Paper-14: ADVANCED FINANCIAL MANAGEMENT

Q.1. (a) POPULAR Ltd will be receiving ₹ 60 Lakhs by way of interim dividend from its subsidiary in 4 months. At the end of the year it will be receiving ₹ 110 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 POPULAR Ltd is 13.50% and the Company discounts continuous compounding for income by way of dividends and interests?

(b) CENTURY LTD. paid a dividend of ₹2.60 during the last year and the growth rate in the dividends are expected to be 8%. The current market price of the stock is ₹30.00. The beta of the stock is 1.60 and the return on the market index is 13%. If the risk free-free rate of return is 8%, by how much should the price of the stock be raised in percentage terms so that it is at equilibrium?

(c) Write any three differences between the primary market and the secondary market.

(d) A stock costing ₹140 pays no dividends. The possible prices that the Stock might sell for at the end of the year with the respective probabilities are given below. Compute the Expected Return and its standard Deviation.

Price	135	140	145	150	155	160
Probability	0.1	0.1	0.2	0.3	0.2	0.1

(e) Company is forced to choose between two machines P and Q. The machines are designed differently, but have identical capacity and do exactly the same job. Machine P costs ₹ 75,000 and will last for 3 years. It costs ₹ 20,000 per year to run. Machine Q is an 'economy' model costing only ₹ 50,000, but will last only for 2 years, and costs ₹ 30,000 per year to run. These are real cash flows. The costs are forecasted in rupees of constant purchasing power. Ignore tax. Opportunity cost of capital is 10 per cent. Which machine Company should buy?

(f) State the objective and functions of State Co-operative Bank.

(g) What makes Commodity Trading attractive?

(h) An extract from exchange rate list of a Kolkata based bank is given below:
₹/$: 62.30: 64.25

(i) How many $ will it cost for a foreign tourist visiting India to purchase ₹9,345 worth of painting?

(ii) How much will Mr. Amit in Kolkata have to spend in rupees, to purchase a Sony Camcorder worth $ 325?

(i) If the risk free rate of interest (R_f) is 10%, and expected return on market portfolio (R_m) is 15%, ascertain expected return of the portfolio if portfolio betas are — (i) 0.10 and (ii) 0.30.

(j) What are the differences between Factoring and Securitisation?

Answer:

(a) Present Value under continuous compounding approach

(Computation of Factors)

Present Value (P) = A x e^{-rxt} or A ÷ e^{rXt}

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 Months / 12 Months i.e. 1

Present Value of Cash Flows

Time	Nature of Cash Flow	Cash Flow (₹)	PV Factor at 13.50%	Discounted Cash Flow (₹)
(1)	**(2)**	**(3)**	**(4)** = [1÷e$^{0135x(1)/12}$]	**(5) = (3)X(4)**
4	Interim Dividend	60,00,000	0.9560 [1 ÷ e$^{0.135x4/12}$]	₹ 57,36,000
12	Final Dividend and Interest	1,10,00,000	0.8737 [1 ÷ e$^{0.135x12/12}$]	₹ 96,10,700
Total				₹ 1,53,46,700

(b) The required rate of Return: $R_f + \beta (R_m - R_f) = 8 + 1.6 (13 - 8) = 16\%$

  Expected rate of Return: [D_o (1 + g) / p_o] + g

   = [2.60 (1 + 0.08) / 30] 0.08

   = 17.36%

  At equilibrium, the required rate of return is equal to the expected rate of return.

  0.16 = [2.60 (1.08) / P_o] + 0.08

  Or, 0.08P_o = 2.808

  Or, P_o = 2.808/0.08 = ₹ 35.10

  Hence the price should be increased by ₹ 5.10 (35.10 – 30.00) or 17.00%

  So that it is at equilibrium.

(c) Difference between the primary market and the secondary market

In the primary market, securities are offered to public for subscription for the purpose of raising capital or fund. Secondary market is an equity trading avenue in which already existing/pre- issued securities are traded amongst investors. Secondary market could be either auction or dealer market. While stock exchange is the part of an auction market, Over-the-Counter (OTC) is a part of the dealer market.

(d) Computation of the Expected Return and its standard Deviation

Price	Return (R)= Price - ₹ 140	Probability (P)	Expected Return (P x R)	D = R - $\bar{R}$	D²	P x D²
135	(5)	0.1	(0.5)	(13.5)	182.25	18.225
140	0	0.1	0.0	(8.5)	72.25	7.225
145	5	0.2	1.0	(3.5)	12.25	2.450
150	10	0.3	3.0	1.5	2.25	0.675
155	15	0.2	3.0	6.5	42.25	8.450
160	20	0.1	2.0	11.5	132.25	13.225
Total			$\bar{R}$ **= 8.5**			**50.250**

Expected Return on Security = ₹ 8.5

Risk of Security = σ = $\sqrt{\text{Variance}}$ = $\sqrt{50.25}$ = ₹ 7.09

(e) Working Notes:

Compound present value of 3 years @ 10%   = 2.486

P.V. of Running cost of Machine P for 3 years   = ₹ 20,000 x 2.486 = ₹ 49,720

Compound present value of 2 years @ 10%   = 1.735

P.V. of Running cost of Machine Q for 2 years   = ₹ 30,000 x 1.735 = ₹ 52,050

Statement showing evaluation of Machine P and Q   (₹)

Particulars	Machine P	Machine Q
Cost of purchase	75,000	1,00,000
Add: P.V. of running cost for 3 years	49,720	1,04,100
	1,24,720	1,02,050

P.V. of Cash outflow		1,24,720	1,02,050
		2.486	1.735
Equivalent Present value of annual Cash outflow	=	1,00,338	= 1,17,637

Analysis: Since the annual Cash outflow of Machine P is lowest, Machine P can be purchased.

(f) Objective and functions of State Cooperative Banks

The chief objectives of State Cooperative Bank are to coordinate the work of the Central Banks, and to link Cooperative Credit Societies with the general money market and the Reserve Bank of India.

These banks work as real pivots of the Cooperative movement in the state. They act as initial source of credit for seasonal and urgent needs of their members. Their main functions are:-

(i) They act as banker's bank to the Central Cooperative Banks in the districts. These banks not only mobilise the financial resources needed by the societies, but they also deploy them properly among the various sectors of the movement.

(ii) They coordinate their own policies with those of the cooperative movement and the government.

(iii) They form a connecting link between the cooperative credit societies and the commercial money market and the RBI.

(iv) They formulate and execute uniform credit policies for the cooperative movement as a whole.

(v) They promote the wise of cooperation in general by granting subsidiaries to the Central Cooperative Banks for the development of cooperative activities.

(vi) They act as a clearing house for capital i.e., money flows from, the Apex Banks to the Central Banks and from the Central Banks to the rural societies and from them to individual borrowers.

(vii) They supervise, control and guide the activities of the Central Bank through regular inspections by their inspection staff and rectify the defects in their work. Thus, they act as their friend, philosopher and guide.

(viii) They also perform general utility functions such as issuing drafts, cheques and letters of credit on various centres and thereby help remittance of funds.

(ix) They collect and discount bills with the permission of the Registrar.

(g) The following are the reason which makes Commodity Trading attractive -

(i)   A good low-risk portfolio diversifier

(ii)   A highly liquid asset class, acting as a counterweight to stocks, bonds and real estate.

(iii)   Less volatile, compared with, equities and bonds.

(iv)   Investors can leverage their investments and multiply potential earnings.

(v)   Better risk-adjusted returns.

(vi)   A good hedge against any downturn in equities or bonds as there is

(vii)   Little correlation with equity and bond markets.

(viii) High co-relation with changes in inflation.

(ix)   No securities transaction tax levied.

(h) The foreigner will have to pay

(₹9,345/62.30 or) =$ 150 for the painting

Mr. Amit will have to pay

($ 325 × 64.25) = ₹20,881 (approx)

(i) Rule for determining Expected Return on Portfolio under CAPM

Under Capital Asset Pricing Model (CAPM) $R_p = R_f + (\beta \times (R_m - R_f))$

Notation	Particulars	Value
R_p	Expected Return on Portfolio	To be computed
R_f	Risk Free Rate of Interest/ Return	10%
β	Portfolio Beta	0.10/0.30
R_m	Expected Return on Market Portfolio	15%

Computation of Expected Return on Portfolio

Beta	Expected Return = $R_f + \beta_x (R_m - R_f)$
0.10	= 10% + 0.10(15%-10%)=10.5%
0.30	= 10% + 0.30(15%-10%)=11.5%

(j) Difference between Factoring and Securitisation

Basis	Factoring	Securitisation
Range of Investors	In Factoring, only one party is involved.	Issues of securitisation are sold to a wide range of investors.
Issue Expenses	No issue expenses are involved in Factoring.	Issue expenses are involved.
Recourse	Factoring may be with or without Recourse.	Securitisation is generally without recourse.
Receipt of payment	Payment from the Factor comes in after a time lag, during which the Factor charges interest for any advances allowed.	In securitization, cash is generally received as soon as the issue is placed.
Other Services	Services such as credit checking and ledger maintenance are offered along with Factoring.	Securitization does not carry any such services with it.
Time Period	Short-term receivables are factored.	Long term receivables and Short-term receivables can be securitized.
Credit Rating	Credit Rating is not compulsory.	Credit rating is compulsory.
Availability	Factoring Resources are readily available.	Investors of securitized instruments are to be identified.
Mature of Receivables	Only existing receivables can be factored.	Future and existing receivables can be securitized.

Section – A

Q.2. (a) A has invested in three mutual fund schemes as per details below:

	MF 1	MF 2	MF 3
Date of investment	01.12.2009	01.01.2010	01.03.2010
Amount of investment	₹50,000	₹1, 00,000	₹50,000
Net Asset Value (NAV) at entry date	₹10.50	₹10	₹10
Dividend received upto 31.03.2013	₹970	₹1,520	Nil
NAV as at 31.03.2013	₹10.40	₹10.10	₹9.80

What is the effective yield on per annum basis in respect of each of the three schemes to Mr. Varun upto 31.03.2010?

(b) What do you understand by 'External Commercial Borrowing' (ECB)? Mention two agencies engaged in ECB.

Answer: 2 (a)

1.   Computation of Net Value Added during the year ended 31.03.2013

Schemes	Opening NAV" (₹)	NAV as at entry date	Units No,	NAV as at 31.03.2013 (₹)	Total NAV 31.03.2013 (₹)	Net NAV (₹)
[1]	[2]	[3]	[4] = [2] ÷[3]	[5]	[6] = [4]X[5]	[7] = [2]-[6]
MF 1	50,000	₹10.50	4761.905	10.40	49,523.812	(-)476.188
MF 2	1,00,000	₹10	10,000	10.10	1,01,000	(+)1,000
MF 3	50,000	₹10	5,000	9.80	49,000	(-) 1,000

2.   Effective Yield in %

- Total Yield = Net NAV + Dividend
- Effective Yield in % = (Total Yield ÷ Opening NAV) X (365 ÷ No. of days of holding)

Schemes	Dividend Received (₹)	Total Yield	No. of days	Effective yield % p.a
MF 1	970	493.812	122	2.95%
MF 2	1,520	2,520	91	10.11%
MF 3	—	(-) 1,000	31	(23.55)%

Answer: 2 (b)

An external commercial borrowing (ECB) is an instrument used in India to facilitate the access to foreign money by Indian corporations and PSUs (public sector undertakings). ECBs include commercial bank loans, buyers' credit, suppliers' credit, securitised instruments such as floating rate notes and fixed rate bonds etc., credit from official export credit agencies and commercial borrowings from the private sector window of multilateral financial Institutions such as International Finance Corporation (Washington), ADB, AFIC, CDC, etc". Eligible Borrowers:

  (1) Corporates in manufacturing sector, infrastructure sector and service companies in the hotel, hospital, software sectors (registered under the Companies Act, 1956)
  (2) Infrastructure Finance Companies (IFCs).
  (3) Units in Special Economic Zones(SEZ)
  (4) NGOs engaged in micro finance activities
  (5) Micro Finance Institutions (MFIs)

Eligible Lenders:

Borrowers can raise ECB from internationally recognized sources,

(1) International banks,
(2) International capital markets,
(3) Multilateral financial institutions (such as IFC, ADB, CDC, etc.)
(4) Export credit agencies,
(5) Suppliers of equipments,
(6) Foreign collaborators and
(7) Foreign equity holders.

Q. 3. (a) Describe the grounds on which an Ombudsman can reject complaints lodged with him, under the Banking Ombudsman Scheme 2006. Can an appeal be filed against such a rejection and if so to whom and within what time limit?

(b) Under what circumstances can a company registered as a Collective Investment Management Company raise funds from the public?

(c) State the objective of the financing public private partnerships.

Answer: 3(a)

The Reserve Bank of India (RBI) brought about crucial amendments to the Banking Ombudsman Scheme 2006 which will now enable aggrieved customers to not only appeal against any Ombudsman's decision but also to appeal in case of complaints being rejected. The appeal could be made to the Deputy Governor's Office of RBI.

The Ombudsman , however, has the right to reject Complaints if they are: Not on the grounds of complaint referred to in Clause 8; beyond the pecuniary Jurisdiction of Banking Ombudsman prescribed; frivolous vexatious, malafide ; without any sufficient cause; that it is not pursued the complainant with reasonable diligence; in the opinion of the Banking Ombudsman there is not loss or damage or inconvenience caused to the Complainants; or requiring Consideration of elaborate documentary and oral evidence and the proceedings before the Banking Ombudsman.

In case of a complaint being aggrieved by the award under Clause-12 or by rejection of a Complaint, he may exercise the option of an appeal within 30 days, the RBI said in its notification.

Answer: 3(b)

(a) A registered Collective Investment Management Company is eligible to raise funds from the public by launching schemes.
(b) Such schemes have to be compulsory credit rated as well as appraised by an appraising agency.
(c) The schemes also have to approved by the Trustee and contain disclosures, as provided in the Regulations which would enable to investors to make informed decision.
(d) A copy of the office document of the Scheme had to be filed with SEBI and if no modifications are suggested by SEBI within 21 days from the date of filing, then the collective investment Management company is entitled to issue the offer document to the public raising funds from them.

Answer: 3 (c)

Objective of the Financing Public Private Partnerships

The objective of the Financing Public Private Partnerships (PPP) in Infrastructure through Support to India Infrastructure Finance Company Limited (IIFCL) Project is to increase the availability of long-term financing for infrastructure PPP projects. There are two components the project, the first component being long-term finance to infrastructure projects. This component will provide long-term funds to the IIFCL for on-lending to PPP-based infrastructure projects. The Bank team has carried out a pipeline review to identify projects eligible for financing through the International Bank for Reconstruction and Development (IBRD) loan. Based on the review, which was updated to factor in the impact of the recent global financial crisis on Indian infrastructure, the team believes that there will be a sufficient number of good sub-projects for the IIFCL to support through the proposed IBRD loan. The pipeline of sub-projects being considered includes selected power, roads, and ports projects. Finally, the second component is the capacity building. This component will include support for the two broad areas: a) strengthening IIFCL 's organizational needs in the following areas: i) strengthening and mainstreaming IIFCL environmental and social safeguards framework (ESSF) into its credit review process and post-sanction monitoring of sub-projects, ii) human resource strategy development and implementation, and iii) risk management and research support for IIFCL treasury; and b) implementing and monitoring the project: this will include support to the IIFCL for the day-to-day implementation of the project, covering all aspects of the operations manual (OM), including Financial Management (FM) monitoring and reporting; procurement; safeguards review; monitoring and implementation; overall results monitoring; and efforts to ensure governance accountability and transparency.

Q. 4. Explain briefly the function performed by the Securities and Exchange Board of India (SEBI).

Answer: 4
The functions performed by the Securities and Exchange Board of India (SEBI) are enumerated below:

(1) Regulate the business in stock exchanges and other securities markets;
(2) Registering and regulating the working of stock brokers, sub-brokers, share transfer agents, bankers to an issue, merchant bankers, underwriters, portfolio managers, investment advisors and such other intermediaries, who are associated with the securities market in any manner.
(3) Registering and regulating the working of depositories, custodians of securities, FIIs, credit rating schemes, including mutual funds;
(4) Promoting and regulating Self-Regulatory Organizations (SROs);
(5) Prohibiting fraudulent and unfair trade practices relating to the securities market;
(6) Providing Investors' education and training of intermediaries in securities market;
(7) Prohibiting & Regulating substantial acquisition of shares and takeovers of companies;
(8) Calling for information from, undertaking inspection, conducting inquiries and audits in the stock exchanges and intermediaries and self-regulatory organizations in the securities market;

(9) Performing such functions and exercising such powers under the Securities Contract (Regulations) Act, (SCRA), 1956 as may be delegated to it by the Central Government;

(10) Levying fees & other charges for carrying out its work;

(11) Conducting research for the above purposes;

(12) Performing such other functions that may be prescribed

Under the SEBI Act, some of the powers exercised by the Central Government under SCRA Power prohibit contracts in certain cases.

