Paper-12: FINANCIAL MANAGEMENT & INTERNATIONAL FINANCE

Time Allowed: 3 Hours **Full Marks: 100**

Answer Question No. 1 from Part A which is compulsory and any five questions from Part B.

Working notes should form a part of the answer

"Wherever necessary, suitable assumptions should be made and indicated in answers by the candidates"

PART A (25 Marks)

1.(a) For each of the questions given below, one out of four answers is correct. Indicate the correct answer and give your workings/ reasons briefly. [5 × 3=15]

(i) Calculate the price of 3 months ADS futures, if ADS (FV ₹10) quotes ₹ 440 on NSE and 3 months future price quotes at ₹430 and the 1 month borrowing rate is given as 15% and the expected annual dividend yield is 25% per annum payable before expiry.

(A) ₹ 454
(B) ₹ 464
(C) ₹ 444
(D) ₹ 450

(ii) RBI sold a 91 days T-Bill of face value of ₹ 100 at an yield of 7%. What was the issue price?

(A) ₹ 98.00
(B) ₹ 98.08
(C) ₹ 98.18
(D) ₹ 98.28

(iii) A one day repo is entered into on Jan 10, 2013 on an 11.99% 2014 security, maturing on April 7, 2014. The face value of the transaction is ₹ 5 Crores. The price of the security is ₹ 115.00. Assume that RBI has lent securities in the first leg to PNB. If the repo rate is 6%, what is the settlement amount on Jan 10, 2013? [Use 360 days convention]

(A) ₹ 5,90,45,161
(B) ₹ 5,90,55,261
(C) ₹ 5,90,65,361
(D) ₹ 5,90,75,461

(iv) The P/V ratio of a firm dealing in precision instruments is 50% and margin of safety is 40%. Calculate net profit, if the sales volume is ₹ 12,50,000.

(A) ₹ 25,000
(B) ₹ 1,25,000
(C) ₹ 2,50,000
(D) ₹ 1,50,000

(v) The value of a share of MN Ltd. after right issue was found to be ₹75/-. The theoretical value of the right is ₹ 5. The number of existing shares required for a rights share is 2. The subscription price at which were issued were:

(A) ₹ 22.50
(B) ₹ 40.00
(C) ₹ 65.00
(D) ₹ 82.00

(b) Write if each of the following sentences is T (true) or F (false) [5]

(i) While designing the capital structure of a business the earnings capacity becomes a less important factor than the each flow ability.

(ii) An operating lease is one where a significant part of risk-bearing burden is on the lessee.

(iii) Swapping from fixed to floating may save the original borrower if interest rates decline.

(iv) LIBOR for treasury bill rate is the example of basis swaps.

(v) TRIPS are the international agreement on intellectual property rights.

Answer 1. (a)(i)

(A) ₹454

Future Price = Spot Price + Cost of Carry- Dividend

= 440 + (440 × 0.15 × 0.25) – (10 × 0.25)

= 440 + 16.50 – 2.50

= 454

The future price is ₹454 which is now quoted at ₹430 in the exchange. The fair value of Futures is more than the actual future price. So, no arbitrage opportunities exist.

Answer 1. (a)(ii)

(D)₹98.28

Issue price of T-bill is at discounted value and redeemed at face value.

Maturity Period 91days

Face Value ₹ 100

Yield Rate 7% or 0.07

Let the issue price of T-Bill be 'x'.

Then,

$$0.07 = \frac{100 - x}{x} \times \frac{365}{91} \times 100$$

$$0.07 = \frac{100 - x}{x} \times 4.011$$

0.07x = 401.10-4.011x

4.081x = 401.10

X = 401.10/4.081 = 98.28

The issue price of T-Bill was ₹ 98.28.

Answer 1. (a)(iii)

(C)₹5,90,65,361

In the first leg RBI has lent securities and receives money from PNB

Stage I:

G Sec pays bi-annual coupons;

Interests are paid on April 7 & October 7.

G Sec Maturity on April 7, 2014;

Days elapsed from October 8, 2012 till Jan 10, 2013 = 24 + 30 + 31 + 9 = 94 days

Accrued Interest: 5 Crores x 0.1199 x 94/360 = ₹ 1565361

Transaction Value = ₹ 5 Crores x 115/100 = ₹ 57500000

Total Settlement amount = ₹ 59065361 = Money receive by RBI from PNB

Answer 1. (a)(iv)

(C) ₹ 2,50,000

Margin of Safety	12,50,000 @40%	₹ 5,00,000
BEP Sales	12,50,000 – 5,00,000	₹ 7,50,000
Fixed cost	[BEP (s) × p/v ratio] 7,50,000 × 50%	₹ 3,75,000
Contribution	12,50,000 x 50%	₹ 6,25,000
Profit	6,25,000 – 3,75,000	₹ 2,50,000

Answer 1. (a)(v)

(C) - ₹ 65.

