PAPER-14 Advanced Financial Management

Section A – Financial Markets and Institutions

Study Note 1: Agents in Financial Markets

1. (a) **Distinguish between Banking Institutions and Non- Banking Institutions.**
   (b) **Define Cash Reserve Ratio.**
   (c) **'As the nation's financial regulator, the Reserve Bank handles a range of activities.'- List the activities.**

Answer:

(a)

Basis	Banking Institutions	Non-Banking Institutions
Participation in payment mechanism	The Banks participate in the economy's payments mechanism.	Non-banking institutions do not participate in the payments mechanism of an economy.
Transaction Services	Banks provide transaction services like providing overdraft facility, issue of cheque books, traveler's cheque, demand draft, transfer of funds, etc	The non-banking institutions do not provide any transaction services
Deposits as a part of National Money supply	Bank deposits (are the liabilities to the banks) constitute a major part of the national money supply.	The money supply of the non- banking institutions is small
Credit creation	banks create credit	Non-banking institutions do not create credit
Compliance	Banks are subjected to fulfillment of some legal requirements like Cash Reserve Ratio (CRR), Capital Adequacy Ratio (CAR).	Non-banking institutions are not subjected to these legal requirements.
Advance credit	banks can advance credit by creating claims against themselves	Non-banking institutions cannot do so.

(b)
   Cash Reserve Ratio (CRR): The share of net demand and time liabilities that banks must maintain as cash balance with the Reserve Bank. The Reserve Bank requires banks to maintain a certain amount of cash in reserve as percentage of their deposits to ensure that banks have sufficient cash to cover customer withdrawals. The adjustment of this ratio, is done as an instrument of monetary policy, depending on prevailing conditions. Our centralized and

computerized system allows for efficient and accurate monitoring of the balances maintained by banks with the Reserve Bank of India.

(c)
As the nation's financial regulator, the Reserve Bank handles a range of activities, including:
- Licensing;
- Prescribing capital requirements;
- Monitoring governance;
- Setting prudential regulations to ensure solvency and liquidity of the banks;
- Prescribing lending to certain priority sectors of the economy;
- Regulating interest rates in specific areas;
- Setting appropriate regulatory norms related to income recognition, asset classification, provisioning, investment valuation, exposure limits and the like;
- Initiating new regulation.

2. (a) State the problems in the working of State Cooperative Banks.
   (b) List the important regulations relating to acceptance of deposits by NBFCs.
   (c) Discuss the statutory functions of IRDA.

Answer:

(a) The State Cooperative Banks do suffer from the following problems:

(i)   Poor deposits mobilisation: These banks have not been successful in raising deposits as, even now, individual deposits from less than 25 per cent in many States.
(ii) Undesirable investment of funds: These banks are not followed the guide of RBI about the matter of investment of fund. Despite the advice of the RBI, a cautious policy is not being followed in the matter of investment of the funds which agriculture even now utilised for the purchase of shares in other cooperative institutions; or in making huge advances to the primary cooperative societies; and by way of loans to individuals.
(iii) Failure to assess genuineness of borrowing: The banks have failed in assessing the genuineness of the borrowings of the Central Cooperative Banks. This is evidenced from the fact that the credit limits of such banks had been fixed on the basis of their owned funds without taking into account their past performance; and the bank's own financial position.
(iv) Ineffective supervision and inspection: Many of the Banks have not taken up this work in right way.Some of the banks have neither adequate nor separate staff for this work. Officers of these banks sometimes pay only ad-hoc and hurried visits.
(v)   Book adjustment: Book adjustments are often made regarding repayment of loans. The State Cooperative Banks have failed to check the fictitious transactions of the Central cooperative Banks.
(vi) Increasing overdues: The overdues of the Banks have been showing a rising trend. This is due to the fact that these banks have not followed the prescribed loaning procedure.
(vii) They utilize their reserve funds as working capital.

(b) Some of the important regulations relating to acceptance of deposits by NBFCs are as under:

- The NBFCs are allowed to accept/renew public deposits for a minimum period of 12 months and maximum period of 60 months. They cannot accept deposits repayable on demand.

- NBFCs cannot offer interest rates higher than the ceiling rate prescribed by RBI from time to time.The present ceiling is 12.5 per cent per annum. The interest may be paid or compounded at rests not shorter than monthly rests.
- NBFCs cannot offer gifts/incentives or any other additional benefit to the depositors.
- NBFCs (except certain AFCs) should have minimum investment grade credit rating.
- The deposits with NBFCs are not insured.
- The repayment of deposits by NBFCs is not guaranteed by RBI.
- Certain mandatory disclosures are to be made about the company in the Application Form issued by the company soliciting deposits.

(c) Statutory functions of IRDA are as follows:

- Issue to the applicant a certificate of registration, renew, modify, withdraw, suspend or cancel such registration

- Protection of the interests of the policyholders in matters concerning assigning of policy, nomination by policy holders, insurable interest, settlement of insurance claim, surrender value of policy and other terms and conditions of contracts of insurance

- Specifying requisite qualifications, code of conduct and practical training for intermediaries or insurance intermediaries and agents

- Specifying the code of conduct for surveyors and loss assessors

- Promoting efficiency in the conduct of insurance business

- Promoting and regulating professional organisations connected with insurance and reinsurance business

- Levying fees and other charges for carrying out the purposes of the Act

- Calling for information from, undertaking inspection of, conducting enquiries and investigations including audit of the insurers, intermediaries, insurance intermediaries and other organisations connected with the insurance business

- Control and regulation of rates, advantages, terms and conditions that may be offered by the insurers in respect of general insurance business not so controlled and regulated by the Tariff Advisory Committee under Section 64 U of the Insurance Act 1938 (4 of 1938)

- Specifying the form and manner in which books of accounts shall be maintained and statements of accounts shall be rendered by insurers and other insurance intermediaries

- Regulating investment of funds by insurance companies

- Regulating maintenance of margin of solvency

- Adjudication of disputes between insurers and intermediaries or insurance intermediaries

- Supervising the functioning of the Tariff Advisory Committee

- Specifying the percentage of the premium income of the insurer to finance schemes for promoting and regulating professional organisations referred to in clause (f)

- Specifying the percentage of life insurance business and general insurance business to be undertaken by the insurers in the rural and social sector

- Exercising such other powers as may be prescribed.

Study Note 2: Financial Market Instruments

3. (a) Distinguish between Capital Market and Money Market.
  (b) List the salient features of Certificate of Deposits.
  (c) Suppose a company issues a Commercial Paper as per the following details:

Date of Issue	: 17th January 2012
Date of Maturity	: 17th April 2012
No. of Days	: 90 days
Face Value	: ₹1,000
Issue price	: ₹985
Credit rating exp.	: 0.5% of the size of issue
IPA charges	: 0.35%
Stamp Duty	: 0.5%

What is the cost of the commercial paper? What is the yield to investor?

Answer:

(a)

Aspect	Capital Market	Money Market
Type of Instruments	Debt and Equity Instruments.	Debt Instruments only.
Tenor of Instruments	Medium and Long Term Instruments.	Short Term usually less than one year.
Examples	Equity Shares, Preference Stock, Debenture Stock, Zero Coupon Bonds, etc.	Treasury Bills, Certificates of Deposits, Commercial Papers, Banker's Acceptance.
Classification	Capital Market is further classified into Primary Market and Secondary Market.	There is no such further classification.
Participants	Retail Investors, Institutional Investors (Mutual Funds), Financial Institutions, etc.	Banks, Financial Institutions, Reserve Bank of India, Government.
Risk	Low credit and market risk involved.	High credit and market risk.
Regulator	SEBI	RBI

(b)

Certificates of Deposits is a negotiable money market instrument and issued in dematerialized form or as a Usance Promissory Note, for funds deposited at a Bank or other eligible Financial Institution for a specified time period.

Salient features:

- CDs can be issued to individuals, corporations, companies, trusts, funds, associates, etc.
- NRIs can subscribe to CDs on non-repatriable basis.
- CDs attract stamp duty as applicable to negotiable instruments.
- Banks have to maintain SLR and CRR on the issue price of CDs. No ceiling on the amount to be issued.
- The minimum issue size of CDs is ₹1 lakh and in multiples thereof.
- CDs are transferable by endorsement and delivery.
- The minimum lock-in-period for CDs is 15 days.

(c) We know that $\left[\dfrac{\text{Face value Sale Price}}{\text{Sale Price}}\right] \times \left[\dfrac{360}{\text{Maturity Period}}\right] = \text{cost of CP}$

Numerator = Total discount + Rating Charges + IPA charges + stamp duty

Therefore Discount [on FV ₹1,000] = ₹15 + 5 + 5 + 3.5 = ₹28.5

Cost of CP = $\dfrac{28.5}{985} \times \dfrac{360}{90}$ = 0.1157 or11.6%

Yield to investor = $\dfrac{15}{985} \times \dfrac{360}{90} \times 100$ = 6.09

4. (a) State the features of Repo.
(b) Write a note on the following:
(i) Systematic Withdrawal Plan
(ii) Systematic Investment Plan

Answer:

(a) Features of Repo:
- Banks and primary dealers are allowed to undertake both repo and reverse repo transactions.
- It is a collateralized short term lending and borrowing agreement.
- It serves as an outlet for deploying funds on short-term basis.
- The interest rates depend on the demand and supply of the short-term surplus/deficit amongst the interbank players.
- In addition to T-Bills all Central and State Government securities are eligible for repo.
- No sale of securities should be affected unless the securities are actually held by the seller in his own investment portfolio.
- Immediately on sale, the corresponding amount should be reduced from the investment account of the seller.
- The securities under repo should be marked to market on the balance sheet.

(b)(i) Systematic Withdrawal Plan (SWP):

(i)Nature: SWP permits the investor to make an investment at one go and systematically withdraw at periodic intervals, at the same time permitting the balance funds to be re-invested.

(ii)Features:

- Investors can receive regular income while still maintaining their investment's growth potential.

- SWP includes convenient payout options and has several tax advantages.

- Withdrawal can be done either on a monthly basis or on a quarterly basis, based on needs and investment goals of an investor.

- Tax is not deducted, & dividend distribution tax is not applicable. There are no entry or exit loads.

(b)(ii) Systematic Investment Plan (SIP):

(i)Nature: Under a SIP, an investor can invest in the units of Mutual Funds at periodic intervals (monthly or quarterly) prevailing unit price of that time. This fund is for those investors who do not want to accumulate their savings and invest in one go. This fund permits them to accumulate their savings by directly investing in the mutual fund.