They relate to the -

(1) Powers to call for periodical returns, direct enquires to be made from any recognized stock exchange;

(2) Grant approval to any recognized stock exchange & to make bye-laws for the regulation and control of contracts;

(3) Powers to make & amend bye-laws of recognized stock exchanges;

(4) Licensing of dealers in securities by public companies;

(5) Granting approval to amendment to the rules of a recognized stock exchange;

(6) Powers to ask every recognized stock exchange, to furnish to the SEBI, a copy of the annual report containing particulars that may be prescribed;

(7) Powers to supercede the governing body of a recognized stock exchange;

(8) Powers to suspend business of any recognized stock exchange;

Q.5. (a) Briefly state the objective behind issuance of SEBI (Disclosure and Investor Protection) Guidelines, 2000.
  (i) To Whom are the said guidelines applicable?
  (ii) To whom are the said guidelines not applicable?

  (b) For an important business offer made by your client Beautiful Ltd, the offeree is ready to send a digitally signed e mail, accepting the offer. Your client wants to know if the same is legally binding. Advise the client suitability.

Answer: 5 (a)

SEBI (Disclosure and Investor Protection) Guidelines, 2000

New set of guidelines were issued in the year 2000 called SEBI (Disclosure and Investor Protection) Guidelines, 2000, which are also amended subsequently. The said guidelines are issued by SEBI under Section 11 of the Securities and Exchange Board on India Act, 1992. It provides a comprehensive framework for primary capital issues by the companies. The guidelines are applicable to:

(i) All public issues by listed and unlisted companies.

(ii) All offers for sale and rights issues exceeding ₹ 50 lakhs by listed companies whose equity share capital is listed.

The guidelines are not applicable to:

(a) A banking company including local area bank

(b) Public sector banks

(c) Infrastructure companies

(d) Rights issue by a listed company.

Answer: 5 (b)

The Information Technology Act will be of help to the client.

Section 4 and 5 of the Act may be referred to in this context. Section 4 accords legal recognition of electronic records. As per this section, where any law provides that information or any other matter shall be in writing or in the typewritten or printed form, then, notwithstanding anything contained in such law, such requirement shall be deemed to have been satisfied if such information or matter is:

(i)   Rendered or made available in an electronic form, and

(ii)   Accessible so as to be for a subsequent reference.

Section 5 speaks of legal recognition of digital signatures. Accordingly, where any law provides that information or any other matter shall be authenticated by affixing the signature or any document shall be signed or bear the signature of any person then, notwithstanding anything contained therein such law, such requirement shall be deemed to have been satisfied, if such information or matter is authenticated by means of digital signature affixed in such manner as may be prescribed by the Central Government. The Explanation to this section states that for the purposes of this section, "signed', with its grammatical variations and cognate expressions, shall, with reference to a person, mean affixing of his hand written. The client should ensure that in respect of this important e-mails/e-documents/e-records, the sender affixes his digital signature. A digitally signed document is a perfect piece of legal evidence as to its timing, contents, integrity and authenticity.

Q.6. (a) Mr. Kiran can earn a return of 16 per cent by investing in equity shares on his own. Now he is considering a recently announced equity based mutual fund scheme in which initial expenses are 5.7 per cent and annual recurring expenses are 1.7 per cent. How much should the mutual fund earn to provide Mr. Kiran a return of 16 per cent?

(b) Why are commodity derivatives required?

Answer: 6 (a)

Let the Return on Mutual Funds be ₹ X

Investor's Expectation denotes the Return from the amount invested.

$$\text{Returns from Mutual Funds} = \frac{\text{Investors' Expectation}}{100 - \text{Issue Expenses}} + \text{Annual Recurring Expenses}$$

$$X = \frac{16}{(100 - 5.7\%)} 1.7 = 16.96 + 1.7 = 18.67\%$$

Return that the Mutual Fund should earn so as to provide a return of 16% = 18.67%

Monthly Return - Mutual Fund.

Answer: 6 (b)

India is among the top-5 producers of most of the commodities, in addition to being a major consumer of bullion and energy products. Agriculture contributes about 22% to the GDP of the Indian economy. It employees around 57% of the labor force on a total of 163 million hectares of land. Agriculture sector is an important factor in achieving a GDP growth of 8-10%. All this indicates that India can be promoted as a major center for trading of commodity derivatives.

It is unfortunate that the policies of FMC during the most of 1950s to 1980s suppressed the very markets it was supposed to encourage and nurture to grow with times. It was a mistake other emerging economies of the world would want to avoid. However, it is not in India alone that derivatives were suspected of creating too much speculation that would be to the detriment of the healthy growth of the markets and the farmers. Such suspicions might normally arise due to a misunderstanding of the characteristics and role of derivative product.

It is important to understand why commodity derivatives are required and the role they can play in risk management. It is common knowledge that prices of commodities, metals, shares and currencies fluctuate over time. The possibility of adverse price changes in future creates risk for businesses. Derivatives are used to reduce or eliminate price risk arising from unforeseen price changes. A derivative is a financial contract whose price depends on, or is derived from, the price of another asset. Two important derivatives are futures and options.

(i) Commodity Futures Contracts: A futures contract is an agreement for buying or selling a commodity for a predetermined delivery price at a specific future time. Futures are standardized contracts that are traded on organized futures exchanges that ensure performance of the contracts and thus remove the default risk. The commodity futures have existed since the Chicago Board of Trade (CBOT, www.cbot.com) was established in 1948 to bring farmers and merchants together. The major function of futures markets is to transfer price risk from hedgers to speculators. For example, suppose a farmer is expecting his crop of wheat to be ready in two months time, but is worried that the price of wheat may decline in this period. In order to minimize his risk, he can enter into a futures contract to sell his crop in two months' time at a price determined now. This way he is able to hedge his risk arising from a possible adverse change in the price of his commodity.

(ii) Commodity Options contracts: Like futures, options are also financial instruments used for hedging and speculation. The commodity option holder has the right, but not the obligation, to

buy (or sell) a specific quantity of a commodity at a specified price on or before a specified date. Option contracts involve two parties – the seller of the option writes the option in favour of the buyer (holder) who pays a certain premium to the seller as a price for the option. There are two types of commodity options: a 'call' option gives the holder a right to buy a commodity at an agreed price, while a 'put' option gives the holder a right to sell a commodity at an agreed price on or before a specified date (called expiry date).

The option holder will exercise the option only if it is beneficial to him; otherwise he will let the option lapse. For example, suppose a farmer buys a put option to sell 100 Quintals of wheat at a price of ₹ 1250 per quintal and pays a 'premium' of ₹ 25 per quintal (or a total of ₹2500). If the price of wheat declines to say ₹1000 before expiry, the farmer will exercise his option and sell his wheat at the agreed price of ₹ 1250 per quintal. However, if the market price of wheat increases to say ₹ 1500 per quintal, it would be advantageous for the farmer to sell it directly in the open market at the spot price, rather than exercise his option to sell at ₹ 1250 per quintal.

Futures and options trading therefore helps in hedging the price risk and also provide investment opportunity to speculators who are willing to assume risk for a possible return. Further, futures trading and the ensuing discovery of price can help farmers in deciding which crops to grow. They can also help in building a competitive edge and enable businesses to smoothen their earnings because non-hedging of the risk would increase the volatility of their quarterly earnings. Thus futures and options markets perform important functions that cannot be ignored in modern business environment. At the same time, it is true that too much speculative activity in essential commodities would destabilize the markets and therefore, these markets are normally regulated as per the laws of the country.

Q. 7.   Write Short notes on the following:

(a) **Options**
(b) **Objectives of commodity futures**
(c) **Project financing v/s capital financing**
(d) **Takeout financing**
(e) **Wholesale Price Index (WPI)**

Answer: 7 (a)

Options: Options are fundamentally different from forward and futures contracts. An option gives the holder of the option the right to do something. The holder does not have to exercise this right. In contrast, in a forward or futures contract, the two parties have committed themselves to doing something.

Whereas it costs nothing (except margin requirements) to enter into a futures contract, the purchase of an option requires an up-front payment.

There are two basic types of options, call options and put options.

Call option: A call option gives the holder the right but not the obligation to buy an asset by a certain date for a certain price.

Put option: A put option gives the holder the right but not the obligation to sell an asset by a certain date for a certain price.

Answer: 7 (b)

Objectives of Commodity Futures

❖ Hedging with the objective of transferring risk related to the possession of physical assets through any adverse moments in price. Liquidity and Price discovery to ensure base minimum volume in trading of a commodity through market information and demand supply factors that facilitates a regular and authentic price discovery mechanism.

❖ Maintaining buffer stock and better allocation of resources as it augments reduction in inventory requirement and thus the exposure to risks related with price fluctuation declines. Resources can thus be diversified for investments.

❖ Price stabilization along with balancing demand and supply position. Futures trading leads to predictability in assessing the domestic prices, which maintains stability, thus safeguarding against any short term adverse price movements. Liquidity in Contracts of the commodities traded also ensures in maintaining the equilibrium between demand and supply.

❖ Flexibility, certainty and transparency in purchasing commodities facilitate bank financing. Predictability in prices of commodity would lead to stability, which in turn would eliminate the risks associated with running the business of trading commodities. This would make funding easier and less stringent for banks to commodity market players.

Answer: 7 (c)

Project Financing Versus Capital Financing

Countries across the globe use Project Finance vis-à-vis Corporate Finance in industries like infrastructure where there are large cash flows. Project Finance involves significant costs compare to Corporate Finance however the mitigation of Agency Cost (since certain assets like tangible assets with high cash flows are susceptible to costly agency conflicts) and reduction in the deadweight cost of bankruptcy are primary motivators for using Project Finance (Subramanian, Tung, & Wang, 2007). The creation of a project company provides an opportunity to create asset-specific, new governance systems to address the conflicts between ownership and control. Another feature of Project Companies is that they utilize high leverage and joint ownership to discourage costly agency conflicts.

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

a) **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

b) **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.

Answer: 7 (d)

Takeout financing

Takeout financing offers a window to the banks to free their balance sheet from exposure to infrastructure loans, lend to new projects and also enable better management of the asset liability position. In other words, takeout financing enables financing longer term projects with medium term funds. However, due to several factors the mechanism has not really emerged as a game-changer. One plausible reason is that the model does not envisage equitable distribution of risks and benefits. One of the oft repeated arguments is that banks assume credit and liquidity risk since the inception of the project but once the project is economically viable, taking out of the loan results in loss of opportunity of earning returns on seasoned loans. Further, if the original lenders/bankers are required to part with their security interest fully their residual exposure would be sub-ordinated to the interest of the take out financier.

Answer: 7 (e)

Wholesale Price Index (WPI)

This index is the most widely used inflation indicator in India. This is published by the Office of Economic Adviser, Ministry of Commerce and Industry. WPI captures price movements in a most comprehensive way. It is widely used by Government, banks, industry and business circles. Important monetary and fiscal policy changes are linked to WPI movements. It is in use since 1939 and is being published since 1947 regularly. We are well aware that with the changing times, the economies too undergo structural changes. Thus, there is a need for revisiting such indices from time to time and new set of articles /commodities are required to be included based on current economic scenarios. Thus, since 1939, the base year of WPI has been revised on number of occasions. The current series of Wholesale Price Index has 2004-05 as the base year. Latest revision of WPI has been done by shifting base year from 1993-94 to 2004-05 on the recommendations of the Working Group set upwith Prof Abhijit Sen,, Member, Planning Commission as Chairman for revision of WPI series. This new series with base year 2004-05 has been launched on 14th September, 2010. A brief on the historical development of this WPI is given below: -

Base Year	Year of Introduction	No of Items in Index	No of Price Quotations
Week ended 19th August 1939	1942	23	23
End August 1939	1947	78	215
1952-53 (1948-49 as weight base)	1952	112	555
1961-62	July 1969	139	774
1970-71	January 1977	350	1295
1981-82	July 1989	447	2371
1993-94	April 2000	435	1918
2004-05	September 2010	676	5482

Earlier, the concept of wholesale price covered the general idea of capturing all transactions carried out in the domestic market. The weights of the WPI did not correspond to contribution of the goods concerned either to value - added or final use. In order to give this idea a more precise definition, it was decided to define the universe of the wholesale price index as comprising as far as possible all transactions at first point of bulk sale in the domestic market.

Q.8. (a) Equi-Stable, is a portfolio model where in 20% of Fund Value is invested in Fixed Income Bearing Instruments. The Balance of 80% is divided among Old Industry Stock (Iron and Steel), Automotive Industry Stock, Information Technology Stocks, infrastructure Company Stocks and Financial Services Sector in the ratio of 4:2:6:3:5.

Three mutual funds X, Y and Z, offer a Fund Scheme based on the Equi-Stable Portfolio Model. The actual return on Equi-Stable portfolios of each of the three funds for the past 3 years is as follows —

Year	1	2	3
Portfolio X	17.35%	18.70%	21.60%
Portfolio Y	17.20%	18.25%	22.15%
Portfolio Z	17.10%	18.60%	22.00%

Beta factor of the Equi-Stable portfolio is measured at 1. 35. Return on Market Portfolio indicate that ₹1000 invested will fetch ₹153 in an year (including capital appreciation and dividend yield). RBI Bonds, guaranteed by the Central Government yields 4.50%.

Rate the fund managers of X, Y and Z.

(b) Write down the unique features of National Level Commodity Exchanges.

Answer: 8 (a)

1. Computation of Expected Rate of Return under CAPM

$E(R_X) R_F + [B_X \times (R_M - R_F)]$ [Expected Return on portfolio X]

Risk Free Return R_F 14.50% [RBI Bonds]

Return on Market Portfolio R_M 15.30% [Annual Return × 153 ÷ Investment × ₹1000]

Beta of Equi-Stable BE 1.35 [Given]

Expected Return of Equi-Stable $E(R_E)$ = 4.50% + [1.35 × (15.30% -4.50%)] = **19.08%**

2. Computation of Alpha Facto of the 3 Funds

Year	Mutual Fund X		Mutual Fund Y		Mutual Fund Z	
	Actual Return	Abnormal Return [AR_X]	Actual Return	Abnormal Return [AR_Y]	Actual Return	Abnormal Return [AR_Z]
(1)	(2)	(3) = (1)- $E(R_E)$	(4)	(5) = (4) - $E(R_E)$	(6)	(7) = (6)- $E(R_E)$
1	17.35%	17.35 -19.08 = (1.73)	17.20%	17.20 -19.08 =(1.88)	17.10%	17.10 -19.08 = (1.98)
2	18.70%	18.70 -19.08 = (0.38)	18.25%	18.25 -19.08 = (0.83)	18.60%	18.60 -19.08 = (0.48)
3	21.60%	21.60 -19.08-2.52	22.15%	22.15 -19.08 = 3.07	22.00%	22.00 - 19.08 = 2.92
		0.41		**0.36**		**0.46**

Alpha Factor:

Fund X $\alpha_X = \Sigma AR_X \div n$ = 0.41 ÷ 3 Years   = **0.137%**

Fund Y $\alpha_Y = \Sigma AR_Y \div n$ = 0.36 ÷ 3 Years   = **0.120%**

Fund Z $\alpha_Z = \Sigma AR_Z \div n$ = 0.46 ÷ 3 Years   = **0.153%**

Evaluation: Equi-Stable Scheme of Mutual Fund Z has the highest Alpha i.e. it has yielded 0.153% return more than the market expectations, when compared to 0.137% and 0.12% of Fund X and Y. Therefore, Fund Manager of Mutual Fund Z has performed better. Ranking of the fund managers are as follows —

1. → Fund Manager of Z

2. → Fund Manager of X

3. → Fund Manager of Y

Answer: 8 (b)

Unique Features of National Level Commodity Exchanges

The unique features of national level commodity exchanges are:

- They are demutualized, meaning thereby that they are run professionally and there is separation of management from ownership. The independent management does not have any trading interest in the commodities dealt with on the exchange.

- They provide online platforms or screen based trading as distinct from the open-out-cry systems (ring trading) seen on conventional exchanges. This ensures transparency in operations as everyone has access to the same information.

- They allow trading in a number of commodities and are hence multi-commodity exchanges.

- They are national level exchanges which facilitate trading from anywhere in the country. This corollary of being an online exchange.

Q. 9. (a) Explain the fundamental factors that derive the commodity market.

(b) State the 'Hedging Approach' to financing working capital requirements of a firm.

