4. COST OF CAPITAL

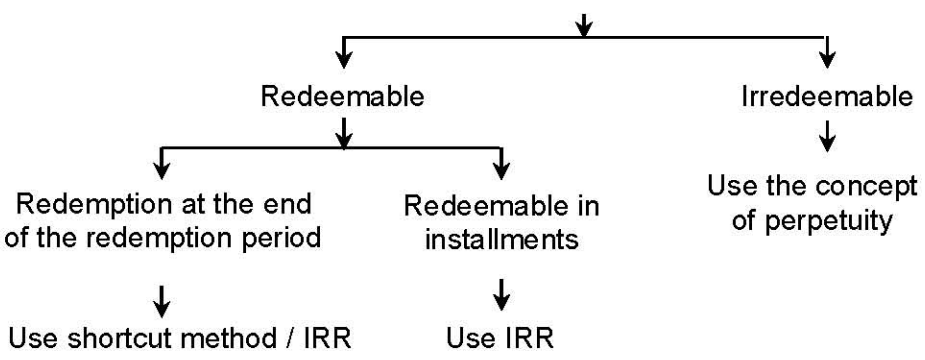
CONCEPT WISE ANALYSIS OF PAST EXAM PAPERS OF IPCC

Model No.	M-09	N-09	M-10	N-10	M-11	N-11	M-12	N-12	M-13 TO N-13	M-14	N-14	M-15	N-15	M-16	N-16
1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1.2	-	-	-	-	-	-	-	-	-	-	-	-	5	-	2.5
1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.5
3.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.1	-	-	3	-	-	-	-	-	-	5	2.5	8	-	-	-
6.2	9	-	-	5	-	-	5	-	-	-	-	-	-	8	8
7	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-

Introduction: Every profit seeking corporation has its own risk-return characteristics. Each group of investors in the corporation - bond holders, preference stock holders and common stock holders require a minimum rate of return commensurate with the risks it accepts by investing in the firm. The minimum rate of return that the corporation must earn in order to satisfy the overall rate of return required by its investors is called corporation's cost of capital."

PROBLEMS FOR CLASSROOM DISCUSSION

MODEL 1: COST OF DEBT, BONDS, DEBENTURES, ETC.



MODEL 1.1: COST OF CAPITAL OF IRREDEEMABLE / PERPETUAL DEBT

The cost of capital of perpetual debt may be ascertained as follows:

$$K_i = \frac{I}{NP}$$

Where, K_i = Cost of Capital of Debt (before tax)

I = Annual Interest payable

NP = Net Proceeds

Few points are worth noting:

a) The above equation calculates the cost of capital of debt before tax. The tax adjustment will be taken up later.

b) The repayments (periodic amortization or maturity repayment) have not been considered as the debt is taken as perpetual. It may be noted that the concept of perpetual debt is theoretical in nature, otherwise, debt being a type of loan, is always repayable.

Pr.1: A Company has 15 % perpetual debt of Rs.1,00,000. The tax rate is 35%. Determine the cost of capital (before tax as well as after tax) assuming the debt is issued at (i) Par, (ii) 10% discount and (iii) 10% premium.

(Ans.: Before Tax (i) 15%, (ii)16.67%,(iii)13.63%, After Tax (i) 9.75%, (ii)10.83%, (iii) 8.86%)

Note:_____

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Pr.2: Five years ago, Sona Limited issued 12 percent irredeemable debentures at Rs. 103, a Rs.3 premium to their par value of Rs.100. The current market price of these debentures is Rs.94. If the company pays corporate tax at a rate of 35 percent what is its current cost of debenture capital? *(Ans.: 8.29%)*

Note:_____

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Pr.3: ABC company sold Rs.1,000 16% debentures, carrying no maturity date to the public 5 years ago. Interest rates since have risen, so that debentures of the quality represented by this company are now selling at 14% yield basis.

a) Determine the current indicated market price of debentures. Would you buy the debentures for Rs.1,200? Explain your answer.

b) Assuming that the debentures of the company are selling at Rs.1,040 and if the debentures have 8 years to run to maturity, compute the approximate effective yield an investor would earn on his investment. *(Ans: Market Price:Rs.1,143 ,Yield:15.19%)*

Note:_____

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MODEL 1.2: COST OF CAPITAL OF REDEEMABLE DEBT (REDEEMABLE AT A SINGLE TIME)

Using IRR Method: Cost of capital of redeemable debt may be ascertained with the help of equation:

$$B_0 = \sum_{i=1}^{n} \frac{I_i(1-t)}{(1+k_d)^i} + \frac{COP_i}{(1+k_d)^i} + \frac{COP_n}{(1+k_d)^n}$$

Where, I = Annual Interest Payment

B_0 = Net Proceeds

COP_i = Regular Cash Outflow on account of amortization

COP_n = Cash Outflow on account of repayment at maturity

K_d = After tax cost of capital of debt.

In case, the debt is repayable only at the time of maturity and there is no annual amortization then the above equation will not contain the second element i.e., $COP_i/(1 + k_d)^i$. The Equation should be solved for the value of k_d, which will be after tax cost of capital for debt. This equation is to be solved by trial and error procedure.

Using shortcut method: In order to avoid the cumbersome procedure of trial and error to find out the value of k_d short cut method may be used to give an approximation to after tax cost of capital of debt.

$$K_d = \frac{I(1-t) + (RV - NP)/N}{(RV + NP)/2}$$

Where, RV = Redemption Value of Debentures

NP = Net Sale proceeds

K_d = After tax Cost of capital

t = Tax rate

N = Life of debentures

Moreover this equation can be used only when debentures are to be redeemed at maturity.

Note: Under the provisions of the Income Tax Act, 1961, the discount on issue of debentures or premium payable on redemption of debentures is deducted out of the taxable income of the company on proportionate basis over the life of the debentures. Hence, this tax deductibility provides a tax shield to the company. In the strict sense, this tax shield should be treated as a cash inflow for different years and be incorporated in the process of calculation of cost of capital of debentures. However, the present value of the annual tax shield of discount on issue and premium on redemption has been ignored for the sake of simplicity.

