Paper 2: Strategic Financial Management

Test series: April, 2012

1. a) Annual return = dividends + capital gain / base year NAV

or, $\frac{D_1 + CG_1 + (NAV_1 - NAV_0)}{NAV_0}$

Where,

D_1 = Dividend = `0.04 x 5 unit i.e. **`0.20**

CG_1 = Realised capital gain = `0.45

$NAV_1 - NAV_0$ = Unrealised capital gain = `0.45 x 0.30 i.e. **`0.135**

NAV_0 = Base NAV = `20

NAV_1 = Unrealised capital gain + NAV0 = 0.135 + 20 = `20.135

Workings:

(i) Annual Return = $\frac{\text{Dividend + Capital Gains}}{NAV_0} \times 100 = \frac{0.20 + 0.45}{20} \times 100$ = 3.25% per month or **39% p.a.**

(ii) Expense Ratio = $\frac{\text{Expense per unit}}{\text{Average NAV}} = \frac{`0.50}{`20.0675^*} \times 100$ = **2.49%**

***** Average NAV = 20 + 20.135/2 = `20.0675

b) (i) Market price of bond = 120(PVIFA 17%,6) + 1,000 (PVIF 17%,6)

= 120(3.589) + 1,000 (0.39)

= 430.68 + 390 = `820.68

Macaulay Duration

Year	Cash flow	PVIF @ 17%	P.V.	Proportion of bond value	Proportion x time
1	120	0.855	102.60	0.125	0.125
2	120	0.731	87.72	0.107	0.214
3	120	0.624	74.88	0.091	0.273
4	120	0.534	64.08	0.078	0.312
5	120	0.456	54.72	0.067	0.335
6	1120	0.390	436.80	0.532	3.192
			820.80	**1.000**	**4.451**

Duration of bond is 4.451 years

(ii) **Modified Duration** = $\frac{\text{Macaulay Duration}}{(1+ YTM)}$

= $\frac{4.451}{1 + 0.17} = \frac{4.451}{1.028}$ = **3.80 years**

c) (i) **Under stepped up plan :**

Let the lease rent be LR

3.00 = LR x PVIF (10, 1) + 1.08LR x PVIF (10, 2) + 1.166LR x PVIF (10, 3)

or, 3.00 = 0.909LR + 0.892LR + 0.876LR

Hence **LR = `1.12 crores per year.**

(ii) **Under deferred plan:**

3.00 = LR x PVIF (10, 3)

or, 3.00 = 0.751LR

Hence **LR = `3.99 crores per year.**

d) Interest rate parity (IRP): It is theory which states that 'the size of forward premium/ discount should be equal to the difference of interest rate between two countries. When this parity exists interest arbitrage is not feasible because an interest rate advantage in the foreign country will be covered by the discount on the forward rate.

Equation of IRP:

$1+r_D = \frac{F}{S}(1+ r_F)$

Where, r_D = rate of interest in domestic market

r_F = rate of interest in foreign market

F = forward rate

S = spot rate

Purchasing power parity (PPP): This theory focuses on the 'inflation – exchange rate' relationship. There are two forms of PPP:

ABSOLUTE FORM: It is also called "Law of One Price" suggests that "prices of similar products of two different countries should be equal when measured in a common currency".

RELATIVE FORM: It is an alternative version that accounts for the possibility of market imperfections such as transportation costs, tariffs, and quotas. It suggests that because of these market imperfections, prices of similar products of different countries will not necessarily be the same when measured in a common currency.