Theoretical value of a right (V_t)= (P-S)/N+1=₹ 5 where N=2

or, P-S=5(2+1)

or, P=15+S ----------(i)

Value of share after right (V_0) =NP +S where V_0= ₹ 75

or, 75 = (2P + S)/3

or, 2P+S =3*75

or, 2P+S = 225 ----------(ii)

Putting value of P in equation (ii), we get

2 P + S = 225

or, 2(15+S)+S = 225

or, 30+3S =225
or, S =(225-30)/3
or, S =65.

Answer 1. (b)

(i) True

(ii) False

(iii) True

(iv) False

(v) True

PART B (75 MARKS)

2. (a) Y Ltd. is foreseeing a growth rate of 14% per annum in the next 2 years. The growth rate is likely to fall to 10% for the third year and fourth year. After that the growth rate is expected to stabilize at 8% per annum. If the last dividend paid was ₹ 1.50 per share and the investors' required rate of return is 16%, find out the intrinsic value per share of Y Ltd. as of date. You may use the following table:

Years	0	1	2	3	4	5
Discounting Factor at 16%	1	0.86	0.74	0.64	0.55	0.48

[8]

(b) A firm's sales, variable costs and fixed cost amount to ₹ 37,50,000, ₹ 21,00,000 and ₹ 3,00,000 respectively. It has borrowed ₹ 22,50,000 at 9% and its equity capital totals ₹ 27,50,000.

i. What is the firm's ROI?

ii. Does it have favourable financial leverage?

iii. If the firm belongs to an industry whose asset turnover is 3, does it have a high or low asset leverage?

iv. What are the operating, financial and combined leverages of the firm? [1+1+1+3]

Answer 2. (a)

Present value of dividend stream for the first 2 years

= ₹1.50 (1.14) × .86 + ₹1.50 $(1.14)^2$ × .74

= ₹1.71 × .86 + ₹1.95 × .74

= ₹1.47 + ₹1.44

= ₹2.91

Present value of dividend stream for the next 2 years

= ₹1.95 (1.1) × .64 + ₹1.95 $(1.1)^2$ × .55

= ₹2.145 × .64 + ₹2.36 × .55

= ₹1.373 + ₹1.30

= ₹2.673

Market Value of equity share at the end of 4th year computed by using the constant dividend growth model would be:

$$P_4 = \frac{D_5}{K_S - g_n}$$

Where D_5 is dividend in the fifth year, g_n is the growth rate and K_s is required rate of return.

Now $D_5 = D_4 (1 + g_n)$

D_5 = ₹2.36 (1+0.08)

= ₹2.55

So, $P_4 = \frac{₹2.55}{0.16 - 0.08}$ = ₹31.88

Present Market value of P_4 = 31.88 × .55 = ₹17.534

Hence, the intrinsic value per share of Y Ltd. would be

= ₹2.91 + ₹2.673 + ₹17.534 = ₹23.12

Answer 2. (b)

	₹
Sales	37,50,000
Variable Cost	21,00,000
Contribution	16,50,000
Fixed Cost	3,00,000
EBIT	13,50,000
Less: Interest	2,02,500
EBT	11,47,500

i. $ROI = \frac{EBIT}{Capitalemployed} = \frac{1350000}{5000000} x100 = 27\%$

ii. ROI > K_d the firm has favourable financial leverage i.e. trading on equity.

iii. Asset turnover ratio = (sales /total assets) =(37,50,000/ 50,00,000) = 0.75

Much lower than the industry average

iv. DOL = (C/EBIT) = (16,50,000/13,50,000) = 1.2222

DFL = (EBIT/ EBT) = (13,50,000/11,47,500)= 1.18

DCL = 1.2222 × 1.18 = 1.44

3. (a) The present capital structure of a company is as follows:

	₹(million)
Equity share (Face value = ₹10)	240
Reserves	360
11% Preference shares (Face value =₹10)	120
12% Debentures	120
14% Term Loans	360
	1,200

Additionally the following information are available:

Company's equity beta	1.05
Yield on long-term treasury bonds	10%
Stock market risk premium	6%
Current ex-dividend equity share price	₹15
Current ex-dividend preference share price	₹12
Current ex-interest debenture market value ₹102.50 per	₹100
Corporate tax rate	40%

The debentures are redeemable after 3 years and interest paid annually. Ignoring floatation costs, calculate the company's weighted average cost of capital (WACC).