Pr.4: A company issues new 15% debentures of Rs. 1,000 face value to be redeemed after 10 years. The debenture is expected to be sold at 5% discount. It will also involve floatation cost of 2.5%. The company's tax rate is 35%. What would be the cost of debentures? *(Ans.: 10.9%)*

(Solve Problem No. 2 of Assignment Problems as rework)

Note:_____

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Pr.5: ABC Ltd. issues 15% debentures of face value of Rs.100 each, redeemable at the end of 7 years. The debentures are issued at a discount of 5% and flotation cost is estimated to be 1%. Find out the cost of capital of debentures given that the firm has 50% tax rate.

(Ans.: 8.61%)

(Solve Problem No. 3 of Assignment Problems as rework)

Note:_____

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Pr. 6: A company issued 10,000, 10% debentures of Rs.100 each on 1.4.2010 to be matured on 1.4.2015. The company wants to know the current cost of its existing debt and the market price of the debentures is Rs.80. Compute the cost of existing debentures assuming 35% tax rate. **(SM)** *(Ans.: 11.67%)*

(Solve Problem No. 1 of Assignment Problems as rework)

Note: _____

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Pr.7: (PRINTED SOLUTION AVAILABLE) Calculate the explicit cost of debt for each of the following situations:

a) Debentures are sold at par and flotation costs are 5%.

b) Debentures are sold at a premium of 10% and floatation costs are 5% of issue price.

c) Debentures are sold at a discount of 5% and flotation costs are 5% of issue price.

Assume: (i) Coupon rate of interest on debentures is 15% (ii) Face value of debentures is Rs. 100; (iii) Maturity period is 10 years (iv) Tax rate is 35%. *(Ans.: a. 10.51%, b. 9.10%, c. 11.27%)*

Note:_____

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Pr.8: (PRINTED SOLUTION AVAILABLE)

a) A company's debentures of the face value of Rs.100 bear 8% coupon rate. Debentures of this type currently yield 10%. What is the market price of debentures of the company?

b) What would happen to the market price of debentures if interest rises to (i) 16% & (ii) drips to 12%?

c) What would be the market price of debentures in situation (a) if it is assumed that debentures were originally having 15 year maturity period & maturity period is 4 years away from now?

d) Would you pay Rs.90 to purchase debentures specified in situation (c)? Explain.

(Ans.: a. 80, b. 160,120, c. 93.66, d. Advisable to purchase the given Debentures)

Note:_____

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MODEL 1.3: COST OF CAPITAL OF DEBT REDEEMABLE IN INSTALMENTS

Amortisation of a Bond or Debenture: A bond or debenture may be amortised every year i.e. principal is repaid every year rather than at maturity. In such a situation, the principal will go down with annual payments and interest will be computed on the outstanding amount. The cash flows of the bond or debenture will be uneven.

The formula for determining the value of a bond or debenture that is amortised every year is as follows:

$$V_B = \frac{C_1}{(1+k_d)^1} + \frac{C_2}{(1+k_d)^2} + \ldots\ldots + \frac{C_n}{(1+k_d)^n} = \sum_{t=1}^{n} \frac{C_t}{(1+k_d)^t}$$

Pr.9: A company has issued 15% debentures aggregating Rs.1,00,000. The flotation cost is 15%. The company has agreed to repay the debentures at par in 5 equal annual instalments starting at the end of year 1. The rate of tax is 35%. Find cost of debt. *(Ans.: **16.82%**)*

Note:_____

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Pr.10: (PRINTED SOLUTION AVAILABLE) Reserve Bank of India is proposing to sell a 5-year bond of Rs.5,000 at 8 percent rate of interest p.a. The bond amount will be amortized equally over its life. What is the bond's present value for an investor if he expects minimum rate of return of 6 percent? **(SM)** *(Ans.: Rs. 5262.08)*

Note:_____

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Pr.11: (PRINTED SOLUTION AVAILABLE) The Elu Ltd is contemplating a debenture issue on the following terms: Face value: Rs. 100 per debenture & Term of maturity: 7 years. Yearly coupon rate of interest is:

Years 1-2	8%
3-4	12%
5-7	15%

The current market rate on similar debentures is 15% per annum. The company proposes to price the issue so as to yield a (Compounded) return of 16% per annum to the investors. Determine the issue price. Assume redemption at a premium of 5% on face value.

(Ans.: Rs.82.941)

Note:_____

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Cost of convertible Debentures: In case, the company issues convertible debentures (CD) then the face value of these CDs are fully or partially converted into equity shares as per the terms of issue of CD. The cost of capital of CD may be defined as the discount rate which equates the present value of cash outflows with the inflows. The value of K_d in the following equation is the cost of CD:

$$B_o = \sum_{i=1}^{n} \frac{I(1-t)}{(1+k_d)^i} + \frac{mP_c b}{(1+k_d)^c} + \frac{RV}{(1+k_d)^n}$$

Where, I = Interest Amount per annum

t = Tax Rate

m = Number of shares issued at the time of conversion

P_c = Price per share at conversion time

b = Proportion of market price, that could be realized net, if fresh shares were issued

c = Conversion time.

RV = Redemption Value.

The value of k_d in the above equation can be calculated by trial and error method and will be the cost of convertible debentures.

MODEL 2: COST OF PREFERENCE SHARES

- Redeemable → Similar to that of debentures
- Irredeemable → Similar to that of Perpetual debt

MODEL 2.1: COST OF CAPITAL OF REDEEMABLE PREFERENCE SHARES

If the preference shares are redeemable at the end of a specific period then cost of capital of preference shares can be calculated by the following equation:

$$P_o = \sum_{i=1}^{n} \frac{PD_i}{(1+k_p)^i} + \frac{P_n}{(1+k_d)^n}$$

Where, P_0 = Net Proceeds on issue of preference shares

P_D = Annual Preference dividend at fixed rate of dividend

P_n = Amount payable at the time of redemption

k_p = Cost of preference share capital, and

n = Redemption period of preference shares.

The above equation is to be solved by trial and error procedure to find out the value of k_p. In the above equation neither k_p nor PD require any tax adjustment as preference dividend is payable out of profit after tax and consequently there is no tax shield to the company.