(ii)Feature: Investors can save a fixed amount of rupees every month or quarter, for the purchase of additional units.

5. (a)

Portfolio	Average annual return	Standard Deviation	Correlation with market
P	18.6	27.0	0.81
Q	14.8	18.0	0.65
R	15.1	8.0	0.98
S	22.0	21.2	0.75
T	-9.0	4.0	0.45
U	26.5	19.3	0.63
Market Risk	12.0	12.0	
Free Rate	9.0		

(i) **Rank these Portfolios using —**

- **Sharpe's method, and**

- **Treynor's Method.**

(ii) **Compare the ranking in part (i) and explain the reasons behind the differences.**

(b) A has invested in three mutual fund schemes as per details given below:

	MFA	MFB	MFC
Date on investment	1.12.13	1.1.14	1.3.14

Amount of investment	₹50,000	₹1 lakh	₹50,000
NAV at entry date	₹10.50	₹10.00	₹10.00
Dividend received up to 31.03.14	₹950	₹1,500	Nil
NAV as on 31.03.14	₹10.40	₹10.10	₹9.80

Required:

What is the effective yield on per annum basis in respect of each of the three schemes to Mr. A up to 31.03.2014?

Answer:

(a)

P	0.3555 [(18.6 − 9) ÷ 27]	4	1.823 [27 × 0.81÷12]	5.266 [(18.6-9)÷1.823]	5
Q	0.3222 [(14.8 − 9)÷ 18]	5	0.975 [18 × 0.65÷12]	5.95 [(14.8-9)÷0.975]	4
R	0.7625 [(15.1 − 9) ÷ 8]	2	0.653 [8 × 0.98÷12]	9.342 [(15.1-9)÷0.653]	3
S	0.6132 [(22 − 9) ÷ 21.2]	3	1.325 [21.2× 0.75÷12]	9.811 [(22-9)÷1.325]	2
T	− 4.5 [(− 9 − 9) ÷ 4]	6	0.15 [4 × 0.45÷12]	-120 [(-9-9)÷0.15]	6
U	0.9067 [(26.5 − 9) ÷ 19.3]	1	1.013 [19.3× 0.63÷12]	17.27 [(26.5-9)÷1.013]	1

Reasons for Difference between Sharpe and Treynor's method:

(a) Sharpe Index considers only the Standard Deviation and leaves market Standard Deviation and the Correlation whereas Treynor considers market Standard Deviation and Correlation.

(b) Greater correlation result in greater value of Beta. This would reduce the points in Treynor.

(c) Portfolio R which is ranked '2' in Sharpe is pushed a position back in Treynor owing to the correlation effect. Also evident in Portfolio P and Q.

(b)

	MFA	MFB	MFC
Date on investment	1.12.13	1.1.14	1.3.14
Amount of investment	₹50,000	₹ 1 lakh	₹50,000
NAV at entry date	₹10.50	₹10.00	₹10.10
Dividend received up to 31.03.14	₹950	₹1,500	Nil
NAV as on 31.03.14	₹10.40	₹10.10	₹9.80
Number of units issued	50,000/10.5 = 4,762	1 lakh/10 =10,000	50,000/10 = 5,000
Dividend per unit	950/4,762 =	1,500/10,000 =	Nil

	0.20	0.15	
Capital Gains per unit	(10.4 -10.5) = -0.10	(10.10-10.00) = +0.10	(9.80 -10) = - 0.20
Total	**0.10**	**0.25**	**- 0.20**
Yield	0.10/10.5= 0.95%	0.25/10 = 2.5%	-0.2/10 = -2%
Yield per annum = Yield × (12/months of investment)	**2.85%**	**10%**	**-24%**

Study Note 3: Commodity Exchange

6. (a) State the characteristics of Commodity Exchange in India.
(b) Define Forward Contract and list its salient features.
(c) 'Clearing of trades that take place on an exchange happens through the exchange clearing house.'- Justify.

Answer:

(a) Commodity Exchange in India - Characteristics

- There is no value-adding process performed on commodity items. A unit of one type of commodity is broadly interchangeable with another unit. This allows the units to be traded on exchanges without prior inspection.

- Commodities are produced "naturally" which means that each commodity is subject to unique supply factors. For example, the production of coffee is affected by the weather, while that of copper is affected by availability of ore. The supply of oil is subject to a great deal of disruptions including wars, geopolitical uncertainty, accidents, or transport issues.

- Commodities are subject to cycles in demand from both intermediate players and end users. High prices usually lead to a boost in resource investments causing excess supply in the future which eventually pushes down commodity prices.

- Commodities from different groups can often exhibit negative correlation at any point of time. For example, the prices of wheat and aluminum can move in the opposite direction as they are affected by a different set of factors.

- Commodity prices are positively correlated with growth measures, although there may be a significant lag between a pickup in industrial production and commodity prices.

- Commodities generally exhibit positive correlation with inflation indicators. In particular, commodities tend to react to an early stage of inflation as raw material price appreciation generally tends to precede, and quite often exceed consumer price inflation growth. While true over the very long term, the relationship between inflation and commodity prices has been considerably weaker over the last 10 years, which has been characterized by disinflation/low inflation.

(b) A forward contract is an agreement to buy or sell an asset on a specified date for a specified price.

One of the parties to the contract assumes a long position and agrees to buy the underlying asset on a certain specified future date for a certain specified price. The other party assumes a short position and agrees to sell the asset on the same date for the same price. Other contract details like delivery date, price and quantity are negotiated bilaterally by the parties to the contract. The forward contracts are normally traded outside the exchanges.

The salient features of forward contracts are:

- They are bilateral contracts and hence exposed to counter-party risk.
- Each contract is custom designed, and hence is unique in terms of contract size, expiration date and the asset type and quality.
- The contract price is generally not available in public domain.
- On the expiration date, the contract has to be settled by delivery of the asset.
- If the party wishes to reverse the contract, it has to compulsorily go to the same counterparty, which often results in high prices being charged.

However forward contracts in certain markets have become much standardized, as in the case of foreign exchange, thereby reducing transaction costs and increasing transactions volume. This process of standardization reaches its limit in the organized futures market.

(c) Clearing of trades that take place on an exchange happens through the exchange clearing house.

A clearing house is a system by which exchanges guarantee the faithful compliance of all trade commitments undertaken on the trading floor or electronically over the electronic trading systems. The main task of the clearing house is to keep track of all the transactions that take place during a day so that the net position of each of its members can be calculated. It guarantees the performance of the parties to each transaction.

Typically it is responsible for the following:

- Effecting timely settlement.

- Trade registration and follow up.

- Control of the evolution of open interest.

- Financial clearing of the payment flow.

- Physical settlement (by delivery) or financial settlement (by price difference) of contracts.

- Administration of financial guarantees demanded by the participants.

The clearing house has a number of members, who are mostly financial institutions responsible for the clearing and settlement of commodities traded on the exchange. The margin accounts for the clearing house members are adjusted for gains and losses at the end of each day (in the same way as the individual traders keep margin accounts with the broker).

7. (a) A six month Call option on Nagarjuna Fertilizer with a strike price of ₹43 sells for ₹8. A put option on the same stock and same strike price sells for ₹2. option on this stock is available with a strike price of ₹40 and an expiration date in six months. If the risk-free rate equals 10% at what price shares of Nagaijuna Fertilizer should trade to prevent arbitrage?

(b) The 3-month futures contract on NIFTY maturing in April 2009 is currently trading at 2610. The current value of NIFTY is 2590. The one-year risk free rate is 8% and the year -end dividend yield on the market index is 4%. Find the theoretical futures price and comment on arbitrage opportunity.

Answer:

(a) Call option are Nagaijuna Fertilizer
Given that X = 43, Price of call = C = 8, t = 6 months and r = 10%
Put option on same stock of X = 43 is P = 2
We have to find that value of S, the stock price that would bring parity or in other words prevent arbitrage. If put call parity is satisfied we have no arbitrage. Let us use the formula to find S:
S + P = C + PV(X)
Substituting we get, S = - 2 + 8 + = ₹46.95
Therefore the stock should quote at ₹46.95 to prevent arbitrage.

(b) Price of 3-months futures on NIFTY = 2610
Spot Nifty = 2590
r = risk free rate = 8%
Dividend yield on market index = 4%
Theoretical price of Index futures

$$F = S + \frac{S \times r \times n}{365 \times 100} - \frac{S \times D \times n}{365 \times 100}$$

$$F = 2590 + \frac{2590 \times 8 \times 3}{100 \times 12} - \frac{2590 \times 4 \times 3}{100 \times 12} = 2615.90$$

The actual futures are quoted lower than the theoretical futures price; hence we have an arbitrage opportunity.

Study Note 4: Infrastructure Financing

8. (a) Describe the attributes of hard infrastructure.
(b) Discuss the two main distinguishing features of Project Finance compared to Corporate Finance.

Answer:

(a) Hard infrastructure generally has the following attributes:

(i) Capital assets that provide services
These are physical assets that provide services. The people employed in the hard infrastructure sector generally maintain, monitor, and operate the assets, but do not offer services to the clients or users of the infrastructure. Interactions between workers and clients are generally limited to administrative tasks concerning ordering, scheduling, or billing of services.

(ii) Large networks
These are large networks constructed over generations, and are not often replaced as a whole system. The network provides services to a geographically defined area, and has a long life because its service capacity is maintained by continual refurbishment or replacement of components as they wear out.

(iii) Historicity and interdependence
The system or network tends to evolve over time as it is continuously modified, improved, enlarged, and as various components are rebuilt, decommissioned or adapted to other uses. The system components are interdependent and not usually capable of subdivision or separate disposal, and consequently are not readily disposable within the commercial marketplace. The system interdependency may limit a component life to a lesser period than the expected life of the component itself.

(iv) Natural monopoly
The systems tend to be natural monopolies, insofar that economies of scale means that multiple agencies providing a service are less efficient than would be the case if a single agency provided the service. This is because the assets have a high initial cost and a value that is difficult to determine. Once most of the system is built, the marginal cost of servicing additional clients or users tends to be relatively inexpensive, and may be negligible if there is no need to increase the peak capacity or the geographical extent of the network.

In public economics theory, infrastructure assets such as highways and railways tend to be public goods, in that they carry a high degree of non-excludability, where no household can be excluded from using it, and non-rivalry, where no household can reduce another from enjoying it. These properties lead to externality, free ridership, and spillover effects that distort perfect competition and market efficiency. Hence, government becomes the best actor to supply the public goods.

