Paper 14: Advance Financial Management

Answer Question No.1 which is compulsory

Total Allowed: 3hours   Full Marks: 100

1.

(a) NTPC 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 NTPC Ltd is 13.50% and the Company discounts continuous compounding for income by way of dividends and interests?   **[5]**

(b) Wipro 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?   **[3]**

(c) Write any three differences between the primary market and the secondary market.**[3]**

(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.   **[4]**

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 X and Y. The machines are designed differently, but have identical capacity and do exactly the same job. Machine X costs ₹ 75,000 and will last for 3 years. It costs ₹ 20,000 per year to run. Machine Y 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?   **[5]**

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) = $[1 \div e^{0135 \times (1)/12}]$	(5) = (3)X(4)
4	Interim Dividend	60,00,000	0.9560 $[1 \div e^{0.135 \times 4/12}]$	₹ 57,36,000
12	Final Dividend and Interest	1,10,00,000	0.8737 $[1 \div e^{0.135 \times 12/12}]$	₹ 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)

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 = $\sigma = \sqrt{Variance} = \sqrt{50.25} = ₹ 7.09$

(e) Working Notes:
Compound present value of 3 years @ 10% = 2.486
P.V. of Running cost of Machine X 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 Y for 2 years   = ₹ 30,000 x 1.735 = ₹ 52,050

Statement showing evaluation of Machine X and Y   (₹)

Particulars	Machine X	Machine Y
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 Y is highest, Machine X can be purchased.

Section A

(Answer any two of the following)

2.
   a) **What are the factors affecting fluctuation of call rate? Point out the measures adopted from time to time for stabilizing call rates?**
   b) **The following are the data on Five mutual funds-**

Fund	Return	Standard Deviation	Beta
Laheri	15	7	1.25
Mitra	1 8	10	0.75
Vredhi	14	5	1.40
Varsha	12	6	0.98
Raksha	16	9	1.50

What is the reward – to – variability ratio and the ranking if the risk – free rate is 6%?

[(4+4) +4]

Answer: 2 (a)

After the removal of ceiling, the call rate has fluctuated widely. The call rate is volatile due to following reasons:

i)   Large borrowings on certain dates by banks to meet the CRR requirements (then call rate rise sharply) and demand for call money falls when CRR needs are met.

ii)   The credit operations of certain banks tend to be much in excess of their own resources.

iii) Disturbance in the banking industry.

iv) When liquid fund of an institution is very essential to repay the loan, advance tax, matured amount of security, and at the boom position of institution the call rates increase.

v)   When call market is easy, Banks invest funds in govt. securities, bonds in order to maximise earnings. But with no buyers in the market, these securities are not cashed. Due to such liquidity crisis, call rate is high.

vi) The structural deficiencies in the banking system. The banking system tries to build up deposits in last week of end of the year.

vii) Forex market turbulence.

viii) Call market is over-the-telephone-market. Borrowers and lenders contact each other over telephone. In the absence of perfect communication they deal at different rates.

ix) In call market, main borrowers are commercial banks and lenders are UTI, LIC etc. In absence of lenders for few days, call rates rise up.

x) When Govt. securities mature and are encashed by the public, supply of call loans increases and call rates fall.

xi) Cyclical mass import payments reduce liquidity in the money market and hence call rates decreases.

Measures adopted from time to time for stabilizing call rates:

The volatility of call rate can be controlled to achieve a state of stability by the following ways:

(i) Intervention by the DFHI as market maker.

(ii) Channelization of more funds by the RBI through the DFHI, & STCI.

(iii) Channelization of more funds by certain financial institutions with surplus funds.

(i) Introduction of new money market instruments and allowing large number of participants in call money market.

(ii) Use of call loans for normal banking operation.

For this purpose, the RBI has been established different policy. The money market support by RBI and the reduction in CRR for credit expansion & for increase liquidity, and increasing Govt. securities refinancing had helped to moderate the call rate in 1995. The spot foreign exchange purchases by the RBI had helped to reduce the call rate in March 1996. The recommencement of repo auctions by RBI in November 1996 had provided a reasonable floor to call money rates.

It cannot be said that these measures have reduced the volatility in the call market in India.

Inter – Bank Money and its distinction from Call Money and Notice Money:

Inter Bank Market for deposits of maturity beyond 14 days is referred to as Inter-Bank Term Money. Term Money is accepted by the institutions at a discounted value, and on the due date payment will be made equal to the face value.

Answer: 2 (b)

Formula for computing Reward – to – Volatility / Volatility Ratio is –
- Treynor's Ratio = $[(R_P - R_f) \div \beta_P]$
- Sharpe's Measure = $[(R_P - R_f) \div \sigma_P]$

Ranking based on Sharpe's Ratio and Treynor Method:

Portfolio	Under Sharpe's Method $[(R_P - R_f) \div \sigma_P]$	Ranking	Under Treynor Method $[(R_P - R_f) \div \beta_P]$	Ranking
Laheri	$[(15 - 6) \div 7] = 1.29$	2	$[(15 - 6) \div 1.25] = 7.20$	2
Mitra	$[(18 - 6) \div 10] = 1.20$	4	$[(18 - 6) \div 0.75] = 16.00$	1
Vredhi	$[(14 - 6) \div 5] = 1.60$	1	$[(14 - 6) \div 1.40] = 5.71$	5
Varsha	$[(12 - 6) \div 6] = 1.00$	5	$[(12 - 6) \div 0.98] = 6.12$	4
Raksha	$[(16 - 6) \div 8] = 1.25$	3	$[(16 - 6) \div 1.50] = 6.67$	3

3. **Write short notes three of the following**
   (a) **No Ombudsman for hearing complaints against NBFCs**
   (b) **Certificate of Deposits**
   (c) **Repo and Reverse Repo**
   (d) **Objectives of Commodity Futures.**   [3 × 4 = 12]

Answer:

   a. **No Ombudsman for hearing complaints against NBFCs**

   There is no Ombudsman for hearing complaints against NBFCs. However, in respect of credit card operations of an NBFC, if a complainant does not get satisfactory response from the NBFC within a maximum period of thirty (30) days from the date of lodging the complaint, the customer will have the option to approach the Office of the concerned Banking Ombudsman for redressal of his grievance/s.