Pr.12: XYZ Ltd. has issued 15% preference shares of the face value of Rs.100 each to be redeemed after 10 years. Flotation cost is expected to be 4%. Determine the cost of preferences shares. *(Ans.: 15.71%)*

(Solve Problem No. 4 of Assignment Problems as rework)

Note:_____

Pr.13: A company has 10% redeemable preference shares which are redeemable at the end of 10th year from the date of issue. The underwriting expenses are expected to be 2%. Find out the effective cost of preference share capital. *(Ans.:10.3%)*

Note:_____

Pr.14: **(PRINTED SOLUTION AVAILABLE)** Superior Cement Company issues Rs.100 face value preference stock which carries 12% dividend. The preference capital is repayable in two equal installments at the end of tenth and eleventh years, respectively. The net amount realised per preference share is Rs.95. What is the cost of preference capital? *(Ans.: 12.91%)*

Note:_____

MODEL 2.2: COST OF CAPITAL OF IRREDEEMABLE PREFERENCE SHARES

In case of irredeemable preference shares, the dividend at the fixed rate will be payable to the preference shareholder perpetually. The cost of capital of the irredeemable preference shares can be calculated with the help of following equation:

$$k_p = \frac{PD}{P_o}$$ Where, PD = Annual preference dividend,

P_0 = Net Proceeds on issue of preference shares,

K_p = Cost of capital of preference shares.

It may be noted that no company in India can issue irredeemable preference shares after 1988 (Section 80 of the Companies Act, 1956).

Pr.15: If Reliance Energy is issuing preferred stock at Rs.100 per share, with a stated dividend of Rs.12, and a floatation cost of 3% then, what is the cost of preference share? **(SM)**

(Ans.: 12.37%)

Note: _____

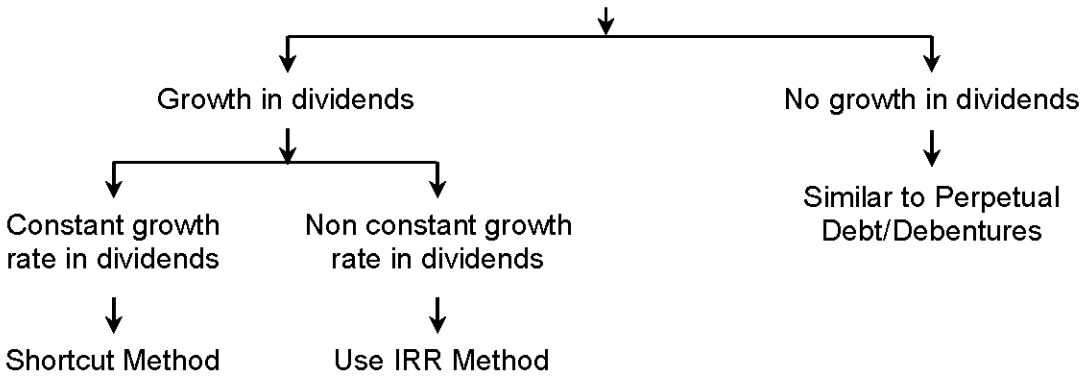
Pr.16: A company issues 14% irredeemable preference shares of the face value of Rs.100 each. Floatation costs are estimated at 5% of the expected sale price. (a) What is k_p, if preference shares are issued at (i) Par value, (ii) 10% premium, and (iii) 5% discount?

(Ans.: (i) 14.73%,(ii) 13.39%,(iii) 15.51%)

(Solve Problem No. 5 of Assignment Problems as rework)

Note:_____

MODEL 3: COST OF EQUITY SHARE CAPITAL



MODEL 3.1: COST OF EQUITY – NO GROWTH IN DIVIDENDS / ZERO GROWTH IN DIVIDENDS

It may be assumed that dividends will remain constant. In such a case, the dividend stream is treated as perpetuity of dividends and the cost of equity share capital, k_e can be ascertained with the help of following equation.

$$K_e = \frac{DPS_1}{MP_0}$$

Where, K_e = Cost of equity share capital

DPS_1 = Expected dividend at the end of year 1

MP_0 = Current market price of the share.

Impliedly, zero growth dividend means that the firm is following policy of 100% dividend pay out ratio and no profits are retained by the firm. Under such a situation, DPS_1 will be equal to EPS_1 of the firm.

$EPS_1 = EPS_2 = EPS_3 \ldots\ldots\ldots EPS_n$ and

$DPS_1 = DPS_2 = DPS_3 \ldots\ldots\ldots DPS_n$ and therefore, EPS = DPS.

On the basis of this equation and EPS = DPS, $K_e = \frac{EPS_1}{MP_0}$

It may be noted that on the basis of this equation, $k_e = 1 / (P_0/E_1)$ and therefore, k_e may also be defined as inverse of PE ratio.

Pr.17: A company has paid dividend of Re.1 per share (of face value of Rs.10 each) last year and it is expected to grow @ 10% next year. Calculate the cost of equity if the market price of share is Rs.55. **(SM)** *(Ans.: 12%)*

Note:_____

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Pr.18: Mahendra is a shareholder in the Central India Ltd. Although earnings for Central have varied considerably, Mahendra has determined that the long run average dividends for the firm have been Rs.2 per share. He expects a similar pattern to prevail in the future. Given the volatility of Central's dividends, Mahendra has decided that a minimum rate of 20% should be earned on this share. What price would Mahendra be willing to pay for Central's Shares?