Equation of PPP:

$(1+ i_F) = \frac{S}{F}(1+i_D)$

Where, i_D = rate of inflation in domestic country

i_F = rate of inflation in foreign country

F = forward rate

S = spot rate

2. (a) Working Notes :

Particulars	**Sun Ltd.(`)**	**Moon Ltd.(`)**
Profit before interest	18,000	18,000
Less : Interest	3,600	--
Net profit	14,400	18.000
Dividends per share	14,400 / 90,000 = `0.16	18,000 / 1,50,000 = `0.12
Market price per share = Market capitalization / No. of equity shares	1,08,000 / 90,000 = `1.20	1,50,000 / 1,50,000 = `1.00

(i) Present income of the investor holding 10% shares in Sun Ltd.:
90,000 x 10% = 9,000 shares
9,000 shares x 0.16 = `1,440(dividend)
He will sell the shares in market and get `10,800(9,000 x 1.20). The same amount will be invested in Moon Ltd. and he will purchase shares at `1.00 per share. He will get dividend of `1,296 (10,800 x 0.12).
Advise: An investor will not be better off in switching his holding to Moon Ltd. hence he should hold shares Star Ltd.

(ii) Assumptions of MM Approach:

1. Existence of perfect capital market, where all investors are rational.
2. No tax differential between dividend income and capital gain.
3. Transaction and flotation cots do not exist.
4. There is no risk and uncertainty.
5. The firm has fixed investment policy.
6. Securities are infinity divisible.
7. The cost of equity is equal to shareholders' expectations.

(b) Calculation of unlevered beta:

$$\beta_U = \frac{\beta_L}{[1 + (1-T)\, D/E]}$$

Company	Unlevered Beta
ECO Ltd.	$\frac{1.1}{[1 + (0.75)\ 0.3]} = 0.8979$
FLASH Software's Ltd.	$\frac{1.0}{[1 + (0.75)\ 0.2]} = 0.8696$
AB & Co.	$\frac{0.95}{[1 + (0.75)\ 0.3]} = 0.8979$

Average Unlevered Beta = 0.8477

(i) **Calculation of levered beta(beta of the project):**

β_u calculated above can be taken as proxy for unlevered beta of the project. Levering this β_u, we get:

$$\beta_L = \frac{\beta_u}{[1 + (1-T)\ D/E]}$$

$$= \frac{0.8477}{[1 + (0.75)0.33]} = 0.6795$$

(ii) **K_o**

Calculation of cost of equity:

$K_e = R_f + \beta_L (R_m - R_f)$

$= 0.10 + 0.6795(0.15 - 0.10)$

$= 0.1340$ or 13.4%

Project's WACC (K_o):

Source	Weight (1)	Cost (2)	Weighted cost (1) x (2)
Debt	0.33	0.12	0.33x0.12 = 0.03960
Equity	0.67	0.134	0.67x0.134 = 0.08978
			0.12938

Therefore overall cost of capital of the project is 12.94%.

3. a)

(i) $\beta_{co.} = \beta_{equity} \times \frac{\text{Value of equity(Ve)}}{\text{Total capital (Vo)}} + \beta_{debt} \times \frac{\text{Value of debt(Vd)}}{\text{Total capital (Vo)}}$

Since beta of debt is not given **it is assumed that** debt capital of the company is virtually riskless.

Here, $\beta_{equity} = \beta_{assets} = 1.5$

$B_{debt} = 0$

Ve = `80 lakhs

Vd = `20 lakhs

Vo = `100 lakhs

$$\beta_{co.} = 1.5 \times \frac{80}{100} + 0 \times \frac{20}{100} = 1.20$$

(ii) $K_e = R_f + \beta \times$ risk premium

$= 0.06 + 1.20 \times 0.10 = 0.18$ or 18%

In case of expansion of the company's present business, the same rate of return i.e. 18% will be used. however, in case of diversification into new business the risk profile of new business is likely to be different. Therefore, different discount factor has to be worked out for such business.

b)

WACC:

Parameters	High Growth	Stable Growth
$K_e = R_f + \beta\ (R_m - R_f)$	0.10 + 1.15(0.16 – 0.10) = 0.169	0.09 + 1 (0.14 – 0.09) = 0.14
K_d	9.10%	9%

Cost of capital (K_o)	0.5 x 0.169 + 0.5 x 0.091 = 0.13 or 13%	0.6 x 0.14 + 0.4 x 0.090 = 0.12 or 12%