   All NBFCs have in place a Grievance Redressal Officer, whose name and contact details have to be mandatorily displayed in the premises of the NBFCs. The grievance can be taken up with the Grievance Redressal Officer. In case the complainant is not satisfied with the settlement of the complaint by the Grievance Redressal Officer of the NBFC, he/she may approach the nearest office of the Reserve Bank of India with the complaint. The detail of the Office of the Reserve Bank has also to be mandatorily displayed in the premises of the NBFC.

   b. **Certificate of Deposits**

   Certificates of Deposit (CDs) - introduced since June 1989 - are unsecured, negotiable, short-term instruments in bearer form, issued by a commercial bank(s)/Financial Institution(s) at discount to face value at market rates, with maturity ranging from 15 days to one year.

   Being securities in the form of promissory notes, transfer of title is easy, by endorsement and delivery. Further, they are governed by the Negotiable Instruments Act. As these certificates are the liabilities of commercial banks/financial institutions, they make sound investments.

   DFHI trades in these instruments in the secondary market. The market for these instruments is not very deep, but quite often CDs are available in the secondary market. DFHI is always willing to buy these instruments thereby lending liquidity to the market.

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

   c. **Repo and Reverse Repo**

   Repo or ready forward contact is an instrument for borrowing funds by selling securities with an agreement to repurchase the said securities on a mutually agreed future date at an agreed price which includes interest for the funds borrowed. Repo rate is the return earned on a repo transaction expressed as an annual interest rate.

   The reverse of the repo transaction is called 'reverse repo' which is lending of funds against buying of securities with an agreement to resell the said securities on a mutually agreed future date at an agreed price which includes interest for the funds lent.

It can be seen from the definition above that there are two legs to the same transaction in a repo/ reverse repo. The duration between the two legs is called the 'repo period'. Predominantly, repos are undertaken on overnight basis, i.e., for one day period. Settlement of repo transactions happens along with the outright trades in government securities.

The consideration amount in the first leg of the repo transactions is the amount borrowed by the seller of the security. On this, interest at the agreed 'repo rate' is calculated and paid along with the consideration amount of the second leg of the transaction when the borrower buys back the security. The overall effect of the repo transaction would be borrowing of funds backed by the collateral of Government securities.

The money market is regulated by the Reserve Bank of India. All the above mentioned money market transactions should be reported on the electronic platform called the Negotiated Dealing System (NDS).

As part of the measures to develop the corporate debt market, RBI has permitted select entities (scheduled commercial banks excluding RRBs and LABs, PDs, all-India FIs, NBFCs, mutual funds, housing finance companies, insurance companies) to undertake repo in corporate debt securities. This is similar to repo in Government securities except that corporate debt securities are used as collateral for borrowing funds. Only listed corporate debt securities that are rated 'AA' or above by the rating agencies are eligible to be used for repo. Commercial papers, certificate of deposit, non-convertible debentures of original maturity less than one year are not eligible for the purpose. These transactions take place in the OTC market and are required to be reported on FIMMDA platform within 15 minutes of the trade for dissemination of information. They are also to be reported on the clearing house of any of the exchanges for the purpose of clearing and settlement.

d. **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.

4.

(a) A Mutual Fund Co. has the following assets under it on the close of business as on:

Company	No. of Shares	1st February 2013 Market price per share(₹)	2nd February 2013 Market Price per share (₹)
P Ltd	10,000	20.00	20.50
Q Ltd	15,000	312.40	360.00
R Ltd	10,000	361.20	383.10
S Ltd	30,000	505.10	503.90

Total No. of Units 3, 00,000

i) Calculate Net Assets Value (NAV) of the Fund.

ii) Following information is given: Assuming one Mr. Basu, submits a cheque of ₹ 15, 00,000 to the Mutual Fund and the Fund manager of this company purchases 4,000 shares of Q Ltd; and the balance amount is held in Bank. In such a case, what would be the position of the Fund?

iii) Find new NAV of the fund as on 2nd February 2013.

(b) An aggressive mutual fund promises an expected return of 18 per cent with a possible volatility (standard deviation) of 20%. On the other hand, a conservative mutual fund promises an expected return of 17 per cent and volatility of 19%.

i) Which fund would you like to invest in?

ii) Would you like to invest in both if you have money?

iii) Assuming you can borrow money from your provident fund at an opportunity cost of 10%, which fund you would invest your money in?

iv) Would you consider both funds if you could lend or borrow money at 10%?

[8+4=12]

Answer: 4 (a)

i) NAV of the Fund

$$= \frac{₹\,2,00,000 + ₹\,46,86,000 + ₹\,36,12,000 + ₹\,1,51,53,000}{3,00,000}$$

$$= \frac{₹\,2,36,51,000}{3,00,000} = ₹\,78.8366 \text{ rounded to } ₹\,78.84$$

ii) The revised position of fund shall be as follows:

Shares	No. of shares	Price	Amount (₹)
P Ltd.	10,000	20.00	2,00,000
Q Ltd.	19,000	312.40	59,35,600
R Ltd.	10,000	361.20	36,12,000
S Ltd.	30,000	505.10	1,51,53,000
Cash			2,50,400
Total			2,51,51,000

No of units of fund = $3,00,000 + \dfrac{15,00,000}{78.8366} = 3,19,027$

iii) On 2nd February 2013, the NAV of fund will be as follows:

Shares	No. of shares	Price	Amount (₹)
P Ltd.	10,000	20.50	2,05,000
Q Ltd.	19,000	360.00	68,40,000

R Ltd.	10,000	383.10	38,31,000
S Ltd.	30,000	503.90	1,51,17,000
Cash			2,50,400
Total			2,62,43,400

NAV as on 2nd February 2013 = $\dfrac{₹\,2,62,43,400}{3,19,027}$ = ₹ 82.26 per unit

Answer: 4 (b)

i) It depends on your preference and risk-taking attitude.

ii) You can achieve diversification gains if you invest in both.

iii) The slopes of the capital market line for two funds are:

- Aggressive fund = (16 – 10)/20 =0.30; and
- Conservative fund: (13-10)715 = 0.20. Aggressive fund is preferable.

iv) Benefits of diversification can be obtained if you invest in both funds and also lend and borrow.

Section – B
(Answer any one of the following)

5.

(a) The shares of JSW Steel Ltd are currently priced at ₹415 and call option exercisable in three month's time has an exercise rate of ₹400. Risk Free Interest Rate is 5% p.a. and Standard Deviation (volatility) of share Price is 22%. Based on the assumption that JSW Steel Ltd is not going to declare any dividend over the next three months is the option worth buying for ₹25?

i) Calculate value of aforesaid call option based on Black Scholes Valuation Model if the current Price is considered as ₹380.

ii) What would be the worth of put option if current price is considered ₹380?

