BB VIRTUALS

## CA Intermediate May 24 Onwards

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CA Shubham Gupta AIR 10
CFA, US L1 cleared
Scored 83 in CA Final SFM/AFM

# MEET ME!

*This side, CA Shubham Gupta.*

*With a stellar **academic background**, I scored **All India Rank of 10** in the CA Final examinations (May/July 21 attempt) and cleared my CA in the first attempt at the age of 21. Major highlight was the CA Final SFM (finance), where I scored exceptionally well 83.*

*Armed with a solid foundation in commerce, I also earned a Bachelor's degree with Honors in B.Com. Alongside, I cleared Level 1 of the Chartered Financial Analyst (**CFA**), USA program.*

*From the very beginning, I am highly inclined to the world of finance. Be it opening and regularly trading in my own **Demat account from the age of 18** or handling family portfolios running in lakhs to making big financial decisions, I find finance very fascinating and interesting.*

*With **over 2.5 years of invaluable experience in business management consulting** during my job tenure post-qualification, I bring a wealth of practical knowledge to the table having established a comprehensive understanding of the intricacies of the finance industry.*

*I feel very delighted **to start my journey as an educator** in the field of finance and having picked up subjects*

- *CA Inter Paper 6 FM-SM*
- *CA Final Paper 2 AFM*

*Do join me for **CA Inter FM Xpress Revision batch** for May 24 onwards, launched in collaboration with our favorite **BB sir – CA Bhanwar Borana & BB Virtuals**. I hope you find the content useful and it adds value to your knowledge helping you clear exams and enter the prestigious CA club!*

***Tayyari CA Ki!***

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**Question 1 – Cost of Capital. TYK Q5**

*DETERMINE the cost of capital of Best Luck Limited using the book value (BV) and market value (MV) weights from the following information:*

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

*Additional information:*

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

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

III. *Preference shares: 15% Preference shares with face value of ₹ 100 would realise ₹105 per share.*

IV. *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%.*

V. *Tax: Corporate tax rate is 35%.Ignore dividend tax.*

*Floatation cost would be calculated on face value.*

**Solution**

(i) Cost of Equity $(K_e) = \frac{D_1}{P_0 - F} + g = \frac{₹15}{₹125 - ₹5} + 0.06^*$

$K_e = 0.125 + 0.06 = 0.185$

*Calculation of g:

$₹10.6(1+g)^5 = ₹14.19$

Or, $(1+g)^5 = \frac{14.19}{10.6} = 1.338$

Table (FVIF) suggests that ₹1 compounds to ₹1.338 in 5 years at the compound rate of 6 percent. Therefore, g is 6 per cent.

(ii) Cost of Retained Earnings $(K_r) = \frac{D_1}{P_0} + g = \frac{₹15}{₹125} + 0.06 = 0.18$

(iii) Cost of Preference Shares $(K_p) = \frac{PD}{P_0} = \frac{₹15}{₹105} = 0.1429$

(iv) Cost of Debentures $(K_d) = \frac{I(1-t) + \left(\frac{RV - NP}{n}\right)}{\frac{RV + NP}{2}}$

$$= \frac{₹15(1-0.35) + \left(\frac{₹100 - ₹91.75^*}{11 \text{years}}\right)}{\frac{₹100 + ₹91.75^*}{2}}$$

$$= \frac{₹15 \times 0.65 + ₹0.75}{₹95.875} = \frac{₹10.5}{₹95.875} = 0.1095$$

*Since yield on similar type of debentures is 16 per cent, the company would be required to offer debentures at discount.