(b) Two main distinguishing features of Project Finance compared to Corporate Finance are:

(i) Enhanced verifiability of cash flows: Due to contractual agreements possible because of a single, discrete project in legal isolation from the sponsor and the resultant absence of future growth opportunities in the Project Financed Company. Since Corporate Finance involves a multitude of future and current projects the same contractual agreements cannot be effected in Corporate Finance Company, and

(ii) Lack of sponsors' assets and cash flows: In case of Corporate Finance the lender has a potentially larger pool of cash flows from which to get paid as compared to Project Finance where the cash flows from the project only are used to pay the investors.

According to some empirical researches, Project Finance is more likely than Corporate Finance in countries where the investor protection against managerial self-dealing is weaker and investor protection is low. This can be better understood in terms of comparison between the neighboring countries: India and China. India used predominantly Project Financing for Infrastructure Projects while China has started using Capital Finance for its huge infrastructure projects.

9. **Write a note on the following:**
    (i) Public-Private Partnership Projects in Infrastructure
    (ii) Foreign Direct Investment and Infrastructure Development

Answer:

(i) As Government faces a tight budget constraint in the context of a rule based fiscal policy framework, it was important to encourage the private sector to invest more in the infrastructure sector. Resultantly, the Government started encouraging Public-Private Partnership (PPP) projects in the infrastructure sector. PPP mechanism provides built in credit enhancement for improving project viability by way of buyback guarantee, escrow arrangement, substitution rights for the lenders, etc. Government has taken several initiatives, especially to standardize the documents and process for structuring and award of PPP projects. This has improved transparency in relation to the issues involved in setting up PPP projects.

(ii) To facilitate infrastructure financing 100 per cent FDI is allowed under the automatic route in some of the sectors such as mining, power, civil aviation sector, construction and development projects, industrial parks, petroleum and natural gas sector, telecommunications and special economic zones. Further, FDI is also allowed through the Government approval route in some sectors such as civil aviation sector, (Domestic Airlines (beyond 49 per cent), Existing airports (beyond 74 per cent to 100 per cent)); investing companies in infrastructure/services sector (except telecom); Petroleum and Natural Gas sector – refining PSU companies; Telecommunications – Basic and Cellular Services (beyond 49 per cent to 74 per cent), ISP with gateways, radio paging, end-to-end bandwidth (beyond 49 per cent to 74 per cent, ISP without gateway (beyond 49 per cent); Satellites (up to 74 per cent) and, mining and mineral separation of titanium bearing minerals and ores (100 per cent).

Section B – Financial Risk Management

Study Note 5: Capital Market Instruments

10. (a) Describe the concept Insider Trading.
    (b) State the limitations of Credit Rating.

Answer:

(a) Insider Trading is the use of confidential information about a business gained through employment in a company or a stock brokerage, to buy and/or sell stocks and bonds based on the private knowledge that the value will go up or down.

It is buying or selling or dealing in securities of a Listed company by Director, Member of Management, an Employee or any other person such as Internal or Statutory Auditor, Agent, Advisor, Analyst Consultant etc. who have knowledge of material, 'inside' information not available to general public.

Illegal: Dealing in securities by an insider is illegal when it is predicated upon utilization of inside information to profit at the expense of other investors who do not have access to such investment information. It is prohibited and is considered as an offence as per SEBI (Insider Trading) Regulations,1992.

Punishable: Insider trading is an unethical practice resorted by those in power, causing huge losses to common investors thus driving them away from capital market, and hence punishable.

Two decades have passed since the SEBI (Prohibition of Insider Trading) Regulations, 1992 were notified which was framed to deter the practice of insider trading in the securities of listed companies. Since then there have been several amendments to the Regulations and judicial paradigm through case laws have also evolved in India. In fact, world over, the regulatory focus is shifting towards containing the rising menace of insider trading effectively. To ensure that the regulatory framework dealing with insider trading in India is further strengthened, SEBI seeks review of the extant Insider Trading Regulatory regime in India.

(b) Limitations of Credit Rating:

(i)   Rating Changes: Rating given to instruments can change over a period of time. They have to be kept under rating watch. Downgrading of an instrument may not be timely enough to help investors.

(ii) Industry Specific rather than Company Specific: Downgrades are linked to industry rather than company performance. Agencies give importance to macro aspects and not to micro ones; over react to existing conditions which come from optimistic / pessimistic views arising out of up / down turns.

(iii) Cost -Benefit of Rating: Ratings being mandatory, it becomes a must for entities rather than carrying out Cost Benefit Analysis of obtaining such, ratings. Rating should be optional and the entity should be free to decide on the issue of obtaining a credit rating.

(iv) Conflict of Interest: The rating agency collects fees from the entity it rates leading to a conflict of interest. Rating market being competitive there is a possibility of such conflict entering into the rating system especially in a case where the rating agencies get their revenues from a single service or group.

(v)   Transparency: Greater transparency in the rating process should exist an example being the disclosure of assumptions leading to a specific public rating.

11. (a) List the advantages and disadvantages of Book Building.
   (b) Write a note on the process of Dematerialisation.

Answer:

(a) Advantages of Book Building:

   (i) The book building process helps in discovery of price & demand.
   (ii) The costs of the public issue are much reduced.
   (iii) The time taken for the completion of the entire process is much less than that in the normal public issue.
   (iv) In book building, the demand for the share is known before the issue closes. Infact, if there is not much demand, the issue may be deferred.
   (v) It inspires investors confidence leading to a large investor universe.
   (vi) Issuers can choose investors by quality.

(vii) The issue price is market determined.

Disadvantages of Book Building:

(i) There is a possibility of price rigging on listing as promoters may try to bail out syndicate members.
(ii) The book building system works very efficiently in matured market conditions. But, such conditions are not commonly found in practice.
(iii) It is appropriate for the mega issues only.
(iv) The company should be fundamentally strong & well known to the investors without it book building process will be unsuccessful.

(b) In order to dematerialise physical securities one has to fill in a DRF (Demat Request Form) which is available with the DP and submit the same along with physical certificates that are to be dematerialised. Separate DRF has to be filled for each ISIN. The complete process of dematerialisation is outlined below:

- Surrender certificates for dematerialisation to your DP.

- DP intimates to the Depository regarding the request through the system.

- DP submits the certificates to the registrar of the Issuer Company.

- Registrar confirms the dematerialisation request from depository.

- After dematerialising the certificates, Registrar updates accounts and informs depository regarding completion of dematerialisation.

- Depository updates its accounts and informs the DP.

- DP updates the demat account of the investor.

Study Note 6: Types of Financial Risks

12. (a) State the types of credit risk.
   (b) Define Market Risk.

Answer:

(a) Credit risk can be classified in the following way:

- Credit default risk - The risk of loss arising from a debtor being unlikely to pay its loan obligations in full or the debtor is more than 90 days past due on any material credit obligation; default risk may impact all credit-sensitive transactions, including loans, Securities and derivatives.

- Concentration risk - The risk associated with any single exposure or group of exposures with the potential to produce large enough losses to threaten a bank's core operations. It may arise in the form of single name concentration or industry concentration.

- Country risk - The risk of loss arising from sovereign state freezing foreign currency payments
(transfer/conversion risk) or when it defaults on its obligations (sovereign risk).

(b) Market risk is the risk of losses in positions arising from movements in market prices. Some market risks include:

- Equity risk, the risk that stock or stock indexes (e.g. Euro Stoxx 50, etc.) prices and/or their implied volatility will change.

- Interest rate risk, the risk those interest rates (e.g. Libor, Euribor, etc.) and/or their implied volatility will change.

- Currency risk, the risk that foreign exchange rates (e.g. EUR/USD, EUR/GBP, etc.) and/or their implied volatility will change.

- Commodity risk, the risk that commodity prices (e.g. corn, copper, crude oil, etc.) and/or their implied volatility will change.

Study Note 7: Financial Derivatives as a tool for risk Management

13. (a) State the key characteristics of Hedge Funds.
(b) List the important features of a swap.

Answer:
(a) Key Characteristics of Hedge Funds

- Hedge funds utilize a variety of financial instruments to reduce risk, enhance returns and minimize the correlation with equity and bond markets. Many hedge funds are flexible in their investment options (can use short selling, leverage, derivatives such as puts, calls, options, futures, etc.).

- Hedge funds vary enormously in terms of investment returns, volatility and risk. Many, but not all,hedge fund strategies tend to hedge against downturns in the markets being traded.

- Many hedge funds have the ability to deliver non-market correlated returns.

- Many hedge funds have as an objective consistency of returns and capital preservation rather than magnitude of returns.

- Most hedge funds are managed by experienced investment professionals who are generally disciplined and diligent.

- Pension funds, endowments, insurance companies, private banks and high net worth individuals and families invest in hedge funds to minimize overall portfolio volatility and enhance returns.

- Most hedge fund managers are highly specialized and trade only within their area of expertise and competitive advantage.

- Hedge funds benefit by heavily weighting hedge fund managers' remuneration towards performance incentives, thus attracting the best brains in the investment business. In addition, hedge fund managers usually have their own money invested in their fund.

- Performance of many hedge fund strategies, particularly relative value strategies, is not dependent on the direction of the bond or equity markets -- unlike conventional equity or mutual funds (unit trusts), which are generally 100% exposed to market risk

  The popular misconception is that all hedge funds are volatile -- that they all use global macro strategies and place large directional bets on stocks, currencies, bonds, commodities, and gold, while using lots of leverage. In reality, less than 5% of hedge funds are global macro funds. Most hedge funds use derivatives only for hedging or don't use derivatives at all, and many use no leverage.

(b) The following are the important features of a swap:

(i) Basically a forward: A swap is nothing but a combination of forwards. So, it has all the properties of forward contract.

(ii) Double coincidence of wants: Swap requires that two parties with equal and opposite needs must come into contact with each other, i.e., rate of interest differs from market to market and within the market itself. It varies from borrowers to borrowers due to relative credit worthiness of borrowers.

(iii) Comparative Credit Advantage: Borrowers enjoying comparative credit advantage in floating rate debts will enter into a swap agreement to exchange floating rate interest with the borrowers enjoying comparative advantage in fixed interest rate debt, like bonds. In the bond market, lending is done at a fixed rate for a long duration, and therefore the lenders do not have the opportunity to adjust the interest rate according to the situation prevailing in the market.

(iv) Flexibility: In short term market, the lenders have the flexibility to adjust the floating interest rate (short term rate) according to the conditions prevailing in the market as well as the current financial position of the borrower. Hence, the short term floating interest rate is cheaper to the borrower with low credit rating when compared with fixed rate of interest.