[8]

(b) A Ltd. has present annual sales of 5,000 units at ₹600 per unit. The variable cost is ₹400 per unit and the fixed costs amount to ₹3,00,000 per annum. The present credit period allowed by the company is 1 month. The company is considering a proposal to increase the credit period to 2 months and 3 months and has made the following estimates:

	Existing	Proposed	
Credit Policy	1 month	2 months	3 months
Increase in sales	-	20%	30%
% of bad debts	1%	3%	5%

There will be increase in fixed cost by ₹ 50,000 on account of increase of sales beyond 25% of present level. The company plans on a pre-tax return of 20% on investment in receivables.

You are required to calculate the most viable credit policy for the company. [7]

Answer 3. (a)

Specific cost of capital:

R_f = 10%, R_m = 16%, β=1.05

K_e(CAPM) = $R_f + \beta (R_m - R_f)$

= 10% + 1.05 (16%-10%)

= 16.3%

K_p = (Dividend/ NS) × 100

= (1.1/12) × 100 = 9.17%

$$K_d = \frac{12(1-0.4)+\frac{100-102.5}{3}}{\frac{100+102.5}{2}} x100 = 6.29\%$$

Alternatively,

$$K_d = \left[\frac{12+\frac{100-102.5}{3}}{\frac{100+102.5}{2}} x100\right] \times (1-0.4) = 6.61\%$$

K_I = 14% (1- 0.4) = 8.4%

$K_r = K_e$ = 16.3%(as there is no flotation costs)

WACC

Book Value Basis:

Source	₹ in millions	weight	Cost of capital	K_o
Equity Capital	240	0.20	16.3%	3.26
Reserves	360	0.30	16.3%	4.89
Preference	120	0.10	9.17%	0.917
Debentures	120	0.10	6.61%	0.661
Term Loans	360	0.30	8.40%	2.52
	1200			12.25%

Market value basis:

Source	₹ in millions	weight	Cost of capital	K_o
Equity	360	0.3647	16.3%	5.945
Preference	144	0.1459	9.17%	1.338
Debentures	123	0.1246	6.61%	0.824
Term Loans	360	0.3647	8.40%	3.063
	987			11.17%

Answer 3. (b)

A Ltd.
Evaluation of Credit Policy

	Present Policy	Proposed Policy	
	1 month	2 months	3 months
Sales (Units)	5,000	6,000	6,500
Sales income (A)	₹30,00,000	₹36,00,000	₹39,00,000
Variable cost at ₹400 per unit (B)	₹20,00,000	₹24,00,000	₹26,00,000
Contribution (C=A-B)	₹10,00,000	₹12,00,000	₹13,00,000
Fixed Costs (D)	₹3,00,000	₹3,00,000	₹3,50,000
Net Margin (E=C-D)	₹7,00,000	₹9,00,000	₹9,50,000
Investment in receivables (see working notes) (F)	₹1,91,667	₹4,50,000	₹7,37,500
Expected return on receivables at 20% (G)	₹38,333	₹90,000	₹1,47,500
Bad Debts (H)	₹30,000	₹1,08,000	₹1,95,000
Net Profit (I=E-G-H)	₹6,31,667	₹7,02,000	₹6,07,500
Increase in profits	-	₹70,333	₹(-)94,500

As 2 months credit policy yield higher return, it should be adopted.

Working Notes:

Calculation showing investments in receivables:

$$\text{Formula} = \frac{\text{VariableCost} + \text{FixedCost}}{12} \times \text{No.ofmonthscredit}$$

Investment :

1 month: (₹23,00,000/12) × 1 = ₹1,91,667

2 months: (₹27,00,000/12) × 2 = ₹4,50,000

3 months: (₹29,50,000/12) × 3 = ₹7,37,500

4. (a) The following information has been extracted from the records of a company:

Product Cost sheet	₹/ unit
Raw Materials	45
Direct labour	20
Overheads	40
Total	105
Profit	15
Selling Price	120

- **Raw materials are in stock on an average of two months.**
- **The materials are in process on an average for 4 weeks. The degree of completion is 50%.**
- **Finished goods stock on an average is for one month.**
- **Time lag in payment of wages and overheads is $1^1/_2$ weeks.**
- **Time lag in receipt of proceeds from debtors is 2 months.**
- **Credit allowed by suppliers is one month.**
- **20% of the output is sold against cash.**
- **The company expects to keep a cash balance of ₹2,00,000.**
- **Take 52 weeks per annum.**

The company is poised for a manufacture of 1,50,000 units in the year. You are required to prepare a statement showing the Working Capital requirements of the Company. [7]

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

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

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

What is the net advantage of leasing for ABC Limited?