Market price of debentures (approximation method)

= ₹15 ÷ 0.16 = ₹93.75

Sale proceeds from debentures = ₹93.75 – ₹2 (i.e., floatation cost) = ₹91.75

Market value ($P_0$) of debentures can also be found out using the present value method:

$P_0$ = Annual Interest × PVIFA (16%, 11 years) + Redemption value × PVIF (16%, 11 years)

$P_0$ = ₹15 × 5.029 + ₹100 × 0.195

$P_0$ = ₹75.435 + ₹19.5 = ₹ 94.935

Net Proceeds = ₹94.935 – 2% of ₹100 = ₹ 92.935

Accordingly, the cost of debt can be calculated

**Total Cost of capital [BV weights and MV weights]**

**(Amount in (₹) lakh)**

| Source of capital | Weights | | Specific Cost (K) | Total cost | |
|---|---|---|---|---|---|
| | BV | MV | | (BV × K) | (MV × K) |
| Equity Shares | 120 | 160* | 0.1850 | 22.2 | 29.6 |
| Retained Earnings | 30 | 40* | 0.1800 | 5.4 | 7.2 |
| Preference Shares | 36 | 33.75 | 0.1429 | 5.14 | 4.82 |
| Debentures | 9 | 10.4 | 0.1095 | 0.986 | 1.139 |
| Total | 195 | 244.15 | | 33.73 | 42.76 |

*Market Value of equity has been apportioned in the ratio of Book Value of equity and retained earnings i.e., 120:30 or 4:1.

**Weighted Average Cost of Capital (WACC):**

Using Book Value = $\frac{₹33.73}{₹195}$ = 0.1729 or 17.29%

Using Market Value = $\frac{₹42.76}{₹244.15}$ = 0.1751 or 17.51%

**Question 2 – Cost of Capital. Illustration 18**

*ABC Ltd. has the following capital structure, which is considered to be optimum as on 31st March, 2023.*

| | (₹) |
|---|---|
| *14% Debentures* | *30,000* |
| *11% Preference shares* | *10,000* |
| *Equity Shares (10,000 shares)* | *1,60,000* |
| | *2,00,000* |

*The company share has a market price of ₹ 23.60. Next year dividend per share is 50% of year 2022 EPS. Following is the uniform trend of EPS for the preceding 10 years which is expected to continue in future:*

| Year | EPS (₹) | Year | EPS (₹) |
|---|---|---|---|
| *2013* | *1.00* | *2018* | *1.61* |
| *2014* | *1.10* | *2019* | *1.77* |
| *2015* | *1.21* | *2020* | *1.95* |
| *2016* | *1.33* | *2021* | *2.15* |
| *2017* | *1.46* | *2022* | *2.36* |

*The company issued new debentures carrying 16% rate of interest and the current market price of debenture is ₹ 96.*

*Preference shares of ₹ 9.20 (with annual dividend of ₹ 1.1 per share) were also issued. The company is in 50% tax bracket.*

*(A) CALCULATE after tax:*

*(i) Cost of new debt*

*(ii) Cost of new preference shares*

*(iii) Cost of new equity share (assuming new equity from retained earnings)*

*(B) CALCULATE marginal cost of capital when no new shares are issued.*

*(C) DETERMINE the amount that can be spent for capital investment before new ordinary shares must be sold. Assuming that the retained earnings for next year's investment is 50 percent of 2022.*

*(D) COMPUTE marginal cost of capital when the fund exceeds the amount calculated in (C), assuming new equity is issued at ₹ 20 per share.*

**Solution**

**(A)** (i) Cost of new debt

$$K_d = \frac{I(1-t)}{P_0}$$

$$= \frac{₹16\,(1-0.5)}{₹96} = 0.0833$$

(ii) Cost of new preference shares

$$K_p = \frac{PD}{P_0} = \frac{₹1.1}{₹9.2} = 0.12$$

(iii) Cost of new equity shares

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

$$= \frac{₹1.18}{₹23.60} + 0.10 = 0.05 + 0.10 = 0.15$$

Calculation of g when there is a uniform trend (on the basis of EPS)

$$= \frac{EPS\,(2014) - EPS\,(2013)}{EPS\,(2013)}$$

$$= \frac{₹\,1.10 - ₹\,1.00}{₹\,1.00} = 0.10 \text{ or } 10\%$$

Calculation of $D_1$

$D_1$ = 50% of 2022EPS = 50% of 2.36 = ₹ 1.18

**(B)** Calculation of marginal cost of capital

| Type of Capital | Proportion | Specific Cost | Product |
|---|---|---|---|
| (1) | (2) | (3) | (2) × (3) = (4) |
| Debenture | 0.15 | 0.0833 | 0.0125 |
| Preference Share | 0.05 | 0.1200 | 0.0060 |
| Equity Share | 0.80 | 0.1500 | 0.1200 |
| Marginal cost of capital | | | **0.1385** |

