Chapter wise Test (2001)
Cost of Capital

Instructions

- All questions are compulsory.
- Test Duration will be one hour, starting from 11:00 AM to 12:00 AM
- 5 minutes reading time will be provided before 11, i.e. question paper will be shared by 10:55 AM.
- Share your scanned answer sheets by 12:05 on below link

https://forms.gle/wLRZWiTvMELNpCeC6

1. A company issues:
   - 15% convertible debentures of Rs. 100 each at par with a maturity period of 6 years. On maturity, each debenture will be converted into 2 equity shares of the company. The risk-free rate of return is 10%, market risk premium is 18% and beta of the company is 1.25. The company has paid dividend of Rs. 12.76 per share. Five years ago, it paid dividend of Rs. 10 per share. Flotation cost is 5% of issue amount.
   - 5% preference shares of Rs. 100 each at premium of 10%. These shares are redeemable after 10 years at par. Flotation cost is 6% of issue amount.

Assuming corporate tax rate is 40%.

(i) CALCULATE the cost of convertible debentures using the approximation method.

Use YTM method to CALCULATE cost of preference shares. [10 marks]

Solution:

(i) Calculation of Cost of Convertible Debentures:

Given that,

R_F = 10%

$R_m - R_f$ = 18%

B = 1.25

D_0 = 12.76

D_5 = ₹ 10

Flotation Cost = 5%

Using CAPM,

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

= 10%+1.25 (18%)

= **32.50%**

Calculation of growth rate in dividend

$12.76 = 10 (1+g)^5$

$1.276 = (1+g)^5$

$(1+5\%)^5$ = 1.276 ..... from FV Table

g = **5%**

Price of share after 6 years = $\frac{D_7}{k_e - g} = \frac{12.76(1.05)^7}{0.325 - 0.05}$

$P_6 = \frac{12.76 \times 1.407}{0.275}$

P_6 = 65.28

Redemption Value of Debenture (RV) = 65.28 × 2 = **130.56** (RV)

NP = 95

n = 6

$$K_d = \frac{INT(1-t)+\left(\frac{RV-NP}{n}\right)}{\frac{(RV-NP)}{2}} \times 100$$

$$= \frac{15(1-0.4)+\frac{(130.56-95)}{6}}{\frac{(130.56+95)}{2}} \times 100$$

$$= \frac{9+5.93}{112.78} \times 100$$

K_d = 13.24%

(ii) Calculation of Cost of Preference Shares:

Net Proceeds = 100 (1.1) - 6% of 100 (1.1)

= 110 - 6.60

= 103.40

Redemption Value = 100

Year	Cash Flows (₹)	PVF @ 3%	PV (₹)	PVF @ 5%	PV (₹)
0	103.40	1	103.40	1	103.40
1-10	-5	8.530	-42.65	7.722	-38.61
10	-100	0.744	-74.40	0.614	-61.40
			-13.65		**3.39**

$$K_p = 3\% + \frac{5\%-3\%}{[(-13.65)-3.39]} X -13.65$$

$$= 3\% + \frac{2\%}{17.04} \times 13.65$$

K_p = 4.6021%

2. Capital structure of D Ltd. as on 31st March, 2023 is given below:

Particulars	Rs.
Equity share capital (Rs. 10 each)	30,00,000
8% Preference share capital (Rs. 100 each)	10,00,000
12% Debentures (Rs. 100 each)	10,00,000

- Current market price of equity share is Rs. 80 per share. The company has paid dividend of Rs. 14.07 per share. Seven years ago, it paid dividend of Rs. 10 per

share. Expected dividend is Rs. 16 per share.

- 8% Preference shares are redeemable at 6% premium after five years. Current market price per preference share is Rs. 104.
- 12% debentures are redeemable at 20% premium after 10 years. Flotation cost is Rs. 5 per debenture.
- The company is in 40% tax bracket.

- In order to finance an expansion plan, the company intends to borrow 15%

Long-term loan of Rs. 30,00,000 from bank. This financial decision is expected to increase dividend on equity share from Rs. 16 per share to Rs. 18 per share. However, the market price of equity share is expected to decline from Rs. 80 to Rs. 72 per share, because investors' required rate of return is based on current market conditions.

Required:

(i) Determine the existing Weighted Average Cost of Capital (WACC) taking book value weights.

(ii) Compute Weighted Average Cost of Capital (WACC) after the expansion plan taking book value weights.

Interest Rate	1%	2%	3%	4%	5%	6%	7%
FVIFi,5	1.051	1.104	1.159	1.217	1.276	1.338	1.403
FVIFi,6	1.062	1.126	1.194	1.265	1.340	1.419	1.501
FVIFi,7	1.072	1.149	1.230	1.316	1.407	1.504	1.606

[10 Marks]

Solution:

(i) (a) Growth rate in Dividends

14.07 = 10 x FVIF (i,7 years)