(v) Necessity of an Intermediary: Swap requires the existence of two counterparties with opposite but matching needs. This has created a necessity for an intermediary to connect both the parties. By arranging swaps, these intermediaries can earn income too. Financial companies, particularly banks, can play a key role in this innovative field by virtue of their special position in the financial market and their knowledge of the diverse needs of the customers.

(vi) Settlements: Though a specified principal amount is mentioned in the swap agreement; there is no exchange of principal. On the other hand, a stream of fixed rate interest is exchanged for a floating rate of interest, and thus, there are streams of cash flows rather than single payment.

(vii) Long term agreement: Generally, forwards are arranged for short period only. Long dated forward rate contracts are not preferred because they involve more risks like risk of default, risk of interest rate fluctuations etc. But, swaps are in the nature of long term

agreement and they are just like long dated forward rate contracts. The exchange of a fixed rate for a floating rate requires a comparatively longer period.

14. (a) Rajalingam had entered into 5 Put Options and 5 Call Options in different securities, the particulars of which are given below, along with their exercise price and actual market price on the date of exercise-

Call Options		
Security	Exercise Price	Actual Market Price
P	₹370	₹376
Q	₹450	₹444
R	₹1790	₹1700
S	₹135	₹140
T	₹953	₹953

Put Options		
Security	Exercise Price	Actual Market Price
A	₹118	₹122
B	₹758	₹758
C	₹350	₹340
D	₹65	₹69
E	₹230	₹220

What is his position on the date of exercise and what would he do?

(b) Gita Ltd will be receiving ₹120 lakhs by way of interim dividend from its subsidiary in 4 months. At the end of the year it will be receiving ₹220 lakhs by way of final dividend and interest on loans to subsidiaries. What is the present value of such interest and dividends if the weighted average cost of capital for Gita Ltd is 13.5% and the company discounts continuous compounding for income by way of dividends and interests?

Answer:

(a)

Call Option [Right to Buy]

Security	Exercise Price (EP)	Actual Market Price (AMP)	AMP vs. EP [Higher]	Position	Action
P	₹370	₹376	AMP	In the Money	Exercise
Q	₹450	₹444	EP	Out of Money	Lapse
R	₹1790	₹1700	EP	Out Of Money	Lapse
S	₹135	₹140	AMP	In the Money	Exercise
T	₹953	₹953	Equal	At the Money	No Action

Put Option [Right to Sell]

	Exercise Price (EP)	Actual Market Price (AMP)	AMP vs. EP [Higher]	Position	Action
A	₹118	₹122	AMP	Out of Money	Lapse
B	₹758	₹758	Equal	At the Money	No Action
C	₹350	₹340	EP	In the Money	Exercise
D	₹65	₹69	AMP	Out of Money	Lapse
E	₹230	₹220	EP	In the Money	Exercise

(b) Present Value under continuous compounding approach

Present Value (P) = A X $e^{-r \times t}$ or A ÷ $e^{r \times t}$

Where, A= Future Cash Flow

e= Exponential Value (i.e.2.71828)

r= Rate of Interest = 13.50% or 0.135

t= No. of years i.e. Period/ Year = 4 months/12 months i.e. 1/3 and 12/12 i.e. 1

Present Value of Cash Flow

Time	Nature of cash flow	Cash Flow(₹)	PV Factor at 13.5%	Discounted Cash Flow(₹)
(1)	(2)	(3)	(4)=[1÷$e^{0.135 \times (1)/12}$]	(5)= (3) x(4)
4	Interim Dividend	1,20,00,000	0.9560 [1 ÷ $e^{0.135 \times 4/12}$]	₹1,14,72,000
12	Final Dividend and Interest	2,20,00,000	0.8737 [1 ÷ $e^{0.135 \times 12/12}$]	₹1,92,21,400
			Total	₹3,06,93,400

15. **(a) Consider a trader who buys an European call option on British Pound with a strike price of $ 1.6500 and a premium of 2 cents ($0.020). The current spot rate is $ 1.6329. Calculate his gain/loss when the option expires if the spot rates are as follows. 1.6300, 1.6270, 1.6400, 1.6500, 1.6549, 1.6320, 1.6500, 1.6900, 1.7000.**

(b) A company has borrowed $200 million on floating basis for 3 years. The interest rates are reset every year. The spread over LIBOR is 25 bps. The company buys a 3 year cap on a 1-year LIBOR with a strike rate of 9% and having a face value of $200 million. The cap carries a premium of 2% of face value or $4 million. Current 1 year LIBOR is 9%. If the LIBOR at the end of 1,2 and 3 years are 9.5% 8.5% and 10%. What is the cash flow from cap each year? Amortize premium equally over three years.

Answer:

(a)

Spot Rate	Premium	Payoff	Gain/Loss
1.6300	0.02	0	(0.02)
1.6270	0.02	0	(0.02)
1.6400	0.02	0	(0.02)
1.6500	0.02	0	(0.02)
1.6549	0.02	0.0049	(0.0151)
1.6320	0.02	0	(0.02)
1.6500	0.02	0	(0.02)
1.6900	0.02	0.04	0.02

1.7000	0.02	0.05	0.03

(b) The strike rate of the cap is Libor which is currently 9%. Since the spread over Libor is 25 bps, the interest rate applicable on the borrowing would be 9.75%, 8.75% & 10.25% respectively for the three years. Thus the interest payable in amount terms over three years would be $1,95,00,000, $1,75,00,000 and $2,05,00,000 respectively. Now, the premium paid for buying this cap is $4 million. As given in the problem equal amortization would involve $ 13,33,333 each year. The seller of the cap would part with the difference whenever Libor is above the strike price. Therefore we can construct the cash flow table as follows:

Time	Cash Flow Loan	Amortization of premium	Cash Flow from Cap	Total
0	+ 20,00,00,000	—	—	+ 20,00,00,000
1	− 1,95,00,000	− 13,33,333	+10,00,000	− 1,98,33,333
2	− 1,75,00,000	− 13,33,333	—	− 1,88,33,000
3	− 2,05,00,000	− 13,33,333	+20,00,000	− 1,98,33,333
3	− 20,00,00,000	—	—	− 20,00,00,000

Study Note 8: Financial Risk Management in International Operations

16. (a) Given the following quotes for per unit of each currency against US dollar, on two different dates:

British pound	1.5398	1.6385
Canadian dollar	0.6308	0.6591
EMU euro	0.9666	1.0835
Japanese yen	0.008273	0.008343
Mexican peso	0.1027	0.0917
Swedish krona	0.1033	0.1179

What is the rate of appreciation or depreciation of each currency over the period?

(b) An Indian customer approaches a bank for a two-month forward contract to help it to settle AUD 200,000 payable maturing on 01/04/14. The bank quotes a rate of ₹35.40/AUD. On 01/04/14, the customer requests the bank to extend the contract for one more month. If the rates prevailing on 1/4/14 are as follows, what should the bank charge for extending the contract?

Spot   : ₹35.20/AUD

One-month forward   : ₹ 35.50/AUD

Answer:

(a)

Pound = ($1.6385 - $1.5398)/$1.5398 = +0.0641= +6.41%.

Canadian dollar = ($0.6591 - $0.6308)/$0.6308 = +0.0449 = +4.49%.

Euro   = ($1.0835 - $0.9666)/$0.9666 = +0.1209 = +12.09%.

Yen   = ($0.008343 - $0.008273)/$0.008273 = +0.0085 = +0.85%.

Peso   = ($0.0917 - $0.1027)/$0.1027 = -0.1071 = -10.71%.

Krona = ($0.1179 - $0.1033)/$0.1033 = +0.1413 = +14.13%.

(b)

Original Forward Contract Details:

Amount   : AUD 2 00000

Due Date   : 01/04/14

Rate   : ₹35.40 / DM

Requests: On due date to extend the contract by one month.

Step I: Calculate Cancellation Charges:

Bank would first, square the buy position i.e. bank would sell spot @ ₹35.20/AUD

Cancellation Charges, Payable by customer i.e. ₹ (35.20 - 35.40) × 2,00,000   = - ₹40000

Step II: Book new contract

Now Bank would buy forward value one month i.e. value 1/5/14 @ ₹35.50/AUD for delivery to customer on due date.

17. **(a) (i) The rate of inflation in USA is likely to be 3% per annum and in India it is likely to be 6.5%. The current spot rate of US $ in India is ₹ 43.40. Find the expected rate of US $ in India after 1 year and 3 years from now using purchasing power parity theory.**

   (ii) On April1, 3 months interest rate in the UK £ and US $ are 7% and 3% per annum respectively. The UK £ /US $ spot rate is 0.7570. What would be the forward rate for US $ for delivery on 30th June?

  (b) A US co has struck a deal to sell goods to a German company for euro 1,250,000 due six months. Because the contract is in Euros rather than dollars, the US Company is considering several hedging alternatives to reduce the exchange rate risk arising from the sale. The following information is available.

   The spot exchange rate is $ 1.40/euro

   The six month forward rate is $1.38/euro

   US company's cost of capital is 11%

   The Euro zone 6-month borrowing rate is 9%

   The Euro zone 6-month lending rate is 7%

   The U.S. 6-month borrowing rate is 8%

   The U.S. 6-month lending rate is 6%

   December put options for Euro 6,25,000; strike price $ 1.42, premium price is 1.5% of spot

US Company's forecast for 6-month spot rates is $1.43/euro

Evaluate the following strategies:

1. **No Hedge**
2. **Forward Hedge**
3. **Options Hedge**
4. **If the US Company locks in the forward hedge at $1.38/euro, and the spot rate when the transaction was recorded on the books was $1.40/euro, what will be the consequences?**

Answer:

(a)

(i) According to Purchasing Power Parity forward rate is

Spot rate $\left[\dfrac{1+{}^rH}{1+{}^rF}\right]^t$

So spot rate after one year

$= ₹\,43.40 \left[\dfrac{1+0.065}{1+0.03}\right]^1$

$= ₹\,43.40\ (1.03399)$

$= ₹\,44.8751$

After 3 years

$₹\,43.40 \left[\dfrac{1+0.065}{1+0.03}\right]^3$

$= ₹\,43.40\ (1.03398)^3$

$= ₹\,43.40\ (1.10544) = ₹\,47.9761$

(ii) As per interest rate parity

$S_1 = S_0 \left[\dfrac{1+in\,A}{1+in\,B}\right]$

$S_1 = £0.7570 \left[\dfrac{1+(0.075) \times {}^3/_{12}}{1+(0.035) \times {}^3/_{12}}\right]$

$= £0.7570 \left[\dfrac{1.01875}{1.00875}\right]$

$= £0.7570 \times 1.0099 = £0.7645$

$= UK\ £0.7645\ /\ US\$

(b) 1. Remain Un-hedged:

Sell Euros 12,50,000 in the spot market six months days from now at $1.43/euro. The company would then get $17,87,500

2. **Forward Hedge:**

Sell Euros six months forward @ $1.38/euro.