(b) Considering the following quotes
Spot (Euro/Pound) = 1.6543/1.6557
Spot (Pound/NZ$) =0.27860/0.2800

i) Calculate the % spread on the Euro/Pound Rate

ii) Calculate the % spread on the Pound/NZ$ Rate

iii) The maximum possible % spread on the cross rate between the Euro and the NZ$.

(c) Make a critical assessment of WTO's contributions to world trade.   [10+5+5]

Answer: 5 (a)

1. **Computation of Value of option if Current Price is ₹415**

   i) **Basic data**

Factor	Notation	Value
Current stock Price	SP_0	₹415
Exercise Price	EP	₹400
Time	t	0.25
Risk Free rate of return	r	5% or 0.05

Standard deviation of Return	σ	0.22
Variance	σ^2	0.0484

$$D_1 = \frac{Ln(\frac{SP_0}{EP}) + [(r + 0.50\sigma^2) \times t]}{\sigma\sqrt{t}} = \frac{Ln(\frac{415}{400}) + [(0.05 + 0.50 \times 0.0484) \times 0.25]}{[0.22 \times \sqrt{0.25}]}$$

$$= \frac{Ln1.0375 + [(0.05 + 0.0242) \times 0.25]}{[0.22 \times 0.5]}$$

$$= \frac{(Ln1.0375 + 0.01855)}{0.11} = \frac{0.05777}{0.11} = \mathbf{0.5252}$$

$$D_2 = \frac{Ln(\frac{SP_0}{EP}) + [(r - 0.50\sigma^2) \times t]}{\sigma\sqrt{t}} = D_1 - \sigma\sqrt{t}$$

$$= 0.5252 - 0.22 \times \sqrt{0.25} = 0.5252 - 0.11 = \mathbf{0.4152}$$

ii) Computation of probability factors

N (D_1) = N (0.5252) = 0.50 + 0.2019 = **0.7019**   N (D_2) = N(0.4152) = 0.50 + 0.1628 = **0.6628**

iii) Computation of value of call

Value of call = $SP_0 \times N(D_1) - [EP \times e^{-rt} \times N(D_2)]$
= [₹415 × 0.7019] – [₹400 × $e^{-0.05 \times 0.25}$ × 0.6628]
= ₹291.2885 – ₹400 × $e^{-0.0125}$ × 0.6628 = ₹291.2885 – ₹400 × 0.9876 × 0.6628
= ₹291.2885 – ₹261.833 = ₹**29.4555**

iv) Inference
Since the price of the call is ₹25 which is less than the value of call under black and Sholes Model, it is under priced. Hence, the call may be bought.

2. **Computation of value of call if the current Market price is ₹380**

i) Basic Data

Factor	Notation	Value
Current stock Price	SP_0	₹380
Exercise Price	EP	₹400
Time	t	0.25
Risk Free rate of return	r	5% or 0.05
Standard deviation of Return	σ	0.22
Variance	σ^2	0.0484

$$D_1 = \frac{Ln(\frac{SP_0}{EP}) + [(r + 0.50\sigma^2) \times t]}{\sigma\sqrt{t}} = \frac{Ln(\frac{380}{400}) + [(0.05 + 0.50 \times 0.0484) \times 0.25]}{[0.22 \times \sqrt{0.25}]}$$

$$= \frac{Ln0.95 + [(0.05 + 0.0242) \times 0.25]}{[0.22 \times 0.5]}$$

$$= \frac{[\text{Ln } (0.95 + 0.01855]}{0.11} = \frac{(-0.0513 + 0.01855)}{0.11} = \frac{(-0.03275)}{0.11} = \mathbf{0.2977}$$

$$D_2 = \frac{\text{Ln}(\frac{SP_0}{EP}) + [(r - 0.50\sigma^2) \times t]}{\sigma\sqrt{t}} = D_1 - \sigma\sqrt{t}$$

$$= - 0.2977 - 0.22 \times \sqrt{0.25} = - 0.2977 - 0.11 = \mathbf{- 0.4077}$$

ii) Computation of probability factors

$N (D_1) = N (- 0.2977) = 0.50 - 0.1179 = \mathbf{0.3821}$ $N (D_2) = N(- 0.4077) = 0.50 - 0.1591 = \mathbf{0.3409}$

iii) Computation of value of call

Value of call = $SP_0 \times N(D_1)$ - $[EP \times e^{-rt} \times N(D_2)]$

= [₹380 × 0.3821] – [₹400 × $e^{-0.05 \times 0.25}$ × 0.3409]

= ₹145.198 – ₹400 × $e^{-0.0125}$ × 0.3409 = ₹145.198 – ₹400 × 0.9876 × 0.3409

= ₹145.198 – ₹134.669 = ₹**10.529**

3. **Value of put if the Current Market Price is ₹380**

Value of call option = ₹10.529

Current Market value = ₹380

Present value of Exercise Price = 400 × $e^{-0.05 \times 0.25}$

= 400 × $e^{-0.0125}$

= ₹400 × 0.9876 = ₹**395.04**

Using the put call Parity Theory,

Value of put = Value of call + Present value of Exercise Price – Spot price

V_P = 10.529 + 395.04 - 380 = ₹**25.569**

Answer: 5 (b)

(i) The % spread on Euro/Pound = $\frac{1.6557 - 1.6543}{1.6543} \times 100$ = 0.085%

(ii) % Spread on the pound/NZ $ = $\frac{0.2800 - 0.2786}{0.2786} \times 100$ = 0.50%

(iii) The maximum possible % spread on the cross rate between € & NZ $

To find out cross rate first

Given Spot (EURO/Pound) = 1.6543/1.6557

Spot (Pound / NZ$) = 0.2786/0.2800

Spot (Euro/NZ$) = 0.2786 × 1.6543 / 0.2800 × 1.6557

= 0.4609/0.4636

The maximum % spread on Euro/NZ$ = $\frac{0.4636 - 0.4609}{0.4609} \times 100$ = 0.59%

Answer: 5 (c)

The positive contributions:

i) The system helps trade flow smoothly which leads to less political conflict and people getting more prosperous leading to promote peace.

ii) Disputes are handled constructively.

iii) WTO is rule based system and decisions are taken through consensus and ratification. Decisions being applicable to one and all, increase bargaining power for small countries. MFN status avoids complexity.

iv) Freer trade cuts the cost of living. Food and clothing has become cheaper. So is for other goods and services.

v) Customers world-over are provided with more choice of products of good qualities;

vi) Free movement of goods and services rises incomes and stimulates economic growth. China and India are good examples.

vii) The system encourages good governance and transparency.