Answer: 9 (a)

Fundamental Factors

There are various fundamentals factors that drive the commodity markets. These fundamentals may be different for different commodities based on its characteristics. There are certain important fundamentals that apply to all commodities either directly or indirectly.

(a) Demand & supply

Demand and supply are basic factors that affect the movement of any commodity prices. The law of demand and supply is same for equity as well as commodity markets. However demand and supply of all commodities vary during different time periods depending upon seasons, domestic and global conditions and various other major factors influencing its characteristics.

(b) Demand Curve

It is refined form of demand analysis. Demand curve in a laymen's term is a graphical representation of demand over a period of time. Price is represented on y-axis and demand on the x-axis. The graph is a line graph representing demand at particular prices over a period of time. It gives a clear understanding of the demand situation over a period of time at various price levels.

(c) Global and domestic economy

Economic scenario significantly affects the prices of a commodity. Demand and supply of any commodity has a direct relationship with economic condition in the state. Depending upon the nature of the commodity, global and domestic economic scenarios affect the commodity prices. For e.g.; Steel prices highly depend on global economic factors as this is a globally and massively used commodity. However as far as a commodity like Kapas (cotton beans) is concerned global factors affect less when compared to domestic factors.

(d) Economic growth

Economic growth of the world as well as the domestic economy is an important fundamental that will affect the demand and supply positions in a country. If the country is growing at a fast rate the consumption level will also be at a higher rate. This will increase the demand on one hand but supply may not increase at the same rate as it takes time to set up new industries and increase production. This drives the commodity prices of all major commodities.

(e) Inflation

Commodities are considered as hedge against inflation because unlike equity, commodity prices move in direction of inflation. With increase in inflation the prices of major commodities tend to increase and it is true the other way as well.

(f) Geo-political concerns

Political factors have a direct as well as indirect effect on commodity prices. For example if we take the case of Potato when one year back it was barred from trading on the exchanges. However at time political factors can have positive effects as well.

(g) Major Economic Indicators

The Gross Domestic Product, Industrial Production, Purchasing Managers Index ,Durable Goods, Housing data, Unemployment Data, Retail Sales, Producer Price Index , Consumer Price Index, Interest Rate, Consumer Confidence Index etc.

(h) Extra-ordinary events

There may be certain extra-ordinary factors that do not occur very frequent. Wars, natural calamities, depression etc. are such events that affect the commodity prices in a dramatic way.

(i) Speculation

Speculators bring information into system at times fake or over hyped in-order to trigger the price movement in a particular direction. Speculators are though a part of technical analysis but it is important in the matter of fact that speculation may be of some fundamental factors. However they are an important part of the market's price discovery mechanism.

Answer: 9 (b)

Hedging Approach

It is a method of financing where each asset would be offset with a financing instrument of the same approximate maturity. With this approach, short-term or seasonal variation in current assets would be financed with short-term debt; the permanent component of current assets and all fixed assets would be met with long-term debt.

The rationale for the policy is that if long-term debt is used to finance short-term needs, the firm will be paying interest for the use of such funds at times when funds are needed.

Q. 10. (a) A new equity based mutual fund collected ₹ 50 crores through the New Fund Offer at ₹ 10 a unit. On the first day when the NAV was to be released, the following stock purchases were made. The balance was parked in reverse repo for a day at 6% yield. The initial expense is 6% and is expected to be amortized over 5 years. The total recurring expenses which would be deducted on a daily basis (which also includes investment and advisory fees for this fund size) is 2.5% per annum. Assume recurring expenses is charged on opening balance of net assets. Find 1ˢᵗ day NAV for this fund.

Name of the stock	Qty.	Cost	Closing price
BHEL	2500	1968.00	1968.25
Infosys	3000	1600.00	1630.20
TCS	2500	928.00	928.00
ITC	25600	169.00	164.55
Reliance Communication	16500	265.00	258.20

(b) As an executive of a lending institution, what factors should you critically evaluate with respect to a large industrial project, from the perspectives of environmental and economic viability?

Answer: 10 (a)

Fund collection   :   ₹ 50.00000 crores

Stock purchases :   ₹ 2.07389 crores

Balance corpus :   ₹ 47.92611 crores

Income – repo (₹ 47,92,61,100 x 0.06) x (1/365)   =   ₹ 78,783

Unrealized loss :   - ₹ 1,34,895

Initial expenses (0.06 × ₹ 50 crores) ÷ (5 x 365)=   ₹ 16,438 [amortised over five years]

Recurring expenses (0.025 × ₹ 50 crores) ÷ 365   =   ₹ 34,247

Name of the stock	Qty	Cost (₹)	Closing price (₹)	Total cost (₹)	Unrealized gain/loss (₹)
BHEL	2,500	1,968	1,968.25	49,20,000	625
Infosys	3,000	1,600	1,630.20	48,00,000	90,600
TCS	2,500	928	928.00	23,20,000	0
ITC	25,600	169	164.55	43,26,400	-1,13,920
Reliance Communication	16,500	265	258.20	43,72,500	-1,12,200
				2,07,38,900	**-1,34,895**

First day's NAV of equity based fund

$$= \frac{\text{Balance Corpus} + \text{Income} + \text{Stock Purchases} - \text{Unrealised Loss} - \text{Expenses}}{\text{Outstanding Number of Units}}$$

$$= \frac{47.92611 \text{ crores} + 78,783 + 2.07389 \text{ crores} - 1,34,895 - 16,438 - 34,247}{5 \text{ crores}}$$

= ₹ 9.9979

Answer: 10 (b)

The performance of a project may not only be influenced by the financial factors as stated above. Other external environmental factors which may be economic, social or cultural may have a positive impact as well. The larger projects may be critically evaluated by the lending institutions by taking into consideration the following factors-

(1) Employment potential

(2) Utilization of domestically available raw material and other facilities

(3) Development of industrially backward areas as per govt. policy

(4) Effect of the project on the environment with particular emphasis on the pollution of water and air to be caused by it.

(5) the arrangements for effective disposal of effluent as per Govt. policy

(6) Energy conservation devices etc. employed for the project.

Other economic factors which influence the final approval of a particular project are-

(1) Internal Rate of Return (IRR)

(2) Domestic Resources Cost (DRC)

Section – B

Q. 11. (a) Describe the five credit rating agencies registered with the SEBI.

(b) A unit trust wants to hedge its portfolios of shares worth ₹10 million using the BSE-SENSEX index futures. The contract size is 100 times the index. The index is currently quoted at 6,840. The beta of the portfolio is 0.8. The beta of the index may be taken as 1. What is the number of contracts to be traded?

Answer: 11 (a)

There are five credit rating agencies registered with the SEBI. They are outlined as follows:

1. **CRISIL Limited (Formerly the Credit Rating Information Services of India Limited) :-**

   a) CRISIL is the oldest rating agency originally promoted by ICICI.

   b) **Services Offered:** CRISIL offers a comprehensive range of integrated product and service offerings - real time news, analyzed data, opinion and expert advice - to enable investors, issuers, policy makers de-risk their business and financial decision making, take informed investment decisions and develop workable solutions.

   c) **Risk Standardisation:** CRISIL helps to understand, measure and standardise risks - financial and credit risks, price and market risks, exchange and liquidity risks, operational, strategic and regulatory risks.

2. **ICRA Limited (Formerly Investment Information and Credit Rating Agency of India)** –

   a) ICRA is an independent and professional Company, providing investment information and credit rating services.

   b) **Activities:** ICRA executes assignments in credit ratings, equity grading, and mandated studies spanning diverse, industrial sectors. ICRA has broad based its services to the corporate and financial sectors, both in India and overseas and offers its services under three banners namely- Rating Services, Information Services, Advisory Services.

3. **CARE (Credit Analysis and Research Limited)** –

   a) CARE is equipped to rate all types of debt instruments like Commercial Paper, Fixed Deposit, Bonds, Debentures and Structured Obligations.

   b) **Services:** CARE's Information and Advisory services group prepares credit reports on specific requests from banks or business partners, conducts sector studies and provides advisory services in the areas of financial restructuring, valuation and credit appraisal systems.

4. **Fitch Ratings India Private Limited:** Fitch Rating India was formerly known as DCR India- Duff and Phelps Credit Rating Co. Fitch Ratings, USA and DCR India merged to form a new entity called Fitch India. Fitch India is a 100% subsidiary of Fitch Ratings, USA and is the wholly owned foreign operator in India. Fitch is the only international rating agency with a

presence on the ground in India. Fitch Rating India rates corporates, banks, financial institutions, structured deals, securitized paper, global infrastructure and project finance, public finance, SMEs, asset management companies, and insurance companies.

5. **Brickwork Ratings:** It is the fifth agency in the ratings business which commenced its activities from September 24, 2008. It rates IPOs, perpetual bonds of banks, non-convertible debenture issues, and certificate of deposits.

Answer: 11 (b)

- Beta of Portfolio $= \beta_1 = 0.8$

- Beta of Index $= \beta_N = 1$

- Value per Futures Contract $= V_F = ₹\ 6,840 \times 100 = ₹6.84$ Lakhs

- Value of the Portfolio $= V_P = ₹100$ Lakhs

- Hedge Ratio = Beta of the Portfolio ÷ Beta of the Index

    $= 0.8 ÷ 1 = 0.8$

- No. of Futures Contract to be traded:

$$= \text{Portfolio Value} \times \frac{\text{Hedge Ratio}}{\text{Value of a Futures Contract}}$$

$$= V_P \times \frac{\text{HedgeRatio}}{V_F}$$

$= ₹100$ Lakhs x [0.8 ÷ ₹6.84 Lakhs] = 11.70 i.e. 12 Contracts

Q. 12. (a) On 19th July following are the spot rates - Spot USD / EUR 1.20000 INR / USD

Following are the quotes of European Options;

Currency Pair	Call/Put,	Strike Price	Premium	Expiry Date
USD/EUR	Call	1.2000	$ 0.035	Oct. 19
USD/EUR	Put	1.2000	$0.04	Oct.19
INR/USD	Call	44.8000	Re.0.12	Dec. 19
INR/USD	Put	44.8000	Re.0.04	Dec.19

(i) **A Trader sells an At-The-Money Spot Straddle expiring at three months (Oct. 19). Calculate the gain or loss if three months later the spot rate is USD / EUR 1.2900.**

(ii) **Which strategy gives a profit to the dealer if five months later (Dec. 19) expected spot rate is INR / USD 45.00. Also calculate profit for a transaction of USD 1.40 Millions.**

(b) **A Laptop Bag is priced at $ 105.00 at New York. The same bag is priced at ₹ 4,250 in Mumbai. Determine Exchange Rate in Mumbai.**

(i) **If, over the next one year, price of the bag increases by 7% in Mumbai and by 4% in New York, determine the price of the bag at Mumbai and-New York? Also determine the exchange rate prevailing at New York for ₹ 100.**

(ii) **Determine the appreciation or depreciation in Re. in one year from now.**

Answer: 12 (a)

1. **Straddle Strategy - At the Money - Profit or Loss Calculation**

Straddle is an Option Strategy which involves buying / writing a call and put with the same strike price and same expiry date. A trader sells a Straddle, will be selling a Call option & a put option with Strike Price of USD 1.2000 per EUR.

2. **Computation of Net Pay-Off**

Particulars	Amount
Exercise Price	$1.2000
Spot Price as on Exercise Date	$1.2900
Action of the Buyer of the Options	Call - Exercise Put - Lapse
Loss on Call Option to the WRITER = Strike Price - Exercise Price	$0.0900
Total Options Premium inflow to the WRITER = $0,035 + $ 0.040	$0.0750
Net Loss	$0.0150

3. **Increase in Prices** - **Strategy**

As Expected Future price is higher, purchase of call option is beneficial. (Otherwise, put option may be sold).

Course of Action -

1.   Contract Date: 19th July: Pay Premium for USD 14,00,000 @ ₹ 0.12 per USD = INR 1,68,000.

2.   Exercise Date: 19th December: Exercise Call - Gain = 14,00,000 X ₹ (45.00 - 44.80) =INR 2,80,000.

3.   Net Gain or Profit = (1) - (2) = INR 1,12,000.

Answer: 12 (b)

1. Exchange Rate in Mumbai (Purchasing Power Parity Theory)

    Exchange Rate in Mumbai per $ = Bag Price in ₹ at Mumbai / Bag Price in $ at New York

    $$= ₹ 4,250 ÷ USD 105 = ₹ 40.4762$$

2. Price in a Year's time

    Mumbai = Prevailing Price X (1 + Increase in Rate) = ₹ 4250 X (1 + 7%)

    = ₹ 4,250 x 1.07 = ₹ 4,547.50

    New York = Prevailing Price x (1 + Increase m Rate) = USD 105 X (1 + 4%)

    = USD 105 X 1.04 = USD 109.20

3. Exchange Rate in New York (after one year)

    Exchange Rate in New York per ₹ 100

    = Bag Price in $ at New York/ Bag Price in ₹ at Mumbai x ₹ 100

    = (USD 109.20 ÷ ₹ 4.547.50) x ₹ l00= USD 2.4013

4. Depreciation (in %) of Re. over the year

    Depreciation = [(1 + Indian Inflation Rate) / (1 + New York Inflation Rate)] - 1

    = [(1 + 7%) / (1 + 4%)] - 1 = 1.07 / 1.04 - 1 = 2,88%

    Alternatively = (Future Spot Rate ₹ / $ - Spot Rate of ₹ / $) ÷ Spot Rate X 100

    Future Spot = Bag Price in Mumbai / Bag Price in New York in one year = ₹ 4,547.50 / USD 109.20

    = ₹ 41.6438

    Depreciation = (Future Spot ₹ 41.6438 - Spot Rate ₹ 40.4762) ÷ Spot Rate ₹ 40.4762 x 100

    = ₹ 1.1676 ÷ ₹ 40.4762 X 100 = 2.88%

Q. 13. (a) Das Ltd. an Indian company is evaluating an investment in Hong Kong. The project costs 300 Million Hong Kong Dollars. It is expected to generate an income of 100 Million HKDs a year in real terms for the next 4 years (project duration). Expected inflation rate in Hong Kong is 6% p.a. Interest rate in India is 7% p.a. while in Hong Kong it is 10% p.a.

The risk premium for the project is 6% in absolute terms, over the risk free rate. The project beta is 1.25. Spot Rate per HKD is ₹ 5.75.

Evaluate the project in Rupees, if the investment in the project is out of retained earnings.

(b) DY has purchased ₹400 million cap (i.e., call options on interest rates) of 9 percent at a premium of 0.65 percent of face value. ₹400 million floor (i.e., put options on interest rates) of 4 percent is also available at premium of 0.69 percent of face value.

(i) If interest rates rise to 10 percent, what is the amount received by DY? What are the net savings after deducting the premium?

(ii) If DY also purchases a floor, what are the net savings if interest rates rise to 11 percent? What are the net savings if interest rates fall to 3 percent?

(iii) If, instead, DY sells (writes) the floor, what are the net savings if interest rates rise to 11 percent? What if they fall to 3 percent?

(iv) What amount of floors should it sell in order to compensate for its purchases of caps, given the above premiums?

Answer: 13 (a)

1. **Inflation Adjusted Cash Flows (in HKD Millions)**

Year	Real Cash Flow	Inflation Factor	Adjusted Cash Flows
1	100	1.0600	106.00
2	100	1.0600 x 1.06 = 1.1236	112.36
3	100	1.1236 x 1.06 = 1.1910	119.10
4	100	1.1910 x 1.06 = 1.2625	126.25

2. **Expected Future Spot Rates (under Interest Rate Parity Theory)**

$$\text{Future Spot Rate} = \text{Opening Spot Rate} \times \frac{(1 + \text{Home Currency Rate i.e. India Rate})}{(1 + \text{Foreign Currency Rate i.e. HKD Rate})}$$

Year	Opening Spot Rate (₹ / HKD)	Closing Spot Rate
1	5.750	₹ 5.750 x (1 + 0.07) / (1 + 0.10) = ₹ **5.593**
2	5.593	₹ 5.593 x (1 + 0.07)/ (1 + 0.10) = ₹ **5.441**
3	5.441	₹ 5.441 x (1 + 0.07) / (1 + 0.10) = ₹ **5.292**
4	5.292	₹ 5.292 x (1 + 0.07) / (1 + 0.10) = ₹ **5.148**

3. Evaluation of Project (₹ Millions)

Year	Cash Flow (HKD)	Conversion Rate	Cash Flow (₹)	PV Facfor @ 14.50%	Discounted Cash Flow (₹)
0	(300.00)	₹ 5.750	(1725.000)	1.000	(1725.000)
1	106.00	₹ 5.593	592.858	0.873	517.565
2	112.36	₹ 5.441	611.351	0.763	466.461
3	119.10	₹ 5.292	630.277	0.666	419.764
4	126.25	₹ 5.148	649.935	0.582	378.262
Net Present Value					57.052

Note: Discount Rate = Risk Free Rate + Project Beta x Risk Premium

7% -f 1.25 x 6% = 7% + 7.5% = **14.50%**

Conclusion: Since the NPV is positive, investment in Hone Kong can be proceeded with.