= Euro receivable × Forward rate of $/€

= €1,250,000 × 1.38 $/€ = $ 17,25,000

3. Options Hedge

Purchase put options with exercise price = 1.42 $/€

Each contract is 6,25,000, would mean 2 contracts would be bought.

Premium = 1.5% of 1.40 = $0.021

Total premium paid = 2 × 6,25,000 × 0.021 = $26250

If the expected spot after 6 months is $1.43/€, the options would not be exercised. The total receivable in dollars would be = $1.43 × 1,250,000 less $26250 = $17,61,250.

4. When the transaction recorded was $ 1.40/€ and the forward is booked at $ 1.3 8/€, there would be a transaction loss of $0.02 × 1,250,000 = $25,000

Conclusion: It is better to remain un-hedged.

Section C – Security Analysis and Portfolio Management

Study Note 9: Security Analysis and Portfolio Management

18. (a) 'Two basic approaches of security analysis are fundamental analysis and technical analysis.' – Discuss.
(b) Discuss the techniques used in company analysis.

Answer:

(a) Two basic approaches of security analysis are fundamental analysis and technical analysis. Security Analysis is based on the following parameters:-

(i)   Fundamental Analysis: This involves the determination of the intrinsic value of the Share based on the Company's profits and dividend expectations.

- Economic Analysis: It is concerned with the analysis of the overall economy, of which the entity is a part. Economic analysis is used to forecast National Income with its various components that have a bearing on the concerned industry and the company in particular.

- Industry Analysis: It involves analysis of the specific industry to which the company belongs as against analysis of the economy as a whole.

- Company Analysis: Economic and industry framework provides the investor with proper background against which shares of a particular company are purchased. Company Analysis requires the assessment of the particular company in which the investment is sought to be made. This requires careful examination of the company's quantitative and qualitative fundamentals.

(ii)   Technical Analysis: Technical Analysis is concerned with the fundamental strength or weakness of a company or an industry; as reflected by investor and price behaviour. It is the study and analysis of Security Price movements on the following assumptions —

- There is a basic trend in the share price movements

- Such trend is repetitive.

- Share prices have little relationship with Intrinsic Value and based more on investor psychology and perception.

(b) Techniques Used in Company Analysis:

(i)   Correlation & Regression Analysis: Simple regression is used when inter relationship covers two variables. For more than two variables, multiple regression analysis is followed. Here the inter relationship between variables belonging to economy, industry and company are found out. The same is quantified using the correlation co-efficient between the variables and standard deviation of the variables.

(ii) Time Series and Trend Analysis: A Trend line or characteristic line is drawn using the method of least squares to identify and extrapolate the trend obtained based on a given Time Series.

(iii) Decision Tree Analysis: This involves the use of probability to find out the expected value arising out a given course of action. In this method various probabilities arc assigned to states of nature and the expected value of a given course of action is determined.

19. (a) Describe the concepts of Support Levels and Resistance Levels.
   (b) Discuss the market application of Bollinger Bands.

 Answer:

   (a) The concepts of support and resistance are undoubtedly two of the most highly discussed attributes of technical analysis and they are often regarded as a subject that is complex by those who are just learning to trade. Support and resistance represent key junctures where the forces of supply and demand meet. In the financial markets, prices are driven by excessive supply (down) and demand (up). Supply is synonymous with bearish, bears and selling. Demand is synonymous with bullish, bulls and buying. As demand increases, prices advance and as supply increases, prices decline. When supply and demand are equal, prices move sideways as bulls and bears slug it out for control.

   Support Levels: When the Index / Price rebounds after reaching a trough subsequently, the lowest value reached becomes the support level. A support level is a price level where the price tends to find support as it is going down. This means the price is more likely to "bounce" off this level rather than break through it. However, once the price has passed this level, by an amount exceeding some noise, it is likely to continue dropping until it finds another support level.

   Resistance Levels: Represents the peak value from which the index or price goes down. A resistance level is the opposite of a support level. It is where the price tends to find resistance as it is going up. This means the price is more likely to "bounce" off this level rather than break through it. However, once the price has passed this level, by an amount exceeding some noise, it is likely that it will continue rising until it finds another resistance level.

   (b) Market Application:

- Indication of Volatility: Tightening of the bands is often used by technical traders as an early indication that that the volatility is about to increase sharply.

- Interference of Prices around the Band: The closer the prices move to the upper band, the more overbought (purchase position more than sale position) the market, and the closer the prices move to the lower band, the more oversold (sale position more than the purchase position) the market.

- Larger Trend: Bollinger's Band helps in identifying the larger trend, since in the short run every price movement is volatile. Bollinger's Band presents a price channel, which are designed to encompass the trading activity around the trend.

- Action Based on Bollinger Band: Traders use them primarily to determine overbought and oversold levels, selling when price touches the upper Bollinger Band and buying when it hits the lower Bollinger band.

20. **(a) List the factors affecting investment decisions in Portfolio Management.**
(b) 'Systematic Risk arises out of external and uncontrollable factors, which are not specific to a security or industry to which such security belongs.'- Justify.
(c) State the features of Capital Asset Pricing Model.

Answer:

(a) Selection of Investment is based on the following criteria—
- Types of Securities: What type of securities should be chosen? Debentures. Convertible Bonds, Preference Shares, Equity Shares, Government Securities and Bonds etc.
- Proportion of Investment: What should be the proportion of investment in Fixed Interest/ Dividend Securities and variable interest/dividends bearing securities?
- Identification of Industry: In case investments are to be made in the Shares or Debentures of Companies, which particular industry shows potential of growth?
- Identification of Company: After identifying industries with high growth potential, selection of the Company, in whose shares or securities investments are to be made.
- Objectives of Portfolio: If the portfolio is to have a safe and steady returns (such as Provident Funds and welfare funds), then securities with low-risk would be selected. In case of portfolios which are floated for high returns, then risk investments which carry a very high rate of return will be selected.
- Timing of purchase:

  At what price the share is acquired for the Portfolio, depends entirely on the timing decision.
  If a person wishes to make any gains, he should buy when the shares are selling at a low price and sell when they are at a high price.

- Risk Tolerance: Risk refers to the volatility of portfolio's value. The amount of risk the investor is willing to take on is an extremely important factor. While some people do become more risk averse as they get older; a conservative investor remains risk averse over his life-cycle. An aggressive investor generally dares to take risk throughout his life. If an investor is risk averse and he takes too much risk, he usually panic when confronted with unexpected losses and abandon their investment plans mid-stream and suffers huge losses.

(b) Systematic Risk: It arises out of external and uncontrollable factors, which are not specific to a security or industry to which such security belongs. It is that part of risk caused by factors that affect the price of all the securities. Systematic Risk cannot be eliminated by diversification.

   (i) Market Risk:

•   These are risks that are triggered due to social, political and economic events. Example: When CBDT issued a draft circular on how to treat income from trading in shares, whether as Capital Receipts or Business Receipts, the stock prices fell down sharply, across all sectors.

•   These risks arises due to changes in demand and supply, expectations of the investors, information flow, investor's risk perception, etc. consequent to the social, political or economic events.

   (ii) Interest Rate Risk:

•   Uncertainty of future market values and extent of income in the future, due to fluctuations in the general level of interest, is known as Interest Rate Risk.

•   These are risks arising due to fluctuating rates of interest and cost of corporate debt. The cost of corporate debt depends on the interest rates prevailing, maturity periods, credit worthiness of the borrowers, monetary and credit policy of RBI, etc.

   (iii) Purchasing Power Risk: Purchasing Power Risk is the erosion in the value of money due to the effects of inflation.

(c) Features:

(i) CAPM explains the relationship between the Expected Return, Non-Diversifiable Risk (Systematic Risk) and the valuation of securities.

(ii) CAPM is based on the premise that the diversifiable risk of a security is eliminated when more and more securities are added to the Portfolio.

(iii) All securities do not have same level of systematic risk and therefore, the required rate of return goes with the level of systematic risk. It considers the required rate of return of a security on the basis of its (Systematic Risk) contribution to the total risk.

(iv) Systematic Risk can be measured by Beta, p, which is a function of the following —

Total Risk Associated with the Market Return,

Total Risk Associated with the Individual Securities Return,

Correlation between the two.

21.   X Ltd., has an expected return of 20% and Standard Deviation of 40%.
Y Ltd., has an expected return of 22% and Standard Deviation of 38%.
X Ltd., has a beta of 0.86 and Y Ltd., a beta of 1.24.

The correlation coefficient between the return of X Ltd., and Y Ltd., is 0.72. The Standard deviation of the market return is 20%.

Suggest.

(i) Is investing in Y Ltd., better than investing in X Ltd.?

(ii) If you invest 30% in Y Ltd., and 70% in X Ltd., what is your expected rate of return and Portfolio Standard Deviation?

(iii) What is the market Portfolio's expected rate of return and how much is the risk free rate?

(iv) What is the beta of portfolio if X Ltd.'s weight is 60% and Y Ltd.'s weight is 40%?

Answer:

(i)   Better Investment
- X Ltd., has lower return and higher risk than Y Ltd.,
- Investing in Y Ltd., is better than in X Ltd., because the Returns are higher and the Risk lower.
- However, investing in both will yield diversification advantage.

(ii) Expected Return and Standard Deviation of the Portfolio
- **Return on the Portfolio of X and Y:** 70% of Return on Security X + 30% of Return on Security Y

  i.e. 70% X 20% + 30% X 22% = 15.4% + 7.2% = **20.6%**

- **Risk on the Portfolio of X and Y:**

$$\sigma XY = \sqrt{\left(\sigma X^2 \times W_X{}^2\right) + \left(\sigma Y^2 \times W_Y{}^2\right) + 2\left(\sigma X \times W_X \times \sigma Y \times W_Y \times \rho XY\right)}$$

$$= \sqrt{\left(0.40^2 \times 0.70^2\right)\left(0.38^2 \times 0.30^2\right) + \left(2 \times 0.40 \times 0.70 \times 0.38 \times 0.30 \times 0.72\right)}$$

$$= \sqrt{\left[(0.0784) + (0.012996) + (0.04596)\right]}$$

$$= \sqrt{0.137356} = 37.06\%$$

(iii) Market Portfolio's Expected Rate of Return

The Risk free rate and Market Rate will be the same for X and Y Ltd.