(Ans.: Rs.10)

Note:_____

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Pr.19: The Xavier Corporation, a dynamic growth firm, anticipates long-run level of future earning of Rs.7 per share. The current price of Xavier's shares is Rs. 55.45, floatation costs for the sale of equity shares would average about 10% of the price of the shares. What is the cost of new equity capital to Xavier? *(Ans.: 14.02%)*

Note:____

MODEL 3.2: COST OF EQUITY - CONSTANT GROWTH RATE IN DIVIDENDS PERPETUALLY

Dividends may be assumed to grow at a constant rate, say, 'g' percent per annum. In such a case, the dividend payment in year n can be expressed as

$DPS_n = DPS_0 (1 + g)^n$ and the present market price of the share can be shown as below:

$$P_0 = \frac{DPS_0(1+g)^1}{(1+K_e)^1} + \frac{DPS_0(1+g)^2}{(1+K_e)^2} + ------------ + \frac{DPS_0(1+g)^\infty}{(1+K_e)^\infty}$$

The only condition before applying the above equation is that $k_e > g$. Note that in the above equation the dividend amount will get larger and larger as time passes because of the growth factor, g. Mathematically, equation can be further simplified and written as follows:

$$MP_0 = \frac{DPS_0(1+g)}{K_e - g} = \frac{DPS_1}{K_e - g} \text{ or } k_e = \frac{DPS_1}{MP_0} + g$$

Pr.20: A company is about to pay dividend of Rs.1.40 per share having a market price of Rs.19.50. The expected future growth in dividends is estimated at 12%. Calculate Ke. *(Ans.:19%)*

Note:____

Pr.21: The current market price of shares of A Ltd. is Rs.95. The floatation costs are Rs.5 per share. Dividend per share amounts to Rs.4.50 and is expected to grow at the rate of 7%. You are required to calculate cost of equity share capital. *(Ans.: 12.35%)*

(Solve Problem No. 7 of Assignment Problems as rework)

Note:____

Pr.22: Investors require 12% rate of return on equity shares of company Y. What would be the market price of the share if the previous dividend (Do) was Rs.2 and investors expect dividends to grow at a constant rate of (a) 4% (b) 0% (c) - 4% (d) 11%.

(Ans.: (a) Rs.26, (b) Rs.16.66, (c) Rs.12 (d) Rs. 222)

Note:____

Pr.23: **(PRINTED SOLUTION AVAILABLE)** An investor is contemplating the purchase of equity shares of a company which had paid a dividend of Rs.5 per share last year. The dividends are expected to grow at 6% forever. The required rate of return on the shares of this company in the capital market is 12%. What will be the maximum price you will recommend the investor pay for one equity share of the company? Will your answer be different if he wants to hold the equity share for 3 years and 6 years?

(Ans.: Rs.88.33, For 3 Years Rs.105.21, For 6 Years Rs.125.30)

Note:____

Pr.24: A mining company's iron ore reserves are being depleted and its cost of recovering declining quantity of iron ore are rising each year. As a consequence, the company's earning or dividends are declining at a rate of 8% per year. If the previous year's dividend was Rs.10 and the required rate of return is 15%, what would be the current price of the equity share of the company? *(Ans.: Rs.40)*

Note:_____

Pr.25: (PRINTED SOLUTION AVAILABLE) The share of ABC Ltd. is presently traded at Rs.50 and the company is expected to pay dividend of Rs.4 per share with a growth rate expected at 8% per annum. It plans to raise fresh equity share capital. The merchant banker has suggested that an under pricing of Rupee 1 is necessary in pricing the new issue besides involving a cost of 50 paisa per share on miscellaneous expenses. Find out the cost of existing equity shares as well as the new equity, given that the dividend rate and growth rate are not expected to change. *(Ans.: 16%, 16.25%)*

Note:_____

Pr.26: (PRINTED SOLUTION AVAILABLE)

a) If current earnings are Rs.2.76 a share, while 10 years earlier, they were Rs.2.00, what has been the rate of growth in earnings?

b) If a company is paying currently a dividend of Rs.6.00 per share, whereas 5 years before it was paying Rs.5.00 per share, what has been the rate of growth in dividends?

c) A company which is not subject to growth expects to pay dividend of Rs.12 per share for ever. Calculate the value of a share, assuming 10% as the appropriate discount rate for such a company. *(Ans.: a. 3%, b. 4%, c. Rs.120)*

Note:_____

Pr.27: (PRINTED SOLUTION AVAILABLE) From the under mentioned facts determine the cost of equity shares of company X:

a) Current market price of a share = Rs.150.

b) Cost of flotation per share on new shares Rs.3.

c) Dividend paid on the outstanding shares over the past five years:

Year	1	2	3	4	5	6
Dividend Per Share	10.50	11.02	11.58	12.16	12.76	13.40

d) Assume a fixed dividend pay out ratio.

e) Expected dividend on the new shares at the end of the current year is Rs.14.10 per share. *(Ans.: 14.6%)*

(Solve Problem No.8 of Assignment Problems as rework)

Note:_____

MODEL 3.3: COST OF EQUITY – NON CONSTANT GROWTH RATE IN DIVIDENDS

Pr.28: A large sized chemical company has been expected to grow at 14% per year for the next 4 years and to grow indefinitely at the same rate as that of the national economy that is 5%. The required rate of return on the equity share is 12%. Assume that the company paid a dividend of Rs.2 per share last year. Determine market price of the share as on today.

(Ans.: Rs.40.62)

Note:_____

Pr.29: **(PRINTED SOLUTION AVAILABLE)** D Ltd. is foreseeing a growth rate of 12% per annum in the next two years. The growth rate is likely to be 10% for the third and fourth year. After that the growth rate is expected to stabilize at 8% per annum. If the last dividend was Rs.1.50 per share and the investor's required rate of return is 16%, determine the current value of equity share of the company.

The PV factors at 16%

Year	1	2	3	4
PV Factor	0.862	0.743	0.641	0.552

(PM) *(Ans: Value of Equity share: Rs.22.43/-)*

Note:_____

MODEL 3.4: COST OF EQUITY - REALIZED YIELD APPROACH

According to this approach, the average rate of return realized in the past few years is historically regarded as 'expected return' in the future. The yield of equity for the year is:

$$\text{Return on Investment in Equity shares} = \frac{DPS_1 + (P_1 - P_0)}{P_0} X100$$

Though, this approach provides a single mechanism of calculating cost of equity, it has unrealistic assumptions. If the earnings do not remain stable, this method is not practical.

Pr.30: A share is selling for Rs.50 on which a dividend of Rs.3 per share is expected at the end of the year. The expected market price after the dividend declaration is Rs.60. Compute (i) the return on investment (r) in shares, (ii) dividend yield and (iii) capital gain yield.