Answer: 13 (b)

(i) Premium for purchasing the cap = 0.0065 x ₹400 million = ₹26,00,000. If interest rates rise to 10 percent, cap purchasers receive ₹ 400 million x 0.01 = ₹40,00,000. The net savings is ₹14,00,000.

(ii) If DY also purchases the floor: Premium = 0.0069 x ₹400 million = ₹27,60,000, and the total premium = ₹27,60,000 + ₹ 26,00,000 = ₹53,60,000.

If interest rates rise to 11 percent, cap purchasers receive 0.02 x ₹400m = ₹80,00,000 and the net savings = ₹80,00,000 - ₹53,60,000 = ₹26,40,000.

If interest rates fall to 3 percent, floor purchaser receive 0.01 x ₹400 million = ₹40,00,000 and the net savings =₹ 40,00,000 - ₹53,60,000 = - ₹ 13,60,000.

(iii) If DY sells the floor, it receives net ₹27,60,000 minus the cost of the cap of ₹26,00,000 = +₹160,000.

If interest rates rise to 11 percent, cap purchasers receive 0.02 x ₹400m = ₹80,00,000. The net the net savings = ₹80,00,000 + ₹ 1,60,000 = ₹81,60,000.

If interest rates fall to 3 percent, floor purchasers receive 0.01 x ₹400 million = ₹40,00,000. The net savings to DY = ₹-40,00,000 + 1,60,000 = - ₹38,40,000.

(iv) DY needs to sell: X ˣ0.0069 = ₹26,00,000, or X = ₹37,68,11,594 worth of 4 percent floors.

Q. 14. (a) Write down the various auction methods in securities market.

(b) Nelon Company a UK Company is considering undertaking a new project in Australia. The project would require immediate capital expenditure of A $10 Lakhs, plus A $ 5 Lakhs of working capital which would be recovered at the end of the project's four year life. The net cash flows expected to be generated from the project are A $ 13 Lakhs before tax. Straight line depreciation over the life of the project is an allowable expense against company tax in Australia, which is charged at the rate of 50 % payable at each year without delay. The project will have zero scrap value.

Nelon Company will not have to pay any UK tax on the project due to a double taxation avoidance agreement.

The A $/ UKP spot rate is 2.0 and A $ is expected to depreciate against the UKP by 10 % per year. A similar risk, UK - based project would be expected to generate a minimum return of 20 % after tax.

Evaluate the Cash Flows of the Project in £ and A $ and Comment on the same.

Answer: 14 (a)

The various auction methods in securities market are:

1. **Yield Based Auction:** A yield based auction is generally conducted when a new Government security is issued. Investors bid in yield terms up to two decimal places (for example, 8.19 per cent, 8.20 per cent, etc.). Bids are arranged in ascending order and the cut-off yield is arrived at the yield corresponding to the notified amount of the auction. The cut-off yield is taken as the coupon rate for the security. Successful bidders are those who have bid at or below the cut-off yield. Bids which are higher than the cut-off yield are rejected.

2. **Price Based Auction:** A price based auction is conducted when Government of India re-issues securities issued earlier. Bidders quote in terms of price per ₹100 of face value of the security (e.g., ₹102, ₹101, ₹100, ₹99, etc., per ₹100). Bids are arranged in descending order and the successful bidders are those who have bid at or above the cut-off price. Bids which are below the cut-off price are rejected. Depending upon the method of allocation to successful bidders, auction could be classified as **Uniform Price** based and **Multiple Price** based.

i) **Uniform Price Based or Dutch Auction:** All the successful bidders are required to pay for the allotted quantity of securities at the same rate, i.e., at the auction cut-off rate, irrespective of the rate quoted by them. This method is followed in the case of 91 days treasury bills only.

ii) **Multiple Price Based or French Auction**: All bids equal to or above the cut-off price are accepted. However, the successful bidders are required to pay for the allotted quantity of

securities at the respective price/yield at which they have bid. This method is followed in the case of 364 days treasury bills and is valid only for competitive bidders. An investor may bid in an auction under either of the following categories:

❖ **Competitive Bidding:** In a competitive bidding, an investor bids at a specific price / yield and is allotted securities if the price / yield quoted is within the cut-off price / yield. Competitive bids are made by well informed investors such as banks, financial institutions, primary dealers, mutual funds, and insurance companies. The minimum bid amount is ₹10,000 and in multiples of ₹10,000 thereafter. Multiple bidding is also allowed, i.e., an investor may put in several bids at various price/ yield levels.

❖ **Non-Competitive Bidding:** With a view to providing retail investors, who may lack skill and knowledge to participate in the auction directly, an opportunity to participate in the auction process, the scheme of non-competitive bidding in dated securities was introduced in January 2002. Non-competitive bidding is open to individuals, HUFs, RRBs, co-operative banks, firms, companies, corporate bodies, institutions, provident funds, and trusts. Under the scheme, eligible investors apply for a certain amount of securities in an auction without mentioning a specific price / yield. Such bidders are allotted securities at the weighted average price / yield of the auction. The participants in non-competitive bidding are, however, required to hold a gilt account with a bank or PD. Regional Rural Banks and co-operative banks which hold SGL and Current Account with the RBI can also participate under the scheme of non-competitive bidding without holding a gilt account. The minimum amount and the maximum amount for a single bid is ₹10,000 and ₹2 crore respectively in the case of an auction of dated securities.

Answer: 14 (b)

1. **Computation of NPV** [Amount in Lakhs]

Year	CFAT(in A $)	Exchange Rate	Net CFAT £	Disc factor @ 20%	DCFAT £
1	7.75	2.00 + 10% = 2.20	3.52	0.8333	2.9332
2	7. 75	2. 20 + 10% = 2.42	3.20	0.6944	2.2221
3	7.75	2. 42 + 10% = 2.66	2.91	0.5787	1.6840
4	12.75	2. 66 + 10% = 2.93	4.35	0.4823	2.0980

Total DCFAT	8.9373
Less: Initial Investment [A $ 15 ÷ 2.00 = £ 7.50]	(7.50)
Net Present Value	1.4373

2.   Cash flow for the project lifespan of years 1 to 3

Particulars		Amount(A $ Lakhs)
Contribution **Less:** Depreciation	[10 Lakhs/4 Years]	13.00 (2.50)
Profit Before Tax [PBT] **Less:** Taxes at 50%		10.50 (5.25)
Profit After Tax [PAT] **Add:** Depreciation		5.25 2.50
Cash Flow After Tax		7.75

3.   Cash Flow during Year 4

Particulars	Amount(A $ Lakhs)
Cash Flow After Tax (CFAT from 2 above) **Add:** Repayment of Working Capital	7.75 5.00
Total Cash Flow in Year 5	12.75

4.   Using Interest Rate Parity Method,

Forward Rate = Spot Rate X (1+Annual Discount Rate in Australia) ÷ (1+Annual Discount Rate-in UK)

2.20   = 2.00 x (1 +20%)/(1 + Annual Interest Rate in UK)

Annual Interest Rate in UK = 2.20 X 1.20 ÷ 2.00 = 32%

5.   Discounting the currency cash flows at this discount rate:

Year	A $ Lakhs	DF @ 32%	A $ NPV
1	7.75	0.7576	5.8714
2	7.75	0.5740	4.4585
3	7.75	0.4348	3.3697
4	12.75	0.3294	4.1999
Total DCFAT **Less**: Initial Investment			17.8995 (15.00)
Net Present Value [in A $]			2.8895
NPV in £ [2.8890 ÷ 2]			1.44975

Conclusion: Since NPV under is approx same. Interest Rate Parity Theory holds true.

Q. 15. Explain taxation issues in cross-border financing and investment.

Answer: 15

Taxation Issues In Cross-Border Financing And Investment

India is a federal republic, with 28 states and seven federally administered union territories; it operates a multi-party parliamentary democracy system. It is a common law country with a written constitution. Parliament has two houses: the Lok Sabha (lower house) and the Rajya Sabha (upper house). The President, the constitutional head of the country and of the armed forces, acts and discharges the constitutional duties on the advice of the Council of Ministers, which is headed by the Prime Minister. The Prime Minister and the Council of Ministers are responsible to parliament and subject to the control of the majority members of parliament. The states and union territories are governed by independently elected governments.

India is a three-tier economy, comprising a globally competitive services sector, a manufacturing sector and an agricultural sector. The services sector has proved to be the most dynamic in recent years, with trade, hotels, transport, telecommunications and information technology, financial, and business services registering particularly rapid growth.

Price controls

The central and state governments have passed legislation to control production, supply, distribution and the price of certain commodities. The central government is empowered to list any class of commodity as essential and can regulate or prohibit the production, supply, distribution, price and trade of these commodities for the following purposes: maintain or increase supply; equitable distribution and availability at fair prices; and secure an essential commodity for the defense of India or the efficient conduct of military operations.

Intellectual property

Indian legislation covers patents, copyrights, trademarks, geographical indicators and industrial designs. The Patent Act 1970 has been amended several times to meet India's commitments to the WTO, such as increasing the term of a patent to 20 years.

Trademarks can be registered under the Trade Marks Act, 1999, which provides for registration of trademark for services in addition to goods, simplifies procedures, increases the registration period to 10 years and provides a six-month grace period for the payment of renewal fees.

Copyrights are protected on published and unpublished literary, dramatic, musical, artistic and film works under the Copyright Act 1957. Subsequent amendments have extended protection to other products, such as computer software and improved protection of literary and artistic works and established better enforcement. The protection term for copyrights and rights of performers and producers of phonograms is 50 years.

India is a signatory to the Paris Convention for the Protection of Industrial Property and the Patent Co-operation Treaty, and it extends reciprocal property arrangements to all countries party to the convention. The convention makes India eligible for the Trademark Law Treaty and the Madrid Agreement on Trademarks. The country also participates in the Bern Convention on

Copyrights, the Washington Treaty on Layout of Integrated Circuits, the Budapest Treaty on Deposit of Micro-organisms and the Lisbon Treaty on Geographical Indicators.

As a member of the WTO, India enacted the Geographical Indications of Goods (Registration & Protection) Act (1999).

Currency

The currency is the Indian rupee (INR).

Banking and financing

India's central bank is the Reserve Bank of India (RBI), which is the supervisory authority for all banking operations in the country. The RBI is the umbrella network for numerous activities, all related to the nation's financial sector, encompassing and extending beyond the functions of a typical central bank. The primary activities of the RBI include:

• Monetary authority;

• Issuer of currency;

• Banker and debt manager to the government;

• Banker to banks;

• Regulator of the banking system;

• Manager of foreign exchange; and

• Regulator and supervisor of the payment and settlement systems.

The RBI formulates implements and monitors the monetary policy. It is responsible for regulating non-banking financial services companies, which operate like banks but are otherwise not permitted to carry on the business of banking.

The banking sector in India is broadly represented by public sector banks (where the government owns a majority shareholding and includes the State Bank of India and its subsidiaries); private sector banks; foreign banks operating in India through their branches/wholly owned subsidiaries; and regional rural bank and co-operative banks, which usually are regional.

The RBI has released draft guidelines for the licensing of new banks in the private sector.

Stringent rules govern the operations of systemically important non-deposit taking non-banking financial services companies, such as those with assets of INR 1 billion or more, to reduce the scope of regulatory arbitrage vis-à-vis a bank.

The financial and commercial center in India is Mumbai, and there are proposals to develop this area further as an International Financial Center.

Q. 16. (a) The following data relates to DCB Ltd's share prices:

Current price per share	₹170
Price per share in the futures market - 6 months	₹190

It is possible to borrow money in the market for securities transactions at the rate of 12 % p.a.

Required—

(i) Calculate the theoretical minimum price of 6 month-futures contract.

(ii) Explain if any arbitraging opportunities exist.

(b) Trie market received rumor about XYZ Corporation's tie - up with a multinational company. This has induced the market price to move up. If the rumor is false, the XYZ Corporation's 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 strike price of ₹42 for ₹2 premium, and paid Re.1 per share premium for a 3 months put with a strike price of ₹40.

(i) Determine the Investor's position if the tie up offer bids the price of XYZ Corporation's stock up to ₹44 in 3 months.

(ii) Determine the Investor's ending position, if the tie up programme fails and the price of the stocks falls to ₹35 in 3 months.

Answer: 16 (a)

(i) Theoretical Futures Price

Particulars	Value
6-months Futures Price	₹190
Current Stock Price [S_x]	₹170
Borrowing Rate (r)	12% or 0.12
Time (in years)	6/12 = 0.5 year
Theoretical Futures Price [F_x]	$= S_x \times e^{rt}$ $= ₹170 \times e^{0.12 \times 0.5}$ $= ₹170 \times e^{0.06}$ $= ₹170 \times 1.06184$ $= ₹180.513$

Inference: Since the Theoretical Futures Price is less than the Expected Futures Price, the recommended action would be to sell in the Futures Market.

(ii) Cash Flows to gain from Arbitrage

Opportunity Activity Flow:

1. Arbitrageur can borrow the amount required to buy the Shares at the current Market Price i.e. ₹170 at the rate of 12% p.a. for 6 months.

    1. Enter into a Futures Contract to sell Shares at the rate of ₹190.

    2. On the expiry date, sell the shares at the 6-month Futures rate of ₹190.

    3. Pay the amount of Borrowing together with Interest i.e. [170 x $e^{0.12 \times 0.5}$] **₹180.513.**

Particulars	Time	₹
1. Borrow at the rate of 12% for 6 months	T_0	170
2. Enter into a Futures Contract to sell Shares.	T_0	-
3. On the Expiry Date, sell the shares at 6-month Forward Rate.	T_1	190
4. Repay the amount of Borrowing together with Interest [170 X $e^{0.12 \times 0.5}$] = [170X1.06184]	T_1	180.513
5. Net Gain made [(3) - (4)]	T_1	9.487

Answer: 16 (b)

1. Cost of call and put options

Cost of Call and Put Options = (₹2 per share Call) + (Re.1 per share Put)

= ₹2 + Re.1 = **₹3**

2. Position if Price increases to ₹43.

Particulars	Time	₹
(a) Cost of Options	T_0	3
(b) If Price increases to ₹44, Investor will not exercise the Put Option. Gain on Call [Spot Price on Expiry Date - Exercise Price = ₹44 - ₹42]	T_1	2
(c) **Net Loss due to Options [(a) - (b)]**	**T_1**	**1**

3. Position if Price falls to ₹36

Particulars	Time	₹
(a) Cost of Options	T_0	3
(b) If Price falls to ₹35, Investor will not exercise the Call Option. Gain on Put [Exercise Price - Spot price on Expiry Date = ₹40 - ₹35]	T_1	5
(c) **Net Gain due to Options [(b) - (a)]**	T_1	2

Q.17. (a) Explain briefly the advantages of holding securities in 'Demat' form rather than in physical form.

(b) What is the settlement schedule for the interest Rate Futures contracts for :
(i) Daily mark to Market settlement
(ii) Final settlement

(c) Who can invest in P-Notes?

Answer: 17 (a)

The Depositories Act, 1996 provides the framework for the establishment and working of depositories enabling transactions in securities in scripts 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.

(a) It is faster and avoids delay in transfers

(b) It avoids lot of paper work

(c) It saves on stamp duty.

From the Issuer Company of view also, there are significant advantages due to dematting some of which are:

(a) Saving in printing certificate, postage expenses

(b) Stamp duty waiver

(c) Easy monitoring of buying /selling patters in securities increasing ability to spot takeover attempts at price rigging.

Answer: 17 (b)

Settlement schedule for interest Rate Future Contracts

	Pay-in	Pay-out
Daily Mark to Market Settlement	T+1working day, on or after 11.30 a.m	T+1 working day on or after 12.00 p.m

	(For above, T is the trading day)	
Final Settlement	T+1 working day, or after 11.30 a. m	T+1working day, on or after 12.00 p.m
	For above, T is the expiration day	

Answer: 17 (c)

(i) Any entity incorporated in a jurisdiction that requires filing of constitutional and/or other documents with a registrar of companies or comparable regulatory agency or body under the applicable companies legislation in that jurisdiction;

(ii) Any entity that is regulated, authorised or supervised by a central bank, such as the Bank of England , the Federal Reserve, the Hong Kong Monetary Authority, the Monetary Authority of Singapore or any other similar body provided that the entity must not only be authorised but also be regulated by the aforesaid regulatory bodies;

(iii) Any entity that is regulated, authorised or supervised by a securities or futures commission, such as the Financial Services Authority (UK), the Securities and Exchange Commission, the Commodities Futures Trading Commission, the Securities and Futures Commission (Hong Kong or Taiwan), Australia Securities and Investments Commission (Australia) or other securities or futures authority or commission in any country, state or territory;

(iv) Any entity that is a member of securities or futures exchanges such as the New York Stock Exchange (Sub-account), London Stock Exchange (UK), Tokyo Stock Exchange (Japan), NASD (Sub-account) or other similar self-regulatory securities or futures authority or commission within any country, state or territory provided that the aforesaid organizations which are in the nature of self regulatory organizations are ultimately accountable to the respective securities / financial market regulators.