**(C)** The company can spend the following amount without increasing marginal cost of capital and without selling the new shares:

Retained earnings = 50% of EPS of 2022 × outstanding equity shares

= 0.50×₹2.36 × 10,000 shares = ₹ 11,800

The ordinary equity (Retained earnings in this case) is 80% of total capital

So, ₹11,800 = 80% of Total Capital

$\therefore$ Capital investment before issuing equity shares = $\frac{₹\ 11,800}{0.80}$ = ₹ 14,750

**(D)** If the company spends in excess of ₹ 14,750, it will have to issue new equity shares at ₹20 per share.

$\therefore$ The cost of new issue of equity shares will be = $\frac{D_1}{P_0}+g = \frac{₹1.18}{₹20}+0.10 = 0.159$

The marginal cost of capital will be:

| Type of Capital | Proportion | Specific Cost | Product |
|---|---|---|---|
| (1) | (2) | (3) | (2) × (3) = (4) |
| Debentures | 0.15 | 0.0833 | 0.0125 |
| Preference Shares | 0.05 | 0.1200 | 0.0060 |
| Equity Shares (New) | 0.80 | 0.1590 | 0.1272 |
| | | | **0.1457** |

## Question 3 – Cost of Capital – MTP Series 2 Oct 2023 Q3

Q Ltd. has the following capital structure at book-value as on 31st March 2022:

| Particulars | (₹) |
|---|---|
| Equity share capital (10,00,000 shares) | 4,00,00,000 |
| 12% Preference shares | 80,00,000 |
| 11% Debentures | 2,00,00,000 |
| | 6,80,00,000 |

The equity shares of the company are sold for ₹ 400. It is expected that the company will pay next year a dividend of ₹ 20 per equity share, which is expected to grow by 5% p.a. forever. Assume a 30% corporate tax rate.

Required:

(i) COMPUTE weighted average cost of capital (WACC) of the company based on the existing capital structure.

(ii) COMPUTE the new WACC, if the company raises an additional ₹ 50 lakhs debt by issuing 12% debentures. This would result in increasing the expected equity dividend to ₹ 25 and leave the growth rate unchanged, but the price of equity share will fall to ₹ 300 per share. **[10 Marks]**

## Solution

**(i) Computation of Weighted Average Cost of Capital based on existing capital structure**

| Source of Capital | Existing Capital structure (₹) | Weights (a) | After tax cost of capital (%) (b) | WACC (%) (a) × (b) |
|---|---|---|---|---|
| Equity share capital (W.N.1) | 4,00,00,000 | 0.588 | 10.00 | 5.88 |
| 12% Preference share capital | 80,00,000 | 0.118 | 12.00 | 1.42 |
| 11% Debentures (W.N.2) | 2,00,00,000 | 0.294 | 7.70 | 2.26 |
| Total | 6,80,00,000 | 1.000 | | 9.56 |

**Working Notes:**

1. Cost of Equity Capital:

$$K_e = \frac{\text{Expected dividend}(D_1)}{\text{Current Market Price}(P_0)} + \text{Growth}(g)$$

$$= \frac{20}{400} + 0.05$$

$$= 10\%$$

2. Cost of 10% Debentures

$$K_d = \frac{\text{Interest}(1-t)}{\text{Net proceeds}}$$

$$= \frac{22,00,000\,(1-0.30)}{2,00,00,000}$$

= 0.077 or 7.7%

**(ii) Computation of Weighted Average Cost of Capital based on new capital structure**

| Source of Capital | New Capital structure (₹) | Weights (a) | After tax cost of capital (%) (b) | WACC (%) (a) x (b) |
|---|---|---|---|---|
| Equity share capital (W.N.3) | 4,00,00,000 | 0.548 | 13.33 | 7.30 |
| 12% Preference share capital | 80,00,000 | 0.110 | 12.00 | 1.32 |
| 11% Debentures (W.N.2) | 2,00,00,000 | 0.274 | 7.70 | 2.11 |
| 12% Debentures (W.N.4) | 50,00,000 | 0.068 | 8.40 | 0.57 |
| Total | 7,30,00,000 | 1.000 | | 11.30 |