(Ans.: (i) 26% (ii) 6% (iii) 20%)

Note:_____

Pr.31: ABC Ltd paid a dividend of Rs.2 per share last year (D_0), which is expected to grow at 10 per cent. If the current market price is Rs.40 and the required rate of return is 18 per cent, compute the expected dividend yield and capital gains yield next year. *(Ans.: 5.5%, 12.5%)*

Note:_____

MODEL 3.5: CAPITAL ASSET PRICING MODEL APPROACH (CAPM)

CAPM model describes the risk-return trade-off for securities. It describes the linear relationship between risk and return for securities. The risks to which a security is exposed are divided into two groups, diversifiable and non-diversifiable.

The diversifiable risk can be eliminated through a portfolio consisting of large number of well diversified securities.

The non-diversifiable risk is attributable to factors that affect all businesses. Examples of such risks are:-

i) Interest Rate Changes

ii) Inflation

iii) Political Changes etc.

As diversifiable risk can be eliminated by an investor through diversification, the non-diversifiable risk is the risk which cannot be eliminated; therefore a business should be concerned as per CAPM method, solely with non-diversifiable risk.
The non-diversifiable risks are assessed in terms of beta coefficient (b or β) through fitting regression equation between return of a security and the return on a market portfolio.

Cost of Equity under CAPM Approach:

Thus, the cost of equity capital can be calculated under this approach as:

$$K_e = R_f + b\,(R_m - R_f)$$

Where,

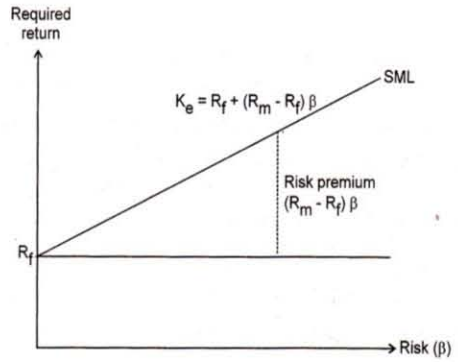
K_e= Cost of equity capital

R_f= Rate of return on security

b = Beta coefficient

R_m= Rate of return on market portfolio

$(R_m - R_f)$ = Market premium



Cost of Equity under CAPM

Pr.32: From the following information, determine the cost of equity capital using CAPM approach.

a) Required rate of return on risk-free security, 8 percent.

b) Required rate of return on market portfolio of investment is 13 percent.

c) The firm's beta is 1.6. ***(Solve Problem No. 6 of Assignment Problems as rework)***

(Ans.: 16%)

Note:_____

Pr.33: The following information is available relating to risk free interest rate, I_f and market rate R_m of a security during last 6 years.

Year	I_f	R_m
1	.06	.14
2	.05	.03
3	.07	.21
4	.08	.26
5	.09	.03
6	.07	.11

On the basis of above information finds out the cost of equity capital on the basis of the CAPM given that the beta factor is .863. *(Ans.: 12.178%)*

Note:_____

Pr.34: The following facts are available:

- Risk-free rate, 9 per cent
- Required rate of return, 18 per cent
- Beta coefficient of the shares of ABC Ltd, 1.5
- Expected dividend during the next year, Rs.3
- Growth rate in dividends/earnings, 8 per cent

Compute the price at which the shares of ABC Ltd should sell? *(Ans.: Rs.20.68)*

Note:_____

Pr.35: (PRINTED SOLUTION AVAILABLE) The beta coefficient of Target Ltd is 1.4. The company has been maintaining 8% rate of growth in dividends and earnings. The last dividend paid was Rs.4 per share. The return on government securities is 10 per cent while the return on market portfolio is 15 per cent. The current market price of one share of Target Ltd. is Rs.36.

a) What will be the equilibrium price per share of Target Ltd?

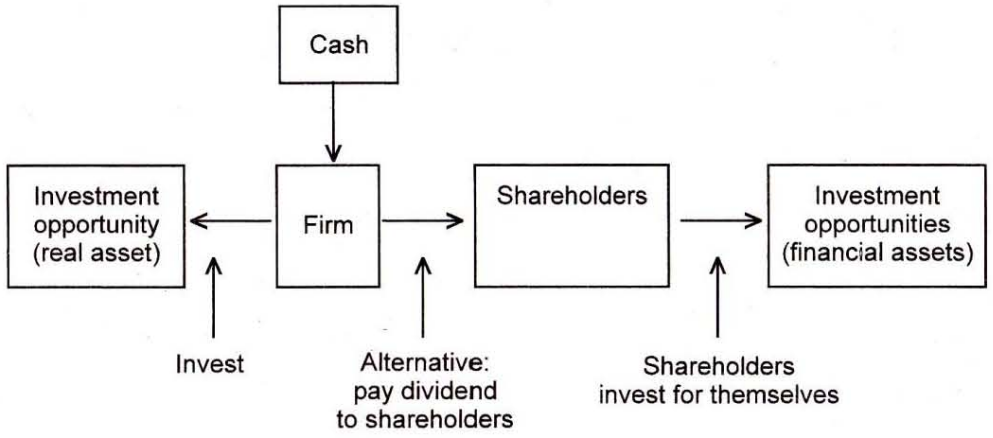
b) Would you advise purchasing the share? *(Ans.: a. Rs.48, b. yes)*

Note:_____

MODEL 4 : COST OF RETAINED EARNINGS

Like another source of fund, retained earnings will also involve cost. It is the opportunity cost of dividends foregone by shareholders.

The given figure depicts how a company can either keep or reinvest cash or return it to the shareholders as dividends. (Arrows represent possible cash flows or transfers.) If the cash is reinvested, the opportunity cost is the expected rate of return that shareholders could have obtained by investing in financial assets.



Cost of Retained Earnings

There are two approaches to measure this opportunity cost. One approach is by using Discounted Cash Flow (DCF) method and the second approach is by using Capital Asset Pricing Model. (CAPM)

a) **By DCF** : $K_s = \frac{D_1}{P_0} + G$

Where,

D_1 = Dividend at the end of first year

P_0 = Current market price

G = Growth rate

b) By CAPM : $K_e = R_f + b (R_m - R_f)$

Pr.36: ABC Company provides the following details: **(SM)**

D_0 = Rs. 4.19	P_0 = Rs. 50	G = 5%

Calculate the cost of retained earnings based on DCF method. *(Ans.: 13.79%)*

Note:_____

Pr.37: ABC Company provides the following details: **(SM)**

R_f = 7%	b = 1.20	R_M - R_f = 6%

Calculate the cost of retained earnings based on CAPM method. *(Ans.: 14.2%)*

Note:_____

Pr.38: Y Ltd. retains Rs.7,50,000 out of its current earnings. The expected rate of return to the shareholders, if they had invested the funds elsewhere is 10%. The brokerage is 3% and the shareholders come in 30% tax bracket. Calculate the cost of retained earnings. **(PM)**

(Ans.: 6.79%)

Note:_____

MODEL 5: SPECIFIC COST OF CAPITAL - MISCELLANEOUS

Pr.39: The following is an extract from the financial statements of KPN Ltd.