The negative side:

George Soros (2002) an authority on international finance and globalization pointed our negativities of WTO as an institution as under:

i) Disparity in the treatment of developed and developing countries.

ii) Bias in favour of corporate interests

iii) Free Trade v. Protection

iv) Trade v. Gains: Trade is the lens to perceive development rather than the other way round. For the poorest, growth will lead to trade and not vice-versa

v) The Veto Power: Theoretically any one of the 150 members can veto an agreement.

vi) The Dispute Settlement: Too lengthy, Appeal has become a regular feature.

vii) Anti-Dumping and Countervailing Measures have been abused as protectionist tools in the hands of the developed countries.

6.

(a) **The price of Compact Stock of a face value of ₹10 on 31ˢᵗ December, 2012 was ₹414 and the futures price on the same stock on the same date i.e., 31ˢᵗ December, 2012 for March, 2013 was ₹444.**

Other features of the contract and the related information are as follows.

- **Time to expiration 3 months (0.25 year)**

- **Annual dividend on the stock of 30% payable before 31.3.2012.**

- **Borrowing Rate is 20 % p.a.**

Based on the above information, calculate future price for Infosys stock on 31ˢᵗ December, 2012. Please also explain whether any arbitrage opportunity exists.

(b) **NMDC Ltd is considering a project in US, which will involve an initial investment of US $55,00,000. The project will have 5 years of life. Current spot exchange rate is ₹ 48 per US $. The risk free rate in US is 8% and the same in India is 12%. Cash inflows from the project are as follows —**

Years	1	2	3	4	5
Cash Inflow (US $)	10,00,000	12,50,000	15,00,000	20,00,000	25,00,000

Calculate the NPV of the project using foreign currency approach. Required rate of return on this project is 14%.

(c) **MNC rolls over a $25 million loan priced at LIBOR on a three-month basis. The company feels that interest rates are rising and that rates will be higher at the next roll- over date in three months. Suppose the current LIBOR is 5.4375%. Explain how MNC can use FRA at 6%**

offered by a bank to reduce its interest rate its FRA? Assume the three month period as 90 days. **[8+7+5]**

Answer: 6 (a)

Securities of	Compact
Spot Price [S_x]	₹414
Expected rate of Dividend [y]	30% or 0.30
Borrowing Rate	20%
Tenor / Time Period [t] in Years	3 Months or 0.25 Year
Present Value of Dividend	$= 30\% \times 10 \times e^{-0.20 \times 0.25}$ $= 30\% \times 10 \div 1.05127 = 2.8537$
Adjusted Spot Price [Spot Price- Present Value of Dividend] [AS_x]	$= 414 - 2.8537 = ₹411.1463$
Theoretical Forward Price [TFP_x] $TFP_X = AS_X \times e^{(r-y) \times t}$	$= ₹411.1463 \times e^{0.20 \times 0.25}$ $= ₹411.1463 \times e^{0.05}$ $= ₹411.1463 \times 1.05127 = ₹432.23$
3-Months Futures Contract Rate [AFP_x]	₹ 444
TFP_x Vs. AFP_x	AFP_x is Higher
Inference	AFP_x is overvalued
Recommended Action	Buy Spot. Sell Future.

2. **Cash Flows to Gain on the Arbitrage Opportunity**

Activity Flow:

(a) Borrow ₹414 for a period of 3 months at the rate of 20% p.a.

(b) Buy the Stock at ₹414 at T_0

(c) Receive the Dividend at the time of 3 months [₹10 X 30% = ₹3].

(d) Sell the Index Futures at the Forward Price at the end of 3 months [₹444].

(e) Repay the amount of Loan with interest at the end of the period.

Cash Flows arising out of the Activities to gain on the Arbitrage.

Sl. No.	Particulars	₹
(a)	Borrow for a period of 3 months and Buy Stock at T_0	₹ 414
(b)	Receive the Dividend at the end of 3 months	3
(c)	Sell the Futures at the Forward Price at the end of 3 months	444

(d)	Repay the amount of borrowing together with Interest = [414(1+0.20x0.25)]	(434.7)
(e)	**Net Cash Inflow [(c)-(d)]**	**9.3**

Answer: 6 (b)

1. **Computation of Discount Rate**

Note: It is assumed that the required rate of return of 14% (Risk Adjusted Rate) is for rupee inflows.

1 + Risk Adjusted Rate = (1 + Risk Free Rate) X (1 + Risk Premium for the project)

1 + 14%	= (1 + 12%) x (1 + Risk Premium)
1.14	= 1.12 x (1 + Risk Premium)
1 + Risk Premium	= 1.14 ÷ 1.12 = 1.01786
Risk Premium	= 0.01786 or 1.786%

Therefore, Risk Adjusted Discount Rate for Dollar Flows is

(1 + Risk Adjusted Discount Rate) = (1 + USD Risk Free Rate) X (1 + Project Risk Premium)

$$= (1 + 8\%) \times (1 + 1.786\%)$$

$$= 1.08 \times 1.01786 = 1.09929$$

Risk Adjusted Discount Rate = 1.09929 − 1 = 0.09929 or **9.93%**

2. **Computation of Net Present Value** [USD in Lakhs]

Particulars	Year	PV Factor @9.93%		Cash Flow	Disc. Cash Flow
Annual Cash Inflow	1	$1 \div 1.0993$	= 0.910	10.00	9.10
	2	$1 \div 1.0993^2$	= 0.827	12.50	10.34
	3	$1 \div 1.0993^3$	= 0.753	15.00	11.30
	4	$1 \div 1.0993^4$	= 0.685	20.00	13.70
	5	$1 \div 1.0993^5$	= 0.623	25.00	15.57
Present Value of Cash Inflows Less: Initial Investment					60.01 (55.00)
Net Present Value (in USD Lakhs)					5.01
NPV in ₹ Lakhs [USD 5.01 x Spot Rate 48.00 per USD]					240.48

Answer: 6 (c)

MNC can use 3 x 6 FRA, if it expects that the rates would be higher at the next roll- over of three months, starting three months from today. In other words MNC would buy 3 x 6 FRA @6.25%, clearly with a view that higher rate would prevail on the settlement date i.e. 3 months from now.