(v) Any individual or entity (such as fund, trust, collective investment scheme, Investment Company or limited partnership) whose investment advisory function is managed by an entity satisfying the criteria of (a), (b), (c) or (d) above.

Section – C

Q. 18. (a) Explain the financial meaning of investment?

(b) Given the following risky portfolios

	A	B	C	D	E	F	G	H
Return %	10	12.5	15	16	17	18	18	20
σ%	23	21	25	29	29	32	35	45

(i)   Which of these portfolios are efficient? Which are inefficient?
(ii) Suppose one can tolerate a risk of 25%, what is the maximum return one can achieve if no borrowing or lending is resorted to?
(iii) Suppose one can tolerate a risk of 25%, what is the maximum return one can achieve if borrowing or lending at the rate of 12% is resorted to?

Answer: 18 (a)

Financial Meaning of Investment

❖ Financial investment involves of funds in various assets, such as *stock, Bond, Real Estate, Mortgages* etc.

❖ Investment is the employment of funds with the aim of achieving additional income or growth in value.

❖ It involves the commitment of resources which have been saved or put away from current consumption in the hope some benefits will accrue in future. Investment involves long term commitment of funds and waiting for a *reward in the future*.

❖ From the point of view people who invest their finds, they are the supplier of 'Capital' and in their view investment is a commitment of a person's funds to derive future income in the form of interest, dividend, rent, premiums, pension benefits or the appreciation of the value of their principle capital.

❖ To the financial investor it is not important whether money is invested for a productive use or for the purchase of secondhand instruments such as existing shares and stocks listed on the stock exchange.

❖ Most investments are considered to be transfers of financial assets from one person to another.

Answer: 18 (b)

(i)   Using the risk-return tradeoff, an investor would prefer B to A (B gives higher return for lower risk, hence dominant); would prefer C; would prefer E to D (E gives higher return for lower risk and hence dominant); would prefer F to G (F is dominant because it offers 18% at lower risk); and H; Hence portfolios B, C, E, F & H are efficient. Portfolios A, D & G are inefficient.

(ii) As seen from the table, if the maximum risk of 25% can be tolerated, then Portfolio C can be chosen to give a maximum return of 15%.

(iii) However, if borrowing/lending can be resorted @12%, then one can borrow in such a manner that the total risk does not exceed 25%. As we know higher returns can be obtained by borrowing at the risk free rate and investing in a risky portfolio. Obviously risk too would increase. Now we need to find that portion of investment in risky portfolio, which will give us maximum return for a risk not greater than 25%. Therefore let us assume weight of investment in risky portfolio be 'x'. Therefore (1-x) would be the weight in risk free asset. It is clear that since □ of risk free asset is zero, we need to find just that proportion in risky security to get 25%.

Thus we have for Portfolio A investment in proportion of 25/23 and -2/23 in risk free instrument (including borrowing) to arrive at a total risk of 25%. We simply used the below formula. [Note substitute σ of Risk free portfolio = 0]

x × σ of Risky Portfolio + (1-x) × σ of Risk free portfolio = 25%

'x' found above, would be used it to find total return.

Total return = x × Return of Risky Portfolio + (1-x) × 12

Thus we get the table given below.

	A	B	C	D	E	F	G	H
Proportion in risky security	25/23	25/21	25/25	25/29	25/29	25/32	25/35	25/45
To get Risk	25	25	25	25	25	25	25	25
Return	9.83	12.60	15.00	15.45	16.31	16.69	16.29	16.44

We see from the table that a maximum return of 16.69% is obtained for portfolio F, when we invest in a proportion of 25/32 in portfolio F & balance 7/32 in risk free asset.

Q. 19. (a) Describe the techniques used in economic analysis.

(b) A group of analysis believes that the returns of the portfolios are governed by two vital factors—
1. the rate of economic growth and 2. the sensitivity of stock to the developments in the financial markets. The sensitivities of returns with respect to these two factors are denoted by β_1 and beta β_1 respectively.

Further these analysts believe that returns on three carefully crafted Portfolios A, B and C must be predominantly governed by these two factors alone leaving remaining to some company/ portfolio specific factors. Assume that these three Portfolios A, B, and C are found to have following beta co-efficients:

Portfolio	Expected Return, %	β_1	β_1
A	16.00	1.00	0.80
B	25.00	1.50	1.30
C	32.00	2.00	1.50

Find out the Arbitrage Pricing Theory (APT) equation governing the returns on the portfolios.

Answer: 19 (a)

Techniques Used in Economic Analysis:

(1) Anticipatory Surveys:

(i) Facilitate investors to form an opinion about the future state of the economy.

(ii) Incorporates industry surveys on construction activities, expenditure on plant and machinery, levels of inventory - all having a definite bearing on economic activities.

(iii) Future spending habits of consumers are taken into account.

However, an important limitation is that the survey results do not guarantee that intentions surveyed would materialize. They are not regarded as forecasts per se, as there can be a consensus approach by the investor for exercising his opinion.

(2) Barometer/Indicator Approach: Various indicators are used to find out how the economy shall perform in the future. The indicators have been classified as under:

(i) **Leading Indicators:** They lead the economic activity in terms of their outcome. They relate to the time series data of the variables that reach high/low points in advance of economic activity.

(ii) **Roughly Coincidental Indicators:** They reach their peaks and troughs at approximately the same time as the economy.

(iii) **Lagging Indicators:** They are time series data of variables that lag behind in their consequences vis-à-vis the economy. They reach their turning points after the economy has reached its own already.

(iv) **Diffusion/composite index:** This index combines several indicators into one index to measure the magnitude of the movement of a particular set of indicators. Computation of diffusion indices are however difficult. Moreover it does not eliminate irregular movements. But this is most useful when the other indicators give conflicting signals and also since they do not measure the magnitude of change.

(3) Economic Model Building Approach: In this approach, a precise and clear relationship between dependent and independent variables is determined. GNP model building or sectoral analysis is used in practice through the use of National Accounting framework. The steps used are as follows:

(i) Hypothesize total economic demand by measuring total income (GNP) based on political stability, rate of inflation, changes in economic levels.

(ii) Forecast the GNP by estimating levels of various components viz. consumption expenditure, gross private domestic investment, government purchases of goods/services, net exports.

(iii) After forecasting individual components of GNP, add them up to obtain the forecasted GNP.

(iv) Comparison is made of total GNP thus arrived at with that from an independent agency for the forecast of GNP and then the overall forecast is tested for consistency.

(4) Gross National Product Analysis: Gross National Product (GNP) as a measure national income reflects the growth rate in economic activities and is regarded as a forecasting tool for analyzing the overall economy along with its various components during a particular period.

Answer: 19 (b)

Arbitrage Pricing Theory for two factors is

$$R_p = \lambda_0 + \lambda_1\beta_1 + \lambda_2\beta_2$$

Putting the given values in the APT to solve for three unknown variables:

For Portfolio A: $16 = \lambda_0 + \lambda_1 \times 1.00 + \lambda_2 \times 0.80$ (1)

For Portfolio B: $25 = \lambda_0 + \lambda_1 \times 1.50 + \lambda_2 \times 1.30$ (2)

For Portfolio C: $32 = \lambda_0 + \lambda_1 \times 2.00 + \lambda_2 \times 1.50$ (3)

Subtracting (1) from (2)

$$9 = \lambda_1 \times 0.50 + \lambda_2 \times 0.50 \qquad (4)$$

Subtracting (1) from (3)

$$16 = \lambda_1 \times 1.00 + \lambda_2 \times 0.70 \qquad (5)$$

Multiplying (4) with 2, we get

$$18 = \lambda_1 \times 1.00 - \lambda_2 \times 1.00 \qquad (6)$$

Subtracting (5) from (6), we get

$$\lambda_2 = 20/3$$

Putting the value in (4)

$$9 = 10/3 + \lambda_1 \times 0.50$$

gives $\lambda_1 = 34/3$

Putting the values of λ_1 and λ_2 in (3) we get

$$32 = \lambda_0 + 2 \times 34/3 + 1.50 \times 20/3$$

and $\lambda_0 = -2/3$

APT would then be $R_p = -2/3 + 34/3 \times \beta_1 + 20/3 \times \beta_2$

Q. 20. Explain Dow-Jones theory regarding the behaviour of stock market prices.

Answer: 20

Dow-Jones Theory Regarding the Behaviour of Stock Market Prices:

The Dow theory is one of the oldest and most famous technical tools. It was originated by Charles Dow, who founded the Dow Jones Company and was the editor of The Wall Street Journal, Mr. Dow died in 1902. The Dow theory was developed by W.P. Hamilton and Robert Rhea from the editorial written by Dow during 1900-1929 years, numerous writers have altered, extended and in some cases abridged the original Dow theory. It is the basis for many other techniques used by technical analysts.

The Dow theory is credited with having forecast the Great Crash of 1929. According to Dow, "The market is always considered as having three movement, all going at the same time. The first is the narrow movement from day to day. The second is the short swing running from two weeks to a month or more, the third is the main movement covering at least four years in duration."

(A) Movements in Share Prices: Movements in the share prices on the share market can be classified into the following three major categories —

(i) Primary Trends: The primary trend is the long range cycle that carries the entire market up or down (bull or bear markets).

- **Feature:** Primary movements indicate the basic trend in the market. However, in the short-run, some reverse trend may also be observed, but in the long-run they will end up either with a rise or fall in prices.

- **Period:** Primary movements reflect the trend of the share market, and may continue from one to three years or even more.

- **Example:** Bull Phase is one in which the succeeding highs exceed the preceding highs, and the successive lows are higher than the preceding lows. The reverse is the case in bear phase. Correct determination of such movements is the major objective of Dow-Jones theorists.

(ii) Secondary Movements (trends): The secondary trend acts as a restraining force on the primary trend. It ends to correct deviations from its general boundaries.

- **Feature:** Intervening movements in prices which last for a short period running counter to the primary trend, i.e. in case of Bull Phase in Primary Movement, after a rise in prices, there will be a fall in the prices. This fall in prices is referred to as Secondary Movement.

- **Time:** Secondary Movements are shorter in duration, ranging in a few weeks, and the extent of secondary movement (upward or downward) ranges from 33% to 66% of the primary movement. Example: In a Bull Run (Primary Movement), for a rise of 30% in the market capitalization, there will be a fall of 20% (Maximum) in Market Capitalisation.

(iii) Daily Fluctuations (minor trends): The minor trends have little analytical value, because of their short durations and variations in amplitude.

- **Feature:** These are everyday's irregular fluctuations in share prices in either direction, as a result of activities of speculators.

- **Importance:** Such fluctuations have no bearing for an investor, and hence his investment or divestment decisions, should not be guided by such fluctuations.

Bull Phase   Bear Phase
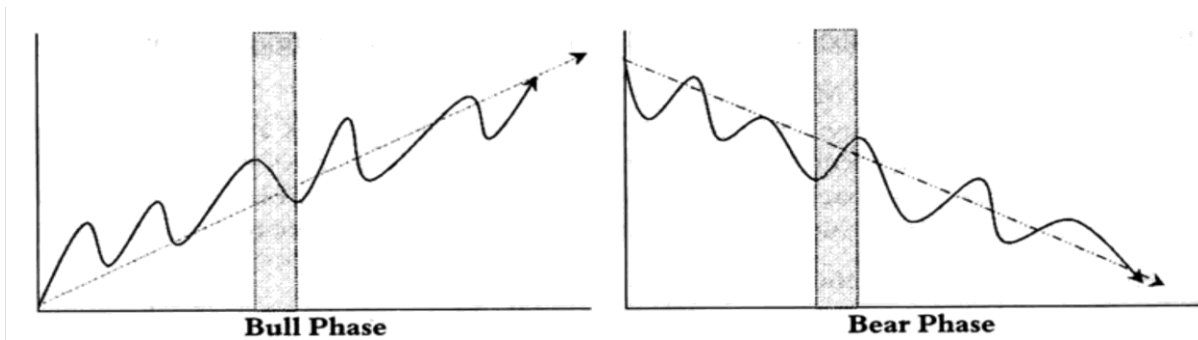
Note:

— Dotted lines represent primary movement in the stock prices.

— Movement in the shaded region represents "Secondary Movement". Under the Bull Phase (Primary Movement), there is a downward movement for a short span oj time. Under the Bear Phase (Primary Movement), there is an upward movement, which is succeeded by a dip.

(B) Dow-Jones Averages: The Dow-Jones Theory is based upon the movement of two indices - constructed by Charles Dow, Dow Jones Industrial Average and Dow Jones Transportation Average. These averages reflect the aggregate impact of all kinds of information on the market.

(C) Benefits of Dow-Jones theory:

(a) Timing of Investment: Investor can choose the appropriate time for his investment / divestment. Investment should be made in shares when their prices have reached the lowest level, and sell them at a time when they reached the highest peak.

(b) Identification of Trend: Using Dow-Jones theory, the correct and appropriate movement in the Market Prices can be identified, and depending on the investors' preference, decisions can be taken.

(D) Criticism of the Theory:

(a) It is not a theory but an interpretation of known data. A theory should be able to explain why a phenomenon occurs. No attempt was made by Dow or his followers to explain why the two averages should be able to forecast future stock prices.

(b) It is not acceptable in its forecast. There was considerable lag between the actual turning points and those indicated by the forecast.

(c) It has poor predictive power. According to Rosenberg, the Dow Theory could not forecast the bull market which had preceded the 1929 crash. It gave bearish indication in early 1926. The 31/2 years which followed the forecast of Hamilton's editorials for the 26-years period, from 1904 to 1929. Of the 90 recommendations Hamilton made for a change in attitude towards the market (55% were bullish, 18% bearish and 29% doubtful) only 45 were correct. Such a result an investor may get by flipping a coin)

Q. 21. (a) Shyamal has the following investments :

Stock	Expected return %	Portfolio weight %	Beta
ABC	15.00	40	0.6
BAC	25.40	30	1.4
CAB	20.60	30	1.1

i. **What is the expected return and β of Shyamal's portfolio?**

ii. **Shyamal has now decided to take on some additional risk in order to increase his expected return, by changing his portfolio weights. If Shyamal's new portfolio's expected return is 22.12% and its β is 1.165, what are his new portfolio weights?**

(b) Describe the term 'Portfolio rebalancing'.

Answer: 21 (a)

i. We can calculate the expected return of Shyamal as follows:

$E(R)$ = $(0.40)(0.15) + (0.0)(0.254) + (0.30)(0.206)$ = 0.198 and

β_P = $(0.40)(0.60) + (0.30)(1.40) + (0.30)(1.10)$ = 0.990.

ii. Let X_1 be the new weight on ABC, X_2 be the new weight on BAC and $X_3 = 1 - X_1 - X_2$ be the new weight on CAB. Then, we have:

$X_1 (0.15) + X_2 (0.254) + (1 - X_1 - X_2)(0.206)$ = 0.2212

$X_1 (0.0.60) + X_2 (1.40) + (1 - X_1 - X_2)(10.10)$ = 1.1650

Rearranging these two equations gives:

$X_1 (-0.056) + X_2 (0.048)$ = 0.0152

$X_1 (-0.50) + X_2 (0.30)$ = 0.0650

Solving we get X_1 = 0.20

 X_2 = 0.55 and

 X_3 = 0.25

Therefore the new weights are 20% on ABC, 55% on BAC and 25% on CAB.

Answer: 21 (b)

Portfolio rebalancing is the action of bringing a portfolio of investments that has deviated away from one's target asset allocation back into line. Under-weighted securities can be purchased with newly saved money; alternatively, over-weighted securities can be sold to purchase under-weighted securities. The investments in a portfolio will perform according to the market. As time goes on, a portfolio's current asset allocation can move away from an investor's original target asset allocation. If left un-adjusted, the portfolio could either become too risky, or too conservative. The goal of rebalancing is to move the current asset allocation back in line to the originally planned asset allocation.

