of deposits or other securities, with the approved intermediary. In case, the borrower fails to return the securities, he will be declared a defaulter and the approved intermediary will liquidate the collateral deposited with it.

In the event of default, the approved intermediary is liable for making good the loss caused to the lender.

The borrower cannot discharge his liabilities of returning the equivalent securities through payment in cash or kind.

National Securities Clearing Corporation Ltd. (NSCCL), Stock Holding Corporation of India (SHCIL), Deutsche Bank, and Reliance Capital etc. are the registered and approved intermediaries for the purpose of stock lending scheme. NSCCL proposes to offer a number of schemes, including the Automated Lending and Borrowing Mechanism (ALBM), automatic borrowing for settlement failures and case by case borrowing.

Question 12

How is a stock market index calculated? Indicate any two important stock market indices.

Answer

1. A base year is set alongwith a basket of base shares.
2. The changes in the market price of these shares is calculated on a daily basis.
3. The shares included in the index are those shares which are traded regularly in high volume.
4. In case the trading in any share stops or comes down then it gets excluded and another company's shares replace it.
5. Following steps are involved in calculation of index on a particular date:
 - Calculate market capitalization of each individual company comprising the index.

- Calculate the total market capitalization by adding the individual market capitalization of all companies in the index.
- Computing index of next day requires the index value and the total market capitalization of the previous day and is computed as follows:
- $$\text{Index Value} = \text{Index on Previous Day} \times \frac{\text{Total market capitalisation for current day}}{\text{Total capitalisation of the previous day}}$$
- It should also be noted that Indices may also be calculated using the price weighted method. Here the share price of the constituent companies form the weights. However, almost all equity indices world-wide are calculated using the market capitalization weighted method.

Each stock exchange has a flagship index like in India Sensex of BSE and Nifty of NSE and outside India is Dow Jones, FTSE etc.

Question 13

What is a depository? Who are the major players of a depository system? What advantages does the depository system offer to the clearing member?

Answer

- (i) A depository is an organization where the securities of a shareholder are held in the form of electronic accounts in the same way as a bank holds money. The depository holds electronic custody of securities and also arranges for transfer of ownership of securities on the settlement dates.
- (ii) Players of the depository system are:
 - Depository
 - Issuers or Company
 - Depository participants
 - Clearing members
 - Corporation
 - Stock brokers
 - Clearing Corporation
 - Investors
 - Banks
- (iii) Advantages to Clearing Member
 - Enhanced liquidity, safety, and turnover on stock market.
 - Opportunity for development of retail brokerage business.

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- Ability to arrange pledges without movement of physical scrip and further increase of trading activity, liquidity and profits.
- Improved protection of shareholder's rights resulting from more timely communications from the issuer.
- Reduced transaction costs.
- Elimination of forgery and counterfeit instruments with attendant reduction in settlement risk from bad deliveries.
- Provide automation to post-trading processing.
- Standardisation of procedures.

Question 14

Write a short note on depository participant.

Answer

Under this system, the securities (shares, debentures, bonds, Government Securities, MF units etc.) are held in electronic form just like cash in a bank account. To speed up the transfer mechanism of securities from sale, purchase, transmission, SEBI introduced Depository Services also known as Dematerialization of listed securities. It is the process by which certificates held by investors in physical form are converted to an equivalent number of securities in electronic form. The securities are credited to the investor's account maintained through an intermediary called Depository Participant (DP). Shares/Securities once dematerialized lose their independent identities. Separate numbers are allotted for such dematerialized securities. Organization holding securities of investors in electronic form and which renders services related to transactions in securities is called a Depository. A depository holds securities in an account, transfers securities from one account holder to another without the investors having to handle these in their physical form. The depository is a safe keeper of securities for and on behalf of the investors. All corporate benefits such as Dividends, Bonus, Rights etc. are issued to security holders as were used to be issued in case of physical form.

Question 15

Write short note on Advantages of a depository system.

Answer

Advantages of a Depository System

The different stake-holders have advantages flowing out of the depository system. They are:-

(I) For the Capital Market:

- (i) It eliminates bad delivery;
- (ii) It helps to eliminate voluminous paper work;
- (iii) It helps in the quick settlement of dues and also reduces the settlement time;

- (iv) It helps to eliminate the problems concerning odd lots;
- (v) It facilitates stock-lending and thus deepens the market.

(II) **For the Investor:**

- (i) It reduces the risks associated with the loss or theft of documents and securities and eliminates forgery;
- (ii) It ensures liquidity by speedy settlement of transactions;
- (iii) It makes investors free from the physical holding of shares;
- (iv) It reduces transaction costs; and
- (v) It assists investors in securing loans against the securities.

(III) **For the Corporate Sector or Issuers of Securities:**

- (i) It provides upto date information on shareholders' names and addresses;
- (ii) It enhances the image of the company;
- (iii) It reduces the costs of the secretarial department;
- (iv) It increases the efficiency of registrars and transfer agents; and
- (v) It provides better facilities of communication with members.

Question 16

Write short note on Green shoe option.

Answer

Green Shoe Option: It is an option that allows the underwriting of an IPO to sell additional shares if the demand is high. It can be understood as an option that allows the underwriter for a new issue to buy and resell additional shares upto a certain pre-determined quantity.

Looking to the exceptional interest of investors in terms of over-subscription of the issue, certain provisions are made to issue additional shares or bonds to underwriters for distribution. The issuer authorises for additional shares or bonds. In common parlance, it is the retention of over-subscription to a certain extent. It is a special feature of euro-issues. In euro-issues the international practices are followed.

In the Indian context, green shoe option has a limited connotation. SEBI guidelines governing public issues contain appropriate provisions for accepting over-subscriptions, subject to a ceiling, say, 15 per cent of the offer made to public. In certain situations, the green-shoe option can even be more than 15 per cent.

Examples:

- IDBI had come-up earlier with their Flexi bonds (Series 4 and 5). This is a debt-instrument. Each of the series was initially floated for ₹ 750 crores. SEBI had permitted IDBI to retain an excess of an equal amount of ₹ 750 crores.

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- ICICI had launched their first tranche of safety bonds through unsecured redeemable debentures of ₹ 200 crores, with a green shoe option for an identical amount.

More recently, Infosys Technologies has exercised the green shoe option to purchase upto 7,82,000 additional ADSs representing 3,91,000 equity shares. This offer initially involved 5.22 million depository shares, representing 2.61 million domestic equity shares.

Question 17

- What are derivatives?*
- Who are the users and what are the purposes of use?*
- Enumerate the basic differences between cash and derivatives market.*

Answer

- Derivative is a product whose value is to be derived from the value of one or more basic variables called bases (underlying assets, index or reference rate). The underlying assets can be Equity, Forex, and Commodity.

(ii)

	Users	Purpose
(a)	Corporation	To hedge currency risk and inventory risk
(b)	Individual Investors	For speculation, hedging and yield enhancement.
(c)	Institutional Investor	For hedging asset allocation, yield enhancement and to avail arbitrage opportunities.
(d)	Dealers	For hedging position taking, exploiting inefficiencies and earning dealer spreads.

- The basic differences between Cash and the Derivative market are enumerated below:-

In cash market tangible assets are traded whereas in derivate markets contracts based on tangible or intangibles assets likes index or rates are traded.

- In cash market tangible assets are traded whereas in derivative market contracts based on tangible or intangibles assets like index or rates are traded.
- In cash market, we can purchase even one share whereas in Futures and Options minimum lots are fixed.
- Cash market is more risky than Futures and Options segment because in "Futures and Options" risk is limited upto 20%.
- Cash assets may be meant for consumption or investment. Derivate contracts are for hedging, arbitrage or speculation.
- The value of derivative contract is always based on and linked to the underlying security. However, this linkage may not be on point-to-point basis.

- (f) In the cash market, a customer must open securities trading account with a securities depository whereas to trade futures a customer must open a future trading account with a derivative broker.
- (g) Buying securities in cash market involves putting up all the money upfront whereas buying futures simply involves putting up the margin money.
- (h) With the purchase of shares of the company in cash market, the holder becomes part owner of the company. While in future it does not happen.

Question 18

What is the significance of an underlying in relation to a derivative instrument?

Answer

The underlying may be a share, a commodity or any other asset which has a marketable value which is subject to market risks. The importance of underlying in derivative instruments is as follows:

- All derivative instruments are dependent on an underlying to have value.
- The change in value in a forward contract is broadly equal to the change in value in the underlying.
- In the absence of a valuable underlying asset the derivative instrument will have no value.
- On maturity, the position of profit/loss is determined by the price of underlying instruments. If the price of the underlying is higher than the contract price the buyer makes a profit. If the price is lower, the buyer suffers a loss.

Question 19

Distinguish between:

- (i) *Forward and Futures contracts.*
- (ii) *Intrinsic value and Time value of an option.*

Answer

(i) **Forward and Future Contracts:**

S.No.	Features	Forward	Futures
1.	Trading	Forward contracts are traded on personal basis or on telephone or otherwise.	Futures Contracts are traded in a competitive arena.
2.	Size of Contract	Forward contracts are individually tailored and have no standardized size	Futures contracts are standardized in terms of quantity or amount as the case may be

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3.	Organized exchanges	Forward contracts are traded in an over the counter market.	Futures contracts are traded on organized exchanges with a designated physical location.
4.	Settlement	Forward contracts settlement takes place on the date agreed upon between the parties.	Futures contracts settlements are made daily via. Exchange's clearing house.
5.	Delivery date	Forward contracts may be delivered on the dates agreed upon and in terms of actual delivery.	Futures contracts delivery dates are fixed on cyclical basis and hardly takes place. However, it does not mean that there is no actual delivery.
6.	Transaction costs	Cost of forward contracts is based on bid – ask spread.	Futures contracts entail brokerage fees for buy and sell order ₹
7.	Marking to market	Forward contracts are not subject to marking to market	Futures contracts are subject to marking to market in which the loss on profit is debited or credited in the margin account on daily basis due to change in price.
8.	Margins	Margins are not required in forward contract.	In futures contracts every participants is subject to maintain margin as decided by the exchange authorities
9.	Credit risk	In forward contract, credit risk is born by each party and, therefore, every party has to bother for the creditworthiness.	In futures contracts the transaction is a two way transaction, hence the parties need not to bother for the risk.

- (ii) **Intrinsic value and the time value of An Option:** Intrinsic value of an option and the time value of an option are primary determinants of an option's price. By being familiar with these terms and knowing how to use them, one will find himself in a much better position to choose the option contract that best suits the particular investment requirements.

Intrinsic value is the value that any given option would have if it were exercised today. This is defined as the difference between the option's strike price (x) and the stock actual current price (c.p). In the case of a call option, one can calculate the intrinsic value by taking CP-X. If the result is greater than Zero (In other words, if the stock's current price is greater than the option's strike price), then the amount left over after subtracting CP-X is the option's intrinsic value. If the strike price is greater than the current stock price, then the intrinsic value of the option is zero – it would not be worth anything if it were to

be exercised today. An option's intrinsic value can never be below zero. To determine the intrinsic value of a put option, simply reverse the calculation to $X - CP$

Example: Let us assume Wipro Stock is priced at ₹105/-. In this case, a Wipro 100 call option would have an intrinsic value of $(₹105 - ₹100 = ₹5)$. However, a Wipro 100 put option would have an intrinsic value of zero $(₹100 - ₹105 = -₹5)$. Since this figure is less than zero, the intrinsic value is zero. Also, intrinsic value can never be negative. On the other hand, if we are to look at a Wipro put option with a strike price of ₹120. Then this particular option would have an intrinsic value of ₹15 $(₹120 - ₹105 = ₹15)$.