Expected Return on Security = $R_f + \beta (R_m - R_f)$

$E(R_X) = 20 = R_f + 0.86 \times (R_m - R_f)$ (1)

$E(R_Y) = 22 = R_f + 1.24 \times (R_m - R_f)$ (2)

(1) – (2)

$E(R_X) - E(R_Y) = -2$

$(R_m - R_f) \times (0.86 - 1.24) = -2$

$(R_m - R_f) = (-2) \div (-0.38)$

$(R_m - R_f) = 5.26\%$

Substituting $(R_m - R_f) = 5.26\%$ in (1)

$E(R_X) = R_f + 0.86 \times (Rm - Rf)$

$20 = R_f + 0.86 \times 5.26$

$20 = R_f + 4.52$

$R_f = 20 - 4.52 = 15.48\%$

$R_m - R_f = 5.26\%$

$R_m = 5.26 + R_f = 5.26 + 15.48 = \mathbf{20.74\%}$

(iv) Beta of the Portfolio if X Ltd.'s weight is 60% and Y Ltd., 's weight is 40%

$\beta_{XY} = \beta_X \times W_X + \beta_Y W_Y$

$= 0.86 \times 0.6 + 1.24 \times 0.4 = \mathbf{1.012}$

22. **Securities X and Y have standard deviations of 3% and 9%. Nitin is having a surplus of ₹20 Lakhs for investment in these two securities. How much should he invest in each of these securities to minimize risk, if the correlation co-efficient for X and Y is — (i) -1; (ii) -0.30; (iii) 0; (d) 0.60**

Answer:

(i)   Basic Values of Factors for Determination of Portfolio Risk

Standard Deviation of Security X	σX	3%
Standard Deviation of Security Y	σY	9%
Correlation co-efficient of Securities X and Y	ρXY	-1,- 0.30, 0,0.60
Weight of Security X	W_X	a
Weight of Security Y	W_Y	1-a

(ii)   Computation of Investment in Securities

$$\text{Proportion of Investment in Security X, } W_X = \frac{\sigma Y^2 - Cov_{XY}}{\sigma X^2 + \sigma Y^2 - 2Cov_{XY}}$$

Proportion of Investment in Security Y, $W_Y = 1 - W_X$

$$Cov_{XY} = \rho XY \times \sigma X \times \sigma Y$$

If ρXY is	Cov$_{XY}$ is	Computation	Investment
-1	-27 (-1x3x9)	$W_X = [\sigma Y^2 - Cov_{XY}] [\sigma X^2 + \sigma Y^2 - 2Cov_{XY}]$ $W_X = [9^2 - (-27)] [3^2 + 9^2 - 2 \times (-27)]$ $W_X = [81 + 27] [9 + 81 + 54]$ $W_X = 108/144 = 0.75$	0.750 in X 0.250 in Y ₹15,00,000 in X ₹5,00,000 in Y

-0.3	-8.1 (-0.3x3x9)	$W_X = [\sigma Y^2 - Cov_{XY}]\ [\sigma X^2 + \sigma Y^2 - 2Cov_{XY}]$ $W_X = [9^2 - (-8.1)]\ [3^2 + 9^2 - 2 \times (-8.1)]$ $W_X = [81 + 8.1]\ [9 + 81 + 16.2]$ $W_X = 89.1\ /\ 106.2 = 0.839$	0.839 in X 0.161 in Y ₹16,78,000 in X ₹3,22,000 in Y
0	0 (0x3x9)	$W_X = [\sigma Y^2 - Cov_{XY}]\ [\sigma X^2 + \sigma Y^2 - 2Cov_{XY}]$ $W_X = [9^2 - 0]\ [3^2 + 9^2 - 2 \times 0]$ $W_X = [81 - 0]\ [9 + 81 - 0]$ $W_X = 81/90 = 0.90$	0.900 in X 0.100 inY ₹ 18,00,000 in X ₹ 2,00,000 in Y
0.60	16.2 (0.6 x 3 x 9)	$W_X = [\sigma Y^2 - Cov_{XY}]\ [\sigma X^2 + \sigma Y^2 - 2Cov_{XY}]$ $W_X = [9^2 - 16.2]\ [3^2 + 9^2 - 2 \times 16.2]$ $W_X = [81 - 16.2]\ [9 + 81 - 32.4]$ $W_X = 64.8\ /\ 57.60 = 1.125 > 1$ At this correlation level, risk reduction is not possible.	Reducing Risk below 3% is not possible.

23. (a) A Ltd. and B Ltd. are in the same risk class, paying taxes at 33%. They are registering steady earnings. A study of their financial statements and the market information highlights the following:

Particulars	A Ltd.	B Ltd.
Capital Employed	₹1,500 crores	₹1,000 crores
Share Capital	₹850 crores	₹600 crores
Reserves	₹650 crores	₹300 crores
9% Debt	-	₹500 crores
Market value of shares	₹3,500 crores	₹1,850 crores
Market value of Debt	-	₹250 crores
Profit after tax	₹472.50 crores	₹396 crores

If Equity Beta of A Ltd. is 1.20, ascertain

(i) Cost of equity of B Ltd.

(ii) Beta of Equity of B Ltd.

(b) A portfolio Manager (PM) has the following four stock in his portfolio:

Compute the following:

Security	No. of Shares	Market Price Per Share (₹)	β
VSL	10,000	50	0.9
CSL	5,000	20	1,0
SML	8,000	25	1.5
APL	2,000	200	1.2

(i) Portfolio beta.

(ii)If the PM seeks to reduce the beta to 0.8, how much risk free investment should he bring in?

(iii) If the PM seeks to increase the beta to 1.2, how much risk free investment should he bring in?

Answer:

(a) Cost of Equity of B Ltd.

Cost of Equity (K$_E$) = Equity Earnings ÷ Market Value of Equity

= ₹ 396 Crores ÷ ₹ 1,850 Crores = 21.40%

  (ii) Beta Value of Equity of B Ltd.

- Beta of B Ltd. – Beta of its Assets
- Since, A Ltd. and B Ltd. are in the same industry and in the same risk class, Beta of B Ltd. = Beta of A Ltd.
- Since A Ltd is an all equity Company, Beta of A Ltd. = Beta of Equity Shares of A Ltd. = 1.20.
- Therefore, Beta of Assets of B Ltd. = 1.20; Beta of Debt = 0

$$\Rightarrow \quad \beta_A = \frac{\beta_{Equity} \times Equity}{Equity + Debt\,(1 - Tax)} + \frac{\beta_{Debt} \times Debt \times (1 - Tax)}{Equity + Debt\,(1 - Tax)}$$

$\Rightarrow$ 1.20 = β$_E$ x 1,850 ÷ [1,850 + 250 x (1 – 33%)] + 0

$\Rightarrow$ 1.20 = β$_E$ x 1,850 ÷ [1,850 + 250 x (1 – 33%)]

$\Rightarrow$ 1.20 = β$_E$ x 1,850 ÷ [1,850 + 250 x 0.67]

$\Rightarrow$ 1.20 = β$_E$ x 1,850 ÷ [1,850 + 167.50]

$\Rightarrow$ 1.20 = β$_E$ x 1,850 ÷ 2,017.50

$\Rightarrow$ 1.20 = β$_E$ x 0.917

$\Rightarrow$ β$_E$ = 1.20 ÷ 0.917 = 1.309

(b) We calculate portfolio beta as 1.108 as shown in table below:

Security	No. of Shares	Market Price Per .Share (₹)	Market value	Proportion	β	Weighted Beta
VSL	10,000	50	5,00,000	0.4167	0.9	0.375
CSL	5,000	20	1,00,000	0.0833	1	0.083
SML	8,000	25	2,00,000	0.1667	1.5	0.250
APL	2,000	200	4,00,000	0.3333	1.2	0.400
Total	25,000		12,00,000	1.00		1.108

If the PM wants to reduce beta he would invest money in risk free asset (which has a beta of zero). Let 'w' be the investment in risk free asset. Then 1 - w is the investment in portfolio whose beta is 1.108. Thus we need overall beta as 0.8. Therefore the requried equation is:

wx0 + (1- w) × 1.108 = 0.8

Solving we get weight or proportion of risk free asset = w = 0.278 approx.

Now, if the PM wants to increase beta he would borrow money in risk free asset (which has a beta of zero), and invest the borrowed money too in the portfolio. Let 'w' be the investment in risk free asset. Then 1 - w is the investment in portfolio whose beta is 1.108. Thus we need overall beta as 1.2. Therefore the requried equation is:

W × 0 + (1- w)× 1.108 = 1.2

Solving we get weight or proportion of risk free asset = w = - 0.083 or - 8.3% approx. meaning borrow risk free asset to the extent of 8.3% of portfolio value i.e. 0.083 * 1200000 = **₹99600** and invest this amount in portfolio i.e. investment in portfolio = **₹1299600**

Section D – Investment Decisions

Study Note 10: Investment Decisions Under Uncertainty

24. (a) Discuss the various causes of uncertainty.
   (b) List the advantages of Project Report.

Answer:

(a) Uncertainty usually arises because it is impossible to predict the different variables and, consequently, the magnitudes of benefits and costs exactly as they will occur. One hundred per cent predictability in project analysis is not feasible for many reasons, the most important being

(i)   Inflation, by which it is understood that the prices of most items, inputs or outputs, increase with time, causing changes in relative prices. The exact magnitude of price increases will always be unknown. Prices may change upwards or downwards for other reasons, too,

(ii) Changes in technology quantities and qualities of inputs and outputs used for project evaluation are estimated according to the present state of knowledge, yet new technologies might be introduced in the future that would alter these estimates,

(iii) The rated capacity used in project evaluation may never be attained. This in turn will affect operating costs as well as sales revenue,

(iv) It often turns out that the needed investment for both fixed and working capital is underestimated and that the construction and running-in periods are considerably longer than expected. This affects the size of investment, operating costs and sales revenue.

Some uncertainties are outside the control of planners, others can be influenced by their policies. The extent of risk associated with an investment project may be reduced either by making advance arrangements for dealing with uncertainty or by substituting a less risky alternative for a more risky one.