Future cash flows of the firm: **(` in crores)**

Particulars	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Terminal year**
Revenue	2,400.00	2,880.00	3456.00	4,147.20	4,561.92
EBIT	360.00	432.00	518.40	622.08	684.29
EAT	252.00	302.40	362.88	435.46	479.00
Capital Exp. less Depreciation	96.00	115.20	138.24	165.89	-
Changes in working capital	100.00	120.00	144.00	172.80	103.68
Free cash flows	**56.00**	**67.20**	**80.64**	**96.77**	**375.32**

Present value of cash flows during the explicit period:

Particulars	**PVIF @ 13%**	**Present value(` in crores)**
56.00	0.885	49.56
67.20	0.783	52.62
80.64	0.693	55.88
96.77	0.613	59.32
		217.38

Terminal value of cash flows = $\frac{375.32}{0.12 - 0.09}$ = `12,510.67 crores

Present value of terminal value = 12,510.67 x $\frac{1}{(1.13)^4}$ = `7673.02 crores

Value of firm = 217.38 + 7673.02 = `7,890.40 crores

4. a) Let **x** be the new 10% debt which would be sold under each of the three given conditions. Now the value of **x** under each of the three conditions is as follows:

A. Pre - tax interest coverage $\left(\frac{\text{Income before tax + Bond int.}}{\text{Bond interest}}\right)$ **remains greater than 4**

i.e. $\frac{\text{` 200 lacs} + \text{`800 lacs x 0.1} + \mathbf{x} \text{ x 0.1}}{1 - 0.4} = 4$

$\frac{}{(\text{` 800 lacs x 0.1}) + (\mathbf{x} \text{ x 0.1})}$

Or, $\frac{\text{`333 lacs} + \text{`80 lacs} + 0.10\,\mathbf{x}}{\text{`(80 lacs} + 0.10\,\mathbf{x})} = 4$

Or, `413 lacs + 0.10 **x** = 4(`80 lacs + 0.10 **x**)

x = `310 lacs

B. Net depreciated value of mortgage assets remains twice the amount of mortgaged debt *

i.e. $\frac{\text{`3000 lacs} + 0.5\,\mathbf{x}}{\text{`800 lacs} + \mathbf{x}} = 2$

Or, `3000 lacs + 0.5 **x** = 2**(**`800 lacs + **x**)

Or, `1.5 **x** = `1400 lacs

Or, **x** = $\frac{\text{`1400 lacs}}{1.5}$ = `933 lacs

Additional mortgage reqd. to satisfy condition no. B is ` 933 lacs.

C. Debt equity ratio remains below 5 #

i.e. $\frac{\text{` 800 lacs} + \mathbf{x}}{\text{` 4000 lacs}} < 5$

Or, `800 lacs + **x** = `20,000 lacs

Or, **x** = `19200 lacs

Since all the conditions are not to be met, the least i.e. `310 lacs (condition **B**) can be borrowed by issuing additional bonds.

Notes and assumptions:

***** Assuming that half of the proceeds of new issue would be added to the base of mortgaged assets.

since in the question, it is given that D/E ration remains below 5, the value of debt is computed by using this condition. However, the new additional debt (**x**) is exorbitant and is not comparable with the value of new additional debt (**x**) computed under conditions **A** and **B.** For getting the comparable value new additional debt the D/E ratio should be read as 0.5. Accordingly, value of additional debt would be `1200 lacs.

b)

Year	R_M	R_m	$R_M - \overline{R}_M$	$R_m - \overline{R}_m$	$(R_M - \overline{R}_M) \times (R_m - \overline{R}_m)$	$(R_m - \overline{R}_m)^2$
1	15	6	11	4.25	46.75	18.06
2	10	3	6	1.25	- 7.50	1.56
3	2	-14	-2	-15.75	31.50	248.06
4	-11	12	-15	10.25	153.75	105.06
Σ	**16**	**7**			**239.50**	**372.74**