Determining an effective rebalancing strategy is a function of the portfolio's assets: their expected returns, their volatility, and the correlation of their returns. For example, a high correlation among the returns of a portfolio's assets means that they tend to move together, which will tend to reduce the need for rebalancing. In addition, the investment time horizon affects the rebalancing strategy. A portfolio with a short time horizon is less likely to need rebalancing because there is less time for the portfolio to drift from the target asset allocation. In addition, such a portfolio is less likely to recover the trading costs of rebalancing.

Q. 22. Write Short notes on the following:

   (a) Diversification and Efficient Portfolio

   (b) Unsystematic Risk

   (c) Alpha

   (d) Risk involved in investment in Government Securities

   (e) Differences between Security Market Line and Capital Market Line.

Answer: 22 (a)

Diversification and Efficient Portfolio:

   (i) Efficient Frontier: Markowitz developed the concept of efficient frontier. For selection of a portfolio, comparison between combinations of portfolios is essential. A portfolio is not efficient if there is another portfolio with —

   - Higher expected value of return and a lower standard deviation (risk).

   - Higher expected value of return and the same standard deviation (risk)

   - Same expected value but a lower standard deviation (risk)

   (ii) Optimum Portfolio: Investor has to select a portfolio from amongst all those represented by the efficient frontier. This will depend upon his risk-return preference. As different

investors have different preferences with respect to expected return and risk, the optimal portfolio of securities will vary considerably among investors.

(iii) Diversification: Diversification is the process which combines assets that are less than perfectly positively correlated in order to reduce portfolio risk without sacrificing any portfolio returns. If an investors' portfolio is not efficient he may —

- Increase the expected value of return without increasing the risk.

- Decrease the risk without decreasing the expected value of return, or

- Obtain some combination of increase of expected return and decrease risk.

Answer: 22 (b)

Unsystematic Risk: These are risks that emanate from known and controllable factors, which are unique and / or related to a particular security or industry. These risks can be eliminated by diversification of portfolio.

(i) Business Risk:

- It is the volatility in revenues and profits of particular Company due to its market conditions, product mix, competition, etc.

- It may arise due to external reasons or (Government policies specific to that kind of industry) internal reasons (labour efficiency, management, etc.)

(ii) Financial Risk (RTP):

- These are risks that are associated with the Capital Structure of a Company. A Company with no Debt Financing, has no financial risk. Higher the Financial Leverage, higher the Financial Risk.

- These may also arise due to short term liquidity problems, shortage in working capital due to funds tied in working capital and receivables, etc.

(iii) Default Risk: These arise due to default in meeting the financial obligations on time. Non-payment of financial dues on time increases the insolvency and bankruptcy costs.

Answer: 22 (c)

Alpha: The difference between the investment's actual expected return and its fair return (as per CAPM) is known as the investment's alpha (i.e.). It is an absolute measure, which is the return on the Portfolio in excess of the CAPM predicted return. Alpha measures the relative value addition provided by an Asset Manager compared to a market index, given a Portfolio's market risk. Alpha can also be interpreted as the deviation from the SML in the CAPM.

Features:

(i) Alpha is appropriate, when the investment represents one of the many investments held by a client.

(ii) Alpha enables to evaluate how well a Manager has performed, when accounting for the level of risk undertaken on to achieve their returns.

Value:

(i) **Positive Alpha:** A positive alpha indicates that the expected return from this stock is higher than the return under CAPM, to the extent of the alpha value. Hence stocks with positive alpha should be considered as under-valued stocks and hence should be bought.

(ii) **Negative Alpha:** A negative Alpha value indicates that expected return from the stock is less than the return under CAPM, to the extent of the alpha value. Hence stocks with negative alpha should be considered as over-valued stocks and should be sold.

Answer: 22 (d)

Risk Involved In Investment in Government Securities:

Interest Rate Risk:

(i) Interest Rate Risk are on account of inverse relation of price and interest. These are typical of any fixed coupon security with a fixed period to maturity.

(ii) However, this risk can be completely eliminated in case an investor's investment horizon (intended period of holding) identically matches the term of security.

Re-investment Risk:

(i) Re—investment risk is the risk that the rate at which the interim cash flows are re-invested may fall thereby affecting the returns.

(ii) The most prevalent tool deployed to measure returns over a period of time is the yield-to-maturity (YTM) method which assumes that the cash flows generated during the life of a security is reinvested at the rate of YTM.

Default Risk:

(i) Default risk in the context of a Government Security is always zero.

(ii) However, these securities suffer from a small variant of default risk, i.e. maturity risk.

(iii) Maturity Risk is the risk associated with the likelihood of Government issuing a new security in place of redeeming the existing security. In case of Corporate Securities, it is referred to as Credit Risk.

Answer: 22 (e)

Differences between Security Market Line and Capital Market Line:

Aspect	Capital Market Line	Security Market Line
1. Risk Considered	Capital Market Line uses Standard Deviation, i.e. Total Risks across the x-axis.	Security Market Line uses Beta or Systematic Risk across the x-axis. (i.e. that part of Total Risk which is common to the whole of market).
2. Nature of Portfolios	It uses only efficient portfolios, i.e. one which is a perfect replication of the Market Portfolio in terms of risks and rewards.	Security Market Line uses both efficient and non-efficient portfolios.
3. Combination	Every point on the Capital Market Line is a proportional combination between Risk free Rate of Return and Market Return.	It graphs all portfolios and securities which he on and off the Capital Market Line.

Q. 23. (a) An investor owns the following investments :

  (i) 1 million equity shares of A Ltd. Price ₹ 40, Beta 1.10

  (ii) 2 million equity shares of B Ltd. Price ₹ 30, Beta 1.20

  (iii) 3 million equity shares of C Ltd. Price ₹ 10, Beta 1.30

  The investor wants to enhance the beta of his portfolio to 1.50. Suggest.

 (b) Arvind Mills has expected dividend growth of 7% and the average market return is 12% per annum. Dividend expected end-year on Arvind is ₹ 2.50. The company stock has β = 2.00 and the risk free rate us 6%. What is the risk-adjusted rate of return on Arvind assuming the CAPM holds? What is the fair price of the equity share if the current market price is ₹ 20? What are the risks attached to the investment strategy?

 (c) The rates of return on the security of Company P and market portfolio for 10 periods are given below:

Period	Return of Security P (%)	Return on Market Portfolio (%)
1	20	22
2	22	20
3	25	18
4	21	16
5	18	20
6	-5	8
7	17	-6
8	19	5
9	-7	6
10	20	11

(i) What is the beta of Security P?
(ii) What is the characteristic line for Security P?

Answer: 23 (a)

To increase the Beta to 1.50, the investor should borrow some money (Assuming that the investor can borrow money at risk free rate of interest) and invest the same in the equity shares of the three companies (the new investment should be in the ratio of amounts of present investment).

To calculate the overall beta, the borrowing is taken as negative investment, its risk is considered as zero (there is no risk in borrowing, there is risk in investing the amount of borrowing in the shares of the three companies) and its beta is taken as zero.

Existing portfolio beta = [(1.10 x 40/130) + (1.20 x 60/130) + 1.30 x 30/130)] = 1.1923
% required increase in risk = [(1.50 – 1.1923)/1.1923] x 100 = 25.81%
Borrowings = 130 m x 0.2581 = 33.55m. This amount should be invested in the shares of the three companies (the new investment should be in the ratio of amounts of present investments)

Calculation of beta in the changed scenario:

Investment	Beta (X)	Amount of investment	Weight (W)	XW
A Ltd.	1.10	40 m + (33.55 x 4/13)m = 50.32m	50.32/130 = 0.3871	0.4258
B Ltd.	1.20	60m + (33.55 x 6/13)m = 75.48m	75.48/130 = 0.5806	0.6967
C Ltd.	1.30	30m + (33.55 x 3/13)m = 37.75m	37.75/130 = 0.2904	0.3775
Borrowings	0	- 33.55 m	- 33.55/130	0
		130m		1.50

Answer: 23 (b)

Risk adjusted rate of return on Arvind, using CAPM is :

$ER_i = ER_f + \beta_i (ER_m - ER_f)$

$\quad = 6\% + 2.00(12\% - 6\%) = 18\%$

Fair value of Arvind is:

$V \quad = D/(ER_i - g)$

$\quad = ₹ 2.50/ (0.18 - 0.07)$

$\quad = ₹ 22.73$

Since the Arvind's equity is underpriced, the investor should buy the equity shares. But the CAPM measure ER_i may not hold for all future periods. If the market price diverges from the fair value, the demand for the Arvind will shot up till there is equilibrium.

Answer: 23 (a)

(i)

Period	R_x	R_m	$(R_x - \bar{R}_x)$	$(R_m - \bar{R}_m)$	$(R_x - \bar{R}_x)(R_m - \bar{R}_m)$	$(R_m - \bar{R}_m)^2$
1	20	22	5	10	50	100
2	22	20	7	8	56	64
3	25	18	10	6	60	36
4	21	16	6	4	24	16

5	18	20	3	8	24	64
6	-5	8	-20	-4	80	16
7	17	-6	2	-18	-36	324
8	19	5	4	-7	-28	49
9	-7	6	-22	-6	132	36
10	20	11	5	-1	-5	1
	150 = $\sum R_x$	120 = $\sum R_m$			357 = $\sum (R_x - \bar{R}_x)(R_m - \bar{R}_m)$	706 = $\sum (R_m - \bar{R}_m)^2$

$$\bar{R}_x = \frac{\sum R_x}{n} = \frac{150}{10} = 15$$

$$\bar{R}_m = \frac{\sum R_m}{n} = \frac{120}{10} = 12$$

$$\sigma_m^2 = \frac{\sum (R_m - \bar{R}_m)^2}{n-1} = \frac{706}{9} = 78.44$$

$$Cov_{xm} = \frac{\sum (R_x - \bar{R}_x)(R_m - \bar{R}_m)}{n-1} = \frac{357}{9} 39.67$$

$$\beta_x = \frac{Cov_{xm}}{\sigma_m^2} = \frac{39.67}{78.44} = 0.506$$

(ii) Y = 15, x = 12
$$Y = \alpha + \beta x$$

$$15 = \alpha + (0.506 \times 12)$$
$$\alpha = 15 - (0.506 \times 12) = 8.928\%$$

Characteristic Line for Security P = $\alpha + (\beta \times R_m)$

Where R_m = Expected return on market index

Then, Characteristic Line for Security $P = 8.928 + 0.506 R_m$

Section – D

Q. 24. (a) Aggressive Leasing Company is considering a proposal to lease out a tourist bus. The bus can be purchased for ₹ 5,00,000 and, in turn, be leased out at ₹ 1,25,000 per year for 8 years with payments occurring at the end of each year :

(i) Estimate the internal rate of return for the company assuming tax is ignored.

(ii) What should be the yearly lease payment charged by the company in order to earn 20% annual compound rate of return before expenses and taxes ?

(iii) Calculate the annual lease rent to be charged so as to amount to 20% after tax annual compound rate of return, based on the following assumptions :
  ● Tax rate is 40%
  ● Straight line depreciation
  ● Annual expenses of ₹ 50,000 and
  ● Resale value ₹ 1,00,000 after the turn.

(b) Pawan Ltd. provides you the following information :

  • **Capital structure as per Balance Sheet as at 1st April, 2010 :**

Particulars	₹
15% Debentures of ₹ 100 each	10,00,000
18% Preference shares of ₹ 100 each	2,00,000
Equity shares of ₹ 10 each	2,00,000
Retained earnings	4,40,000
Total	18,40,000

  • **Currently quoted prices in stock exchange (as at 31st March , 2011)**
  15% Debentures at ₹ 120 per debenture
  18% Preference shares at ₹ 120 per share
  Equity shares at ₹ 78 per share

  • **EPS and DPS**
  EPS for the current year is ₹ 20 per share. Dividend Payout Ratio is 60%. Anticipated growth rate is 4%.

  • **Corporate tax rate is 40%.**

  Required:
  (i) Calculate the weighted average cost of capital using (a) Book Value Weights, (b) Market Value Weights.

(ii) Calculate the cost of new debentures, new preference shares, new equity shares and retained earnings if anticipated external financing opportunities are as follows :

   a) 12% debentures of ₹ 100 each issued at par and redeemable after 5 years at 5% premium. Flotation cost is 5% of issue price.

   b) 15% preference shares of ₹ 100 each issued at par and redeemable after 5 years at 5% premium. Flotation cost is 5% of the issue price.

   c) Equity shares of ₹ 10 each issued at ₹ 60. Flotation cost being ₹ 5 per share.

(iii) How much can be spent for capital investment before new equity shares must be issued?

(iv) Calculate the weighted average cost of capital using marginal weights if the company requires ₹ 4,00,000 for future investment and intends to maintain the existing optimal capital structure.

(v) What is the required amount of capital budget if the company wants to expands its total assets by 47.50% ? There are no short term debts.

(vi) How much of the capital budget must be financed by the external equity to maintain the optimal capital structure in part (v).

(vii) Calculate the weighted average cost of capital using marginal weights in part (vi) assuming that the company intends to maintain the existing optimal capital structure.

(viii)   Calculate the numbers of new equity shares, debentures and preference shares to be issued in part (vi).

Answer: 24 (a)

i) Payback period

= $\frac{5,00,000}{1,25,000}$ = 4 years

PV factor close to 4,000 in 8 years is 4.0776 at 18%

Therefore, IRR = 18% (approx.)

We can arrive at 18.63% instead of 18% if exact calculations are made as follows :

PV factor in 8 years at 19% is 3.9544

By interpolating, we can get

IRR = 18% + $\frac{4.0776 - 4.000}{1.0776 - 3.9544}$ x 1%   =   18.63%

ii) Desired lease rent to earn 20% IRR before expenses and taxes
Present value of inflow annually for 8 years @ 20%   =   3.837

Lease Rent   = $\frac{₹ \ 5,00,000}{3.837}$ =   ₹ 1,30,310 p.a.

iii) Revised lease rental on tourist bus to earn 20% return based on the given conditions

PV factor [(X – Expenses – Depreciation) (1 – T) + D] + (PV factor x Salvage value) = C_0

3.837 [(X – 50,000 – 50,000) (1 – 0.4) + 50,000] + (0.233 x 1,00,000) = 5,00,000

3.837 [0.6 x – 60,000 + 50,000] + 23,000 = 5,00,000

2.3022 x = 5,15,070
X = 2,23,730

Verification	₹
This may be confirmed as lease rental	2,23,730
Less : Expenses + Depreciation	1,00,000
EBT	1,23,730
Less : Tax 40%	49,492
PAT	74,238
Add : Depreciation	50,000
CFAT	1,24,238

$$= \frac{C0 - PV \text{ of } SV}{CFAT} = \frac{₹\,5,00,000 - ₹\,23,300}{₹\,1,24,238} = 3.837 \text{ or } 20\%$$

Answer: 24 (b)

Calculation of retained earnings as at 31.03.2011

Retained earnings as at 01.04.2010	₹ 4,40,000
Add : Current year's retained earning [(20,000 x ₹ 20) x 40%]	₹ 1,60,000
Retained earnings as at 31.03.2011	₹ 6,00,000

(i) (a) Statement showing the weighted average cost of capital
(Using book value weights)

Source of capital A	Amount of each source of capital B (in lakhs)	Proportion of each source of capital C	After tax cost of each source of capital D	Product E = C x D
Equity share capital	2.00	0.100	0.200	0.0200
Retained earnings	6.00	0.300	0.200	0.0600
18% preference share capital	2.00	0.100	0.150	0.0150
15% debentures	10.00	0.500	0.075	0.0375
Total	20.00	1.000		0.1325

**(i) (b) Statement showing the weighted average cost of capital
(Using market value weights)**

Source of capital A	Amount of each source of capital B (in lakhs)	Proportion of each source of capital C	After tax cost of each source of capital D	Product E = C x D
Equity share capital	15.60	0.520	0.200	0.104
18% preference share capital	2.40	0.080	0.150	0.012
15% debentures	12.00	0.400	0.075	0.030
Total	30.00	1.000		0.146