Particulars	lakhs
Operating Profit **Less:** Int. on debentures	105.0 33.0
Earnings before taxes **Less:** Income tax (0.35)	72.0 25.2
Earnings after taxes	46.8
Equity share capital (Shares of Rs. 10 each)	200.0
Reserves and surplus	100.0
15% Non-convertible debentures (of Rs.100 each)	220.0
	520.0

The market price per equity share is Rs.12 and per debenture, Rs.93.75.

a) Calculate Earnings Per Share?

b) What is the percentage cost of capital to the company for debentures and the equity?

(Ans.: a. Rs.2.34, b. 10.4%, 19.5%)

Note:_____

Pr.40: (PRINTED SOLUTION AVAILABLE) Following is the capital structure of Progressive co. Ltd. as on 31st March, 1989:

Particulars	Amount (Rs.)
Equity Share Capital (1,00,000 shares of Rs. 10 each)	10,00,000
Securities Premium	15,00,000
Reserves & Surplus	5,00,000
Net Worth	30,00,000

On 1st April, 1990, the company made bonus issue of two shares for every five held. The market price at the time of bonus issue was Rs.40 per share. X holds 100 shares of the Progressive Co. Ltd., purchased on 1st April, 1987 at a market price of Rs.30. He sold these shares on 31st March, 1992 at RS.50 per share. The income-tax rate for X is 20% and capital gains tax is 15% for him. If the company pays a regular dividend of 10% on par before transferring earnings to reserves and surpluses, state whether X was able to earn his required rate of return of 10% on his investment?

(Ans.: NPV = Rs. 1,319)

Note:_____

MODEL 6: WEIGHTED AVERAGE COST OF CAPITAL

$WACC = K_e.W_1 + k_d.W_2 + k_p.W_3$

Where, WACC = Weighted average cost of capital

K_e = Cost of equity capital

K_d = After tax cost of debt

K_p = Cost of preference shares

W_1 = Proportion of equity capital in capital structure

W_2 = Proportion of debit in capital structure

W_3 = Proportion of preference capital in capital in capital structure.

MODEL 6.1: WACC – BOOK VALUE WEIGHTS

Pr.41: TA Ltd has the following capital structure:

Particulars	Amount
Equity (2,00,000shares)	40,00,000
10% preference shares	10,00,000
14% Debentures	30,00,000
	80,00,000

The share of the company sells for Rs.20. It is expected that the company will pay next year a dividend of Rs.2 per share which will grow at 7% forever. Assume a 50% tax rate.

a) Compute the WACC based on existing capital structure.

b) Compute the new WACC if the company raises an additional Rs. 20,00,000 debt by issuing 15% debentures. This would result in increasing the expected dividend to Rs.3 and leave the growth rate unchanged, but the price of the share will fall to Rs.15 per share.

c) Recomputed WACC if growth rate increases to 10%. *(Ans.: a. 12.375%, b. 15.4%, c.16.6%)*

(Solve Problem No. 09 of Assignment Problems as rework)

Note:_____

Pr.42: (PRINTED SOLUTION AVAILABLE) The capital structure of Hindustan Traders Ltd. as on 31.3.1996 is as follows:

Particulars	Crores
Equity capital:	
100 lakhs equity share of Rs.10 each	10
Reserves	2
14% Debentures of Rs. 100 each	3

For the year ended 31.3.1996 the company has paid equity dividend at 20%. As the company is a market leader with good future, dividend is likely to grow by 5% every year. The equity shares are now traded at Rs.80 per share in the stock exchange. Income-tax rate applicable to company is 50%.

Required to calculate:

a) The current weighted cost of capital.

b) The company has plans to raise a further Rs.5 crores by way of long-term loan at 16% interest. When this takes place the market value of the equity shares is expected to fall to Rs.50 per share. What will be the new weighted average cost of capital of the company.

(Ans.: a. 7.5%, b. 8.75%)

Note: _____

_____

Pr.43: (PRINTED SOLUTION AVAILABLE) The following is the capital structure of Simons Company Ltd. as on 31.12.1998: **(PM)**

	Rs.
Equity shares: 10,000 shares (of Rs. 100 each)	10,00,000
10% Preference Shares (of Rs. 100 each)	4,00,000
12% Debentures	6,00,000
	20,00,000

The market price of the company's share is Rs.110 and it is expected that a dividend of Rs.10 per share would be declared for the year 1998. The dividend growth rate is 6%.

a) If the company is in the 50% tax bracket, compute the weighted average cost of capital using Book value weights.

b) Assuming that in order to finance an expansion plan, the company intends to borrow a fund of Rs. 10 lakhs bearing 14% rate of interest, what will be the company's revised weighted average cost of capital? This financing decision is expected to increase dividend from Rs. 10 to Rs. 12 per share. However, The market price of equity share is expected to decline from Rs. 110 to Rs. 105 per share.

(Ans.: a. 11.34%, b. 10.67%)

(Solve Problem No. 10 of Assignment Problems as rework)

Note: _____

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Pr.44: (PRINTED SOLUTION AVAILABLE) Aries Limited wishes to raise additional finance of Rs.10 lakhs for meeting its investment plans. It has Rs.2,10,000 in the form of retained earnings available for investment purposes. Following are further details: **(SM)**

Debt/equity mix	30% - 70%
Cost of Debt:	
Upto Rs. 1,80,000	10% [before tax]
Beyond Rs. 1,80,000	16% [before tax]
Earnings per share	Rs. 4

Dividend pay out	50% of earnings
Expected growth rate in dividend	10%
Current market price per share	Rs. 44
Tax rate	50%

You are required:

a) To determine the pattern for raising the additional finance.

b) To determine the post-tax average cost of additional debt.

c) To determine the cost of retained earnings and cost of equity, and

d) Compute the overall weighted average after tax cost of additional Finance. **(M-15)**

(Ans.: b. 6.2%, c.15%, d. 12.36%)

Note:_____

MODEL 6.2: MARKET VALUE WEIGHTS

Pr.45: The following is the capital structure of ABC Ltd.