(b) Advantages of a Project Report –

(i)   A Project Report lists the objective in various spheres of business and evaluates them from the right perspective.
(ii) Facilitates planning of business by setting guidelines for future action. The successful implementation of a project depends upon the line of action as suggested in the project report. Besides, comparison of results will depend upon the projected profitability and cash flows, production schedule and targets as laid down in the project report.
(iii) Identifies constraints on resources viz. manpower, equipment, financial and technological etc. well in advance to take remedial measures in due course of time.
(iv) Helps in procuring finance from various financial institutions and banks which ask for such detailed information before giving any assistance.
(v)   Provides a framework of the presentation of the information regarding business required by Government for granting licenses, etc.

25. (a) Write a note on Capital Rationing.
   (b) Discuss the need for Social Cost Benefit Analysis.

Answer:

(a) There may be situations where a Firm has a number of projects that yield a positive NPV. However, the most important resource in investment decisions, i.e. funds, are not fully

available to undertake all the projects. In such case, the objective of the firm is to maximize the wealth of shareholders with the available funds. Such investment planning is called Capital Rationing.
There are two possible situations of Capital Rationing:-

(i) Generally, Firms fix up maximum amount that can be invested in capital projects, during a given period of time, say a year. This budget ceiling imposed internally is called as Soft Capital Rationing.

(ii) There may be a market constraint on the amount of funds available for investment during a period. This inability to obtain funds from the market, due to external factors is called Hard Capital Rationing.

(b) Need for Social Cost Benefit Analysis (SCBA)

(i) Market prices used to measure costs and benefits in project analysis, do not represent social values due to imperfections in market.
(ii) Monetary Cost Benefit Analysis fails to consider the external effects of a project, which may be positive like development of infrastructure or negative like pollution and imbalance in environment.
(iii) Taxes and subsidies are monetary costs and gains, but these are only transfer payments from social point of view and therefore irrelevant.
(iv) SCBA is essential for measuring the redistribution effect of benefits of a project as benefits going to
poorer section are more important than one going to sections which are economically better off.
(v) Projects manufacturing life necessities like medicines, or creating infrastructure like electricity generation are more important than projects for manufacture of liquor and cigarettes. Thus merit wants are important appraisal criterion for SCBA.

26. Write a note on the following:
   (i) Bridge Finance
   (ii)Cross Border Leasing
   (iii) Forfaiting

Answer:

(i) Bridge Finance refers to loans taken by a company usually from commercial banks, for a short period, pending disbursement of loans sanctioned by financial institutions.

Sanction:
(a)   When a promoter or an enterprise approaches a financial institution for a long-term loan, there may be some normal time delays in project evaluation, administrative & procedural formalities and final sanction.
(b)   Since the project commencement cannot be delayed, the promoter may start his activities after receiving "in-principle" approval from the term lending institution.
(c)   To meet his temporary fund requirements for starting the project, the promoter may arrange short- term loans from commercial banks or from the term lending institution itself.
(d)   Such temporary finance, pending sanction of the long term loan, is called as "Bridge Finance".
(e)   This Bridge Finance may be used for - (i) paying advance for factory land / machinery acquisition,(ii) purchase of equipments, etc.

Terms:

(a) interest: The interest rate on Bridge Finance is higher when compared to term loans.
(b) repayment: These are repaid or adjusted out of the term loans as and when disbursed by the concerned institutions.
(c) security: These are secured by hypothecating movable assets, personal guarantees & promissory notes.

(ii) Cross-border leasing is a leasing arrangement where lessor and lessee are situated in different countries. Cross-border leasing can be considered as an alternative to equipment loans to foreign buyers, the only difference being the documentation, with down payments, payment streams, and lease-end options the same as offered under Equipment Loans. Operating leases may be feasible for exports of large equipment with a long economic life relative to the lease term.

Objectives of cross Border leasing:

(a) Overall cost of Financing: A major objective of cross-border leases is to reduce the overall cost of financing through utilization by the lessor of tax depreciation allowances to reduce its taxable income. The tax savings are passed through to the lessee as a lower cost of finance. The basic prerequisites are relatively high tax rates in the lessor's country, liberal depreciation rules and either very flexible or very formalistic rules governing tax ownership.

(b) Security: The lessor is often able to utilize non-recourse debt to finance a substantial portion of the equipment cost. The debt is secured by among other things, a mortgage on the equipment and by an assignment of the right to receive payments under the lease.

(c) Accounting treatment: Also, depending on the structure, in some countries the lessor can utilize very favourable "Leveraged Lease" Financial Accounting treatment for the overall transaction.

(d) Repossession: In some countries, it is easier for a lessor to repossess the leased equipment following a Lessee default because the lessor is an owner and not a mere secured lender.

(iii) Forfaiting refers to the exporter relinquishing his right to a receivable due at a future date in exchange for immediate cash payment, at an agreed discount, passing all risks and responsibilities for collecting the debt to the Forfaiter.

Features:
(a) Forfaiting is a form of financing of receivables pertaining to International Trade.
(b) It is the discounting of international trade receivables on a 100% "without recourse" basis.
(c) It denotes the purchase of trade bills/ promissory notes by a Bank / Financial Institution without recourse to the Seller.
(d) The purchase is in the form of discounting the documents covering entire risk of non-payment in collection.
(e) Forfaiting transforms the supplier's credit granted to the importer into cash transaction for the exporter, protecting him completely from all the risks associated with selling overseas on credit.

27. (a) A Co. has a capital structure of 30% debt and 70% equity. The company is considering various investment proposals costing less than ₹30 lakhs. The company does not want to disturb its present capital structure. The cost raising the debt and equity are as follows:

Project Cost	Cost of Debt	Cost of Equity
Above ₹5 lakhs	9%	13%
Above ₹5 lakhs and upto ₹20 lakhs	10%	14%
Above ₹20 lakhs and upto ₹40 lakhs	11%	15%
Above ₹40 lakhs and upto ₹1 crore	12%	15.55%

Assuming the tax rate is 50%, compute the cost of two projects X and Y, whose fund requirements are ₹8 lakhs and ₹22 lakhs respectively. If the projects are expected to yield after tax return of 11%, determine under what conditions it would be acceptable?

(b) A Ltd has the following book-value capital structure as on 31st March

Equity Share Capital (2,00,000 Shares)	₹40,00,000
11.5% Preference Shares	₹10,00,000
10% Debentures	₹30,00,000
Total	₹80,00,000

The Equity Shares of the company sell for ₹20. It is expected that the Company will pay a dividend of ₹ 2 per share next year, this dividend is expected to grow at 5% p.a. forever. Assume 35% corporate tax rate.
1. Compute the Company's WACC based on the existing Capital Structure.
2. Compute the new WACC if the company raises an additional ₹40 lakhs debt by issuing 12% debentures. This would result in increasing the expected Equity dividend to ₹2.40 and leave the growth rate unchanged, but the price of equity share will fall to ₹16 per share.

Answer:
(a)

Particulars	K_d (Debt)%	K_e (Equity)%	WACC=K_o
% of Debt and Equity	30%	70%	
Upto ₹5 lakhs	9 x 50% = 4.5%	13%	4.5 x 30% +13 x 70% = 10.45%
Above ₹5 lakhs to ₹20 lakhs	10 x 50% = 5%	14%	5 x 30% +14 x 70% =11.30%
Above ₹20 lakhs to ₹40 lakhs	11 x 50% = 5.5%	15%	5.5 x 30% +15 x 70% =12.15%
Above ₹40 lakhs to ₹1 crore	12 x 50% =6%	15.55%	6 x 30% +15.55 x 70% =12.69%

Project	Investment	WACC	Return	Decision
X	₹8 Lakhs	11.30% (₹5L to ₹20L)	11%	ROI< WACC
Y	₹22 Lakhs	12.15% (₹20L to ₹40L)	11%	ROI< WACC

Decision: If ROI 11%, Project is acceptable only if,
(a) Project Investment is less than ₹5 lakhs.
(b) Fractional Investment is possible on a divisible project- Investment is less than ₹5 lakhs.

(b)

(i) K_e $\dfrac{\text{Dividend per Share}}{\text{Market Price per Share}}$ + g = $\dfrac{₹2.00}{₹20.00}$ + 5% = 10% + 5% = 15.00%

(ii) K_d Net Proceeds of Issue   30,00,000 =10%(1- 0.35) = 6.50%

(iii) K_p Preference Dividend = 11.50% i.e. ₹ 1,15,000
        Net Proceeds of Issue   ₹ 10,00,000

1. Computation of WACC under present capital structure:

Particulars	Amount	%	Individual Cost	WACC
Debt	30,00,000	37.50%	K_d = 6.50%	2.44%
Preference Capital	10,00,000	12.50%	K_p = 11.50%	1.44%
Equity Capital	40,00,000	50.00%	K_e = 15.00%	7.50%
Total	80,00,000	100%	WACC = K_0 =	11.38%

2. Computation of WACC under revised capital structure:

Component	Amount	%	Individual Cost	WACC
Present Debt	30,00,000	25%	K_d = 6.50%	1.63%
New Debt at 12%	40,00,000	33.33%	K_d = 7.80%	2.60%
Preference Capital	10,00,000	8.33%	K_p = 11.50%	0.96%
Equity Capital	40,00,000	33.34%	K_e = 20.00%	6.67%
Total	1,20,00,000	100%	WACC = K_0 =	11.86%

Revised K_e = $\dfrac{\text{Dividend per Share}}{\text{Market Price per Issue}}$ + g = $\dfrac{₹2.40}{₹16.00}$ + 5% = 15% + 5% = 20.00%

New Debt K_{d} = 12% (1-.035)= 7.8%

28. **Z Ltd. an existing profit-making company, is planning to introduce a new product with a projected life of 8 years. Initial equipment cost will be ₹120 lakhs and additional equipment costing ₹10 lakhs will be needed at the beginning of third year.At the end of the 8 years, the original equipment will have resale value equivalent to the cost of removal, but the additional equipment would be sold for ₹1 lakh. Working capital of ₹15 lakhs will be needed. The 100 % capacity of the plant is of 4,00,000 units per annum, but the production and sales-volume expected are as under:**

Year	Capacity in percentage
1	20
2	30
3-5	75
6-8	50

A sale price of ₹100 per unit with a profit-volume ratio of 60% is likely to be obtained. Fixed Operating Cash Cost are likely to be ₹16 lakhs per annum. In addition to this the advertisement expenditure will have to be incurred as under:

Year	1	2	3-5	6-8
Expenditure in ₹ lakhs each year	30	15	10	4

The company is subject to 40% tax, straight-line method of depreciation, (permissible for tax purposes also) and taking 15% as appropriate after tax Cost of Capital, should the project be accepted?