Time Value: This is the second component of an option's price. It is defined as any value of an option other than the intrinsic value. From the above example, if Wipro is trading at ₹105 and the Wipro 100 call option is trading at ₹7, then we would conclude that this option has ₹2 of time value $(₹7 \text{ option price} - ₹5 \text{ intrinsic value} = ₹2 \text{ time value})$. Options that have zero intrinsic value are comprised entirely of time value.

Time value is basically the risk premium that the seller requires to provide the option buyer with the right to buy/sell the stock upto the expiration date. This component may be regarded as the Insurance premium of the option. This is also known as "Extrinsic value." Time value decays over time. In other words, the time value of an option is directly related to how much time an option has until expiration. The more time an option has until expiration, greater the chances of option ending up in the money.

Question 20

- (i) *What are Stock futures?*
- (ii) *What are the opportunities offered by Stock futures?*
- (iii) *How are Stock futures settled?*

Answer

- (i) Stock future is a financial derivative product where the underlying asset is an individual stock. It is also called equity future. This derivative product enables one to buy or sell the underlying Stock on a future date at a price decided by the market forces today.
- (ii) Stock futures offer a variety of usage to the investors Some of the key usages are mentioned below:

Investors can take long-term view on the underlying stock using stock futures.

- (a) Stock futures offer high leverage. This means that one can take large position with less capital. For example, paying 20% initial margin one can take position for 100%, i.e., 5 times the cash outflow.
- (b) Futures may look over-priced or under-priced compared to the spot price and can offer opportunities to arbitrage and earn riskless profit.

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- (c) When used efficiently, single-stock futures can be effective risk management tool. For instance, an investor with position in cash segment can minimize either market risk or price risk of the underlying stock by taking reverse position in an appropriate futures contract.
- (iii) Up to March 31, 2002, stock futures were settled in cash. The final settlement price is the closing price of the underlying stock. From April 2002, stock futures are settled by delivery, i.e., by merging derivatives position into cash segment.

Question 21

What is a "derivative"? Briefly explain the recommendations of the L.C. Gupta Committee on derivatives.

Answer

The derivatives are most modern financial instruments in hedging risk. The individuals and firms who wish to avoid or reduce risk can deal with the others who are willing to accept the risk for a price. A common place where such transactions take place is called the 'derivative market'.

Derivatives are those assets whose value is determined from the value of some underlying assets. The underlying asset may be equity, commodity or currency.

Based on the report of Dr. L.C. Gupta Committee the following recommendations are accepted by SEBI on Derivatives:

- Phased introduction of derivative products, with the stock index futures as starting point for equity derivative in India.
- Expanded definition of securities under the Securities Contracts (Regulation) Act (SCRA) by declaring derivative contracts based on index of prices of securities and other derivatives contracts as securities.
- Permission to existing stock exchange to trade derivatives provided they meet the eligibility conditions including adequate infrastructural facilities, on-line trading and surveillance system and minimum of 50 members opting for derivative trading etc.
- Initial margin requirements related to the risk of loss on the position and capital adequacy norms shall be prescribed.
- Annual inspection of all the members operating in the derivative segment by the Stock Exchange.
- Dissemination of information by the exchange about the trades, quantities and quotes in real time over at least two information vending networks.
- The clearing corporation/house to settle derivatives trades. This should meet certain specified eligibility conditions and the clearing corporation/house must interpose itself between both legs of every trade, becoming the legal counter party to both or

alternatively provide an unconditional guarantee for settlement of all trades.

- Two tier membership: The trading member and clearing member, and the entry norms for the clearing member would be more stringent.
- The clearing member should have a minimum networth of ₹ 3 crores and shall make a deposit of ₹ 50 lakhs with the exchange/clearing corporation in the form of liquid assets.
- Prescription of a model Risk Disclosure Document and monitoring broker-dealer/client relationship by the Stock Exchange and the requirement that the sales personnel working in the broker-dealer office should pass a certification programme.
- Corporate clients/financial institutions/mutual funds should be allowed to trade derivatives only if and to the extent authorised by their Board of Directors/Trustees.
- Mutual Funds would be required to make necessary disclosures in their offer documents if they opt to trade derivatives. For the existing schemes, they would require the approval of their unit holder. The minimum contract value would be ₹ 1 lakh, which would also apply in the case of individuals.

Question 22

Write short note on Marking to market.

Answer

Marking to market: It implies the process of recording the investments in traded securities (shares, debt-instruments, etc.) at a value, which reflects the market value of securities on the reporting date. In the context of derivatives trading, the futures contracts are marked to market on periodic (or daily) basis. Marking to market essentially means that at the end of a trading session, all outstanding contracts are repriced at the settlement price of that session. Unlike the forward contracts, the future contracts are repriced every day. Any loss or profit resulting from repricing would be debited or credited to the margin account of the broker. It, therefore, provides an opportunity to calculate the extent of liability on the basis of repricing. Thus, the futures contracts provide better risk management measure as compared to forward contracts.

Suppose on 1st day we take a long position, say at a price of ₹ 100 to be matured on 7th day. Now on 2nd day if the price goes up to ₹ 105, the contract will be repriced at ₹ 105 at the end of the trading session and profit of ₹ 5 will be credited to the account of the buyer. This profit of ₹ 5 may be drawn and thus cash flow also increases. This marking to market will result in three things – one, you will get a cash profit of ₹ 5; second, the existing contract at a price of ₹ 100 would stand cancelled; and third you will receive a new futures contract at ₹ 105. In essence, the marking to market feature implies that the value of the futures contract is set to zero at the end of each trading day.

Question 23

What are the reasons for stock index futures becoming more popular financial derivatives over stock futures segment in India?

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Answer

Stock index futures is most popular financial derivatives over stock futures due to following reasons:

1. It adds flexibility to one's investment portfolio. Institutional investors and other large equity holders prefer the most this instrument in terms of portfolio hedging purpose. The stock systems do not provide this flexibility and hedging.
2. It creates the possibility of speculative gains using leverage. Because a relatively small amount of margin money controls a large amount of capital represented in a stock index contract, a small change in the index level might produce a profitable return on one's investment if one is right about the direction of the market. Speculative gains in stock futures are limited but liabilities are greater.
3. Stock index futures are the most cost efficient hedging device whereas hedging through individual stock futures is costlier.
4. Stock index futures cannot be easily manipulated whereas individual stock price can be exploited more easily.
5. Since, stock index futures consists of many securities, so being an average stock, is much less volatile than individual stock price. Further, it implies much lower capital adequacy and margin requirements in comparison of individual stock futures. Risk diversification is possible under stock index future than in stock futures.
6. One can sell contracts as readily as one buys them and the amount of margin required is the same.
7. In case of individual stocks the outstanding positions are settled normally against physical delivery of shares. In case of stock index futures they are settled in cash all over the world on the premise that index value is safely accepted as the settlement price.
8. It is also seen that regulatory complexity is much less in the case of stock index futures in comparison to stock futures.
9. It provides hedging or insurance protection for a stock portfolio in a falling market.

Question 24

Write short note on Options.

Answer

Options: An option is a claim without any liability. It is a claim contingent upon the occurrence of certain conditions and, therefore, option is a contingent claim. More specifically, an option is contract that gives the holder a right, without any obligation, to buy or sell an asset at an agreed price on or before a specified period of time. The option to buy an asset is known as a call option and the option to sell an asset is called put option. The price at which option can be exercised is called as exercise price or strike price. Based on exercising the option it can be classified into two categories:

- (i) **European Option:** When an option is allowed to be exercised only on the maturity date.
- (ii) **American Option:** When an option is exercised any time before its maturity date.

When an option holder exercises his right to buy or sell it may have three possibilities.

- (a) An option is said to be in the money when it is advantageous to exercise it.
- (b) When exercise is not advantageous it is called out of the money.
- (c) When option holder does not gain or lose it is called at the money.

The holder of an option has to pay a price for obtaining call/put option. This price is known as option premium. This price has to be paid whether the option is exercised or not.

Question 25

What are the features of Futures Contract?

Answer

Future contracts can be characterized by:-

- (a) These are traded on organized exchanges.
- (b) Standardised contract terms like the underlying assets, the time of maturity and the manner of maturity etc.
- (c) Associated with clearing house to ensure smooth functioning of the market.
- (d) Margin requirements and daily settlement to act as further safeguard i.e., marked to market.
- (e) Existence of regulatory authority.
- (f) Every day the transactions are marked to market till they are re-wound or matured.

Future contracts being traded on organized exchanges, impart liquidity to a transaction. The clearing house being the counter party to both sides of a transaction, provides a mechanism that guarantees the honouring of the contract and ensuring very low level of default.

Question 26

Give the meaning of 'Caps, Floors and Collars' options.

Answer

Cap: It is a series of call options on interest rate covering a medium-to-long term floating rate liability. Purchase of a Cap enables the a borrowers to fix in advance a maximum borrowing rate for a specified amount and for a specified duration, while allowing him to avail benefit of a fall in rates. The buyer of Cap pays a premium to the seller of Cap.

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Floor: It is a put option on interest rate. Purchase of a Floor enables a lender to fix in advance, a minimal rate for placing a specified amount for a specified duration, while allowing him to avail benefit of a rise in rates. The buyer of the floor pays the premium to the seller.

Collars: It is a combination of a Cap and Floor. The purchaser of a Collar buys a Cap and simultaneously sells a Floor. A Collar has the effect of locking its purchases into a floating rate of interest that is bounded on both high side and the low side.

Question 27

What do you know about swaptions and their uses?

Answer

- (i) Swaptions are combination of the features of two derivative instruments, i.e., option and swap.
- (ii) A swaption is an option on an interest rate swap. It gives the buyer of the swaption the right but not obligation to enter into an interest rate swap of specified parameters (maturity of the option, notional principal, strike rate, and period of swap). Swaptions are traded over the counter, for both short and long maturity expiry dates, and for wide range of swap maturities.
- (iii) The price of a swaption depends on the strike rate, maturity of the option, and expectations about the future volatility of swap rates.
- (iv) The swaption premium is expressed as basis points

Uses of swaptions:

- (a) Swaptions can be used as an effective tool to swap into or out of fixed rate or floating rate interest obligations, according to a treasurer's expectation on interest rates. Swaptions can also be used for protection if a particular view on the future direction of interest rates turned out to be incorrect.
- (b) Swaptions can be applied in a variety of ways for both active traders as well as for corporate treasures. Swap traders can use them for speculation purposes or to hedge a portion of their swap books. It is a valuable tool when a borrower has decided to do a swap but is not sure of the timing.
- (c) Swaptions have become useful tools for hedging embedded option which is common in the natural course of many businesses.
- (d) Swaptions are useful for borrowers targeting an acceptable borrowing rate. By paying an upfront premium, a holder of a payer's swaption can guarantee to pay a maximum fixed rate on a swap, thereby hedging his floating rate borrowings.
- (e) Swaptions are also useful to those businesses tendering for contracts. A business, would certainly find it useful to bid on a project with full knowledge of the borrowing rate should the contract be won.

Question 28

Explain the significance of LIBOR in international financial transactions.

Answer

LIBOR stands for London Inter Bank Offered Rate. Other features of LIBOR are as follows:

- It is the base rate of exchange with respect to which most international financial transactions are priced.
- It is used as the base rate for a large number of financial products such as options and swaps.
- Banks also use the LIBOR as the base rate when setting the interest rate on loans, savings and mortgages.
- It is monitored by a large number of professionals and private individuals world-wide.

Question 29

Write short notes on the following:

- Embedded derivatives*
- Arbitrage operations*
- Rolling settlement.*
- Mention the functions of a stock exchange.*
- Interest Swap*

Answer

(a) Embedded Derivatives: A derivative is defined as a contract that has all the following characteristics:

- Its value changes in response to a specified underlying, e.g. an exchange rate, interest rate or share price;
- It requires little or no initial net investment;
- It is settled at a future date;
- The most common derivatives are currency forwards, futures, options, interest rate swaps etc.