Source	Amount	Specific C/C
Equity share Capital (2,00,000 shares of Rs. 10 each)	20,00,000	11%
Preference Share Capital (50,000 shares of Rs. 10 each)	5,00,000	8.5%
Retained Earnings	10,00,000	11%
9% Debentures of Rs. 1,000 each	15,00,000	4.5%

Presently, the debentures are being traded at 94%, preference shares at par and the Equity shares at Rs.13 per share. Find out the WACC based on market value weights. *(Ans.: 8.78%)*

(Solve Problem No. 11 of Assignment Problems as rework)

Note: _____

Pr.46: (PRINTED SOLUTION AVAILABLE) You are required to determine the weighted average cost of capital of a firm using (i) book value weights and (ii) market value weights. The following information is available for your perusal:

Present book value of the firm's capital structure is:

	Rs.
Debentures of Rs.100/- each	8,00,000
Preference Shares of Rs.100/- each	2,00,000
Equity Shares of Rs.10/- each	10,00,000
	20,00,000

All these securities are traded in the capital markets. Recent prices are:

Debentures @ Rs.110, Preference shares @ Rs.120 and Equity shares @ Rs.22.

Anticipated external financing opportunities are as follows:

i) Rs.100 per debenture redeemable at par : 20 years maturity 8% coupon rate, 4% floatation costs, sale price Rs.100.

ii) Rs.100 preference share redeemable at par: 15 years maturity, 10% dividend rate, 5% floatation costs, sale price Rs.100.

iii) Equity shares: Rs.2 per share floatation costs, sale price Rs.22.

In addition, the dividend expected on the equity share at the end of the year is Rs.2 per share;

the anticipated growth rate in dividends is 5% and the firm has the practice of paying all its earnings in the form of dividend. The corporate tax rate is 50%. **(PM)**

(Ans: (i) WACC (Book value Weights = 10.23%, Market value Weights = 11.81%)

(Solve Problem No. 12 of Assignment Problems as rework)

Note:_____

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Pr.47: (PRINTED SOLUTION AVAILABLE) The Following is the capital structure of a company.

Sources	Book Value (Rs.)	Market Value (Rs.)
Equity shares @ Rs.100/- each	80,00,000	1,60,00,000
9% Cumulative Preference Shares@ 100/- each	20,00,000	24,00,000
11% Debentures	60,00,000	66,00,000
Retained Earnings	40,00,000	-
	2,00,00,000	2,50,00,000

The current Market price of the company's equity share is Rs.200/-.For the last year the company had paid equity dividend at 25% and its dividend is likely to grow 5% every year. The corporate tax rate is 30% and shareholders personal income tax rate is 20%.

You are required to calculate:

a) Cost of capital for each source of capital.

b) WACC on the basis of book value weights.

c) WACC on the basis of Market value weights. **(PM)**

(Ans:(a) Ke :18.125%,Kd:7.7%,Kr:14.5%,(b)13.36% (c)14.497%)

(Solve Assignment Problem No:13 as Rework)

Note:_____

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MODEL 7: MISCELLANEOUS (ENTIRE CHAPTER)

Pr.48: (PRINTED SOLUTION AVAILABLE) A company is considering raising Rs.100 lakh by one of the two alternative methods, viz. 14 per cent institutional term loan and 13 per cent non-convertible debentures. The term loan option would attract no major incidental cost. The debentures would have to be issued at a discount of 2.5 per cent and would involve Rs 1 lakh as cost of issue. Advise the company as to the better option based on the effective cost of capital in each case. Assume a tax rate of 35 per cent.

(Ans.: Raise the required funds of 100Lacs through non-convertible debentures)

Note:_____

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Pr.49: (PRINTED SOLUTION AVAILABLE) Gamma Limited has issued 5,00,000 Rs. 1 ordinary shares whose current exdividend market price is Rs. 1.50 per share. The company has just paid a dividend of 27 paise per share, and dividends are expected to continue at this level for some time. If the company has no debt capital, what is the weighted average cost of capital? **(SM)** *(Ans.:18%)*

Pr.50: Find the value of the share from the data tabulated below:

Firm	Expected EPS	P/E multiple
A	Rs. 5.00	8.3
B	7.50	12.5

C	3.00	15.2
D	4.00	11.5
E	8.50	22.0

(Ans:A:41.50,B:93.75,C:45.60,D:46,E:187.)

Note:_____

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'A' CATEGORY PROBLEMS -
2,3,7,8, 11,16,19,21,22,23,26,27,29,35,38,40,42,43,44 ,46,47
(APPLICABLE FOR WEEKEND EXAMS ONLY BUT NOT FOR ANY OTHER EXAMS)

ASSIGNMENT PROBLEMS

COST OF DEBENTURES:

Pr.1: A 7-years Rs.100 bond of a firm can be sold for a net price of Rs.97.75 and is redeemable at a premium of 5%. The coupon rate of interest is 15% and tax rate is 55%. Calculate cost of bonds. *(Ans.: 7.68%)*

Pr.2: XYZ Company has debentures outstanding with 5 years left before maturity. The debentures are currently selling for Rs.90 (Face value is Rs.100). These debentures are to be redeemed at 5% premium. The interest is paid annually at a rate of interest of 12%. The firm's tax rate is 35%. Calculate Cost of Debentures. *(Ans.: 11.07%)*

Pr.3: ABC Ltd. issues 15% debentures of face value of Rs.1000 each at a flotation cost of Rs.100 per debenture. Find out the cost of capital of the debenture which is to be redeemed in 5 annual instalments of Rs.200 each starting from the end of year 1. The tax rate is 50%.