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

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

[8]

Answer 4. (a)

Statement showing the Working Capital Requirement

Current Assets:	₹
Stock of raw materials [₹67,50,000/ 12 months] × 2 months	11,25,000
Work-in –progress [(₹1,57,50,000 × 4) /52 months] × 50%	6,05,769
Finished Goods (₹ 1,57,50,000 /12)	13,12,500
Debtors (₹ 30,00,000 × 80%)	24,00,000
Cash Balances	2,00,000
Total (CA)	56,43,269
Current Liabilities	
Creditors of raw materials (₹ 67,50,000 /12 months)	5,62,500
Creditors for wages & overheads $\frac{₹90,00,000}{52 weeks} \times 1.5$ weeks	2,59,615
Total(CL)	8,22,115
Net Working Capital (CA-CL)	48,21,154

Working Notes:

1.

Annual raw materials requirements(₹) 1,50,000 units × ₹45	₹67,50,000
Annual direct labour cost (₹) 1,50,000 units × ₹20	₹30,00,000
Annual overhead cost (₹) 1,50,000 units × ₹40	₹60,00,000
Total Cost (₹)	₹1,57,50,000

2.

Total Sales: (1,50,000 units × ₹120)	₹1,80,00,000
Two months sales (₹1,80,00,000 /6 months)	₹30,00,000

Answer 4. (b)

Calculation of NPV if car is acquired on Finance Lease

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

Calculation of Depreciation of WDV Basis

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

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

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

5. A large profit making company is considering the installation of a machine to process the waste produced by one of its existing manufacturing process to be converted into a marketable product. At present, the waste is removed by a contractor for disposal on payment ₹60 lakhs per annum for the next four years. The contract can be terminated upon installation of the aforesaid machine on payment of a compensation of ₹30 lakhs before the processing operation starts. This compensation is not allowed as deduction for tax purposes.

The machine required for carrying out the processing will cost ₹200 lakhs to be financed by a loan repayable in 4 equal instalments commencing from the end of year 1. The interest rate is 16% per annum. At the end of the 4th year, the machine can be sold for ₹ 20 lakhs and the cost of dismantling and removal will be ₹15 lakhs.

Sales and direct costs of the product emerging from waste processing for 4 years are estimated as under:

(₹ in lakhs)

Year	1	2	3	4
Sales	322	322	418	418
Material consumption	30	40	85	85
Wages	75	75	85	85
Other Expenses	40	45	54	70
Factory Overheads	55	60	110	145
Depreciation (as per income-tax rules)	50	38	28	21

Initial stock of materials required before commencement of the processing operations is ₹ 20 lakhs at the start of year 1. The stock levels of materials to be maintained at the end of year 1, 2 and 3 will be ₹ 55 lakhs and the stock at the end of year 4 will be nil. The storage of materials will utilize space which would otherwise have been rented out for ₹10 lakhs per annum. Labour costs include wages of 40 workers, whose transfer to this process will reduce idle time payments of ₹15 lakhs in year 1 and ₹ 10 lakhs in year 2. Factory overheads include apportionment of general factory overheads except to the extent of insurance charges of ₹30 lakhs per annum payable on this venture. The company's tax rate is 35%.

Present value factors for four years are as under:

Year	1	2	3	4
Present value factors	0.870	0.756	0.658	0.572

Advise the management on the desirability of installing the machine for processing the waste. All calculations should form part of the answer. [15]

Answer 5.