An embedded derivative is a derivative instrument that is embedded in another contract - the host contract. The host contract might be a debt or equity instrument, a lease, an insurance contract or a sale or purchase contract. Derivatives require to be marked-to-market through the income statement, other than qualifying hedging instruments. This requirement on embedded derivatives are designed to ensure that mark-to-market through the income statement cannot be avoided by including - embedding - a derivative

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in another contract or financial instrument that is not marked-to market through the income statement.

An embedded derivative can arise from deliberate financial engineering and intentional shifting of certain risks between parties. Many embedded derivatives, however, arise inadvertently through market practices and common contracting arrangements. Even purchase and sale contracts that qualify for executory contract treatment may contain embedded derivatives. An embedded derivative causes modification to a contract's cash flow, based on changes in a specified variable.

- (b) **Arbitrage Operations:** Arbitrage is the buying and selling of the same commodity in different markets. A number of pricing relationships exist in the foreign exchange market, whose violation would imply the existence of arbitrage opportunities - the opportunity to make a profit without risk or investment. These transactions refer to advantage derived in the transactions of foreign currencies by taking the benefits of difference in rates between two currencies at two different centers at the same time or of difference between cross rates and actual rates.

For example, a customer can gain from arbitrage operation by purchase of dollars in the local market at cheaper price prevailing at a point of time and sell the same for sterling in the London market. The Sterling will then be used for meeting his commitment to pay the import obligation from London.

- (c) **Rolling Settlement:** SEBI introduced a new settlement cycle known as the 'rolling settlement cycle'. This cycle starts and ends on the same day and the settlement take place on the 'T+5' day, which is 5 business days from the date of the transaction. Hence, the transaction done on Monday will be settled on the following Monday and the transaction done on Tuesday will be settled on the following Tuesday and so on. Hence unlike a BSE or NSE weekly settlement cycle, in the rolling settlement cycle, the decision has to be made at the conclusion of the trading session, on the same day, Rolling settlement cycles were introduced in both exchanges on January 12, 2000.

Internationally, most developed countries follow the rolling settlement system. For instance both the US and the UK follow a rolling settlement (T+3) system, while the German stock exchanges follow a (T+2) settlement cycle.

- (d) **Functions of Stock Exchange are as follows:**

1. Liquidity and marketability of securities- Investors can sell their securities whenever they require liquidity.
2. Fair price determination-The exchange assures that no investor will have an excessive advantage over other market participants
3. Source for long term funds-The Stock Exchange provides companies with the facility to raise capital for expansion through selling shares to the investing public.

4. Helps in Capital formation- Accumulation of saving and its utilization into productive use creates helps in capital formation.
 5. Creating investment opportunity of small investor- Provides a market for the trading of securities to individuals seeking to invest their saving or excess funds through the purchase of securities.
 6. Transparency- Investor makes informed and intelligent decision about the particular stock based on information. Listed companies must disclose information in timely, complete and accurate manner to the Exchange and the public on a regular basis.
- (e) **Interest Swap:** A swap is a contractual agreement between two parties to exchange, or "swap," future payment streams based on differences in the returns to different securities or changes in the price of some underlying item. Interest rate swaps constitute the most common type of swap agreement. In an interest rate swap, the parties to the agreement, termed the swap counterparties, agree to exchange payments indexed to two different interest rates. Total payments are determined by the specified notional principal amount of the swap, which is never actually exchanged. Financial intermediaries, such as banks, pension funds, and insurance companies, as well as non-financial firms use interest rate swaps to effectively change the maturity of outstanding debt or that of an interest-bearing asset.

Swaps grew out of parallel loan agreements in which firms exchanged loans denominated in different currencies.

Question 30

Write a short note on the factors affecting the value of an option.

Answer

There are a number of different mathematical formulae, or models, that are designed to compute the fair value of an option. You simply input all the variables (stock price, time, interest rates, dividends and future volatility), and you get an answer that tells you what an option should be worth. Here are the general effects the variables have on an option's price:

- (a) *Price of the Underlying: The value of calls and puts are affected by changes in the underlying stock price in a relatively straightforward manner. When the stock price goes up, calls should gain in value and puts should decrease. Put options should increase in value and calls should drop as the stock price falls.*
- (b) *Time: The option's future expiry, at which time it may become worthless, is an important and key factor of every option strategy. Ultimately, time can determine whether your option trading decisions are profitable. To make money in options over the long term, you need to understand the impact of time on stock and option positions.*

With stocks, time is a trader's ally as the stocks of quality companies tend to rise over long periods of time. But time is the enemy of the options buyer. If days pass without any significant change in the stock price, there is a decline in the value of the option. Also, the value of an option declines more rapidly as the option approaches the expiration day. That is good news for the option seller, who tries to benefit from time decay, especially during that final month when it occurs most rapidly.

- (c) *Volatility: The beginning point of understanding volatility is a measure called statistical (sometimes called historical) volatility, or SV for short. SV is a statistical measure of the past price movements of the stock; it tells you how volatile the stock has actually been over a given period of time.*
- (d) *Interest Rate- Another feature which affects the value of an Option is the time value of money. The greater the interest rates, the present value of the future exercise price is less.*

Question 31

Write a short note on Forward Rate Agreements.

Answer

A Forward Rate Agreement (FRA) is an agreement between two parties through which a borrower/ lender protects itself from the unfavourable changes to the interest rate. Unlike futures FRAs are not traded on an exchange thus are called OTC product.

Following are main features of FRA.

- ◆ *Normally it is used by banks to fix interest costs on anticipated future deposits or interest revenues on variable-rate loans indexed to LIBOR.*
- ◆ *It is an off Balance Sheet instrument.*
- ◆ *It does not involve any transfer of principal. The principal amount of the agreement is termed "notional" because, while it determines the amount of the payment, actual exchange of the principal never takes place.*
- ◆ *It is settled at maturity in cash representing the profit or loss. A bank that sells an FRA agrees to pay the buyer the increased interest cost on some "notional" principal amount if some specified maturity of LIBOR is above a stipulated "forward rate" on the contract maturity or settlement date. Conversely, the buyer agrees to pay the seller any decrease in interest cost if market interest rates fall below the forward rate.*
- ◆ *Final settlement of the amounts owed by the parties to an FRA is determined by the formula*

$$\text{Payment} = \frac{(N)(RR - FR)(dtm/DY)}{[1 + RR(dt/DY)]} \times 100$$

Where,

N = the notional principal amount of the agreement;

RR = Reference Rate for the maturity specified by the contract prevailing on the contract settlement date; typically LIBOR or MIBOR

FR = Agreed-upon Forward Rate; and

dtm = maturity of the forward rate, specified in days (FRA Days)

DY = Day count basis applicable to money market transactions which could be 360 or 365 days.

If LIBOR > FR the seller owes the payment to the buyer, and if LIBOR < FR the buyer owes the seller the absolute value of the payment amount determined by the above formula.

- ◆ The differential amount is discounted at post change (actual) interest rate as it is settled in the beginning of the period not at the end.

Thus, buying an FRA is comparable to selling, or going short, a Eurodollar or LIBOR futures contract.

Question 32

Following information is available in respect of dividend, market price and market condition after one year.

Market condition	Probability	Market Price ₹	Dividend per share ₹
Good	0.25	115	9
Normal	0.50	107	5
Bad	0.25	97	3

The existing market price of an equity share is ₹ 106 (F.V. Re. 1), which is cum 10% bonus debenture of ₹ 6 each, per share. M/s. X Finance Company Ltd. had offered the buy-back of debentures at face value.

Find out the expected return and variability of returns of the equity shares.

And also advise-Whether to accept buy back after?

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Answer

The Expected Return of the equity share may be found as follows:

Market Condition	Probability	Total Return	Cost (*)	Net Return
Good	0.25	₹ 124	₹ 100	₹ 24
Normal	0.50	₹ 112	₹ 100	₹ 12
Bad	0.25	₹ 100	₹ 100	₹ 0

$$\text{Expected Return} = (24 \times 0.25) + (12 \times 0.50) + (0 \times 0.25)$$

$$= \left(\frac{12}{100} \right) \times 100 = 12\%$$

The variability of return can be calculated in terms of standard deviation.

$$\begin{aligned} \text{VSD} &= 0.25 (24 - 12)^2 + 0.50 (12 - 12)^2 + 0.25 (0 - 12)^2 \\ &= 0.25 (12)^2 + 0.50 (0)^2 + 0.25 (-12)^2 \\ &= 36 + 0 + 36 \end{aligned}$$

$$\text{SD} = \sqrt{72}$$

$$\text{SD} = 8.485 \text{ or say } 8.49$$

(*) The present market price of the share is ₹ 106 cum bonus 10% debenture of ₹ 6 each; hence the net cost is ₹ 100 (There is no cash loss or any waiting for refund of debenture amount).

M/s X Finance company has offered the buyback of debenture at face value. There is reasonable 10% rate of interest compared to expected return 12% from the market. Considering the dividend rate and market price the creditworthiness of the company seems to be very good. The decision regarding buy-back should be taken considering the maturity period and opportunity in the market. Normally, if the maturity period is low say up to 1 year better to wait otherwise to opt buy back option.

Question 33

The share of X Ltd. is currently selling for ₹ 300. Risk free interest rate is 0.8% per month. A three months futures contract is selling for ₹ 312. Develop an arbitrage strategy and show what your riskless profit will be 3 month hence assuming that X Ltd. will not pay any dividend in the next three months.

Answer

The appropriate value of the 3 months futures contract is –

$$F_0 = ₹ 300 (1.008)^3 = ₹ 307.26$$

Since the futures price exceeds its appropriate value it pays to do the following:-

Action	Initial Cash flow	Cash flow at time T (3 months)
Borrow ₹ 300 now and repay with interest after 3 months	+ ₹ 300	- ₹ 300 (1.008) ³ = - ₹ 307.26
Buy a share	- ₹ 300	ST
Sell a futures contract (Fo = 312/-)	0	₹ 312 – ST
Total	₹ 0	₹ 4.74

Such an action would produce a risk less profit of ₹ 4.74.

Question 34

A Mutual Fund is holding the following assets in ₹ Crores :

Investments in diversified equity shares	90.00
Cash and Bank Balances	<u>10.00</u>
	100.00

The Beta of the portfolio is 1.1. The index future is selling at 4300 level. The Fund Manager apprehends that the index will fall at the most by 10%. How many index futures he should short for perfect hedging? One index future consists of 50 units.

Substantiate your answer assuming the Fund Manager's apprehension will materialize.

Answer

Number of index future to be sold by the Fund Manager is:

$$\frac{1.1 \times 90,00,00,000}{4,300 \times 50} = 4,605$$

Justification of the answer:

Loss in the value of the portfolio if the index falls by 10% is ₹ $\frac{11}{100} \times 90$ Crore = ₹ 9.90 Crore.

Gain by short covering of index future is: $\frac{0.1 \times 4,300 \times 50 \times 4,605}{1,00,00,000} = 9.90$ Crore

This justifies the answer cash is not part of the portfolio.

Question 35

A trader is having in its portfolio shares worth ₹ 85 lakhs at current price and cash ₹ 15 lakhs. The beta of share portfolio is 1.6. After 3 months the price of shares dropped by 3.2%.

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Determine:

- (i) Current portfolio beta
- (ii) Portfolio beta after 3 months if the trader on current date goes for long position on ₹ 100 lakhs Nifty futures.