Cost of equity capital (k_e) or retained earnings (k_r)

$$= \frac{D_1}{P_0} + g = \frac{D_0 + (1+g)}{P_0} + g = \frac{12(1+0.04)}{78} + 0.04 = 0.16 + 0.04 = 0.20$$

ii. **Calculation of the new cost**

    a) Cost of new debentures (k_d)

$$k_d = \frac{\text{Interest}(1 - \text{tax rate}) + [(\text{Redeemable value} - \text{Net sale proceeds})/N]}{[(\text{Redeemable value} + \text{Net sale proceeds})/2]}$$

$$= \frac{12(1 - 0.4) + [(105 - 95)/5]}{(105 + 95)/2} = 0.092 \text{ or } 9.2\%$$

    b) Cost of new preference share (k_p)

$$k_p = \frac{\text{Preference dividend} + [\text{Redeemable value} - \text{Net sale proceeds}]]/N}{[(\text{Redeemable value} + \text{Net sale proceeds})/2]}$$

$$= \frac{15 + [(105 - 95)/5]}{(105 + 95)/2} = 0.17 \text{ or } 17.00\%$$

    c) Cost of new equity shares (k_e)

$$k_e = \frac{D_1}{P_0} + g = \frac{D_0 + (1+g)}{P_0} + g = \frac{12(1+0.04)}{(60 - 5)} + 0.04$$

$$= 0.2269 + 0.04 = 0.2669 \text{ or } 26.69\%$$

    d) Cost of retained earnings (k_r)

$$k_r = \frac{D_1}{P_0} + g = \frac{D_0 + (1+g)}{P_0} + g$$

$$= \frac{12(1+0.04)}{60} + 0.04 = 0.208 + 0.04 = 0.248 \text{ or } 24.80\%$$

iii. **Calculation of investment before issue of equity shares**

Retained earning available = Total number of shares x EPS – Dividend paid

= (20,000 x ₹ 20) – (20,000 x ₹ 12)

= ₹ 4,00,000 – ₹ 2,40,000 = ₹ 1,60,000

Total investment = (1,60,000/0.40) = ₹ 4,00,000

Hence, the company can expand its project by Rs, 4,00,000 without issuing new equity shares.

iv. **Calculation of weighted average cost by using marginal weights**

Source of capital A	Amount of each source of capital B (in lakhs)	Proportion of each source of capital C	After tax cost of each source of capital D	Product E = C x D
Retained earnings	1.60	0.400	0.248	0.0992
New 15% preference share capital	0.40	0.100	0.170	0.0170
New 12% debentures	2.00	0.500	0.092	0.0460
Total	4.00	1.000		0.1622

v. **Required amount of capital budget** = 47.5% of ₹ 20 lakhs = ₹ 9.50 lakhs

vi. **External equity to be raised** = Equity portion in new investment – Retained earnings available

= (40% of ₹ 9,50,000) – ₹ 1,60,000 = ₹ 2,20,000

vii. **Statement showing the weighted average cost of capital (using marginal weights)**

Source of capital A	Amount of each source of capital B (in lakhs)	Proportion of each source of capital C	After tax cost of each source of capital D	Product E = C x D
New Equity share capital	2.20	0.232	0.267	0.0619
Retained earnings	1.60	0.168	0.248	0.0417
New 15% preference share capital	0.95	0.100	0.170	0.0170

New 12% debentures	<u>4.75</u>	<u>0.500</u>	0.092	<u>0.0460</u>
Total	9.50	1.000		0.1666

viii. **Calculation of number of new securities**

No. of new equity shares   = $\dfrac{₹12,20,000}{₹55}$ =   4,000

No. of new preference shares = $\dfrac{₹95,000}{₹95}$ =   1,000

No. of new debentures   = $\dfrac{₹4,75,000}{₹95}$ =   5,000

Q. 25 (a) Explore the interrelationship between Investment, Finance and Dividend Decisions.

  (b) MP Limited has made plans for the next year 2014-15. It is estimated that the company will employ total assets of ₹25,00,000; 30% of assets being financed by debt at an interest cost of 9% p.a. the direct costs for the year are estimated at ₹ 15,00,000 and all other operating expenses are estimated at ₹ 2,40,000. The sales revenue are estimated at ₹ 22,50,000. Tax rate is assumed to be 40%. Required to calculate:

  (i) Net profit margin

  (ii) Return on assets

  (iii) Asset turnover

  (iv) Return on equity

Answer: 25 (a)

    The finance functions are divided into three major decisions, viz., investment, financing and dividend decisions. It is correct to say that these decisions are inter-related because the underlying objective of these three decisions is the same, i.e. maximisation of shareholders' wealth. Since investment, financing and dividend decisions are all interrelated, one has to consider the joint impact of these decisions on the market price of the company's shares and these decisions should also be solved jointly. The decision to invest in a new project needs the finance for the investment. The financing decision, in turn, is influenced by and influences dividend decision because retained earnings used in internal financing deprive shareholders of their dividends. An efficient financial management can ensure optimal joint decisions. This is possible by evaluating each decision in relation to its effect on the shareholders' wealth.

    The above three decisions are briefly examined below in the light of their inter-relationship and to see how they can help in maximising the shareholders' wealth i.e. market price of the company's shares.

Investment decision: The investment of long term funds is made after a careful assessment of the various projects through capital budgeting and uncertainty analysis. However, only that investment proposal is to be accepted which is expected to yield at least so much return as is adequate to meet its cost of financing. This have an influence on the profitability of the company and ultimately on its wealth.

Financing decision: Funds can be raised from various sources. Each source of funds involves different issues. The finance manager has to maintain a proper balance between long-term and short-term funds. With the total volume of long-term funds, he has to ensure a proper mix of loan funds and owner's funds. The optimum financing mix will increase return to equity shareholders and thus maximise their wealth.

Dividend decision: The finance manager is also concerned with the decision to pay or declare dividend. He assists the top management in deciding as to what portion of the profit should be paid to the shareholders by way of dividends and what portion should be retained in the business. An optimal dividend pay-out ratio maximises shareholders' wealth.

We can infer from the above discussion that investment, financing and dividend decisions are interrelated and are to be taken jointly keeping in view their joint effect on the shareholders' wealth.

Answer: 25 (b)

The net profit is calculated as follows:

	₹
Sales Revenue	22,50,000
Less: Direct Costs	15,00,000
Gross Profits	7,50,000
Less: Operating Expense	2,40,000
EBIT	5,10,000
Less: Interest (9% × 7,50,000)	67,500
EBT	4,42,500
Less: Taxes(@ 40%)	1,77,000
PAT	2,65,500

(i)   Net Profit Margin = $\dfrac{EBIT(1-t)}{Sales} \times 100 = \dfrac{5,10,000 \times (1-0.4)}{22,50,000} = 13.6\%$

(ii)   Return on Assets (ROA)
ROA = EBIT(1- t) ÷ Total Assets
= 5,10,000(1-0.4) ÷ 25,00,000 = 3,06,000 ÷ 25,00,000
= 0.1224 = 12.24%

(iii)   Asset Turnover

Asset Turnover = $\dfrac{\text{Sales}}{\text{Assets}} = \dfrac{22,50,000}{25,00,000} = 0.9$

(iv)   Return on Equity (ROE)

$ROE = \dfrac{PAT}{Equity} = \dfrac{2,65,500}{17,50,000} = 15.17\%$

ROE =15.17%

Q. 26. (a) Clustfine company is considering the purchase of a new plastic extrusion machine at accost of ₹ 2,00,000. The future cashflows, after tax, are dependent on the success of the company's marketing program and on the economic growth in the geographic area. The following probability tree outlines the possible cash flows and their probabilities of occurrence.

Branch	Initial Probability	Yr 1 Cash Flow(000s)	Conditional Probability*	Yr 2 Cash Flow (000s)
1	0.20	- ₹200	0.25	- ₹1,500
2	0.20	- ₹200	0.25	- ₹1,100
3	0.20	- ₹200	0.50	- ₹700
4	0.60	₹200	0.10	- ₹300
5	0.60	₹200	0.80	₹100
6	0.60	₹200	0.10	₹500
7	0.20	₹600	0.50	₹900
8	0.20	₹600	0.25	₹1,300
9	0.20	₹600	0.25	₹1,700

*Probability in period 2, probability in period 1 given.

What are the joint probabilities of occurrence of the various branches?

If the risk-free rate is 8% what is

(i)   The NPV of each of the 9 complete branches

(ii)   The expected value and standard deviation of the probability distribution of possible net present values?

(b) A firm can make investment in either of the following two projects. The firm anticipates its cost of capital to be 10% and the net (after tax) cash follows of the projects for five years are as follows:

(Figures in ₹'000)

Year	0	1	2	3	4	5
Project – A	(500)	85	200	240	220	70
Project – B	(500)	480	100	70	30	20

The discount factors are as under:

Year	0	1	2	3	4	5
PVF (10%)	1	0.91	0.83	0.75	0.68	0.62
PVF (20%)	1	0.83	0.69	0.58	0.48	0.41

Required:
(i) Calculate the NPV and IRR of each project.
(ii) State with reasons which project you would recommend.
(iii) Explain the inconsistency in ranking of two projects.

Answer: 26 (a)

Calculation of Joint Probability:

Branch	Initial Probability	Conditional Probability*	Joint Probability
	A	B	A × B
1	0.20	0.25	0.05
2	0.20	0.25	0.05
3	0.20	0.50	0.10
4	0.60	0.10	0.06
5	0.60	0.80	0.48
6	0.60	0.10	0.06
7	0.20	0.50	0.10
8	0.20	0.25	0.05
9	0.20	0.25	0.05
Total			1.00

1. **NPV of 9 Branches**

Branch	Yr 1 Cash Flow(000s)	PV factor @ 8% Yr-1	Yr 2 Cash Flow(000s)	PV Factor @8% Yr 2	NPV(₹)= -Cash Outflow + (A×B+C×D)
	A	**B**	**C**	**D**	
1	- ₹200	0.926	- ₹1,500	0.857	-1670700
2	- ₹200	0.926	- ₹1,100	0.857	-1327900
3	- ₹200	0.926	- ₹700	0.857	-985100
4	₹200	0.926	- ₹300	0.857	-271900
5	₹200	0.926	₹100	0.857	70900
6	₹200	0.926	₹500	0.857	413700
7	₹600	0.926	₹900	0.857	1126900
8	₹600	0.926	₹1,300	0.857	1469700
9	₹600	0.926	₹1,700	0.857	1812500

Branch	NPV (₹)	Joint Prob(p_i)	Expected NPV(₹)$\overline{NPV}$	Variance=$p_i.(NPV-\overline{NPV})^2$
	A	**B**	**X= A×B**	**(in 000000)**
1	-1670700	0.05	-83535	151658.5
2	-1327900	0.05	-66395	97832.07
3	-985100	0.10	-98510	111513.6
4	-271900	0.06	-16314	7050.71
5	70900	0.48	34032	0
6	413700	0.06	24822	7050.71
7	1126900	0.10	112690	111513.6
8	1469700	0.05	73485	97832.07
9	1812500	0.05	90625	151658.5
		$\overline{NPV}$	70900	736109.8

Expected Value = 70900

Standard Deviation = $\sqrt{736109.8} \times 1000 = 857980$

Answer: 26 (b)

Computation of NPV and IRR
For Project A:

Years	Cash flows ₹ '000	PVF 10%	P.V. ₹ '000	PVF 10%	P.V. ₹ '000
0	-500	1.00	-500.00	1.00	-500.00
1	85	0.91	77.35	0.83	70.55
2	200	0.83	166.00	0.69	138.00
3	240	0.75	180.00	0.58	139.20
4	220	0.68	149.60	0.48	105.60
5	70	0.62	43.40	0.41	28.70
	NPV		+116.35		-17.95

NPV of Project A at 10% (Cost of Capital) is ₹ 1,16,350.

IRR of Project A may be calculated by interpolation method as under:

NPV at 20% is (-) 17.95 (₹ '000)

NPV at 10% is + 116.35 (₹ '000)

$\therefore$ IRR = 10 + $\dfrac{116.35}{116.35 - (-17.95)}$ (20 – 10)% = 18.66%

For Project B:

Years	Cash flows ₹ '000	PVF 10%	P.V. ₹ '000	PVF 10%	P.V. ₹ '000
0	-500	1.00	-500.00	1.00	-500.00
1	480	0.91	436.80	0.83	398.40
2	100	0.83	83.00	0.69	69.00
3	70	0.75	52.50	0.58	40.60
4	30	0.68	20.40	0.48	14.40
5	20	0.62	12.40	0.41	8.20
	NPV		+105.10		+30.60

NPV of Project B at 10% (Cost of Capital) is ₹ 1,50,100.

IRR of Project B may be calculated by interpolation method as under:

NPV at 10% is = + 105.10 (₹ '000)

NPV at 20% is = + 30.60 (₹ '000)

$$IRR = 10 + \frac{105.10}{105.10 - 30.60} (20 - 10)\% = 24.10\%$$

(Note: Though in above solution discounting factors of 10% and 20% have been used. However, instead of 20%, students may assume any rate beyond 20%, say 26%, and then NPV becomes negative. In such a case, the answers of IRR of Project may slightly vary from 24.10%.)

(i) The ranking of the projects will be as under:

	NPV	IRR
Project A	1	2
Project B	2	1

There is a conflict in ranking. IRR assumes that the project cash flows are reinvested as IRR whereas the cost of capital is 10%. The two projects are mutually exclusive. In the circumstances, the project which yields the larger NPV will earn larger cash flows. Hence the project with larger NPV should be chosen. Thus Project A qualifies for selection.

(ii) Inconsistency in ranking arises because if NPV criterion is used, Project A is preferable. If IRR criterion is used, Project B is preferable. The inconsistency is due to the difference in the pattern of cash flows.

Where an inconsistency is experienced, the projects yielding larger NPV is preferred because of larger cash flows which is generates. IRR criterion is rejected because of the flowing reasons:
(i) IRR assumes that all cash flows are re-invested at IRR.
(ii) IRR is a percentage but the magnitude of cash flow is important.
(iii) Multiple IRR may arise if the projects have non-conventional cash flows.

Q. 27. Fun Ltd. has a new project for the manufacture of remote controlled toy car. The product is a novelty in the toy market. The company had already spent an amount of ₹ 7,20,000 in developing the product and is eager to place it in the market as quickly as possible. The company estimates a five-year market life for the product. The maximum number it can produce in any given year is limited to 36 lakh units. The expected market scenario will support a sale equivalent of 20%, 50%, 100% and 30% of the capacity in 1st year, 2nd year, 3rd year, 4th year and 5th year respectively.

Investment in the project is expected to be completed in one year and will have the following major components :   (₹ Lakhs)

Land, buildings and civil works	12.50
Machinery and equipments	87.50
Interest during construction	8.00

Cost structure of the toy is as given below :
Materials   ₹ 2.00
Conversion cost excluding depreciation   ₹ 1.00

Materials are required to be held in stock for 15 days at an average while finished goods may be held for up to 60 days. Production cycle is 12 days. Credit expectancy of the market is 30 days both on sale and purchases. It is the usual practice of the company to keep a cash-in-hand reserve for 15 days expenses not provided for specifically elsewhere in the working capital estimates.

Working capital requirements should be worked out on the above basis for the first year. Same level in terms of money will be maintained in the subsequent years, though composition may change.

The following assumptions are made:

- The project will be financed by a combination of equity and term loans in a ratio as close to 30:70 as practicable.
- Loans will carry an interest of 20% p.a.
- Loan disbursement will be uniform throughout the period of construction, simple interest at the same rate will be applied.
- Selling price per unit will be ₹ 6.
- One year moratorium on the principal will be available.
- Product promotion expenses for the first three years will be ₹ 2.00 lakhs, ₹ 1.00 lakh and ₹ 0.50 lakh respectively.
- Production is prorated every month equally.
- The factory operates one shift for 360 days in a year.
- Ignore interest on overdraft.
- Working capital requirement will not increase after the initial first year.

Calculate:
  (i) Initial working capital required.
  (ii) Total financial investment in the project and its financing.
  (iii) Profit before depreciation and interest charges for 5 years.
  (iv) Debts service coverage ratio.

Answer: 27

  (i) **Computation of Initial working capital required :**

1st year production and sales = 36,00,000 units x 20/100 = 7,20,000 units.

Particulars	Norm	Computation	Amount (₹)
Materials	15 days	(7,20,000 x 2 x 15/360)	60,000
Work-in-progress	12 days	(7,20,000 x 1.5 x 12/360)	36,000
Finished goods	60 days	(7,20,000 x 3 x 60/360)	3,60,000
Debtors	30 days	(7,20,000 x 3 x 30/360)	1,80,000
Cash	15 days	(7,20,000 x 1 x 15/360)	30,000
			6,66,000

Assumption – 360 days in a year and 30 days in a month.