Now if on the settlement date, the rate is 6.5%, then MNC's decision to buy 3 x 6 FRA has been proved right and it would receive the present value of the interest differentials on the loan amount i.e. it would receive:

Pay off = national amount x $\dfrac{(\text{reference Rate} - \text{Fixed rate})}{1 + \text{Reference Rate} \times \alpha}$ (a is the day count function)

= $2,50,00,000 x $\dfrac{(0.065 - 0.0625) \times 90/360}{1 + 0.0625 \times 90/360}$ = $15,385

Section C

(Answer any one of the following)

7. Ms Mitrika an analyst at Aasheesh Securities Ltd. is considering the stocks of Aftek Ltd. And Paraan Ltd. For investment. Expected returns on these stocks depend on the growth rate GDP. The conditional returns of the market and the stocks are given below:

Economic Scenario GDP growth rate	Probability	Return on (%)		Return on market %
		Aftek Ltd.	Paraan Ltd.	
1.00 - 3.00%	0.18	15	9	7
3.00 - 6.00%	0.24	25	14	11
6.00 - 8.00%	0.26	38	27	18
More than 8.00%	0.32	46	33	25

The expected risk-free return is 6.5%
Assume that CAPM holds well in the market
You are required to
i) Calculate the ex-ante-betas for the two stocks.
ii) Find out whether the stocks of Aftek Ltd. And Paraan Ltd. Are underpriced or overpriced.
iii) Calculate the proportion of systematic risk and unsystematic risk for both the companies.
iv) Determine which stock the analyst would suggest to invest. [16]

Answer: 7

i) Expected return on stock and variance of Aftek Ltd.
$E(R_A) = 0.18 \times 15 + 0.24 \times 25 + 0.26 \times 38 + 0.32 \times 46 = 33.3\%$

σ^2_A (Variance): $0.18 \times (15 - 33.3)^2 + 0.24 \times (25 - 33.3)^2 + 0.26 \times (38 - 33.3)^2 + 0.32 \times (46 - 33.)^2$
= 60.28 + 16.53 + 5.74 + 51.62 = 134.17%

Expected return on stock and Variance of Paraan Ltd:
$E(R_P) = 0.18 \times 9 + 0.24 \times 14 + 0.26 \times 27 + 0.32 \times 33 = 22.56\%$
σ^2_P (Variance): $0.18 \times (9 - 22.56)^2 + 0.24 \times (14 - 22.56)^2 + 0.26 \times (27 - 22.56)^2 + 0.32 \times (33 - 22.56)^2$
= 33.10 + 17.58 + 5.13 + 34.88 = 90.69%

Expected return and variance on Market:
$E(R_M) = 0.18 \times 7 + 0.24 \times 11 + 0.26 \times 18 + 0.32 \times 25 = 16.58\%$

σ^2_M (Variance): $0.18 \times (7 - 16.58)^2 + 0.24 \times (11 - 16.58)^2 + 0.26 \times (18 - 16.58)^2 + 0.32 \times (25 - 16.58)^2 = 47.20\%$

COV_{AM} = 0.18 (15 – 33.3) (7 - 16.58) + 0.24 x (25 – 33.3) (11 – 16.58) + 0.26 (38 – 33.3) (18 – 16.58) + 0.32 (46 – 33.3) (25 – 16.58) = 78.63%

COV_{PM} = 0.18 (9 – 22.56) (7 – 16.58) + 0.24 (14 – 22.5) (11 – 16.58) + 0.26 (27 – 22.56) (18 – 16.58) + 0.32 (33 – 22.56) (25 – 16.58) = 64.61%

Betas:
β_A = COV_{AM} / σ^2M = 78.63 / 47.20 = 1.67
β_P = COV_{PM} / σ^2M = 64.61 / 47.20 = 1.37

ii) Normal return = Rf + ß (Rm – Rf)
Aftek Ltd.: 6.5 + 1.67 (16.58 – 6.5) = 23.33%
Alpha / Excess return = 33.3 – 23.33 = 9.97%
Paraan Ltd.: 6.5 + 1.37 (16.58 – 6.50) = 20.31%
Excess return / Alpha = 22.56 – 20.31 = 2.25%
The alpha i.e., excess return of both the companies is positive. Hence the stock of Aftek Ltd and Paraan Ltd is under priced.

iii) Systematic Risk = β^2 x σ^2_M
Unsystematic Risk = Total Risk – Systematic Risk
Aftek Ltd:
Systematic Risk = $(1.67)^2$ x 47.20 = 131.64%
Unsystematic Risk = 134.17 – 131.64 = 2.53%
Proportion of Systematic Risk = (131.64/134.17) x 100 = 98.11%
Proportion of Unsystematic Risk = (2.53/134.17) = 1.89%
Paraan Ltd:
Systematic Risk = $(1.37)^2$ x 47.20 = 88.59%
Unsystematic Risk = 90.69 – 88.59 = 2.10%
Proportion of Systematic Risk = 88.59/90.69 = 97.68%
Proportion of Unsystematic Risk = 2.10/90.69 = 2.32%

iv) **Aftek Ltd:**
Excess return / stander deviation:
= 9.97/$\sqrt{134.17}$ = 9.97/11.58 = 0.86

Paraan Ltd:
Excess return / stander deviation:
= 2.25 / $\sqrt{90.69}$ = 2.25/9.52 = 0.24

Analysis: As the excess return / Alpha to Standard deviation are higher for the stock of Aftek Ltd., the analyst should suggest investing on the stock of Aftek Ltd.

8.
(a) **Stock A has a Beta of 1.50 and a market expectation of 17% return. For Stock B, it is 0.80 and 14.5% respectively. If the risk free rate is 7% and the market risk premium is 8%, evaluate whether these two stocks are priced correctly? I these two stocks to be regarded as correctly priced, what should the risk free rate and market risk premium be?**

(b) **What are the weaknesses of technical analysis? Explain the differences of Security Market Line (SML) and Characteristic Line.** [8+8]

Answer: 8 (a)

1. **Expected Return [E(R)] under CAPM**

   Expected Return of Stock X [E (R_x)] = R_F + β_x x [E (R_M) - R_F]

Risk Free Return [R_F]	= 7%
Risk Premium [$E(R_M) - R_F$]	= 8%
Beta of Stock A[β_A]	= 1.50
Beta of Stock B[β_B]	= 0.80
Stock A [$E(R_A)$]	= $R_F + \beta_A \times [E(R_M) - R_F]$
	= 7% + 1.50 x 8% = 7% + 12% = 19.00%
Stock B [$E(R_B)$]	= $R_F + \beta_B \times [E(R_M) - R_F]$
	= 7% + 0.80 x 8% = 7% + 6.40% = 13.40%