Statement of Incremental Profit (₹ in lakhs)

Years	1	2	3	4
Sales (A)	322	322	418	418
Material consumption	30	40	85	85
Wages	60	65	85	100
Other Expenses	40	45	54	70
Factory Overheads (Insurance)	30	30	30	30
Loss of rent	10	10	10	10
Interest	32	24	16	8
Depreciation(as per income-tax rules)	50	38	28	21
Total Cost (B)	252	252	308	324
Incremental profit(C=A-B)	70	70	110	94

Tax (35% of C)	24.5	24.5	38.5	32.9

Statement of Incremental Cash Flows (₹ in lakhs)

Years	0	1	2	3	4
Material stocks	(20)	(35)	-	-	-
Compensation for contract	(30)	-	-	-	-
Contract payment saved	-	60	60	60	60
Tax on contract payment	-	(25)	(25)	(25)	(25)
Incremental profit	-	70	70	110	94
Depreciation added back	-	50	38	28	21
Tax on profits	-	(24.5)	(24.5)	(38.5)	(32.9)
Loan repayment	-	(50)	(50)	(50)	(50)
Profit on sale of machinery(net)	-	-	-	-	5
Total incremental cash flows	(50)	45.5	68.5	84.5	72.1
Present value factor	1.00	0.870	0.756	0.658	0.572
Net present value of cash flows	(50)	39.585	51.786	55.601	41.2412

Net present value= ₹188.2132 - ₹50 = ₹138.2132 lakhs.

Advice: Since the net present value of cash flow is ₹138.2132 lakhs which is positive the management should install the machine for processing the waste.

Notes:

(i) Materials stock increase is taken in cash flows.

(ii) Idle –time wages have also been considered.

(iii) Apportioned factory overheads are not relevant only insurance charges of this project are relevant.

(iv) Interest calculated at 16% based on 4 equal installments of loan repayment.

(v) Sale of machinery- Net income after deducting removal expenses taken. Tax on capital gains ignored.

(vi) Saving in contract payment and income-tax there on considered in the cash flows.

6. (a) Define Swap. State the reasons why swaps are becoming popular. [1+4]

(b) Write short note on trading blocks. [5]

(c) Explain the major functions and features of WTO. [5]

Answer 6. (a)

Swap in finance means an exchange of one obligation with another. Financial swaps are a funding technique, which permit a borrower to access one market or instrument and exchange the liability for another market or instrument. Investors can exchange one type of risk with another.

Swaps are increasingly becoming popular for the following reasons:

(i) Difference in borrowers and investors preferences and market access

(ii) A low cost device to achieve certain objectives, which can be achieved by other means but at a higher cost

(iii) Market saturation i.e. lack of availability of the desired currency due to saturation.

(iv) Differences in financial norms followed by different countries.

Answer 6. (b)

A trading block is preferential economic arrangement between a group of countries that reduces intra-regional barriers to trade in goods, services , investment and capital . There are more than 50 such arrangements at the present time. There are five major forms of economic cooperation among countries. Free trade areas, customs unions, common markets, economic unions and political unions.

The North American Free Trade Agreement(NAFTA) among US,Canada and Mexico is an example of free trade areas where member countries remove all trade barriers among themselves.

Under the customs union arrangement, member nations not only abolish internal tariffs among themselves but also establish common external tariffs.

In common market type of agreement, member countries abolish internal tariffs among themselves and levy common external tariffs. Also allow the free flow of all factors of production, such as capital, labour and technology.

The economic union combines common market characteristics with harmonization of economic policy. Member nations are required to pursue common monetary and fiscal policies.

Political union combines economic union characteristics with political harmony among the member countries.

Answer 6. (c)

(i) World Trade Organization (WTO), was formed in 1995, head quartered at Geneva, Switzerland.

(ii) It has 152 member states

(iii) It is an international organization designed to supervise and liberalize international trade .

(iv) It succeeds the General Agreement on Tariffs and Trade

(v) It deals with the rules of trade between nations at a global level

(vi) It is responsible for negotiating and implementing new trade agreements and is in charge of policing member countries adherence to all the WTO agreements, signed by the bulk of the world's trading nations and ratified in their parliaments.

(vii) Most of the WTO's current work comes from the 1986-94 negotiations calledthe Uruguay Round and earlier negotiations under the GATT.

(viii) Governed by a Ministerial Conference, which implements the conference's policy decisions and is responsible for day-to-day administration and a director-general is appointed by the Ministerial Conference.

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

(ii) On April1, 3 months interest rate in the UK £ and US $ are 7% and 3% per annum respectively. The UK £ /US $ spot rate is 0.7570. What would be the forward rate for US $ for delivery on 30th June? [4+3]

(b) The following market data is available:

Spot USD/JPY 116

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

Forward Rate Agreement (FRA) FOR Yen is Nil.