Answer

(i) Current portfolio

Current Beta for share	= 1.6
Beta for cash	= 0
Current portfolio beta	= 0.85 x 1.6 + 0 x 0.15 = 1.36

(ii) Portfolio beta after 3 months:

$$\text{Beta for portfolio of shares} = \frac{\text{Change in value of portfolio of share}}{\text{Change in value of market portfolio (Index)}}$$
$$1.6 = \frac{0.032}{\text{Change in value of market portfolio (Index)}}$$

$$\text{Change in value of market portfolio (Index)} = (0.032 / 1.6) \times 100 = 2\%$$

Position taken on 100 lakh Nifty futures : Long

$$\begin{aligned} \text{Value of index after 3 months} &= ₹ 100 \text{ lakh} \times (100 - 0.02) \\ &= ₹ 98 \text{ lakh} \end{aligned}$$

$$\text{Mark-to-market paid} = ₹ 2 \text{ lakh}$$

Cash balance after payment of mark-to-market = ₹ 13 lakh

$$\begin{aligned} \text{Value of portfolio after 3 months} &= ₹ 85 \text{ lakh} \times (1 - 0.032) + ₹ 13 \text{ lakh} \\ &= ₹ 95.28 \text{ lakh} \end{aligned}$$

$$\text{Change in value of portfolio} = \frac{₹ 100 \text{ lakh} - ₹ 95.28 \text{ lakh}}{₹ 100 \text{ lakh}} = 4.72\%$$

$$\text{Portfolio beta} = 0.0472 / 0.02 = 2.36$$

Question 36

The 6-months forward price of a security is ₹208.18. The borrowing rate is 8% per annum payable with monthly rests. What should be the spot price?

Answer

Calculation of spot price

The formula for calculating forward price is:

$$A = P (1+r/n)^{nt}$$

Where A = Forward price
 P = Spot Price
 r = rate of interest
 n = no. of compoundings
 t = time

Using the above formula,

$$208.18 = P (1 + 0.08/12)^6$$

$$\text{Or } 208.18 = P \times 1.0409$$

$$P = 208.18/1.0409 = 200$$

Hence, the spot price should be ₹200.

Question 37

BSE	5000
Value of portfolio	₹10,10,000
Risk free interest rate	9% p.a.
Dividend yield on Index	6% p.a.
Beta of portfolio	1.5

We assume that a future contract on the BSE index with four months maturity is used to hedge the value of portfolio over next three months. One future contract is for delivery of 50 times the index.

Based on the above information calculate:

- (i) Price of future contract.
- (ii) The gain on short futures position if index turns out to be 4,500 in three months.

Answer

(i) Current future price of the index = $5000 + 5000 (0.09 - 0.06) \frac{4}{12} = 5000 + 50 = 5,050$

∴ Price of the future contract = ₹50 x 5,050 = ₹2,52,500

(ii) Hedge ratio = $\frac{1010000}{252500} \times 1.5 = 6$ contracts

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Index after three months turns out to be 4500

$$\text{Future price will be} = 4500 + 4500 (0.09 - 0.06) \times \frac{1}{12} = 4,511.25$$

$$\begin{aligned} \text{Therefore, Gain from the short futures position is} &= 6 \times (5050 - 4511.25) \times 50 \\ &= ₹1,61,625 \end{aligned}$$

Note: Alternatively we can also use daily compounding (exponential) formula.

Question 38

The following data relate to Anand Ltd.'s share price:

<i>Current price per share</i>	<i>₹ 1,800</i>
<i>6 months future's price/share</i>	<i>₹ 1,950</i>

Assuming it is possible to borrow money in the market for transactions in securities at 12% per annum, you are required:

- (i) to calculate the theoretical minimum price of a 6-months forward purchase; and*
- (ii) to explain arbitrage opportunity.*

Answer

Anand Ltd

- (i) Calculation of theoretical minimum price of a 6 months forward contract-

$$\text{Theoretical minimum price} = ₹ 1,800 + (₹ 1,800 \times 12/100 \times 6/12) = ₹ 1,908$$

- (ii) Arbitrage Opportunity-

The arbitrageur can borrow money @ 12 % for 6 months and buy the shares at ₹ 1,800. At the same time he can sell the shares in the futures market at ₹ 1,950. On the expiry date 6 months later, he could deliver the share and collect ₹ 1,950 pay off ₹ 1,908 and record a profit of ₹ 42 (₹ 1,950 – ₹ 1,908)

Question 39

Calculate the price of 3 months PQR futures, if PQR (FV ₹10) quotes ₹220 on NSE and the three months future price quotes at ₹230 and the one month borrowing rate is given as 15 percent and the expected annual dividend yield is 25 percent per annum payable before expiry. Also examine arbitrage opportunities.

Answer

$$\begin{aligned} \text{Future's Price} &= \text{Spot} + \text{cost of carry} - \text{Dividend} \\ F &= 220 + 220 \times 0.15 \times 0.25 - 0.25^{**} \times 10 = 225.75 \end{aligned}$$

** Entire 25% dividend is payable before expiry, which is ₹2.50.

Thus we see that futures price by calculation is ₹225.75 which is quoted at ₹230 in the exchange.

Analysis:

Fair value of Futures less than Actual futures Price:

Futures Overvalued Hence it is advised to sell. Also do Arbitraging by buying stock in the cash market.

Step I

He will buy PQR Stock at ₹220 by borrowing at 15% for 3 months. Therefore his outflows are:

Cost of Stock	220.00
<i>Add:</i> Interest @ 15 % for 3 months i.e. 0.25 years $(220 \times 0.15 \times 0.25)$	<u>8.25</u>
Total Outflows (A)	<u>228.25</u>

Step II

He will sell March 2000 futures at ₹230. Meanwhile he would receive dividend for his stock.

Hence his inflows are	230.00
Sale proceeds of March 2000 futures	<u>2.50</u>
Total inflows (B)	<u>232.50</u>

Inflow – Outflow = Profit earned by Arbitrageur
 = 232.50 – 228.25 = 4.25

Question 40

Sensex futures are traded at a multiple of 50. Consider the following quotations of Sensex futures in the 10 trading days during February, 2009:

<u>Day</u>	<u>High</u>	<u>Low</u>	<u>Closing</u>
4-2-09	3306.4	3290.00	3296.50
5-2-09	3298.00	3262.50	3294.40
6-2-09	3256.20	3227.00	3230.40
7-2-09	3233.00	3201.50	3212.30
10-2-09	3281.50	3256.00	3267.50
11-2-09	3283.50	3260.00	3263.80
12-2-09	3315.00	3286.30	3292.00
14-2-09	3315.00	3257.10	3309.30
17-2-09	3278.00	3249.50	3257.80
18-2-09	3118.00	3091.40	3102.60

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Abshishek bought one sensex futures contract on February, 04. The average daily absolute change in the value of contract is ₹ 10,000 and standard deviation of these changes is ₹ 2,000. The maintenance margin is 75% of initial margin.

You are required to determine the daily balances in the margin account and payment on margin calls, if any.

Answer

$$\text{Initial Margin} = \mu + 3\sigma$$

Where μ = Daily Absolute Change

σ = Standard Deviation

Accordingly

$$\text{Initial Margin} = ₹ 10,000 + ₹ 6,000 = ₹ 16,000$$

$$\text{Maintenance margin} = ₹ 16,000 \times 0.75 = ₹ 12,000$$

Day	Changes in future Values (₹)	Margin A/c (₹)	Call Money (₹)
4/2/09	-	16000	-
5/2/09	50 x (3294.40 - 3296.50) = -105	15895	-
6/2/09	50 x (3230.40 - 3294.40) = -3200	12695	-
7/2/09	50 x (3212.30 - 3230.40) = -905	16000	4210
10/2/09	50x(3267.50 - 3212.30) = 2760	18760	-
11/2/09	50x(3263.80 - 3267.50) = -185	18575	-
12/2/09	50x(3292 - 3263.80) = 1410	19985	-
14/2/09	50x(3309.30 - 3292) = 865	20850	-
17/2/09	50x(3257.80 - 3309.30) = -2575	18275	-
18/2/09	50x(3102.60 - 3257.80) = -7760	16000	5485

Question 41

On 31-8-2011, the value of stock index was ₹ 2,200. The risk free rate of return has been 8% per annum. The dividend yield on this Stock Index is as under:

Month	Dividend Paid p.a.
January	3%
February	4%
March	3%
April	3%
May	4%

June	3%
July	3%
August	4%
September	3%
October	3%
November	4%
December	3%

Assuming that interest is continuously compounded daily, find out the future price of contract deliverable on 31-12-2011. Given: $e^{0.01583} = 1.01593$

Answer

The duration of future contract is 4 months. The average yield during this period will be:

$$\frac{3\% + 3\% + 4\% + 3\%}{4} = 3.25\%$$

As per Cost to Carry model the future price will be

$$F = S e^{(r_f - D)t}$$

Where S = Spot Price
 r_f = Risk Free interest
 D = Dividend Yield
 t = Time Period

Accordingly, future price will be

$$= ₹ 2,200 e^{(0.08 - 0.0325) \times 4/12} = ₹ 2,200 e^{0.01583}$$

$$= ₹ 2,200 \times 1.01593 = ₹ 2235.05$$

Question 42

Mr. A purchased a 3 month call option for 100 shares in XYZ Ltd. at a premium of ₹ 30 per share, with an exercise price of ₹ 550. He also purchased a 3 month put option for 100 shares of the same company at a premium of ₹ 5 per share with an exercise price of ₹ 450. The market price of the share on the date of Mr. A's purchase of options, is ₹ 500. Calculate the profit or loss that Mr. A would make assuming that the market price falls to ₹ 350 at the end of 3 months.

Answer

Since the market price at the end of 3 months falls to ₹ 350 which is below the exercise price under the call option, the call option will not be exercised. Only put option becomes viable.

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	₹
The gain will be:	
Gain per share (₹450 – ₹ 350)	<u>100</u>
Total gain per 100 shares	10,000
Cost or premium paid (₹ 30 x 100) + (₹ 5 x 100)	<u>3,500</u>
Net gain	<u>6,500</u>

Question 43

Sumana wanted to buy shares of EIL which has a range of ₹ 411 to ₹ 592 a month later. The present price per share is ₹ 421. Her broker informs her that the price of this share can sore up to ₹ 522 within a month or so, so that she should buy a one month CALL of EIL. In order to be prudent in buying the call, the share price should be more than or at least ₹ 522 the assurance of which could not be given by her broker.

Though she understands the uncertainty of the market, she wants to know the probability of attaining the share price ₹ 592 so that buying of a one month CALL of EIL at the execution price of ₹ 522 is justified. Advice her. Take the risk free interest to be 3.60% and $e^{0.036} = 1.037$.

Answer

$$p = \frac{e^{rt} - d}{u - d}$$

$$e^{rt} = e^{0.036}$$

$$d = 411/421 = 0.976$$

$$u = 592/421 = 1.406$$

$$p = \frac{e^{0.036} - 0.976}{1.406 - 0.976} = \frac{1.037 - 0.976}{0.43} = \frac{0.061}{0.43} = 0.1418$$

Thus probability of rise in price 0.1418

Question 44

The market received rumour about ABC corporation's tie-up with a multinational company. This has induced the market price to move up. If the rumour is false, the ABC corporation stock price will probably fall dramatically. To protect from this an investor has bought the call and put options.

He purchased one 3 months call with a striking price of ₹42 for ₹2 premium, and paid Re.1 per share premium for a 3 months put with a striking price of ₹40.

- (i) Determine the Investor's position if the tie up offer bids the price of ABC Corporation's stock up to ₹43 in 3 months.

(ii) Determine the Investor's ending position, if the tie up programme fails and the price of the stocks falls to ₹ 36 in 3 months.