2. Evaluation of Market Price

Particulars	Stock A	Stock B
Expected Return (Market) **[i]**	17.00%	14.50%
Expected Return under CAPM **[ii]**	19.00%	13.40%
Market Expectations **[i]** vs. CAPM Return **[ii]**	[ii] is Higher	[ii] is Lower
Inference	Stock A gives lesser return than what it should give	Stock B gives higher return than what it should give
Conclusion	Stock A is **Overvalued**	Stock B is **Undervalued**
Recommendation	**SELL**	**BUY**

3. Determination of Risk Free Return

Alternative 1

Let,   Risk free return = R_F

Market Risk Premium = RP

For security A, under CAPM

17%   = R_F + 1.5 X RP

RF   = 17 – 1.5 RP   (1)

For security B, Under CAPM

14.5   = R_F + 0.80 RP

R_F = 14.5 – 0.80 RP   (2)

R_F determined under equation (1) and equation (2) should be equal. Therefore,

        17 – 1.5 RP = 14.5 – 0.80 RP

$17 - 14.5 \qquad = 1.5\ RP - 0.80\ RP$

$2.5 \qquad\qquad = 0.7\ RP$

$RP \qquad\qquad = 2.5/0.7 \qquad = 3.57\%$

Using RP = 3.57%, in equation (1)

$R_F \qquad = 17 - 1.5\ X\ 3.57$

$\qquad\qquad = 11.645\%$

Alternative 2:

Rule: If the stocks are correctly priced, then the Risk - Return Ratio should be the same i.e,

$(R_A - R_F \div \beta_A) = (R_B - R_F \div \beta_B)$

$$\frac{17 - R_F}{1.5} = \frac{14.5 - R_F}{0.80}$$

$1.5(14.5 - R_F) \quad = 0.80\ (17 - R_F)$

$21.75 - 1.5\ R_F \quad = 13.6 - 0.80\ R_F$

$21.75 - 13.6 \quad = 1.5\ R_F - 0.80\ R_F$

$8.15 \qquad\qquad = 0.7\ R_F$

$R_F \qquad\qquad = 11.645\%$

Market Risk Premium $\quad = (R_A - R_F) \div \beta_A$

$\qquad\qquad\qquad\qquad\quad = (17 - 11.645) \div 1.5 = 3.57\%.$

Answer: 8 (b)

Weaknesses of Technical Analysis

Analyst Bias

Just as with fundamental analysis, technical analysis is subjective and our personal biases can be reflected in the analysis. It is important to be aware of these biases when analyzing a chart. If the analyst is a perpetual bull, then a bullish bias will overshadow the analysis. On the other hand, if the analyst is a disgruntled eternal bear, then the analysis will probably have a bearish tilt.

Open to Interpretation

Furthering the bias argument is the fact that technical analysis is open to interpretation. Even though there are standards, many times two technicians will look at the same chart and paint two different scenarios or see different patterns. Both will be able to come up with logical support and resistance levels as well as key breaks to justify their position. While this can be frustrating, it should be pointed out that technical analysis is more like an art than a science, somewhat like economics. Is the cup half-empty or half-full? It is in the eye of the beholder.

Too Late

Technical analysis has been criticized for being too late. By the time the trend is

identified, a substantial portion of the move has already taken place. After such a large move, the reward to risk ratio is not great. Lateness is a particular criticism of Dow Theory.

Always another Level

Even after a new trend has been identified, there is always another "important" level close at hand. Technicians have been accused of sitting on the fence and never taking an unqualified stance. Even if they are bullish, there is always some indicator or some level that will qualify their opinion.

Trader's Remorse

Not all technical signals and patterns work. When you begin to study technical analysis, you will come across an array of patterns and indicators with rules to match. For instance: A sell signal is given when the neckline of a head and shoulders pattern is broken. Even though this is a rule, it is not steadfast and can be subject to other factors such as volume and momentum. In that same vein, what works for one particular stock may not work for another. A 50-day moving average may work great to identify support and resistance for IBM, but a 70-day moving average may work better for Yahoo. Even though many principles of technical analysis are universal, each security will have its own idiosyncrasies.

Technical analysts consider the market to be 80% psychological and 20% logical. Fundamental analysts consider the market to be 20% psychological and 80% logical. Psychological or logical may be open for debate, but there is no questioning the current price of a security. After all, it is available for all to see and nobody doubts its legitimacy. The price set by the market reflects the sum knowledge of all participants, and we are not dealing with lightweights here. These participants have considered (discounted) everything under the sun and settled on a price to buy or sell. These are the forces of supply and demand at work. By examining price action to determine which force is prevailing, technical analysis focuses directly on the bottom line: What is the price? Where has it been? Where is it going?

Even though there are some universal principles and rules that can be applied, it must be remembered that technical analysis is more an art form than a science. As an art form, it is subject to interpretation. However, it is also flexible in its approach and each investor should use only that which suits his or her style. Developing a style takes time, effort and dedication, but the rewards can be significant.

Distinguish between a Security Market Line (SML) and Characteristic Line

Aspect	Security Market Line	Characteristic Line
Scheme	It represents the relationship between return and risk (measured in terms of systematic risk) of a security or portfolio.	It represents the relationship between the returns of two securities or a security and the market return, over a period of time.
Nature of Graph	Security Market Line is a cross-sectional graph.	Security Characteristic Line is a Time Series Graph.

Comparis on	Security Market Line graphs beta versus expected return.	Characteristic Line graphs time series of Security Returns versus the Index Returns.
Utility	It is used for estimating the expected return for a security relative to its beta risk.	To estimate beta and also to determine how a security return correlates to a market index return.

Section D

(Answer any one of the following)

9.

(a) Pearls Builders has been approached by a foreign embassy to build for it a block of six flats to be used as guest houses. As per the terms of the contract, the foreign embassy would provide Pearls Builders the plans and the land costing ₹25 lakhs. Pearls Builders would build the flats at their own cost and lease them to the foreign embassy for 15years. At the end of which the flats will be transferred to the foreign embassy for a nominal value of ₹ 8 lakh. Pearls Builders estimates the cost of constructions as follows:

Area per flat, 1,000 sq. feet ; Construction cost, ₹400 per sq. feet ; Registration and other costs, 2.5 per cent of cost of construction; Pearls Builders will also incur ₹4 lakhs each in years 14 and 15 towards repairs.

Pearls Builders proposes to charge the lease rentals as follows:

Years	Rentals
1 - 5	Normal
6 – 10	120 per cent of normal
11 - 15	150 per cent of normal

Pearls builders present tax rate averages at 35 per cent which is likely to be the same in future. The full cost of construction and registration will be written off over 15 years at a uniform rate and will be allowed for tax purposes.