(ii) Statement showing investment in the project and its financing :

Particulars	Amount (₹)
Cost of project	
Land, building and civil works	12,50,000
Machinery and equipment	87,50,000
Product development	7,20,000
Interest during construction	8,00,000
Initial working capital	6,66,000
	1,21,86,000
Means of finance	
Equity capital	33,86,000
Loans	80,00,000

Overdraft for interest	8,00,000
	1,21,86,000

Debt-equity ratio is 7:3 (basing long-term debt of ₹ 80 lakhs

(iii) Statement showing profit before depreciation and interest charges for 5 years   (₹ Lakhs)

Year	1	2	3	4	5
Sales (units in lakhs)	**7.20**	**18.00**	**36.00**	**36.00**	**10.80**
Sales revenue (a)	43.20	108.00	216.00	216.00	64.80
Expenses					
Materials	14.40	36.00	72.00	72.00	21.60
Conversion expenses	7.20	18.00	36.00	36.00	10.80
Promotion	2.00	1.00	0.50	-	-
(b)	23.60	55.00	108.50	108.00	32.40
Profit before depreciation and interest (a) – (b)	19.60	53.00	107.50	108.00	32.40

(iv) Statement showing debt service coverage ratio (DSCR)   (₹ Lakhs)

Year	1	2	3	4	5
Profit before interest and depreciation (a)	19.60	53.00	107.50	108.00	32.40
Finance charges :					
Interest	16.00	16.00	12.00	8.00	4.00
Principal repayment	-	20.00	20.00	20.00	20.00
(b)	16.00	36.00	32.00	28.00	24.00

DSCR (a)/(b)	1.225	1.472	3.359	3.857	1.350

Q. 28. (a) An Indian company is planning to set up a subsidiary in the US. The initial project cost is estimated to be US $ 400 million; working capital requirements are estimated at US $ 40 million. The Indian company followed the straight-line method of depreciation.

The finance manager of the Indian company estimated data in respect of the project as follows :

(i) Variable cost of production and sales $ 25 per unit.

(ii) Fixed cost per annum are estimated at $ 30 million

(iii) Plant will be producing and selling 50 million units at $ 100 per unit and

(iv) The expected economic useful life of the plant is 5 years with no salvage value.

The subsidiary of the Indian company is subject to 40% corporate tax rate in the US and the required rate of return of such a project is 12%. The current exchange rate between the two countries is ₹ 48/ US $ and the rupee is expected to depreciate by 3% per annum for next five years.

The subsidiary will be allowed to repatriate 70% of the CFAT every year along with the accumulated arrears of blocked funds at year-end 5, the withholding taxes are 10%. The blocked funds will be invested in the USA money market by the subsidiary, earning 4% (free of tax) per year.

Determine the feasibility of having a subsidiary company in the USA, assuming no tax liability in India on earnings received by the parent from the US subsidiary.

(b) The initial investment outlay for a capital investment project consists of ₹ 100 lakhs for plant and machinery and ₹ 40 lakhs for working capital. Other details are summarized below :

Output	1 lakh units of output per year for years 1 to 5
Selling price	₹ 120 per unit of output
Variable cost	₹ 60 per unit of output
Fixed overheads (excluding depreciation)	₹ 15 lakhs per year for years 1 to 5
Rate of depreciation on plant and machinery	25% on WDV method

Salvage value of plant and machinery	Equal to the WDV at the end of year 5
Applicable tax rate	40%
Time horizon	5 years
Post-tax cut off rate	12%

Required:

(i) Indicate the financial viability of the project by calculating the net present value

(ii) Determine the sensitivity of the project's NPV under each of the following conditions :

    a) Decrease in selling price by 5%

    b) Increase in variable cost by 10%

    c) Increase in cost of plant and machinery by 10%

Answer: 28 (a)

Cash outflows (t = 0)	**(figures in million)**
Cost of plant and machinery	$ 400
Working capital requirement	40
Incremental cash outflow in rupees ($ 440 million x ₹ 48)	₹ 21,120

Cash inflows after taxes   **(figures in million)**

Sales revenue (5.0 million units x $ 100)		500
Less : Costs :		
Variable cost (5.0 million units x $25)	$ 125	
Fixed cost	30	
Depreciation ($400 million/ 5 year)	80	235
Earning before taxes		265
Less : Taxes (0.40)		106
Earning after taxes		159
Add : Depreciation		80
CFAT (T = 1 – 4)		239
CFAT in 5th year :		
Operating CFAT	239	
Add : Release of working capital	40	279

Determination of NPV   **(figures in million)**

Particulars	Year				
	1	2	3	4	5

Operating CFAT	$ 239	$ 239	$ 239	$ 239	$ 239
Less : Retention	71.70	71.70	71.70	71.70	-
Repatriation made	167.30	167.30	167.30	167.30	239.00
Less : Withholding tax	16.7	16.7	16.7	16.7	23.9
Accessible funds to parent	150.6	150.6	150.6	150.6	215.1
Add : Repatriation of blocked funds *	-	-	-	-	274
Add : Recovery of working capital	-	-	-	-	40
Re/$ exchange rate	49.44	50.9232	52.4509	54.0244	55.6451
Rupee equivalent	7,445	7,669	7,899	8,136	29,442
PV factor (0.12)	0.893	0.797	0.712	0.636	0.567
Present value	6,648	6,112	5,624	5,174	16,694
Total present value					40,252
Less : Cash outflow					21,210
Net present value					₹ 19,042

Recommendation: Since the NPV is positive, having a subsidiary in the US is financially viable for the Indian company.

*Repatriation of blocked funds after withholding taxes
Future value in year 5 of blocked funds of 17.7 million each during t = 1 to 4 years invested at 4% per year = 4.246 x 71.7 million = 304.44 million – 30.44 million withholding tax = 274 million.

Answer: 28 (b)

i.   Initial investment outlay ₹ 140 lakhs
Depreciation schedule   (₹ In lakhs)

Particulars	Year 1	Year 2	Year 3	Year 4	Year 5
Opening plant and machinery	100	75.00	56.25	42.19	31.64
Annual depreciation	25	18.75	14.06	10.55	7.91
Closing plant and machinery	75	56.25	42.19	31.64	23.73

                                                                                (₹ p.u.)

Selling price	120

Less : variable cost	60
Contribution	60

Total contribution per year   =   1 lakh units

(₹ in lakhs)

Total contribution per year	60
Less : Fixed overheads, other than depreciation, per year	15
Profit before depreciation and tax per year (PBDT)	45

Computation of P.V. of Net Cash Inflow :

(₹ In lakhs)

End of year	1	2	3	4	5
PBDT	45	45.00	45.00	45.00	45.00
Less : Depreciation	25	18.75	14.06	10.55	7.91
PBT	20	26.25	30.94	34.45	37.09
Less : Tax @ 40%	8	10.50	12.38	13.78	14.84
PAT	12	15.75	18.56	20.67	22.25
Depreciation	25	18.75	14.06	10.55	7.91
Salvage value of plant and machinery	-	-	-	-	23.73
Decrease in working capital	-	-	-	-	40.00
Net cash inflow	37	34.50	32.62	31.22	93.89
P.V. factor @ 12%	0.893	0.797	0.712	0.636	0.567
P.V. of net cash inflow	33.04	27.50	23.23	19.86	53.24

NPV   =   P.V. of net cash inflow – Initial investment outlay   =   15.87 – 140.00
            =   ₹ 16.87 lakhs

As the NPV @ 12% is positive, the project is financially viable.

ii.   Sensitivity analysis :
       a) 5% decline in selling price :
           The above change leads to (0.5 x ₹ 120 x (1 – 0.4)
           = 3.6 lakhs per year for years 1 to 5. Decline in post-tax net cash inflow.

           Decline in NPV =   ₹ 3.6 lakhs x PVIF of annuity @ 12%, 5 years
                          =   ₹ 3.6 x 3.605   =   ₹ 12.98 lakhs
           Percentage decline in NPV compared to the base case NPV of ₹ 16.87 lakhs
                          =   (12.98 / 16.87) x 100   =   76.94%

b) Increase in variable cost by 10%:
The above change results in a decline in post-tax net cash inflow to the extent of (1 – 0.4) ₹ 6 lakhs or ₹ 3.6 lakhs per year for years 1 to 5. Calculations made in (a) above will be equally valid here as the decline in net present value will be 76.94%.

c) Increase in cost of plant and machinery by 10% :
As a result initial outlay will be higher by ₹ 10 lakhs. However, the net cash inflow will be higher due to the tax benefit on depreciation of the increase in the cost of plant and machinery. The present value calculation are shown below :

(₹ In lakhs)

Year	1	2	3	4	5
Opening value	10.00	7.50	5.62	4.21	3.16
Depreciation	2.50	1.88	1.41	1.05	0.79
Closing value	7.50	5.62	4.21	3.16	2.37
Tax benefit on depreciation @ 40%	1.00	0.75	0.56	0.42	0.32
Increase in salvage value	-	-	-	-	2.37
Increase in net cash inflow	1.00	0.75	0.56	0.42	2.69
P.V. factor @ 12%	0.893	0.797	0.712	0.636	0.567
Present values	0.89	0.60	0.40	0.27	1.53

Decline in NPV =   P.V. of additional inflow reduced from ₹ 10 lakhs to ₹ 6.31 lakhs
Percentage decline in NPV   =   (₹ 6.31/₹ 16.87 lakhs) x 100   =   37.40%

Further work – The value of the sensitivity analysis could be improved by
  a) Using different rates of change for the single rate of 10%
  b) Examining effect of favourable, as well as, adverse changes
  c) Using a combination of changes and using probability to find out expected values.

New position :

Particulars	₹
Sales (20,000 units x ₹ 2,000)	4,00,00,000
Variable cost (20,000 units x ₹ 1,800)	3,60,00,000
Contribution	40,00,000
Less : Fixed cost	10,00,000
Profit (cash flow)	30,00,000

Analysis – New investment is only ₹ 25 lakhs which would be repaid within the first year itself. Unless there are other special strategic consideration for not engaging subcontractor, the idea should be implemented.

Q. 29. An investment company wants to study the investment projects based on market demand, profit and the investment required, which are independent of each other. Following probability distributions are estimated for each of these three factors :

Annual demand ('000 units)	25	30	35	40	45	50	55
Probability	0.05	0.10	0.20	0.30	0.20	0.10	0.05

Profit per unit			3	5	7	9	10
Probability			0.10	0.20	0.40	0.20	0.10

Investment required (₹ '000)					2,750	3,000	3,500
Probability					0.25	0.50	0.25

Using simulation process, repeat the trial 10 times, compute the investment on each trial taking these factors into trial. What is the most likely return ?

Use the following random numbers:

(30,12,16)   (59,09,69)   (63,94,26)   (27, 08, 74)   (64, 60, 61)   (28,28,72)
(31,23,57)   (54,85, 20)   (64,68,18)   (32,31,87)

In the bracket above, the first random number is for annual demand, the second one is for profit and the last one is for the investment required.

Answer: 29.

Annual return (%)   = $\dfrac{\text{Profit x Number of units demanded}}{\text{Investment}} \times 100$

First of all, random numbers 00-09 are allocated in proportion to the probabilities associated with each of the three variables as given under :

Annual demand

Units ('000)	Probability	Cumulative probability	Random numbers assigned
25	0.05	0.05	00 – 04
30	0.10	0.15	05 – 14
35	0.20	0.35	15 – 34
40	0.30	0.65	35 – 64
45	0.20	0.85	65 – 84

50	0.10	0.95	85 – 94
55	0.05	1.00	95 - 99

Profit per unit

Profit (₹)	Probability	Cumulative probability	Random numbers assigned
3	0.10	0.10	00 – 09
5	0.20	0.30	10 – 29
7	0.40	0.70	30 – 69
9	0.20	0.90	70 – 89
10	0.10	1.00	90 - 99

Investment required

Investments (₹ '000)	Probability	Cumulative probability	Random numbers assigned
2,750	0.25	0.25	00 – 24
3,000	0.50	0.75	25 – 74
3,500	0.25	1.00	75 - 99

Let us now simulate the process for 10 trials. The results of the simulation are shown in the tables given below:

Trials	Random no. of demand	Simulated demand ('000 units)	Random no. for profit per unit	Simulated profit per unit	Random no. for investment	Simulated investment (₹ '000)	Simulated return (%)*
1	30	35	12	5	16	2,750	6.36
2	59	40	09	3	69	3,000	4.00

3	63	40	94	10	26	3,000	13.33
4	27	35	08	3	74	3,000	3.50
5	64	40	60	7	61	3,000	9.33
6	28	35	28	5	72	3,000	5.83
7	31	35	23	5	57	3,000	5.83
8	54	40	85	9	20	2,750	13.09
9	64	40	68	7	18	2,750	10.18
10	32	35	31	7	87	3,500	7.00

*The simulated return is calculated as below :

= <u>Demand x profit p.u.</u>   x 100
　　　Investment

The above table shows that the highest likely return is 13.33% which is corresponding to the annual demand of 40,000 units resulting a profit of ₹ 10 per unit and the required investment will be ₹ 30,00,000.

Q. 30. (a) ABC Ltd. wishes to find out its weighted marginal cost of capital, WMCC, based on target capital structure proportions. Using the data given below, find out the WMCC.

Source	Proportion	Range	Cost
Equity share capital	50%	Upto ₹ 3,00,000	13.00%
		3,00,000 – 7,50,000	13.30 %
		7,50,000 and above	15.50%
Preference shares	10%	Up to ₹ 1,00,000	9.33%
		1,00,000 and above	10.60%
Long term debt	40%	Up to ₹ 4,00,000	5.68%
		4,00,000 – 8,00,000	6.50%

		8,00,000 and above	7.10%

(b) The paid-up capital of a company is ₹ 100 lakh. It has been declaring 20% dividend for the last 5 years.

It has under consideration an expansion programme involving an investment of ₹ 100 lakh and its board of directors desires to raise the dividend to 25%. The expansion programme can be financed by four alternatives – A) 100% equity; B) 18% institutional loan (debt) and equity 50:50; C) Equity and debt, 70:30; and D) 100% debt. Income tax and dividend tax rate are 35% and 10% respectively.

Assuming rate of return as X, analyse the various financing alternatives from the point of view of taxes.

Answer: 30 (a)

Determination of breaking points of different sources :

Source	Proportion	Cost	Range	Breaking points
Equity share capital	50%	13.00%	Upto ₹ 3,00,000	3,00,000/0.50 = 6,00,000
		13.30 %	3,00,000 – 7,50,000	7,50,000/0.50 = 15,00,000
		15.50%	7,50,000 and above	-
Preference shares	10%	9.33%	Up to ₹ 1,00,000	1,00,000/0.10 = 10,00,000
		10.60%	1,00,000 and above	-
Long term debt	40%	5.68%	Up to ₹ 4,00,000	4,00,000/0.40 = 10,00,000
		6.50%	4,00,000 – 8,00,000	8,00,000/0.40 = 20,00,000
		7.10%	8,00,000 and above	-

Now, the WMCC for different ranges of new financing may be calculated as follows :

Range	Source	Proportion	Cost %	Proportion x Cost %
Up to ₹ 6,00,000	Equity shares	0.50	13.00	6.50
	Preference shares	0.10	9.33	0.93
	Long term debt	0.40	5.68	2.27
		WMCC		**9.70**

	Equity shares	0.50	13.30	6.65
₹ 6,00,000 – 10,00,000	Preference shares	0.10	9.33	0.93
	Long term debt	0.40	5.68	2.27
	WMCC			**9.85**
	Equity shares	0.50	13.30	6.65
₹ 10,00,000 – 15,00,000	Preference shares	0.10	10.60	1.06
	Long term debt	0.40	6.50	2.60
	WMCC			**10.31**
	Equity shares	0.50	15.50	7.75
₹ 15,00,000 – 20,00,000	Preference shares	0.10	10.60	1.06
	Long term debt	0.40	6.50	2.60
	WMCC			**11.41**
	Equity shares	0.50	15.50	7.75
₹ 20,00,000 and above	Preference shares	0.10	10.60	1.06
	Long term debt	0.40	7.10	2.84
	WMCC			**11.65**

Answer: 30. (b)

Effect of taxes on Financing Alternatives

(₹ In lakhs)

Particulars	A	B	C	D
Return on ₹ 100 lakh	100X	100X	100X	100X
Less : Interest (0.18)	-	9	5.4	18
Balance	100X	100X -9	100X – 5.4	100X – 18
Less : Tax (0.35)	35X	35X – 3.16	35X – 1.9	35X – 6.30

Balance	655X	65X – 5.86	65X – 3.52	65X – 11.70
Add : Distributable profit before expansion (0.20 x ₹ 100 lakh)	20	20	20	20
Total profits available for distribution (a)	20 + 65X	14.14 + 65X	16.48 + 65X	8.30 + 65X
Expected rate of dividend (%)	25	25	25	25
Expected dividend [0.25 x (₹ 100 lakh + new capital)]	50	37.50	42.50	25
Dividend tax (0.10)	5	3.76	4.26	2.50
Total of dividend and dividend tax (b)	55	41.26	46.76	27.50
Rate of return (value of X) to pay dividend and dividend tax [value of X if (a) = (b)]%	54*	42	47	30

*20 + 65X = 55 or, X = 35/65 = 54%; other values are also determined like this.