Answer

Cost of Call and Put Options

$$\begin{aligned}
 &= (\text{₹ } 2 \text{ per share}) \times (100 \text{ share call}) + (\text{₹ } 1 \text{ per share}) \times (100 \text{ share put}) \\
 &= \text{₹ } 2 \times 100 + 1 \times 100 \\
 &= \text{₹ } 300
 \end{aligned}$$

(i) Price increases to ₹43. Since the market price is higher than the strike price of the call, the investor will exercise it.

$$\begin{aligned}
 \text{Ending position} &= (- \text{₹ } 300 \text{ cost of 2 option}) + (\text{₹ } 1 \text{ per share gain on call}) \times 100 \\
 &= - \text{₹ } 300 + 100
 \end{aligned}$$

$$\text{Net Loss} = - \text{₹ } 200$$

(ii) The price of the stock falls to ₹36. Since the market price is lower than the strike price, the investor may not exercise the call option.

$$\begin{aligned}
 \text{Ending Position:} &= (- \text{₹ } 300 \text{ cost of 2 options}) + (\text{₹ } 4 \text{ per stock gain on put}) \times 100 \\
 &= - \text{₹ } 300 + 400
 \end{aligned}$$

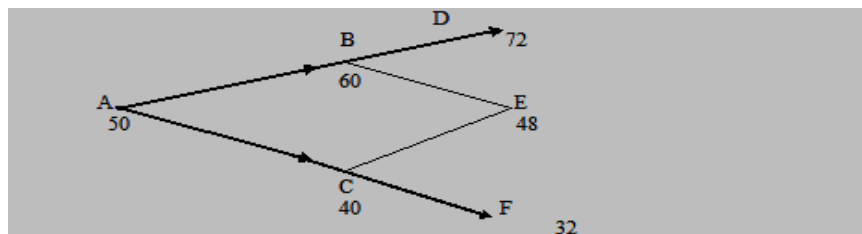
$$\text{Gain} = \text{₹ } 100$$

Question 45

Consider a two year American call option with a strike price of ₹ 50 on a stock the current price of which is also ₹ 50. Assume that there are two time periods of one year and in each year the stock price can move up or down by equal percentage of 20%. The risk free interest rate is 6%. Using binominal option model, calculate the probability of price moving up and down. Also draw a two step binomial tree showing prices and payoffs at each node.

Answer

Stock prices in the two step Binominal tree



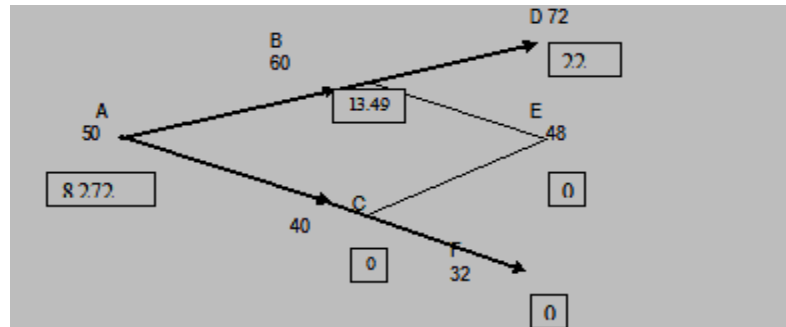
Using the single period model, the probability of price increase is

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$$p = \frac{R-d}{u-d} = \frac{1.06-0.80}{1.20-0.80} = \frac{0.26}{0.40} = 0.65$$

therefore the p of price decrease = $1-0.65 = 0.35$

The two step Binominal tree showing price and pay off



The value of an American call option at nodes D, E and F will be equal to the value of European option at these nodes and accordingly the call values at nodes D, E and F will be 22, 0 and 0 using the single period binomial model the value of call option at node B is

$$C = \frac{C_u p + C_d (1-p)}{R} = \frac{22 \times 0.65 + 0 \times 0.35}{1.06} = 13.49$$

At node B the payoff from early exercise will pay ₹ 10, which is less than the value calculated using the single period binomial model. Hence at node B, early exercise is not preferable and the value of American option at this node will be ₹ 13.49. If the value of an early exercise had been higher it would have been taken as the value of option. The value of option at node 'A' is

$$\frac{13.49 \times 0.65 + 0 \times 0.35}{1.06} = 8.272$$

Question 46

The current market price of an equity share of Penchant Ltd is ₹ 420. Within a period of 3 months, the maximum and minimum price of it is expected to be ₹ 500 and ₹ 400 respectively. If the risk free rate of interest be 8% p.a., what should be the value of a 3 months Call option under the "Risk Neutral" method at the strike rate of ₹ 450? Given $e^{0.02} = 1.0202$

Answer

Let the probability of attaining the maximum price be p

$$(500 - 420) \times p + (400 - 420) \times (1-p) = 420 \times (e^{0.02} - 1)$$

$$\text{or, } 80p - 20(1 - p) = 420 \times 0.0202$$

$$\text{or, } 80p - 20 + 20p = 8.48$$

or, $100p = 28.48$

$p = 0.2848$

The value of Call Option in ₹ = $\frac{0.2848 \times (500 - 450)}{1.0202} = \frac{0.2848 \times 50}{1.0202} = 13.96$

Question 47

Mr. X established the following spread on the Delta Corporation's stock :

- (i) Purchased one 3-month call option with a premium of ₹ 30 and an exercise price of ₹ 550.
 - (ii) Purchased one 3-month put option with a premium of ₹ 5 and an exercise price of ₹ 450.
- Delta Corporation's stock is currently selling at ₹ 500. Determine profit or loss, if the price of Delta Corporation's :
- (i) remains at ₹500 after 3 months.
 - (ii) falls at ₹350 after 3 months.
 - (iii) rises to ₹600.

Assume the size option is 100 shares of Delta Corporation.

Answer

- (i) Total premium paid on purchasing a call and put option
 = (₹30 per share × 100) + (₹5 per share × 100).
 = 3,000 + 500 = ₹3,500

In this case, X exercises neither the call option nor the put option as both will result in a loss for him.

Ending value = - ₹3,500 + zero gain = - ₹3,500

i.e Net loss = ₹3,500

- (ii) Since the price of the stock is below the exercise price of the call, the call will not be exercised. Only put is valuable and is exercised.

Total premium paid = ₹3,500

Ending value = - ₹3,500 + ₹[(450 - 350) × 100] = - ₹3,500 + ₹10,000 = ₹6,500

∴ Net gain = ₹6,500

- (iii) In this situation, the put is worthless, since the price of the stock exceeds the put's exercise price. Only call option is valuable and is exercised.

Total premium paid = ₹3,500

Ending value = -3,500 + [(600 - 550) × 100]

Net Gain = -3,500 + 5,000 = ₹1,500

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Question 48

Equity share of PQR Ltd. is presently quoted at ₹ 320. The Market Price of the share after 6 months has the following probability distribution:

Market Price	₹ 180	260	280	320	400
Probability	0.1	0.2	0.5	0.1	0.1

A put option with a strike price of ₹ 300 can be written.

You are required to find out expected value of option at maturity (i.e. 6 months)

Answer

Expected Value of Option

$(300 - 180) \times 0.1$	12
$(300 - 260) \times 0.2$	8
$(300 - 280) \times 0.5$	10
$(300 - 320) \times 0.1$	Not Exercised*
$(300 - 400) \times 0.1$	<u>Not Exercised*</u>
	<u>30</u>

* If the strike price goes beyond ₹ 300, option is not exercised at all.

In case of Put option, since Share price is greater than strike price Option Value would be zero.

Question 49

You as an investor had purchased a 4 month call option on the equity shares of X Ltd. of ₹ 10, of which the current market price is ₹ 132 and the exercise price ₹150. You expect the price to range between ₹ 120 to ₹ 190. The expected share price of X Ltd. and related probability is given below:

Expected Price (₹)	120	140	160	180	190
Probability	.05	.20	.50	.10	.15

Compute the following:

- (1) Expected Share price at the end of 4 months.
- (2) Value of Call Option at the end of 4 months, if the exercise price prevails.
- (3) In case the option is held to its maturity, what will be the expected value of the call option?

Answer

(1) Expected Share Price

$$= ₹120 \times 0.05 + ₹140 \times 0.20 + ₹160 \times 0.50 + ₹180 \times 0.10 + ₹190 \times 0.15$$

$$= ₹6 + ₹28 + ₹80 + ₹18 + ₹28.50 = ₹160.50$$

(2) Value of Call Option

$$= ₹150 - ₹150 = \text{Nil}$$

(3) If the option is held till maturity the expected Value of Call Option

Expected price (X)	Value of call (C)	Probability (P)	CP
₹120	0	0.05	0
₹140	0	0.20	0
₹160	₹10	0.50	₹5
₹180	₹30	0.10	₹3
₹190	₹40	0.15	<u>₹6</u>
Total			<u>₹14</u>

Question 50

The equity share of VCC Ltd. is quoted at ₹ 210. A 3-month call option is available at a premium of ₹6 per share and a 3-month put option is available at a premium of ₹ 5 per share. Ascertain the net payoffs to the optionholder of a call option and a put option.

- (i) the strike price in both cases in ₹ 220; and
 (ii) the share price on the exercise day is ₹ 200,210,220,230,240.

Also indicate the price range at which the call and the put options may be gainfully exercised.

Answer

Net payoff for the holder of the call option

	(₹)				
Strike price on exercise day	200	210	220	230	240
Option exercise	No	No	No	Yes	Yes
Outflow (Strike price)	Nil	Nil	Nil	220	220
Out flow (premium)	6	6	6	6	6
Total Outflow	6	6	6	226	226
Less inflow (Sales proceeds)	-	-	-	230	240
Net payoff	-6	-6	-6	4	14

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Net payoff for the holder of the put option

	(₹)				
Strike price on exercise day	200	210	220	230	240
Option exercise	Yes	Yes	No	No	No
Inflow (strike price)	220	220	Nil	Nil	Nil
Less outflow (purchase price)	200	210	-	-	-
Less outflow (premium)	5	5	5	5	5
Net Payoff	15	5	-5	-5	-5

The loss of the option holder is restricted to the amount of premium paid. The profit (positive payoff) depends on the difference between the strike price and the share price on the exercise day.

Question 51

A call and put exist on the same stock each of which is exercisable at ₹ 60. They now trade for:

Market price of Stock or stock index ₹ 55

Market price of call ₹ 9

Market price of put ₹ 1

Calculate the expiration date cash flow, investment value, and net profit from:

(i) Buy 1.0 call

(ii) Write 1.0 call

(iii) Buy 1.0 put

(iv) Write 1.0 put

for expiration date stock prices of ₹ 50, ₹ 55, ₹ 60, ₹ 65, ₹ 70.