You are required to calculate the normal lease rental per annum per flat. For your exercise you may assume: (a) Minimum desired return of 10 per cent, (b) Rentals and repairs will arise on the last day of the year, and, (c) Construction, registration and other costs will be incurred at time= 0.

(b) You are analyzing the beta for ROYAL Computers Ltd. and have dividend the Company into four broad business groups, with market values and betas for each group.

Business Group	Market value of Equity	Unleveraged beta
Main frames	₹100 billion	1.10
Personal Computers	₹ 100 billion	1.50
Software	₹ 50 billion	2.00
Printers	₹ 150 billion	1.00

ROYAL Computers Ltd. had ₹ 50 billion in debt outstanding.

Required:

i.   Estimate the beta for ROYAL Computers Ltd. as a Company. Is this beta going to be equal to the beta estimated by regressing past returns on ROYAL Computers stock against a market index. Why or Why not?

ii.   If the treasury bond rate is 7.5% estimate the cost of equity of ROYAL Computers Ltd. Estimate the cost of equity for each division. Which cost of equity would you use to value the printer division? The average market risk premium is 8.5%.   [10+10]

Answer: 9 (a)

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Calculation of present value of Cash out flow: (₹)

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Cost of construction 400x1,000x6		24,00,000
Registration and other costs @ 2.5%		60,000
Cost of Repairs	4,00,000	
(-) tax savings @ 35%	1,40,000	
	2,60,000	
At t_{14} = Present value = 2,60,000 x 0.26333 = 68466		
At t_{15} = present value = 2,60,000 x 0.23939 = 62241		
		1,30,707
		25,90,707 (Rounded of to 25,90,700)

Let 'X' be Normal lease rent per 6 flats per annum. P/V of Recurring Cash Inflow for 15 years

Particulars	1-5 years	6-10 years	11-15 years
Lease Rent p.a.	X	1.2 X	1.5 X
Depreciation	164,000	164,000	164,000
PBT 24,60,000/15	X-164,000	1.2X-164000	1.5X-164,000
PAT 65 %	0.65X-106600	0.78X-106600	0.975X-106600
CIAT = PAT + Dep.	0.65X + 57400	0.78X + 57400	0.975X + 57400
PVCF	3.7908	2.3538	1.4615
PV	2.4635X + 217592	1.836X + 135108	1.42X + 83890

Total = 5.7195 X + 436590

P/V of Terminal Cash Inflows: ₹

Nominal value of flats after 15 years	800,000
Less: Tax on Profit [800000x35%]	280,000
	520,000

P/V = 520,000 x 0.239 = ₹124,280

At 10% Rate of Return: P/V of Cash Inflows = P/V of Cash outflows

5.719X + 436,590 + 124,280 = 2590700

X = ₹3,54,896 .

Lease Rent per Flat = 354896/6 = ₹59,150.

Answer: 9 (b)

1. Computation of Company Bets:

Group	Market value	Proportion	Unleveraged beta	Product beta
Mainframe	₹100 billion	25%	1.10	0.275
Presonal Computer	₹100 billion	25%	1.50	0.375
Software	₹ 50 billion	12.5%	2.00	0.250
Printers	₹150 billion	37.5%	1.00	0.375
Total	**₹ 400 billion**	**100%**	**Unleveraged beta of portfolio**	**1.275**

Note: Beta measures the volatility of ROYAL Computers' stock returns against a broad-based market portfolio. In the above case, the beta is calculated for four business groups in a computer segment and not a broad-based market portfolio. Hence, beta calculations will not be the same, as such.

Beta of the Leveraged Firm B(L) = Beta of Unleveraged Firm B(U)×[(Equity+ Debt)÷Equity]

= 1.275 × [(400 + 50) ÷ 400]

= **1.434**

Market Index Relationship: This leveraged Beta of **1.434** will be equal to the Beta estimated by regressing returns on ROYAL Computers stock against a market index. The reasoning is as under-

  i.   The Beta of a security is a measure of return for the systematic risk of that security, relative to the market i.e. its Systematic Risk.

  ii. A portfolio generally consists of a well - diversified set of securities.

iii. The Systematic Risk cannot be diversified away, and hence, the Beta of a portfolio is the **value - weighted beta** of the securities constituting the portfolio.

iv. The Beta of a portfolio depicts the systematic Risk (i.e. Non-Diversifiable Risk) of the portfolio itself.

v. Cost of **Equity for ROYAL Computers** = Return of Risk Free Securities + (Market Risk premium × Beta) = 7.50% + (8.50% × 1.434) = **19.69%**

vi. **Cost of Equity for each Division**

Division	Cost of Equity for each Division = **Return of Risk Free Securities + (Market Risk premium × Beta)**
Mainframe	= 7.50% + (8.50% × 1.10) = 16.85%
Personal Computer	= 7.50% + (8.50% × 1.50) = 20.25%
Software	= 7.50% + (8.50% × 1.10) = 24.50%
Printers	= 7.50% + (8.50% × 1.00) = 16.00%

For valuing Printer Division, **K_e** of 16% would be used.

10.

(a) **Computronics India Ltd. has been analyzing the firm's policy regarding computers, which are now being leased on a yearly basis on rental amounting to ₹ 1,00,000 per year. The computers can be bought for ₹ 5,00,000. The purchase would be financed by 16% loan repayable in 4 equal annual installments.**
On account of rapid technological progress in the computer industry, it is suggested that a 4-year economic life should be used, instead of the 10-year physical life. It is estimated that the computers would be sold for ₹ 2,00,000 at the end of 4 years.
The company uses the straight line method of depreciation. Corporate tax rate is 50%.

i) **Comment on whether the equipment should be bought or leased?**
ii) **Analyse the financial viability from the point of view of the lessor, assuming 14% cost of capital.**
iii) **Determine the minimum lease rent at which the lessor would break even.**
iv) **Determine the lease rent which will yield an IRR of 16% to the lessor.**

(b) **"Cost of capital is used by a company as a minimum benchmark for its yield". Comment. Also enumerate the applications of cost of capital in managerial decisions.**

(c) **An entity has ₹ 100 lakhs existing funds financed ₹ 40 lakhs from equity share capital, ₹ 30 lakhs from retained earnings and ₹30 lakhs from 12% debentures. It requires additional funds of ₹ 40 lakhs. These can be financed ₹ 20 lakhs from 14% debentures and ₹ 20 lakhs from new issue of equity shares. Tax rate applicable to the company is 40%. The company is expecting to pay ₹4 per share at the end of the year. The company is growth rate of dividends is expected to be 9% perpetually. Market price per equity share is ₹40 per share. Issue price of the new equity shares is expected to be ₹35 per share. Flotation cost to the issue is ₹3 per share. Compute weighted marginal cost of capital.**