**Working Notes:**

3. Cost of Equity Capital:

$$K_e = \frac{25}{300} + 0.05$$

= 13.33%

4. Cost of 12% Debentures

$$K_d = \frac{6,00,000\,(1-0.30)}{50,00,000}$$

= 0.084 or 8.4%

## Question 4 – Cost of Capital – May 2023 Exam Q4

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

| *Particulars* | *₹* |
|---|---|
| *Equity share capital (₹ 10 each)* | *30,00,000* |
| *8% Preference share capital (₹ 100 each)* | *10,00,000* |
| *12% Debentures (₹ 100 each)* | *10,00,000* |

- *Current market price of equity share is ₹ 80 per share. The company has paid dividend of ₹ 14.07 per share. Seven years ago, it paid dividend of ₹ 10 per share. Expected dividend is ₹ 16 per share.*
- *8% Preference shares are redeemable at 6% premium after five years. Current market price per preference share is ₹ 104.*
- *12% debentures are redeemable at 20% premium after 10 years. Flotation cost is ₹ 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 ₹ 30,00,000 from bank. This financial decision is expected to increase dividend on equity share from ₹ 16 per share to ₹ 18 per share. However, the market price of equity share is expected to decline from ₹ 80 to ₹ 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%* |
|---|---|---|---|---|---|---|---|
| $FVIF_{i,5}$ | 1.051 | 1.104 | 1.159 | 1.217 | 1.276 | 1.338 | 1.403 |
| $FVIF_{i,6}$ | 1.062 | 1.126 | 1.194 | 1.265 | 1.340 | 1.419 | 1.501 |
| $FVIF_{i,7}$ | 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**

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

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

2

Kd = (7.2+2.5)/107.5 = 9.02%

Kd = 9.02%

**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%** |

**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%**

**Question 5 – Capital Structure - Illustration 5**

*Alpha Ltd. and Beta Ltd. are identical except for capital structure. Alpha Ltd. has 50 per cent debt and 50 per cent equity, whereas Beta Ltd. has 20 per cent debt and 80 per cent equity (All percentages are in market-value terms). The borrowing rate for both the companies is 8 per cent in a no-tax world, and capital markets are assumed to be perfect.*

*(a) (i) If you own 2 per cent of the shares of Alpha Ltd., DETERMINE your return if the company has net operating income of ₹ 3,60,000 and the overall capitalisation rate of the company ($K_0$) is 18 per cent.*

*(ii) CALCULATE the implied required rate of return on equity of Alpha Ltd.*

*(b) Beta Ltd. has the same net operating income as Alpha Ltd.*

*(i) CALCULATE the implied required rate of return on equity of Beta Ltd.*

*(ii) ANALYSE why does it differ from that of Alpha Ltd.*

**Solution**

**(a)** Value of the Alpha Ltd. $= \frac{NOI}{K_0} = \frac{₹\,3,60,000}{18\%} = ₹\,20,00,000$

**(i) Return on Equity shares of Alpha Ltd.**

| | ₹ |
|---|---|
| Value of the company | 20,00,000 |
| Market value of debt (50% × ₹ 20,00,000) | 10,00,000 |
| Market value of equity (50% × ₹ 20,00,000) | 10,00,000 |
| | ₹ |
| Net operating income | 3,60,000 |
| *Less:* Interest on debt (8% × ₹ 10,00,000) | 80,000 |
| Earnings available to equity shareholders | 2,80,000 |
| Return on 2% equity shares (2% × ₹ 2,80,000) | 5,600 |

**(ii) Implied required rate of return on equity of Alpha Ltd.**

$$= \frac{\text{Earnings available for equity shareholders}}{\text{Market value of Equity}} = \frac{₹\,2,80,000}{₹\,10,00,000} = 28\%$$