FVIF (i,7 years) = 1.407

FVIF (5%, 7 years) = 1.407

i = 5%

Growth rate in dividend= 5%

(b) Cost of Equity

$$Ke = \frac{D_1}{P_0} + g$$

$$Ke = \frac{16}{80} + 0.05$$

$$Ke = 25\%$$

(c) Cost of Preference Shares

$$Kp = \frac{PD + \frac{(RV-NP)}{n}}{\frac{(RV+NP)}{2}}$$

$$Kp = \frac{8 + \frac{(106-104)}{5}}{\frac{(106+104)}{2}}$$

$$Kp = 8.4/105$$

$$Kp = 8\%$$

(d) Cost of Debt

$$Kd = \frac{I(1-t) + \frac{(RV-NP)}{n}}{\frac{(RV+NP)}{2}}$$

$$Kd = \frac{12(1-0.4) + \frac{(120-95)}{10}}{\frac{(120+95)}{2}}$$

Calculation of existing Weighted Average Cost of Capital (WACC)

Capital	Amount (₹)	Weights	Cost	WACC
Equity Share Capital	30,00,000	0.6	25%	15.00%
Preference Share Capital	10,00,000	0.2	8%	1.60%
Debenture	10,00,000	0.2	9.02%	1.80%
	50,00,000	1		**18.40%**

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Alternative presentation

(i) Computation of existing WACC on book value weights

Source (1)	Book value (₹) (2)	Weight (3)	Cost of capital (%) (4)	Product (2) x (4)
Equity share capital	30,00,000	0.60	25	7,50,000
Preference share capital	10,00,000	0.20	8	80,000
Debentures	10,00,000	0.20	9.02	90,200
Total	**50,00,000**	**1.00**		**9,20,200**

WACC = (Product / Total book value) x 100 = (9,20,200 /50,00,000) x 100 = **18.4%**

(ii) Cost of Long Term Debt = 15% (1-0.4) = 9%

Revised Ke = $\frac{18}{72} + 0.05$ = 30%

Calculation of WACC after expansion taking book value weights

Capital	Amount	Weights	Cost	W.C
Equity Share Capital	30,00,000	0.3750	30%	11.25%
Preference Share Capital	10,00,000	0.1250	8%	1.00%
Debenture	10,00,000	0.1250	9.02%	1.13%
Long Term Debt	30,00,000	0.3750	9.00%	3.38%
	80,00,000	1.0000		**16.76%**

Alternative presentation

(i) Computation of WACC on book value weights after expansion

Source (1)	Book value (₹) (2)	Weight (3)	Cost of capital (%) (4)	Product (2) x (4)
Equity share capital	30,00,000	0.375	30	9,00,000
Preference share capital	10,00,000	0.125	8	80,000
Debentures	10,00,000	0.125	9.02	90,200
Long term loan	30,00,000	0.375	9	2,70,000
Total	**80,00,000**	**1.00**		**13,40,200**

WACC = (Product / Total book value) x 100 = (13,40,200 / 80,00,000) x 100 **= 16.76%**

3. Navya Limited wishes to raise additional capital of Rs.10 lakhs for meeting its modernisation plan. It has Rs. 3,00,000 in the form of retained earnings available for investments purposes. The following are the further details:

Debt/ equity mix	40%/60%
ost of debt (before tax)	
Upto Rs. 1,80,000	10%
Beyond Rs. 1,80,000	16%
Earnings per share	Rs. 4
Dividend pay out	Rs. 2
Expected growth rate in dividend	10%
Current market price per share	Rs. 44
Tax rate	50%

Required:

(i) To DETERMINE the pattern for raising the additional finance.

(ii) To CALCULATE the post-tax average cost of additional debt.

(iii) To CALCULATE the cost of retained earnings and cost of equity, and

(iv) To DETERMINE the overall weighted average cost of capital (after tax).

[10 Marks]

Solution:

(i) Pattern of Raising Additional Finance

Equity = 10,00,000 × 60/100 = ₹ 6,00,000
Debt = 10,00,000 × 40/100 = ₹ 4,00,000
Capital structure after Raising Additional Finance

Sources of fund	Amount (₹)
Shareholder's funds	
Equity capital (6,00,000 – 3,00,000)	3,00,000
Retained earnings	3,00,000
Debt at 10% p.a.	1,80,000
Debt at 16% p.a. (4,00,000 –1,80,000)	2,20,000
Total funds	10,00,000

(ii) Post-tax Average Cost of Additional Debt

$K_d = I(1 - t)$, where 'K_d' is cost of debt, 'I' is interest and 't' is tax rate.

On ₹ 1,80,000 = 10% (1 - 0.5) = 5% or 0.05

On ₹ 2,20,000 = 16% (1 – 0.5) = 8% or 0.08

Average Cost of Debt (Post tax) i.e.

$$K_d = \frac{(1,80,000 \times 0.05) + (2,20,000 \times 0.08)}{4,00,000} \times 100 = 6.65\%$$

(iii) Cost of Retained Earnings and Cost of Equity applying Dividend Growth Model

$$K_e = \frac{D_1}{P_0} + g \quad \text{or} \quad \frac{D_0(1+g)}{P_0} + g$$

$$\text{Then, } K_e = \frac{2(1.1)}{44} + 0.10 = \frac{2.2}{44} + 0.10 = 0.15 \text{ or } 15\%$$

(iv) Overall Weighted Average Cost of Capital (WACC) (After Tax)

Particulars	Amount (₹)	Weights	Cost of Capital	WACC
Equity (including retained earnings)	6,00,000	0.60	15%	9.00
Debt	4,00,000	0.40	6.65%	2.66
Total	10,00,000	1.00		11.66