$\overline{R}_M = 16/4 = 4$

$\overline{R}_m = 7/4 = 1.75$

$\sigma^2_m = \frac{\Sigma (R_m - \overline{R}_m)^2}{n} = 372.74/4 = 93.19$

$Cov_{Mm} = \frac{(R_M - \overline{R}_M) \times (R_m - \overline{R}_m)}{n} = 239.50/4 = 59.88$

$\beta_m = \frac{Cov_{Mm}}{\sigma^2_m} = 59.88/93.19 = 06426$

$\overline{R}_M = 4, \overline{R}_m = 1.75$

$y = \alpha + \beta x$

or, $4 = \alpha + 0.6426 \times 1.75$

Alpha (α) = 2.875 or 2.88

Characteristic line for security $x = \alpha + R_m$

$= 2.88 + 0.6426\ R_m$

5. a)

(i) Forward contract:

Amount reqd. in 6 months = £ 3,00,000 x $ 1.96 = $ 5,88,000

(ii) Money market hedge:

Amount reqd. to be borrowed = $ 3,00,000

This amount will be converted into £

Amount in £ to be invested = 3,00,000/1.045 = £ 2,87,081

Interest and principal on $ after 6 months:	Amt ($)
Principal (using spot rate): 2,87,081 x 2	5,74,162
Add: Interest (5,74,162 x 5.5%)	31,579
Repayment amt.	6,05,741

(iii) Call option:

Expected spot rate in 6 months **(1)**	Premium/ unit **(2)**	Exercise option	Total price / unit **(3)=(1)+(2)**	Total price £ 3,00,000 x (3) **(4)**	Probability **(5)**	Amount (£) **(6)=(4)x(5)**
1.91	0.04	No	1.95	5,85,000	0.25	1,46,250
1.95	0.04	No	1.99	5,97,000	0.60	3,58,200
2.05	0.04	Yes	2.01	6,03,000	0.15	90,450
						5,94,900

(iv) No hedging:

Expected future spot rate (1)	Dollar needed $ 3,00,000 x (1) (2)	Probability (3)	Amount ($) (4) = (2) x (3)
1.91	5,73,000	0.25	1,43,250

1.95	5,85,000	0.60	3,51,000
2.05	6,15,000	0.15	92,250
			5,86,500

The probability distribution of outcomes for no hedge strategy appears to be preferable because least number of $ are needed under this option to arrange £ 3,00,000.

b) As per Black – Scholes Model, Value of call option(C) = $S\,N(d_1) - \frac{E}{e^{rt}}\,N(d_2)$

$= 95 \times 0.81827 - [89 \times 0.98757 \times 0.79348]$
$= 77.73565 - 69.74192$
$= 7.99$ or ` 8

Working notes:

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

$= \frac{\ln(95/89) + [0.05 + 0.5 \times (0.18)^2]0.25}{0.18 \times \sqrt{0.25}}$

$= \frac{\ln 1.06742 + [0.05 + 0.0162]0.25}{0.09}$

$= \frac{0.06524^* + 0.01655}{0.09}$

$= 0.90878$

* Using linear interpolation, we get:

$\ln(95/89) = 0.05827 + \frac{0.00939}{0.01} \times 0.00742$

$d_2 = d_1 - \sigma\sqrt{t}$
$= 0.90878 - 0.09$
$= 0.81878$

(ii) Area under normal curve:
Using linear interpolation, we get

$N(d_1) = 0.8051 + \frac{0.0135}{0.05} \times 0.04878 = 0.8051 + 0.01317 = 0.81827$

$N(d_1) = 0.7910 + \frac{0.0141}{0.05} \times 0.00878 = 0.7910 + 0.00248 = 0.79348$

(iii) e^{-rt} or $\frac{1}{e^{rt}} = \frac{1}{1.01259} = 0.98757$

6. a)

(i) Conversion value of bond
= Market price of share x Conversion ratio
= `12 x 20 = `240

(ii) Conversion premium per share
= Market Conversion Price – Conversion value
= `265 – `240 = `25

(iii) Ratio of Conversion premium
$= \frac{\text{Conversion premium per share}}{\text{Market price of share}}$