**(b) (i) Calculation of Implied rate of return on equity of Beta Ltd.**

| | ₹ |
|---|---|
| Total value of company | 20,00,000 |
| Market value of debt (20% × ₹ 20,00,000) | 4,00,000 |
| Market value of equity (80% × ₹ 20,00,000) | 16,00,000 |
| | ₹ |
| Net operating income | 3,60,000 |
| *Less:* Interest on debt (8%× ₹4,00,000) | 32,000 |
| Earnings available to shareholders | 3,28,000 |

Implied required rate of return on equity

$$= \frac{\text{Earnings available for equity shareholders}}{\text{Market value of Equity}} = \frac{₹\,3,28,000}{₹\,16,00,000} = 20.5\%$$

**(ii)** Implied required rate of return on equity of Beta Ltd. is lower than that of Alpha Ltd. because Beta Ltd. uses less debt in its capital structure. As the equity capitalisation is a linear function of the debt-to-equity ratio when we use the net operating income approach, the decline in required equity return offsets exactly the disadvantage of not employing so much in the way of "cheaper" debt funds.

**Question 6 – Capital Structure - TYK Q11**

*The financial advisor of Sun Ltd. is confronted with following two alternative financing plans for raising ₹ 10 lakhs that is needed for plant expansion and modernization*

***Alternative I:*** *Issue 80% of funds with 14% Debenture [Face value (FV) ₹ 100] at par and redeem at a premium of 10% after 10 years and balance by issuing equity shares at $33\frac{1}{3}$ % premium.*

***Alternative II:*** *Raise 10% of funds required by issuing 8% Irredeemable Debentures [Face value (FV) ₹ 100] at par and the remaining by issuing equity shares at current market price of ₹125.*

*Currently, the firm has an Earnings per share (EPS) of ₹ 21*

*The modernization and expansion programme is expected to increase the firm's Earnings before Interest and Taxation (EBIT) by ₹ 200,000 annually.*

*The firm's condensed Balance Sheet for the current year is given below:*

***Balance Sheet as on 31.3.2022***

| ***Liabilities*** | ***(₹)*** | ***Assets*** | ***(₹)*** |
|---|---|---|---|
| *Current Liabilities* | *5,00,000* | *Current Assets* | *16,00,000* |
| *10% Long Term Loan* | *15,00,000* | *Plan & Equipment (Net)* | *34,00,000* |
| *Reserves & Surplus* | *10,00,000* | | |
| *Equity Share Capital (FV: ₹ 100 each)* | *20,00,000* | | |
| *TOTAL* | *50,00,000* | *TOTAL* | *50,00,000* |

*However, the finance advisor is concerned about the effect that issuing of debt might have on the firm. The average debt ratio for firms in industry is 35%. He believes if this ratio is exceeded, the P/E ratio of the company will be 7 because of the potentially greater risk.*

*If the firm increases its equity capital by more than 10 %, he expects the P/E ratio of the company will increase to 8.5 irrespective of the debt ratio.*

*Assume Tax Rate of 25%. Assume target dividend pay-out under each alternative to be 60% for the next year and growth rate to be 10% for the purpose of calculating Cost of Equity.*

*SUGGEST with reason which alternative is better on the basis of each of the below given criteria:*

I. *Earnings per share (EPS) & Market Price per share (MPS)*

II. *Financial Leverage*

III. *Weighted Average Cost of Capital & Marginal Cost of Capital (using Book Value weights)*

**Solution**

**Calculation of Equity Share capital and Reserves and surplus:**

Alternative 1:

$$\text{Equity Share capital} = ₹20,00,000 + \frac{₹2,00,000 \times 100}{133.3333} = ₹21,50,000$$

$$\text{Reserves} = ₹10,00,000 + \frac{₹2,00,000 \times 33.3333}{133.3333} = ₹10,50,000$$