Answer:

Computation of initial cash outlay

Particulars	(₹ in lakhs)
Equipment Cost	120
Working Capital	15
Total	135

Calculation of Cash Inflows

Year	1	2	3-5	6-8
Sales in units	80,000	1,20,000	3,00,000	2,00,000
	₹	₹	₹	₹
Contribution @ ₹60 per unit	48,00,000	72,00,000	1,80,00,000	1,20,00,000
Fixed Cost	16,00,000	16,00,000	16,00,000	16,00,000
Advertisement	30,00,000	15,00,000	10,00,000	4,00,000
Depreciation	15,00,000	15,00,000	16,50,000	16,50,000
Profit/ (losss)	(13,00,000)	26,00,000	1,37,50,000	83,50,000
Tax @ 40%	Nil	10,40,000	55,00,000	33,40,000
Profit / (losss) after tax	(13,00,000)	15,60,000	82,50,000	50,10,000
Add: Depreciation	15,00,000	15,00,000	16,50,000	16,50,000
Cash Inflow	2,00,000	30,60,000	99,00,000	66,60,000

Computation of PV of Cash Inflow

Year	Cash Inflow	PV factor @ 15%	PV of CIF
	₹		₹
1	2,00,000	0.8696	1,73,920
2	30,60,000	0.7561	23,13,666
3	99,00,000	0.6575	65,09,250
4	99,00,000	0.5718	56,60,820
5	99,00,000	0.4972	49,22,280
6	66,60,000	0.4323	28,79,118
7	66,60,000	0.3759	25,03,494
8	66,60,000	0.3269	21,77,154
Working Capital	15,00,000	0.3269	4,90,350
Sale Value	(1,00,000)	0.3269	(32,690)
			2,75,97,3692
PV of Cash Outflow			1,35,00,000
Additional Investment		=₹10,00,000 x 0.7561	7,56,100
NPV			1,33,41,262

Accept the project in view of positive NPV.

29.(a)ABC Limited has decided to go in for a new model of Mercedes Car. The cost of the vehicle is 40 lakhs. The company has two alternatives: (i) taking the car on finance lease or (ii) borrowing and purchasing the car.

BMN Limited is willing to provide the car on finance lease to ABC Limited for five years at an annual rental of ₹ 8.75 lakhs, payable at the end of the year.

The vehicle is expected to have useful life of 5 years, and it will fetch a net salvage value of 10 lakhs at the end of year five. The depreciation rate for tax purpose is 40% on written-down value basis. The applicable tax rate for the company is 35%. The applicable before tax borrowing rate for the company is 13.8462%.

What is the net advantage of leasing for ABC Limited?

The present value interest factor at different rates of discount are as under:

Rate of Discount	Y-1	Y-2	Y-3	Y-4	Y-5
0.138462	0.8784	0.7715	0.6777	0.5953	0.5229
0.09	0.9174	0.8417	0.7722	0.7084	0.6499

(b) Aerofine Airways is planning to acquire a light commercial aircraft for flying class clients at an investment of ₹ 50,00,000.The expected cash flow after tax for the next three years is as follows:

Year 1		Year 2		Year 3	
CFAT	Probability	CFAT	Probability	CFAT	Probability
14,00,000	0.1	15,00,000	0.1	18,00,000	0.2
18,00,000	0.2	20,00,000	0.3	25,00,000	0.5
25,00,000	0.4	32,00,000	0.4	35,00,000	0.2
40,00,000	0.3	45,00,000	0.2	48,00,000	0.1

The Company wishes to take into consideration all possible risk factors relating to an airline operation. The company wants to know:

(i) The expected NPV of this venture assuming independent probability distribution with 10% risk free rate of interest.

(ii) The possible deviation in the expected value.

Answer:

(a)

Calculation of NPV if car is acquired on Finance Lease

Year	Lease rentals	Tax shield gained on lease rental @ 35%	Tax shield lost on depreciation @ 35%	Net cash outflow	Discount factor @ 9%	P.V. of cash outflows
	(a)	(b)	(c)	(a)-(b)+(c)		
1	8,75,000	3,06,250	5,60,000	11,28,750	0.9174	10,35,515
2	8,75,000	3,06,250	3,36,000	9,04,750	0.8417	7,61,528
3	8,75,000	3,06,250	2,01,600	7,70,350	0.7722	5,94,864
4	8,75,000	3,06,250	1,20,960	6,89,710	0.7084	4,88,591
5	8,75,000	3,06,250	72,576	6,41,326	0.6499	4,16,798
5 Loss of salvage value				10,00,000	0.6499	6,49,900
Net Present Value of Cash Outflows						39,47,196

Calculation of Depreciation of WDV Basis

Year	1	2	3	4	5
WDV at the beginning of the year	40,00,000	24,00,000	14,40,000	8,64,000	5,18,400
Depreciation @ 40% WDV	16,00,000	9,60,000	5,76,000	3,45,600	2,07,360
WDV at the end of year	24,00,000	14,40,000	8,64,000	5,18,400	3,11,040
Tax shield on depreciation @ 35%	5,60,000	3,36,000	2,01,600	1,20,960	72,576

Net Benefit of Leasing = ₹40,00,000 – ₹39,47,196 = ₹52,804

Suggestion – Since the NPV of leasing is lower than the cost of purchase, it is suggested to acquire the car on finance lease basis.

(b) (i) Expected NPV   (₹ In lakhs)

Year I			Year II			Year III		
CFAT	P	CF x P	CFAT	P	CF x P	CFAT	P	CF x P
14	0.1	1.4	15	0.1	1.5	18	0.2	3.6
18	0.2	3.6	20	0.3	6.0	25	0.5	12.5
25	0.4	10.0	32	0.4	12.8	35	0.2	7.0
40	0.3	12.0	45	0.2	9	48	0.1	4.8
$\overline{x}$ or $\overline{CF}$		27.0	$\overline{x}$ or $\overline{CF}$		29.3	$\overline{x}$ or $\overline{CF}$		27.9

NPV	PV factor @ 10%	Total PV
27	0.9090	24.54
29.3	0.8264	24.21
27.9	0.7513	20.96
	PV of cash inflow	69.71
	Less: Cash outflow	50.00
	NPV	**19.71**

(ii) Possible deviation in the expected value

Year I				
$X - \overline{X}$	$X - \overline{X}$	$\left(X - \overline{X}\right)^2$	P_1	$\left(X - \overline{X}\right)^2 P_1$
14 – 27	-13	169	0.1	16.9
18 – 27	-9	81	0.2	16.2
25 – 27	-2	4	0.4	1.6
40 - 27	13	169	0.3	50.7
				85.4

$\sigma_1 = \sqrt{85.4}$ = 9.241

Year II				
$X - \overline{X}$	$X - \overline{X}$	$\left(X - \overline{X}\right)^2$	P_2	$\left(X - \overline{X}\right)^2 P_2$
15 – 29.3	-14.3	204.49	0.1	20.449
20 – 29.3	-9.3	86.49	0.2	25.947
32 – 29.3	2.7	7.29	0.4	2.916
45 – 29.3	15.7	246.49	0.2	49.298
				98.61

$\sigma_2 = \sqrt{98.61}$ = 9.930

Year III				
$X - \overline{X}$	$X - \overline{X}$	$\left(X - \overline{X}\right)^2$	P_3	$\left(X - \overline{X}\right)^2 P_3$
18 – 27.9	-9.9	98.01	0.2	19.602
25 – 27.9	-2.9	8.41	0.5	4.205

35 – 27.9	7.1	50.41	0.2	10.082
48 – 27.9	20.1	404.01	0.1	40.401
				74.29

$\sigma_3 = \sqrt{74.29} = 8.619$

Standard deviation about the expected value:

$\delta = \sqrt{\dfrac{85.4}{(1.10)^2} + \dfrac{98.61}{(1.10)^4} + \dfrac{74.29}{(1.10)^6}} = \sqrt{70.58 + 67.35 + 41.94} = 13.4115.$

30. **Shiba Ltd. is considering two mutually exclusive projects A and B. Project A costs ₹36,000 and project B ₹30,000. You have been given below the net present value probability distribution for each project.**

Project A		Project B	
NPV estimates (₹)	Probability	NPV estimates (₹)	Probability
15,000	0.2	15,000	0.1
12,000	0.3	12,000	0.4
6,000	0.3	6,000	0.4
3,000	0.2	3,000	0.1

(i) **Compute the expected net present values of projects A and B.**
(ii) **Compute the risk attached to each project i.e. standard deviation of each probability distribution.**
(iii) **Compute the profitability index of each project.**
(iv) **Which project do you recommend? State with reasons.**

Answer:

(i) Statement showing computation of expected net present value of Projects A and B:

Project A			Project B		
NPV estimates (₹)	Probability	Expected Value	NPV estimates (₹)	Probability	Expected Value
15,000	0.2	3,000	15,000	0.1	1,500
12,000	0.3	3,600	12,000	0.4	4,800
6,000	0.3	1,800	6,000	0.4	2,400
3,000	0.2	600	3,000	0.1	300
	1.0	EV=9,000		1.0	EV=9,000

(ii) Computation of standard deviation of each project

Project A

P	X	(X-EV)	P(X-EV)²
0.2	15,000	6,000	72,00,000
0.3	12,000	3,000	27,00,000
0.3	6,000	-3,000	27,00,000
0.2	3,000	-6,000	72,00,000
		Variance	1,98,00,000

Standard Deviation of Project A = $\sqrt{1,98,00,000}$ =₹4450.

Project B

P	X	(X-EV)	P(X-EV)²

0.1	15,000	6,000	36,00,000
0.4	12,000	3,000	36,00,000
0.4	6,000	-3,000	36,00,000
0.1	3,000	-6,000	36,00,000
		Variance	1,44,00,000

Standard Deviation of Project A = $\sqrt{1,44,00,000}$ =₹3795

(iii) Computation of profitability of each project

Profitability index = Discount cash inflow/ Initial outlay

In case of Project A :PI = $\dfrac{9,000 + 36,000}{36,000} = \dfrac{45,000}{36,000} = 1.25$

In case of Project B : PI = $\dfrac{9,000 + 30,000}{30,000} = \dfrac{39,000}{30,000} = 1.30$

(iv) Measurement of risk is made by the possible variation of outcomes around the expected value and the decision will be taken in view of the variation in the expected value where two projects have the same expected value, the decision will be the project which has smaller variation in expected value. In the selection of one of the two projects A and B, Project B is preferable because the possible profit which may occur is subject to less variation (or dispersion). Much higher risk is lying with project A.