Answer

Expiration date cash flows

Stock Prices	₹ 50	₹ 55	₹ 60	₹ 65	₹ 70
Buy 1.0 call	0	0	0	-60	-60
Write 1.0 call	0	0	0	60	60
Buy 1.0 put	60	60	0	0	0
Write 1.0 put	-60	-60	0	0	0

Expiration date investment value

Stock Prices	₹ 50	₹ 55	₹ 60	₹ 65	₹ 70
Buy 1.0 call	0	0	0	5	10
Write 1.0 call	0	0	0	-5	-10
Buy 1.0 put	10	5	0	0	0
Write 1.0 put	-10	-5	0	0	0

Expiration date net profits

Stock Prices	₹ 50	₹ 55	₹ 60	₹ 65	₹ 70
Buy 1.0 call	-9	-9	-9	-4	1
Write 1.0 call	9	9	9	4	-1
Buy 1.0 put	9	4	-1	-1	-1
Write 1.0 put	-9	-4	1	1	1

Question 52

From the following data for certain stock, find the value of a call option:

- Price of stock now* = ₹80
- Exercise price* = ₹75
- Standard deviation of continuously compounded annual return* = 0.40
- Maturity period* = 6 months
- Annual interest rate* = 12%

Given

<i>Number of S.D. from Mean, (z)</i>	<i>Area of the left or right (one tail)</i>
0.25	0.4013
0.30	0.3821
0.55	0.2912
0.60	0.2743

$e^{0.12 \times 0.5} = 1.062$
 $\ln 1.0667 = 0.0646$

Answer

Applying the Black Scholes Formula,

Value of the Call option now:

The Formula $C = SN(d_1) - K_e^{(-rt)} N(d_2)$

5.50 Strategic Financial Management

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

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

Where,

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

σ = Standard deviation of continuously compounded annual return.

ln = natural logarithm

$$d_1 = \frac{\ln(1.0667) + (12\% + 0.08)0.5}{0.40\sqrt{0.5}}$$

$$= \frac{0.0646 + (0.2)0.5}{0.40 \times 0.7071}$$

$$= \frac{0.1646}{0.2828}$$

$$= 0.5820$$

$$d_2 = 0.5820 - 0.2828 = 0.2992$$

$$N(d_1) = N(0.5820)$$

$$N(d_2) = N(0.2992)$$

$$\text{Price} = SN(d_1) - K e^{(-rt)} N(d_2)$$

$$= 80 \times N(d_1) - (75/1.062) \times N(d_2)$$

Value of option

$$= 80 N(d_1) - \frac{75}{1.062} \times N(d_2)$$

$$N(d_1) = N(0.5820) = 0.7197$$

$$N(d_2) = N(0.2992) = 0.6176$$

$$\begin{aligned}
 \text{Price} &= 80 \times 0.7197 - \frac{75}{1.062} \times 0.6176 \\
 &= 57.57 - 70.62 \times 0.6176 \\
 &= 57.57 - 43.61 \\
 &= ₹13.96
 \end{aligned}$$

Teaching Notes:

Students may please note following important point:

Values of $N(d_1)$ and $N(d_2)$ have been computed by interpolating the values of areas under respective numbers of SD from Mean (Z) given in the question.

It may also be possible that in question paper areas under Z may be mentioned otherwise e.g. Cumulative Area or Area under Two tails. In such situation the areas of the respective Z s given in the question will be as follows:

Cumulative Area

<i>Number of S.D. from Mean, (z)</i>	<i>Cumulative Area</i>
0.25	0.5987
0.30	0.6179
0.55	0.7088
0.60	0.7257

Two tail area

<i>Number of S.D. from Mean, (z)</i>	<i>Area of the left and right (two tail)</i>
0.25	0.8026
0.30	0.7642
0.55	0.5823
0.60	0.5485

Question 53

Following information is available for X Company's shares and Call option:

<i>Current share price</i>	₹185
<i>Option exercise price</i>	₹170
<i>Risk free interest rate</i>	7%
<i>Time of the expiry of option</i>	3 years
<i>Standard deviation</i>	0.18

Calculate the value of option using Black-Scholes formula.

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Answer

$$\begin{aligned}d_1 &= \frac{\ln(S/E) + (r + \frac{\sigma^2}{2})t}{\sigma\sqrt{t}} \\&= \frac{\ln(185/170) + (0.07 + \frac{0.18^2}{2})3}{0.18\sqrt{3}} \\&= \frac{\ln 1.0882 + (0.07 + 0.0162)3}{0.18\sqrt{3}} \\&= \frac{0.08452 + 0.2586}{0.18\sqrt{3}} \\&= \frac{0.34312}{0.31177}\end{aligned}$$

$$d_1 = 1.1006$$

$$\begin{aligned}d_2 &= d_1 - \sigma\sqrt{t} \\&= 1.1006 - 0.31177 = 0.7888\end{aligned}$$

$$N(d_1) = 0.8770 \text{ (from table)}$$

$$N(d_2) = 0.7848$$

$$\begin{aligned}\text{Value of option} &= V_s N(d_1) - \frac{E}{e^{rt}} N(d_2) = 185 (0.8770) - \frac{170}{e^{0.21}} (0.7848) \\&= 162.245 - \frac{170}{1.2336} \times 0.7848 \\&= 162.245 - 108.151 = ₹54.094\end{aligned}$$

Question 54

Suppose a dealer quotes 'All-in-cost' for a generic swap at 8% against six month LIBOR flat. If the notional principal amount of swap is ₹ 5,00,000.

- (i) Calculate semi-annual fixed payment.
- (ii) Find the first floating rate payment for (i) above if the six month period from the effective date of swap to the settlement date comprises 181 days and that the corresponding LIBOR was 6% on the effective date of swap.

In (ii) above, if the settlement is on 'Net' basis, how much the fixed rate payer would pay to the floating rate payer?

Generic swap is based on 30/360 days basis.

Answer

(i) Semi-annual fixed payment

$$= (N) (AIC) (\text{Period})$$

Where N = Notional Principal amount = ₹5,00,000

AIC = All-in-cost = 8% = 0.08

$$= 5,00,000 \times 0.08 \left(\frac{180}{360} \right)$$

$$= 5,00,000 \times 0.08 (0.5)$$

$$= 5,00,000 \times 0.04 = ₹20,000/-$$

(ii) Floating Rate Payment

$$= N (\text{LIBOR}) \left(\frac{dt}{360} \right)$$

$$= 5,00,000 \times 0.06 \times \frac{181}{360}$$

$$= 5,00,000 \times 0.06 (0.503) \text{ or } 5,00,000 \times 0.06 (0.502777)$$

$$= 5,00,000 \times 0.03018 \text{ or } 0.30166 = ₹15,090 \text{ or } 15,083$$

Both are correct

(iii) Net Amount

$$= (i) - (ii)$$

$$= ₹20,000 - ₹15,090 = ₹4,910$$

$$\text{or } = ₹20,000 - ₹15,083 = ₹4,917$$

Question 55

A Inc. and B Inc. intend to borrow \$200,000 and \$200,000 in ₹ respectively for a time horizon of one year. The prevalent interest rates are as follows:

Company	₹ Loan	\$ Loan
A Inc	5%	9%
B Inc	8%	10%

The prevalent exchange rate is \$1 = ₹120.

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They entered in a currency swap under which it is agreed that B Inc will pay A Inc @ 1% over the ¥ Loan interest rate which the later will have to pay as a result of the agreed currency swap whereas A Inc will reimburse interest to B Inc only to the extent of 9%. Keeping the exchange rate invariant, quantify the opportunity gain or loss component of the ultimate outcome, resulting from the designed currency swap.

Answer

Opportunity gain of A Inc under currency swap	Receipt	Payment	Net
Interest to be remitted to B. Inc in \$ 2,00,000x9%=\$18,000 Converted into (\$18,000x¥120)		¥21,60,000	
Interest to be received from B. Inc in \$ converted into ¥ (6%x\$2,00,000 x ¥120)	¥14,40,000	-	
Interest payable on ¥ loan	<u>-</u>	<u>¥12,00,000</u>	
	¥14,40,000	¥33,60,000	
Net Payment	<u>¥19,20,000</u>	<u>-</u>	
	<u>¥33,60,000</u>	<u>¥33,60,000</u>	
\$ equivalent paid ¥19,20,000 x(1/¥120)			\$16,000
Interest payable without swap in \$			<u>\$18,000</u>
Opportunity gain in \$			<u>\$ 2,000</u>

Opportunity gain of B inc under currency swap	Receipt	Payment	Net
Interest to be remitted to A. Inc in (\$ 2,00,000 x 6%)		\$12,000	
Interest to be received from A. Inc in ¥ converted into \$ =¥21,60,000/¥120	\$18,000		
Interest payable on \$ loan@10%	<u>-</u>	<u>\$20,000</u>	
	\$18,000	\$32,000	
Net Payment	<u>\$14,000</u>	<u>-</u>	
	<u>\$32,000</u>	<u>\$32,000</u>	
¥ equivalent paid \$14,000 X ¥120			¥16,80,000
Interest payable without swap in ¥ (\$2,00,000X¥120X8%)			<u>¥19,20,000</u>
Opportunity gain in ¥			<u>¥ 2,40,000</u>

Alternative Solution

Cash Flows of A Inc

(i) At the time of exchange of principal amount

Transactions		Cash Flows
Borrowings	\$2,00,000 x ₹120	+ ₹240,00,000
Swap		- ₹240,00,000
Swap		<u>+\$2,00,000</u>
Net Amount		<u>+\$2,00,000</u>

(ii) At the time of exchange of principal amount

Transactions		Cash Flows
Interest to the lender	¥240,00,000X5%	¥12,00,000
Interest Receipt from B Inc.	¥2,00,000X120X6%	¥14,40,000
Net Saving (in \$)	¥2,40,000/¥120	\$2,000
Interest to B Inc.	\$2,00,000X9%	<u>-\$18,000</u>
Net Interest Cost		<u>-\$16,000</u>

A Inc. used \$2,00,000 at the net cost of borrowing of \$16,000 i.e. 8%. If it had not opted for swap agreement the borrowing cost would have been 9%. Thus there is saving of 1%.

Cash Flows of B Inc

(i) At the time of exchange of principal amount

Transactions		Cash Flows
Borrowings		+ \$2,00,000
Swap		- \$2,00,000
Swap	\$2,00,000X¥120	<u>+¥240,00,000</u>
Net Amount		<u>+¥240,00,000</u>

(ii) At the time of exchange of principal amount

Transactions		Cash Flows
Interest to the lender	\$2,00,000X10%	- \$20,000
Interest Receipt from A Inc.		+\$18,000
Net Saving (in ¥)	-\$2,000X¥120	- ¥2,40,000
Interest to A Inc.	\$2,00,000X6%X¥120	<u>- ¥14,40,000</u>
Net Interest Cost		<u>- ¥16,80,000</u>

5.56 Strategic Financial Management

B Inc. used ₹240,00,000 at the net cost of borrowing of ₹16,80,000 i.e. 7%. If it had not opted for swap agreement the borrowing cost would have been 8%. Thus there is saving of 1%.

Question 56

Derivative Bank entered into a plain vanilla swap through on OIS (Overnight Index Swap) on a principal of ₹ 10 crores and agreed to receive MIBOR overnight floating rate for a fixed payment on the principal. The swap was entered into on Monday, 2nd August, 2010 and was to commence on 3rd August, 2010 and run for a period of 7 days.

Respective MIBOR rates for Tuesday to Monday were:

7.75%, 8.15%, 8.12%, 7.95%, 7.98%, 8.15%.

If Derivative Bank received ₹ 317 net on settlement, calculate Fixed rate and interest under both legs.

Notes:

- (i) Sunday is Holiday.*
- (ii) Work in rounded rupees and avoid decimal working.*

Answer

Day	Principal (₹)	MIBOR (%)	Interest (₹)
Tuesday	10,00,00,000	7.75	21,233
Wednesday	10,00,21,233	8.15	22,334
Thursday	10,00,43,567	8.12	22,256
Friday	10,00,65,823	7.95	21,795
Saturday & Sunday (*)	10,00,87,618	7.98	43,764
Monday	10,01,31,382	8.15	<u>22,358</u>
Total Interest @ Floating			1,53,740
Less: Net Received			<u>317</u>
Expected Interest @ fixed			<u>1,53,423</u>
Thus Fixed Rate of Interest			0.07999914
Approx.			8%

(*) i.e. interest for two days.

Note: Alternatively, answer can also be calculated on the basis of 360 days in a year.

Question 57

M/s. Parker & Co. is contemplating to borrow an amount of ₹ 60 crores for a period of 3 months in the coming 6 month's time from now. The current rate of interest is 9% p.a., but it

may go up in 6 month's time. The company wants to hedge itself against the likely increase in interest rate.