Alternative 2:

$$\text{Equity Share capital} = ₹20,00,000 + \frac{₹9,00,000 \times 100}{125} = ₹27,20,000$$

$$\text{Reserves} = ₹10,00,000 + \frac{₹9,00,000 \times 25}{125} = ₹11,80,000$$

**Capital Structure Plans**

(Amount in ₹)

| Capital | Alternative 1 ₹ | Alternative 2 ₹ |
|---|---|---|
| Equity Share capital | 21,50,000 | 27,20,000 |
| Reserves and surplus | 10,50,000 | 11,80,000 |
| 10% long term debt | 15,00,000 | 15,00,000 |
| 14% Debentures | 8,00,000 | - |
| 8% Irredeemable Debentures | - | 1,00,000 |
| Total Capital Employed | 55,00,000 | 55,00,000 |

**Computation of Present Earnings before interest and tax (EBIT)**

| | |
|---|---|
| EPS (₹) | 21 |
| No. of equity shares | 20,000 |
| Earnings for equity shareholders (I x II) (₹) | 4,20,000 |
| Profit Before Tax (III/75%) (₹)[ | 5,60,000 |
| Interest on long term loan (1500000 x 10%) (₹) | 1,50,000 |
| EBIT (IV + V) (₹) | 7,10,000 |

EBIT after expansion = ₹ 7,10,000 + ₹ 2,00,000 = ₹ 9,10,000

## Evaluation of Financial Plans on the basis of EPS, MPS and Financial Leverage

(Amount in ₹)

| Particulars | Alternative I | Alternate II |
|---|---|---|
| EBIT | 9,10,000 | 9,10,000 |
| Less: Interest: 10% on long term loan | (1,50,000) | (1,50,000) |
| 14% on Debentures | (1,12,000) | Nil |
| 8% on Irredeemable Debentures | Nil. | (8000) |
| PBT | 6,48,000 | 7,52,000 |
| Less: Tax @25% | (1,62,000) | (1,88,000) |
| PAT | 4,86,000 | 5,64,000 |
| No. of equity shares | 21,500 | 27,200 |
| **EPS** | **22.60** | **20.74** |
| Applicable P/E ratio (Working Note 1) | 7 | 8.5 |
| **MPS (EPS X P/E ratio)** | **158.2** | **176.29** |
| **Financial Leverage EBIT/PBT** | **1.40** | **1.21** |

**Working Note 1**

| | Alternative I | Alternative II |
|---|---|---|
| Debt: | | |
| ₹15,00,000 +₹8,00,000 | 23,00,000 | - |
| ₹15,00,000 +₹1,00,000 | - | 16,00,000 |
| Total capital Employed (₹) | 55,00,000 | 55,00,000 |
| Debt Ratio (Debt/Capital employed) | =0.4182 | =0.2909 |
| | **=41.82%** | **=29.09%** |
| Change in Equity: ₹21,50,000-₹20,00,000<br>₹27,20,000-₹20,00,000 | 1,50,000 | <br>7,20,000 |
| Percentage change in equity | 7.5% | **36%** |
| Applicable P/E ratio | **7** | **8.5** |

**Calculation of Cost of equity and various type of debt**

| | Alternative I | Alternative II |
|---|---|---|
| **A) Cost of equity** | | |
| EPS ₹ | 22.60 | 20.74 |
| DPS (EPS X 60%) ₹ | 13.56 | 12.44 |
| Growth (g) | 10% | 10% |
| Po (MPS) | 158.2 | 176.29 |
| Ke= Do (1 + g)/ Po | $\frac{13.56(1.1)}{158.2}$ | $\frac{12.44(1.1)}{176.29}$ |
| | =9.43% | =7.76% |
| **B) Cost of Debt:** | | |
| 10% long term debt | 10% + (1-0.25) | 10% +(1-0.25) |
| | = 7.5% | = 7.5% |
| 14% redeemable debentures | $\frac{14(1-0.25) + (110-100/10)}{110+100/2}$ | nil |
| | = 10.5 + 1 / 10.5 | |
| | = 10.95% | |
| 8% irredeemable debenture | NA | 8000 (1-0.25)/1,00,00 = 6% |