(iv) Conversion parity price of the stock
$= \frac{\text{Bond price}}{\text{Conversion ratio}} = \frac{`265}{20} = `13.25$

b)

(i) Implicit rates for year 2 and year 3

For year 2 $f_2 = \frac{(1+r_2)^2}{1+r_1} - 1$

$$= \frac{(1.1125)^2}{(1.1050)} - 1 = 12\%$$

For year 3 $$f_3 = \frac{(1+r_3)^3}{(1+r_1)(1+f_2)} - 1$$

$$= \frac{(1.12)^3}{(1.1050)(1.12)} - 1$$

$$= \frac{1.404928}{1.2376} - 1$$

$$= 13.52\%$$

(ii) If fairly priced at `1000 and rate of interest increases to 12.50%:

Price = $\frac{1000(1.12)^5}{(1.125)}$ = `978

% change = $\frac{1000 - 978}{1000} \times 100 = 2.20\%$

7. a) Differential inflation = 8% – 4% = 4%

End of year	`	`/$
1	`46.00 x 1.04	47.84
2	`47.84 x 1.04	49.75
3	`49.75 x 1.04	51.74
4	`51.74 x 1.04	53.81

Note: It is assumed that change in inflation rate is reflected at the end of each year.

b) **Forfeiting:** Forfeiting was developed to finance medium to long term contracts for financing capital goods. It is now being more widely used in the short-term also especially where the contracts involve large values. There are specialized finance houses that deal in this business and many are linked to some of main banks . The benefits are that the exporter can obtain full value of his export contract on or near shipment without recourse. The importer on the other hand has extended payment terms at fixed rate finance.

Factoring: It can be defined as an agreement in which receivables arising out of sale of or services are sold by a firm to the factor as a result of which the title to the goods or services represented by the said receivables passes on to the factor. Henceforth, the factor becomes responsible for all credit control, sales accounting and debt collection from the customer.

c)

(i) **Arbitrage Operations:** Arbitrage is the buying and selling of the same commodity in the different markets. These transactions refer advantage derived in foreign currencies by taking the benefits between two currencies at two different centers at the same time or of difference between cross rates and actual rates.

(ii) **Step I**

Buy XYZ stock at `220 by borrowing at 15% for 3 months. Therefore the outflows are:

	`
Cost of stock	220.00
Add: Interest @ 15% for 3 months or 0.25 yrs (220 x 0.15 x 0.25)	8.25
Total outflows	228.25

Step II

Sell 3 month futures at `230. Therefore the inflows are:

	`
Sale proceeds of futures	230.00
Dividend for stock (`10 x 25%)	2.50
Total inflows	232.50

Profit earned by arbitrageur = Inflows – outflows

= 232.50 – 228.25 = `4.25

d) Demerits of investing in mutual fund:

- There is no guarantee of return and investment in mutual fund may depreciate in value which even effect principal amount.
- Investments are subject to different types of hidden costs.
- It lacks transparency.
- There is no guarantee about future performance as mutual fund performance is judged on the basis of past performance record of various companies.
- Many mutual fund schemes are, at times, subject to lock in period, therefore, deny the market drawn benefits.
- It does facilitate ease in redressal of grievances.
- When making decisions about your money, MF managers don't consider your personal taxation situation.

e) Green shoe option: It is an option that allows the underwriting of an initial public offer(IPO) to sell additional shares if the demand is high. It can be understood as an option that allows underwriter for a new issue to buy and resell additional shares up to a certain pre – determined quantity. In common parlance, it is the retention of over-subscription to a certain extent. It is a special feature of euro-issues. In euro-issues the international practices are followed.

In the Indian context, green shoe option has a limited connotation. SEBI guidelines governing public issues contain appropriate provisions for accepting over-subscriptions, subject to a ceiling, say, 15% of offer made to public. In certain situations, the green-shoe option can even be more than 15%. Recently, Infosys Technologies has exercised the green shoe option to purchase up to 7,82,000 additional ADSs representing 3,91,000 equity shares. This offer initially involved 5.22 million depository shares, representing 2.61 million domestic equity shares.