The Company's Bankers quoted an FRA (Forward Rate Agreement) at 9.30% p.a.

What will be the effect of FRA and actual rate of interest cost to the company, if the actual rate of interest after 6 months happens to be (i) 9.60% p.a. and (ii) 8.80% p.a.?

Answer

Final settlement amount shall be computed by using formula:

$$= \frac{(N)(RR - FR)(dtm/DY)}{[1 + RR(dt/DY)]}$$

Where,

N = the notional principal amount of the agreement;

RR = Reference Rate for the maturity specified by the contract prevailing on the contract settlement date;

FR = Agreed-upon Forward Rate; and

dtm = maturity of the forward rate, specified in days (FRA Days)

DY = Day count basis applicable to money market transactions which could be 360 or 365 days.

Accordingly,

If actual rate of interest after 6 months happens to be 9.60%

$$= \frac{(\text{₹ } 60 \text{ crore})(0.096 - 0.093)(3/12)}{[1 + 0.096(3/12)]}$$

$$= \frac{(\text{₹ } 60 \text{ crore})(0.00075)}{1.024} = \text{₹ } 4,39,453$$

Thus banker will pay Parker & Co. a sum of ₹ 4,39,453

If actual rate of interest after 6 months happens to be 8.80%

$$= \frac{(\text{₹ } 60 \text{ crore})(0.088 - 0.093)(3/12)}{[1 + 0.088(3/12)]}$$

$$= \frac{(\text{₹ } 60 \text{ crore})(-0.00125)}{1.022} = - \text{₹ } 7,33,855$$

Thus Parker & Co. will pay banker a sum of ₹ 7,33,855

Note: It might be possible that students may solve the question on basis of days instead of months (as considered in above calculations). Further there may be also possibility that the

5.58 Strategic Financial Management

FRA days and Day Count convention may be taken in various plausible combinations such as 90 days/360 days, 90 days/ 365 days, 91 days/360 days or 91 days/365days.

Question 58

The following market data is available:

Spot USD/JPY 116.00

Deposit rates p.a.	USD	JPY
3 months	4.50%	0.25%
6 months	5.00%	0.25%

Forward Rate Agreement (FRA) for Yen is Nil.

1. What should be 3 months FRA rate at 3 months forward?
2. The 6 & 12 months LIBORS are 5% & 6.5% respectively. A bank is quoting 6/12 USD FRA at 6.50 – 6.75%. Is any arbitrage opportunity available?

Calculate profit in such case.

Answer

1. **3 Months Interest rate is 4.50% & 6 Months Interest rate is 5% p.a.**

Future Value 6 Months from now is a product of Future Value 3 Months now & 3 Months Future Value from after 3 Months.

$$(1+0.05*6/12) = (1+0.045*3/12) \times (1+i_{3,6} * 3/12)$$

$$i_{3,6} = [(1+0.05* 6/12) / (1+0.045 * 3/12) - 1] * 12/3$$

i.e. 5.44% p.a.

2. **6 Months Interest rate is 5% p.a & 12 Month interest rate is 6.5% p.a.**

Future value 12 month from now is a product of Future value 6 Months from now and 6 Months Future value from after 6 Months.

$$(1+0.065) = (1+0.05*6/12) \times (1+i_{6,6} * 6/12)$$

$$i_{6,6} = [(1+0.065/1.025) - 1] * 12/6$$

6 Months forward 6 month rate is 7.80% p.a.

The Bank is quoting 6/12 USD FRA at 6.50 – 6.75%

Therefore there is an arbitrage Opportunity of earning interest @ 7.80% p.a. & Paying @ 6.75%

Borrow for 6 months, buy an FRA & invest for 12 months

To get \$ 1.065 at the end of 12 months for \$ 1 invested today

To pay \$ 1.060# at the end of 12 months for every \$ 1 Borrowed today

Net gain \$ 0.005 i.e. risk less profit for every \$ borrowed

$$\# (1+0.05/2) (1+.0675/2) = (1.05959) \text{ say } 1.060$$

Question 59

From the following data for Government securities, calculate the forward rates:

Face value (₹)	Interest rate	Maturity (Year)	Current price (₹)
1,00,000	0%	1	91,500
1,00,000	10%	2	98,500
1,00,000	10.5%	3	99,000

Answer

Consider one-year Treasury bill.

$$91,500 = \frac{1,00,000}{(1+r_1)}$$

$$1+r_1 = \frac{100,000}{91,500} = 1.092896$$

$$r_1 = 0.0929 \text{ or } 0.093$$

Consider two-year Government Security

$$98,500 = \frac{10,000}{1.093} + \frac{1,10,000}{1.093(1+r_2)}$$

$$98500 = 9149.131 + \frac{1,10,000}{1.093(1+r_2)}$$

$$\Rightarrow 89350.87 = \frac{100640.4}{1+r_2}$$

$$\Rightarrow 1+r_2 = 1.126351$$

$$\Rightarrow r_2 = 0.12635$$

$$\Rightarrow r_2 = 0.1263$$

Consider three-year Government Securities:

$$99,000 = \frac{10,500}{1.093} + \frac{10,500}{1.093 \times 1.1263} + \frac{1,10,500}{1.093 \times 1.1263(1+r_3)}$$

$$\Rightarrow 99,000 = 9,606.587 + 8,529.65 + \frac{89,761.07}{1+r_3}$$

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$$\Rightarrow 80,863.763 = \frac{89,761.07}{1+r_3}$$

$$\Rightarrow 1+r_3 = 1.1100284$$

$$\Rightarrow r_3 = 0.1100284 \text{ say } 11.003\%$$

Question 60

Given below is the Balance Sheet of S Ltd. as on 31.3.2008:

Liabilities	₹ (in lakh)	Assets	₹ (in lakh)
Share capital (Share of ₹ 10)	100	Land and building	40
Reserves and surplus		Plant and machinery	80
Creditors	40	Investments	10
	30	Stock	20
	—	Debtors	15
	170	Cash at bank	5
			170

You are required to work out the value of the Company's, shares on the basis of Net Assets method and Profit-earning capacity (capitalization) method and arrive at the fair price of the shares, by considering the following information:

- (i) Profit for the current year ₹ 64 lakhs includes ₹ 4 lakhs extraordinary income and ₹ 1 lakh income from investments of surplus funds; such surplus funds are unlikely to recur.
- (ii) In subsequent years, additional advertisement expenses of ₹ 5 lakhs are expected to be incurred each year.
- (iii) Market value of Land and Building and Plant and Machinery have been ascertained at ₹ 96 lakhs and ₹ 100 lakhs respectively. This will entail additional depreciation of ₹ 6 lakhs each year.
- (iv) Effective Income-tax rate is 30%.
- (v) The capitalization rate applicable to similar businesses is 15%.

Answer

	₹ lakhs
Net Assets Method	
Assets: Land & Buildings	96
Plant & Machinery	100
Investments	10
Stocks	20
Debtors	15

Cash & Bank	<u>5</u>
Total Assets	246
Less: Creditors	<u>30</u>
Net Assets	<u>216</u>
Value per share	
(a) Number of shares $\frac{1,00,00,000}{10} = 10,00,000$	
(b) Net Assets ₹ 2,16,00,000	
$\frac{₹ 2,16,00,000}{10,00,000} = ₹ 21.6$	

Profit-earning Capacity Method	₹ lakhs	
Profit before tax		64.00
Less: Extraordinary income	4.00	
Investment income (not likely to recur)	<u>1.00</u>	<u>5.00</u>
		59.00
Less: Additional expenses in forthcoming years		
Advertisement	5.00	
Depreciation	<u>6.00</u>	<u>11.00</u>
Expected earnings before taxes		48.00
Less: Income-tax @ 30%		<u>14.40</u>
Future maintainable profits (after taxes)		<u>33.60</u>

Value of business		224
Capitalisation factor	$\frac{33.60}{0.15} =$	
Less: External Liabilities (creditors)		<u>30</u>
		<u>194</u>
Value per share	$\frac{1,94,00,000}{10,00,000}$	₹ 19.40

Fair Price of share	₹
Value as per Net Assets Method	21.60
Value as per Profit earning capacity (Capitalisation) method	19.40
Fair Price= $\frac{21.60 + 19.40}{2} = \frac{41.00}{2} =$	₹20.50

5.62 Strategic Financial Management

Question 61

Which position on the index future gives a speculator, a complete hedge against the following transactions:

- The share of Right Limited is going to rise. He has a long position on the cash market of ₹ 50 lakhs on the Right Limited. The beta of the Right Limited is 1.25.
- The share of Wrong Limited is going to depreciate. He has a short position on the cash market of ₹ 25 lakhs on the Wrong Limited. The beta of the Wrong Limited is 0.90.
- The share of Fair Limited is going to stagnant. He has a short position on the cash market of ₹ 20 lakhs of the Fair Limited. The beta of the Fair Limited is 0.75.

Answer

Sl. No.	Company Name	Trend	Amount (₹)	Beta	Index Value (₹)	Position
(i)	Right Ltd.	Rise	50 lakh	1.25	62,50,000	Short
(ii)	Wrong Ltd.	Depreciate	25 lakh	0.90	22,50,000	Long
(iii)	Fair Ltd.	Stagnant	20 lakh	0.75	<u>15,00,000</u>	Long
					<u>25,00,000</u>	Short

Question 62

Ram buys 10,000 shares of X Ltd. at a price of ₹ 22 per share whose beta value is 1.5 and sells 5,000 shares of A Ltd. at a price of ₹ 40 per share having a beta value of 2. He obtains a complete hedge by Nifty futures at ₹ 1,000 each. He closes out his position at the closing price of the next day when the share of X Ltd. dropped by 2%, share of A Ltd. appreciated by 3% and Nifty futures dropped by 1.5%.

What is the overall profit/loss to Ram?

Answer

No. of the Future Contract to be obtained to get a complete hedge

$$= \frac{10000 \times ₹ 22 \times 1.5 - 5000 \times ₹ 40 \times 2}{₹ 1000}$$

$$= \frac{₹ 3,30,000 - ₹ 4,00,000}{₹ 1000} = 70 \text{ contracts}$$

Thus, by purchasing 70 Nifty future contracts to be long to obtain a complete hedge.

Cash Outlay

$$= 10000 \times ₹ 22 - 5000 \times ₹ 40 + 70 \times ₹ 1,000$$

$$= ₹ 2,20,000 - ₹ 2,00,000 + ₹ 70,000 = ₹ 90,000$$

Cash Inflow at Close Out

$$= 10000 \times ₹ 22 \times 0.98 - 5000 \times ₹ 40 \times 1.03 + 70 \times ₹ 1,000 \times 0.985$$

$$= ₹ 2,15,600 - ₹ 2,06,000 + ₹ 68,950 = ₹ 78,550$$

Gain/ Loss

$$= ₹ 78,550 - ₹ 90,000 = - ₹ 11,450 \text{ (Loss)}$$

Question 63

On January 1, 2013 an investor has a portfolio of 5 shares as given below:

Security	Price	No. of Shares	Beta
A	349.30	5,000	1.15
B	480.50	7,000	0.40
C	593.52	8,000	0.90
D	734.70	10,000	0.95
E	824.85	2,000	0.85

The cost of capital to the investor is 10.5% per annum.

You are required to calculate:

- (i) The beta of his portfolio.
- (ii) The theoretical value of the NIFTY futures for February 2013.
- (iii) The number of contracts of NIFTY the investor needs to sell to get a full hedge until February for his portfolio if the current value of NIFTY is 5900 and NIFTY futures have a minimum trade lot requirement of 200 units. Assume that the futures are trading at their fair value.
- (iv) The number of future contracts the investor should trade if he desires to reduce the beta of his portfolios to 0.6.