**Calculation of Weighted Average cost of capital (WACC)**

| | Alternative 1 | | | Alternative 2 | | |
|---|---|---|---|---|---|---|
| **Capital** | **Weights** | **Cost (%)** | **WACC** | **Weights** | **Cost (%)** | **WACC** |
| Equity Share Capital | 0.3909 | 9.43 | 3.69% | 0.4945 | 7.76 | 3.84% |
| Reserves and Surplus | 0.1909 | 9.43 | 1.80% | 0.2145 | 7.76 | 1.66% |

| | | | | | | |
|---|---|---|---|---|---|---|
| 10% Long term Debt | 0.2727 | 7.50 | 2.05% | 0.2727 | 7.50 | 2.05% |
| 14% Debenture | 0.1455 | 10.95 | 1.59% | | | |
| 8% Irredeemable Debentures | - | | | 0.0182 | 6 | 0.11% |
| | | | **9.12%** | | | **7.66%** |

**Calculation Marginal Cost of Capital (MACC)**

| | **Alternative 1** | | | **Alternative 2** | | |
|---|---|---|---|---|---|---|
| **Capital** | **(weight)** | **Cost (%)** | **MACC** | **(weight)** | **Cost (%)** | **MACC** |
| Equity Share Capital | ₹ 1,50,000 (0.15) | 9.43 | 1.41% | ₹7,20,000 (0.72) | 7.76 | 5.59% |
| Reserves and Surplus | ₹ 50,000 (0.05) | 9.43 | 0.47% | ₹1,80,000 (0.18) | 7.76 | 1.40% |
| 14% Debenture | ₹ 8,00,000 (0.80) | 10.95 | 8.76% | - | | 0.00% |
| 8% Irredeemable Debentures | - | | | ₹1,00,000 (0.10) | 6 | 0.60% |
| Total Capital Employed | ₹10,00,000 | | **10.65%** | ₹10,00,000 | | **7.58%** |

**Summary of solution:**

| | Alternate I | Alternate II |
|---|---|---|
| Earning per share (EPS) ₹ | 22.60 | 20.74 |
| Market price per share (MPS) ₹ | 158.20 | 176.29 |
| Financial leverage | 1.4043 | 1.2101 |
| Weighted Average cost of capital (WACC) | 9.12% | 7.66% |
| Marginal cost of capital (MACC) | 10.65% | 7.58% |

Alternative 1 of financing will be preferred under the criteria of EPS, whereas Alternative II of financing will be preferred under the criteria of MPS, Financial leverage, WACC and marginal cost of capital.

**Question 7 - Capital Structure - Illustration 7**

*Following data is available in respect of two companies having same business risk:*

*Capital employed = ₹2,00,000, EBIT = ₹30,000 and $K_e$ = 12.5%*

| *Sources* | *Levered Company (₹)* | *Unlevered Company (₹)* |
|---|---|---|
| *Debt (@10%)* | *1,00,000* | *Nil* |
| *Equity* | *1,00,000* | *2,00,000* |

*An investor is holding 15% shares in levered company. CALCULATE the increase in annual earnings of investor if he switches his holding from Levered to Unlevered company.*

**SOLUTION**

**1. Valuation of firms**

| Particulars | Levered Firm (₹) | Unlevered Firm (₹) |
|---|---|---|
| EBIT | 30,000 | 30,000 |
| *Less:* Interest on debt (10% × ₹ 1,00,000) | 10,000 | Nil |
| Earnings available to Equity shareholders | 20,000 | 30,000 |
| $K_e$ | 12.5% | 12.5% |
| Value of Equity (S) (Earnings available to Equity shareholders/$K_e$) | 1,60,000 | 2,40,000 |
| Debt (D) | 1,00,000 | Nil |
| Value of Firm (V) = S + D | 2,60,000 | 2,40,000 |

Value of Levered company is more than that of unlevered company. Therefore, investor will sell his shares in levered company and buy shares in unlevered company. To maintain the level of risk he will borrow proportionate amount and invest that amount also in shares of unlevered company.