(Ans.: NPV @ 10% is Rs. (39.34) & IRR is 11.79%)

COST OF PREFERENCE SHARES:

Pr.4: ABC Ltd. issues 15% preference shares of the face value of Rs.100 each at a flotation cost of 4%. Find out the cost of capital of preference shares if preference shares are irredeemable. *(Ans.: 15.62%)*

Pr.5: Mendex Ltd. issues 10% irredeemable preference shares. The nominal value of each share is Rs.100. You are required to calculate the cost of preference share capital in each of the following cases: (a) When issued at 5% discount; (b) When issued at 5% premium. *(Ans.: a. 10.5%, b. 9.5%)*

COST OF EQUITY SHARES:

Pr.6: Calculate the cost of equity capital of H Ltd., whose risk free rate of return equals 10%. The firm's beta equals 1.75 and the return on the market portfolio equals to 15%. **(SM)** *(Ans.: 0.1875)*

Pr.7: ABC Ltd. has just declared and paid a dividend at the rate 15% on the equity share of Rs.100 each. The expected future growth rate in dividends is 12%. Find out the cost of capital o f equity shares given that the present market value of the share is Rs.168. *(Ans.: 22%)*

Pr.8: A purchased 10 shares in a company at a cost of Rs. 318 on Jan. 1, 1990. He held them for 4 years and finally sold them in January 1994 for Rs. 400. The amount of dividend received by him in each of these 4 years was:

Year	1990	1991	1992	1993
Dividend	20.00	20.00	22.00	22.25

You are required to calculate cost of equity capital. *(Ans.: 11.99%)*

WEIGHTED AVERAGE COST OF CAPITAL (WACC):

Pr.09: PQR & Co. has the following capital structure as on Dec.31st, 2000.

Equity Share Capital (5000 shares of 100 each)	5,00,000
9% Preference Shares	2,00,000
10% Debentures	3,00,000

The equity shares of the company are quoted at Rs.102 and the company is expected to declare a dividend of Rs.9 per share for the next year. The company has registered a dividend growth rate of 5% which is expected to be maintained.

a) Assuming tax rate applicable to the company at 50%, calculate weighted average cost of capital &

b) Assuming that the company can raise additional term loan at 12% for Rs.5,00,000 to finance its expansion, calculate the revised WACC. The company's expectation is that the business risk associated with new financing may bring down the market price from Rs.102 to Rs.96 per share. *(Ans.: a. 10.21%, b. 9 %)*

Pr.10: The following figures are taken from the current B/S of Delaware & Co.

Capital	Rs.8,00,000
Share Premium	2,00,000
Reserves	6,00,000
Shareholder's funds	16,00,000
12% Irredeemable debentures	4,00,000

An annual ordinary dividend of Rs.2 per share has just been paid. In the past, ordinary dividends have grown at a rate of 10% per annum and this rate of growth is expected to continue. Annual interest has recently been paid on the debentures. The ordinary shares are currently quoted at Rs.27.5 and the debentures at 80%. Ignore taxation. You are required to estimate the weighted average cost of capital (based on market values) for Delaware & Co.

(Ans.: 17.62%)

Pr. 11: .Calculate the WACC using the following data by using: **(SM)**

a) Book value weights **b)** Market value weights

The capital structure of the company is as under:

	Rs.
Debentures (Rs. 100 per debenture)	5,00,000
Preference shares (Rs. 100 per share)	5,00,000
Equity shares (Rs. 10 per share)	10,00,000
	20,00,000

The market prices of these securities are:

Debenture	Rs. 105 per debenture
Preference	Rs. 110 per preference share
Equity	Rs. 24 each.

Additional information:

a) Rs. 100 per debenture redeemable at par, 10% coupon rate, 4% floatation costs, 10 year maturity.

b) Rs. 100 per preference share redeemable at par, 5% coupon rate, 2% floatation cost and 10 year maturity.

c) Equity shares has Rs.4 floatation cost and market price Rs. 24 per share.

The next year expected dividend is Rs. 1 with annual growth of 5%. The firm has practice of paying all earnings in the form of dividend. Corporate tax rate is 50%. *(Ans.: a. 7.69%, b. 8.57%)*

Pr.12 Determine the cost of capital of Best Luck Limited using the book value (BV) and market value (MV) weights from the following information: **(SM)**

Sources	Book Value (Rs.)	Market Value (Rs.)
Equity shares	1,20,00,000	2,00,00,000
Retained earnings	30,00,000	-
Preference shares	9,00,000	10,40,000
Debentures	36,00,000	33,75,000

Additional information:

a) **Equity:** Equity shares are quoted at Rs. 130 per share and a new issue priced at Rs. 125 per share will be fully subscribed; flotation costs will be Rs. 5 per share.

b) **Dividend:** During the previous 5 years, dividends have steadily increased from Rs. 10.60 to Rs. 14.19 per share. Dividend at the end of the current year is expected to be Rs. 15 per share.

c) **Preference shares:** 15% Preference shares with face value of Rs. 100 would realize Rs. 105 per share.

d) **Debentures:** The company proposes to issue 11-year 15% debentures but the yield on debentures of similar maturity and risk class is 16%; flotation cost is 2%.

e) **Tax:** Corporate tax rate is 35%. Ignore dividend tax. *(Ans.: 16.92%, 17.28%)*

Pr 13: Three companies A, B & C are in the same type of business and hence have similar operating risks. However, the capital structure of each of them is different and the following are the details:

	A	B	C
Equity share capital [face value Rs.10/- per share]	Rs.4,00,000	Rs.2,50,000	5,00,000
Market Value per share	15	20	12
Dividend per share	2.70	4	2.88
Debentures [face value per debenture]	Nil	1,00,000	2,50,000
Market value per debenture	-	125	80
Interest rate	-	10%	8%

Assume that the current levels if dividends are generally expected to continue indefinitely and the income tax rate at 50%.
You are required to compute Weighted Average Cost of Capital. **(PM)**
(Ans:18%;16.8%;19.25%)

'A' CATEGORY ASSIGNMENT PROBLEMS – 1,3,4,9,10,11,12,13
(APPLICABLE FOR WEEKEND EXAMS ONLY BUT NOT FOR ANY OTHER EXAMS)

Verified by : M.P. Raju Sir
Executed by: Sai Ram Sir

THE END