[10+6+4=20]

Answer: 10 (a)

i. **PV of cash outflows under leasing alternative**

Year	Lease rent after taxes	PV factor (0.08)	Total PV
1-4	₹ 50,000	3.312	₹ 1,65,600

Cash outflows under buying alternative

Year-end	Loan at the beginning of the year	Loan installment	Interest on loan (0.16)	Principal repayment	Principal outstanding at the end of year
1	5,00,000	1,78,699*	80,000	98,699	4,01,301
2	4,01,301	1,78,699	64,208	1,14,491	2,86,810
3	2,86,810	1,78,699	45,890	1,32,809	1,54,001
4	1,54,001	1,78,699	24,698	1,54,001	-

*[₹ 50,000 ÷ 2.798 (PV factor of annuity of Re 1 at 16% for 4 years)].

PV of cash outflows under buying alternatives

Year	Loan installment	Payment of		Net cash outflows	PV factor (0.08)	Total PV
		Interest	Depreciation			
1	1,78,699	40,000	37,500	1,01,199	0.926	93,710
2	1,78,699	32,104	37,500	1,09,095	0.857	93,494
3	1,78,699	22,295	37,500	1,18,254	0.794	93,894
4	1,78,699	12,349	37,500	1,28,850	0.735	94,705
4	Salvage value			(2,00,000)	0.735	(1,47,000)
						2,28,803

Recommendation: The leasing option is financially superior.

ii. **Viability form the lessor's point of view**
Determination of CFAT

Particulars	₹
Lease rent received	1,00,000
Less : Depreciation	75,000
EBT	25,000
Less : Taxes (0.50)	12,500
EAT	12,500
Add : Depreciation	75,000
CFAT	87,500

Determination of NPV

Year	CFAT	PV factor (at 0.14)	Total PV
1-4	87,500	2.914	2,54,975
4	2,00,000	0.592	1,18,400
	Total PV		3,73,375
	Less : Cost of computer		5,00,000
	NPV		(1,26,625)

The proposal is not financially viable to the lessor.

iii. **Lease rent, at which lessor would break-even**

Particulars	₹
Cost of computers	5,00,000
Less : PV of salvage value of computers	1,18,400
Net cost to be recovered	3,81,600
Divide by PV annuity factor (14,4)	2.914
CFAT (desired)	1,30,954
Less : Depreciation	75,000
EAT	55,594
Add : Taxes	55,594
EBT	1,11,908
Add : Depreciation	75,000
Lease rental (desired)	1,86,908

iv. **Lease rent to yield 16% IRR**

Particulars	₹
CFAT (desired)	1,39,242
Less : Depreciation	75,000
EAT	64,242
Add : Tax (0.50)	64,242
EBT	1,28,484
Add : Depreciation	75,000
Lease rental (desired)	2,03,484

Working Notes:

Desired CFAT: $₹\,5,00,000 = \sum_{t=1}^{4} \dfrac{X}{(1+0.16)^t} + \dfrac{Rs.\,2,00,000}{(1+0.16)^4}$, where X = CFAT

$$₹\,5,00,000 - \dfrac{Rs.\,2,00,000}{(1+0.16)^4} = \sum_{t=1}^{4} \dfrac{X}{(1+0.16)^t}$$

Substituting PV factor of annuity (16, 4) 2.798 and PV factor (16, 4), 0.552,

$$₹\,5,00,000 - (₹\,2,00,000 \times 0.552) = X/2.798$$
$$3,89,600/2.798 = X$$
$$X = ₹\,1,39,242$$

Answer: 10 (b)

The **cost of capital** is a term used in the field of financial investment to refer to the cost of a company's funds (both debt and equity), or, from an investor's point of view "the shareholder's required return on a portfolio of all the company's existing securities". It is used to evaluate new projects of a company as it is the minimum return that investors expect for providing capital to the company, thus setting a benchmark that a new project has to meet.

For an investment to be worthwhile, the expected return on capital must be greater than the cost of capital. The cost of capital is the rate of return that capital could be expected to earn in an alternative investment of equivalent risk. If a project is of similar risk to a company's average business activities it is reasonable to use the company's average cost of capital as a basis for the evaluation. A company's securities typically include both debt and equity; one must therefore calculate both the cost of debt and

the cost of equity to determine a company's cost of capital. However, a rate of return larger than the cost of capital is usually required.

IMPORTANCE OF COST OF CAPITAL IN DECISION MAKING

The cost of capital is critically important in finance. It plays a crucial role in the capital budgeting decision. The progressive management always takes notice of the cost of capital while taking a financial decision. The concept is quite relevant in the managerial decisions as:

i.   It may be used as the measuring road for adopting an investment proposal. The firm, naturally, will choose the project which gives a satisfactory return on investment which would in no case be less than the cost of capital incurred for its financing. In various methods of capital budgeting, cost of capital is the key factor in deciding the project out of various proposals pending before the management. It measures the financial performance and determines the acceptability of all investment opportunities.

ii. It is significant in designing the firm's capital structure. A capable financial executive always keeps an eye on capital market fluctuations and tries to achieve the sound and economical capital structure for the firm. He may try to substitute the various methods of finance in an attempt to minimize the cost of capital so as to increase the market price and the earning per share.

iii. A capable financial executive must have knowledge of the fluctuations in the capital market and should analyze the rate of interest on loans and normal dividend rates in the market from time to time. Whenever company requires additional finance, he may have a better choice of the source of finance which bears the minimum cost of capital.

iv. It can be used to evaluate the financial performance of the top executives. Evaluation of the financial performance will involve a comparison of actual profitabilities of the projects and taken with the projected overall cost of capital and an appraisal of the actual cost incurred in raising the required fund.

v.   It is also important in many others areas of decision making, such as dividend decisions, working capital policy etc.

Answer: 10 (c)

$$K_d = \frac{I(1-t)}{NP} = \frac{₹14(1-0.40)}{₹100} = 8.4\%$$

$$K_e = \frac{D_1}{P_o} + g = \frac{₹4}{₹32} + 0.09 = 21.5\%$$

Capital Structure	Amount	Weights	C.O.C	WACC
Equity Share Capital	20,00,000	0.5	21.5%	10.75%
14% Debentures	20,00,000	0.5	8.4%	4.20%
	40,00,000	1.00		Ko=14.95%