1. The 6&12 months LIBORS are 5% & 6.5% respectively. A bank is quoting 6/12 USD FRA at 6.50-6.75%. Is any arbitrage opportunity available?

Calculate profit in such case. [8]

Answer 7. (a)

(i) According to Purchasing Power Parity forward rate is

$$\text{Spot rate} \left[\frac{1+r_H}{1+r_F}\right]^t$$

So spot rate after one year

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

$$= ₹\ 43.40\ (1.03399)$$

$$= ₹\ 44.8751$$

After 3 years

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

$$= ₹\ 43.40\ (1.03398)^3$$

= ₹ 43.40 (1.10544) = ₹ 47.9761

(ii) As per interest rate parity

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

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

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

= £ 0.7570 x 1.0099 = £0.7645

= UK £ 0.7645 / US$

Answer 7. (b)

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

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

(1+0.065) = (1+0.05*6/12) x (1+$i_{6.6}$ *6/12)

$i_{6.6}$ = [(1+0.065/1.025) – 1] *12/6

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

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

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

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

To get	$ 1.065 at the end of 12 months for $ 1 invested today
To pay	$ 1.060# at the end of 12 months for every $ 1 Borrowed today
Net gain	$ 0.005 i.e. risk less profit for every $ borrowed

(1+0.05/2) (1+.0675/2) = (1.05959) say 1.060

8. A local record company is considering an investment in a new ₹40,000 CD-pressing machine so that it can start making CDs. The machine has an economic life of 5 years and it is depreciated by a straight-line method towards a zero salvage value. The company currently faces a cost of capital of 12%, and its corporate tax rate is 35%. The financial manager knows that there are 20%, 70% and 10% chances that the best case, normal case and worst case scenarios will take place.

	Best	Normal	Worst
CD unit sales	**3,000**	**2,400**	**1,800**
Price per CD	**₹18**	**₹16**	**₹11**

Variable cost	**₹8**	**₹9**	**₹10**
Machine modification cost	**₹3,000**	**₹3,700**	**₹4,200**

Calculate the NPV of the project for each of the three scenarios. What is your conclusion about the project? [15]

Answer 8.

Initial investment

	Best	**Normal**	Worst
Cost of machine	- ₹40,000	- ₹40,000	- ₹40.000
Modification cost	-₹3,000	-₹3,700	-₹4,200
Total	- ₹43,000	- ₹43,700	₹44,200

Annual after-tax net operating cash flows

We need to first determine the machine's annual depreciation and tax shield for each scenario using the information in (a) as follows:

	Best	**Normal**	**Worst**
Total cost of machine	₹43,000	₹43,700	₹44,200
Annual depreciation	₹8,600	₹8,740	₹8,840
Annual tax shield	₹3,010	₹3,059	₹3,094

Next, we will need to determine the project's operating cash flows based on the revenues and operating expenses generated by the new CD-pressing machine.

	Best	**Normal**	**Worst**
Revenue	₹54,000	₹38,400	₹19,800
Expenses	₹24,000	₹21,600	₹8,000
Operating cash flow	₹30,000	₹16,800	₹1,800

Once we have the determined the after-tax operating cash flows using the above information, we can add the tax shield to get the annual total cash flows as follows:

	Best	**Normal**	**Worst**
After-tax operating CF	₹19,500	₹10,920	₹1,170
Annual tax shield	₹3,010	₹3,059	₹3,094
Total cash flow	₹22,510	₹13,979	₹4,264

NPVs of the projects

Now we can determine the NPVs of the project (with a cost of capital of 12%) in the three different scenarios.

Scenarios	**NPV**
Best*	₹ 38,143.51

Normal*	₹ 6,691.17
Worst*	- ₹ 28,829.23

* NPV = - Cash Outflow (Cost & Mod. Cost) + PVIFA (12%, 5) x Total Cash Flow

Determining the expected NPV and standard deviation of the project

ENPV = 38143.51 x 0.2 + 6691.17 x 0.7 + (-28829.23) x 0.1 = ₹ 9429.60

$$\sigma_{NPV} = \sqrt{38143.51 - 9429.6^2 \times 0.2 + 6691.17 - 9429.6^2 \times 0.7 + -28829.23 - 9429.6^2 \times 0.1}$$

= ₹ 17,791.03

So, the project of purchasing the CD-pressing machine has an expected NPV of ₹ 9,429.60 and a standard deviation of ₹ 17.791.03