No. of days in a year be treated as 365.

Given: $\ln(1.105) = 0.0998$ and $e^{(0.015858)} = 1.01598$

Answer

(i) Calculation of Portfolio Beta

Security	Price of the Stock	No. of shares	Value	Weightage w_i	Beta B_i	Weighted Beta
A	349.30	5,000	17,46,500	0.093	1.15	0.107
B	480.50	7,000	33,63,500	0.178	0.40	0.071

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C	593.52	8,000	47,48,160	0.252	0.90	0.227
D	734.70	10,000	73,47,000	0.390	0.95	0.370
E	824.85	2,000	16,49,700	0.087	0.85	0.074
			1,88,54,860			0.849

Portfolio Beta = 0.849

(ii) Calculation of Theoretical Value of Future Contract

Cost of Capital = 10.5% p.a. Accordingly, the Continuously Compounded Rate of Interest $\ln(1.105) = 0.0998$

For February 2013 contract, $t = 58/365 = 0.1589$

Further $F = Se^{rt}$

$$F = ₹ 5,900e^{(0.0998)(0.1589)}$$

$$F = ₹ 5,900e^{0.015858}$$

$$F = ₹ 5,900 \times 1.01598 = ₹ 5,994.28$$

(iii) When total portfolio is to be hedged:

$$= \frac{\text{Value of Spot Position requiring hedging}}{\text{Value of Future Contract}} \times \text{Portfolio Beta}$$

$$= \frac{1,88,54,860}{5994.28 \times 200} \times 0.849 = 13.35 \text{ contracts say 13 or 14 contracts}$$

(iv) When total portfolio beta is to be reduced to 0.6:

$$\text{Number of Contracts to be sold} = \frac{P(\beta_P - \beta'_P)}{F}$$

$$= \frac{1,88,54,860(0.849 - 0.600)}{5994.28 \times 200} = 3.92 \text{ contracts say 4 contracts}$$

Question 64

A company is long on 10 MT of copper @ ₹ 474 per kg (spot) and intends to remain so for the ensuing quarter. The standard deviation of changes of its spot and future prices are 4% and 6% respectively, having correlation coefficient of 0.75.

What is its hedge ratio? What is the amount of the copper future it should short to achieve a perfect hedge?

Answer

The optional hedge ratio to minimize the variance of Hedger's position is given by:

$$H = \rho \frac{\sigma_S}{\sigma_F}$$

Where

σ_S = Standard deviation of ΔS

σ_F = Standard deviation of ΔF

ρ = coefficient of correlation between ΔS and ΔF

H = Hedge Ratio

ΔS = change in Spot price.

ΔF = change in Future price.

Accordingly

$$H = 0.75 \times \frac{0.04}{0.06} = 0.5$$

No. of contract to be short = $10 \times 0.5 = 5$

Amount = $5000 \times ₹ 474 = ₹ 23,70,000$

Question 65

Indira has a fund of ₹ 3 lacs which she wants to invest in share market with rebalancing target after every 10 days to start with for a period of one month from now. The present NIFTY is 5326. The minimum NIFTY within a month can at most be 4793.4. She wants to know as to how she should rebalance her portfolio under the following situations, according to the theory of Constant Proportion Portfolio Insurance Policy, using "2" as the multiplier:

- (1) Immediately to start with.
- (2) 10 days later-being the 1st day of rebalancing if NIFTY falls to 5122.96.
- (3) 10 days further from the above date if the NIFTY touches 5539.04.

For the sake of simplicity, assume that the value of her equity component will change in tandem with that of the NIFTY and the risk free securities in which she is going to invest will have no Beta.

Answer

$$\text{Maximum decline in one month} = \frac{5326 - 4793.40}{5326} \times 100 = 10\%$$

- (1) Immediately to start with

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$$\begin{aligned}\text{Investment in equity} &= \text{Multiplier} \times (\text{Portfolio value} - \text{Floor value}) \\ &= 2 (3,00,000 - 2,70,000) = ₹ 60,000\end{aligned}$$

Indira may invest ₹ 60,000 in equity and balance in risk free securities.

(2) After 10 days

$$\text{Value of equity} = 60,000 \times 5122.96/5326 = ₹ 57,713$$

$$\text{Value of risk free investment} = ₹ 2,40,000$$

$$\text{Total value of portfolio} = ₹ 2,97,713$$

$$\text{Investment in equity} = \text{Multiplier} \times (\text{Portfolio value} - \text{Floor value})$$

$$= 2 (2,97,713 - 2,70,000) = ₹ 55,426$$

Revised Portfolio:

$$\text{Equity} = ₹ 55,426$$

$$\text{Risk free Securities} = ₹ 2,97,713 - ₹ 55,426 = ₹ 2,42,287$$

(3) After another 10 days

$$\text{Value of equity} = 55,426 \times 5539.04/5122.96 = ₹ 59,928$$

$$\text{Value of risk free investment} = ₹ 2,42,287$$

$$\text{Total value of portfolio} = ₹ 3,02,215$$

$$\text{Investment in equity} = \text{Multiplier} \times (\text{Portfolio value} - \text{Floor value})$$

$$= 2 (3,02,215 - 2,70,000) = ₹ 64,430$$

Revised Portfolio:

$$\text{Equity} = ₹ 64,430$$

$$\text{Risk Free Securities} = ₹ 3,02,215 - ₹ 64,430 = ₹ 2,37,785$$

The investor should off-load ₹ 4502 of risk free securities and divert to Equity.

Question 66

XYZ Limited borrows £ 15 Million of six months LIBOR + 10.00% for a period of 24 months. The company anticipates a rise in LIBOR, hence it proposes to buy a Cap Option from its Bankers at the strike rate of 8.00%. The lump sum premium is 1.00% for the entire reset periods and the fixed rate of interest is 7.00% per annum. The actual position of LIBOR during the forthcoming reset period is as under:

Reset Period	LIBOR
1	9.00%
2	9.50%
3	10.00%

You are required to show how far interest rate risk is hedged through Cap Option.

For calculation, work out figures at each stage up to four decimal points and amount nearest to £. It should be part of working notes.

Answer

First of all we shall calculate premium payable to bank as follows:

$$P = \frac{rp}{\left[(1+i) - \frac{1}{i \times (1+i)^t} \right]} \times A$$

Where

P = Premium

A = Principal Amount

rp = Rate of Premium

i = Fixed Rate of Interest

t = Time

$$= \frac{0.01}{\left[(1/0.035) - \frac{1}{0.035 \times 1.035^4} \right]} \times \text{£}15,000,000$$

$$= \frac{0.01}{\left[(28.5714) - \frac{1}{0.04016} \right]} \times \text{£}15,000,000$$

$$= \frac{0.01}{[3.671]} \times \text{£}15,000,000 = \text{£} 40,861$$

Please note above solution has been worked out on the basis of four decimal points at each stage.

Now we see the net payment received from bank

Reset Period	Additional interest due to rise in interest rate	Amount received from bank	Premium paid to bank	Net Amt. received from bank
1	£ 75,000	£ 75,000	£ 40,861	£34,139
2	£ 112,500	£ 112,500	£ 40,861	£71,639
3	£ 150,000	£ 150,000	£ 40,861	£109,139
TOTAL	£ 337,500	£ 337,500	£122,583	£ 214,917

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Thus, from above it can be seen that interest rate risk amount of ₹ 337,500 reduced by ₹ 214,917 by using of Cap option.

Note: It may be possible that student may compute upto three decimal points or may use different basis. In such case their answer is likely to be different.

Question 67

Trupti Co. Ltd. promoted by a Multinational group "INTERNATIONAL INC" is listed on stock exchange holding 84% i.e. 63 lakhs shares.

Profit after Tax is ₹ 4.80 crores.

Free Float Market Capitalisation is ₹ 19.20 crores.

As per the SEBI guidelines promoters have to restrict their holding to 75% to avoid delisting from the stock exchange. Board of Directors has decided not to delist the share but to comply with the SEBI guidelines by issuing Bonus shares to minority shareholders while maintaining the same P/E ratio.

Calculate

- (i) P/E Ratio*
- (ii) Bonus Ratio*
- (iii) Market price of share before and after the issue of bonus shares*
- (iv) Free Float Market capitalization of the company after the bonus shares.*

Answer

1. P/E Ratio:

	% of holding	No. of Shares
Promoter's Holding	84%	63 Lacs
Minority Holding	16%	12 Lacs
Total Shares	100%	75 Lacs

Free Float Market Capitalization = ₹ 19.20 crores

Hence Market price $\frac{₹19.20 \text{ crores}}{12.00 \text{ lacs}}$ = ₹160 per share

EPS (PAT/No. of Shares) (₹ 4.80 crores /75 lac) = ₹ 6.40 per share

P/E Ratio (₹ 160/ ₹ 6.40) = 25

2. No. of Bonus Shares to be issued:

Promoters holding 84%, = 63 lacs shares

Shares remains the same, but holding % to be taken as 75%

$$\text{Hence Total shares} = \frac{63 \text{ lacs}}{75\%} = 84 \text{ lacs}$$

Shares of Minority = 84 lacs – 63 lacs = 21 lacs

Bonus 9 lacs for 12 lacs i.e. 3 bonus for 4 held

3. Market price before & after Bonus:

Before Bonus = ₹160 per share

After Bonus

$$\text{New EPS} = \frac{\text{₹ 4.80 crores}}{84 \text{ lacs}} = \text{₹ 5.71}$$

New Market Price (25 x ₹ 5.71) = ₹ 142.75

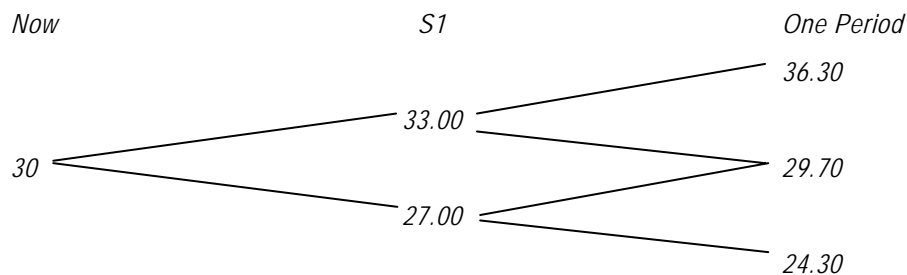
4. Free Float Capitalization is

₹ 142.75 x 21 lacs = ₹29.9775 crores

Exercise

Question 1

Following is a two-period tree for a share of stock in CAB Ltd.:



Using the Binomial model, calculate the current fair value of a regular call option on CAB Stock with the following characteristics: X = ₹ 28, Risk Free Rate = 5 percent (per sub period). You should also indicate the composition of the implied riskless hedge portfolio at the valuation date.

Answer: ₹ 3.83

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Question 2

You are trying to value a long term call option on the Standard and Poor's 500, expiring in 2 months, with a strike price of \$900. The index is currently at \$930, and the annualized standard deviation in stock prices is 20% per annum. The average dividend yield on the index is 0.3% per month, and is expected to remain unchanged over the next month. The Treasury bond rate is 8%.

- (a) Estimate the value of the long term call option.
- (b) Estimate the value of a put option, with the same parameters.

Answer: (a) \$51.87 (b) \$14.37

Question 3

The following information about copper scrap is given:

- Spot price : \$10,000 per ton
- Futures price : \$10,800 for a one year contract
- Interest rate : 12 %
- PV (storage costs) : \$500 per year

What is the PV (convenience yield) of copper scrap?

Answer: \$857.14 per ton

Hint: $\frac{\text{Futures price}}{(1 + \text{Risk-free rate})^1} = \text{Spot price} + \text{Present value of storage cost} - \text{Present value of convenience yield}$