**2. Investment & Borrowings**

| | ₹ |
|---|---|
| Sell shares in Levered company (₹ 1,60,000 x 15%) | 24,000 |
| Borrow money (₹ 1,00,000 x 15%) | 15,000 |
| Buy shares in Unlevered company | 39,000 |

**3. Change in Return**

| | ₹ |
|---|---|
| Income from shares in Unlevered company | |
| (₹ 39,000 x 12.5%) | 4,875 |
| *Less:* Interest on loan (₹ 15,000 x 10%) | 1,500 |
| Net Income from unlevered firm | 3,375 |
| *Less:* Income from Levered firm (₹ 24000 x 12.5%) | 3,000 |
| Incremental Income due to arbitrage | 375 |

**Question 8 – Capital Structure - TYK Q8**

*The following data relates to two companies belonging to the same risk class:*

| ***Particulars*** | ***A Ltd.*** | ***B Ltd.*** |
|---|---|---|
| *Expected Net Operating Income* | *₹ 18,00,000* | *₹ 18,00,000* |
| *12% Debt* | *₹ 54,00,000* | - |
| *Equity Capitalization Rate* | - | *18* |

*REQUIRED:*

*(a) Determine the total market value, Equity capitalization rate and weighted average cost of capital for each company assuming no taxes as per M.M. Approach.*

*(b) Determine the total market value, Equity capitalization rate and weighted average cost of capital for each company assuming 40% taxes as per M.M. Approach.*

**Solution**

(a) Assuming no tax as per MM Approach.

Calculation of Value of Firms 'A Ltd.' and 'B Ltd' according to MM Hypothesis

Market Value of 'B Ltd' [Unlevered(u)]

Total Value of Unlevered Firm ($V_u$) = [NOI/$k_e$] = 18,00,000/0.18 = ₹ 1,00,00,000

$K_e$ of Unlevered Firm (given) = 0.18

$K_o$ of Unlevered Firm (Same as above = $k_e$ as there is no debt) = 0.18

**Market Value of 'A Ltd' [Levered Firm (I)]**

Total Value of Levered Firm ($V_L$) = $V_u$ + (Debt× Nil)

= ₹ 1,00,00,000 + (54,00,000 × nil)

= ₹1,00,00,000

**Computation of Equity Capitalization Rate and Weighted Average Cost of Capital (WACC)**

| | Particulars | A Ltd. | B Ltd. |
|---|---|---|---|
| A. | Net Operating Income (NOI) | ₹ 18,00,000 | ₹ 18,00,000 |
| B. | Less: Interest on Debt (I) | ₹ 6,48,000 | - |
| C. | Earnings of Equity Shareholders (NI) | ₹ 11,52,000 | ₹ 18,00,000 |
| D | Overall Capitalization Rate ($k_o$) | 0.18 | 0.18 |
| E | Total Value of Firm (V = NOI/$k_o$) | ₹ 1,00,00,000 | ₹ 1,00,00,000 |
| F | Less: Market Value of Debt | ₹ 54,00,000 | - |
| G | Market Value of Equity (S) | ₹ 46,00,000 | ₹ 1,00,00,000 |
| H | Equity Capitalization Rate [$k_e$ = NI /S] | 0.2504 | 0.18 |
| I | Weighted Average Cost of Capital [WACC ($k_o$)]*$k_o$ = ($k_e$×S/V) + ($k_d$×D/V) | 0.18 | 0.18 |

*Computation of WACC A Ltd

| Component of Capital | Amount | Weight | Cost of Capital | WACC |
|---|---|---|---|---|
| Equity | ₹ 46,00,000 | 0.46 | 0.2504 | 0.1152 |
| Debt | ₹ 54,00,000 | 0.54 | 0.12* | 0.0648 |
| Total | ₹ 1,00,00,000 | | | 0.18 |

*$K_d$ = 12% (since there is no tax)

WACC = 18%

**(b)** Assuming 40% taxes as per MM Approach

Calculation of Value of Firms 'A Ltd.' and 'B Ltd' according to MM Hypothesis

Market Value of 'B Ltd' [Unlevered(u)]

Total Value of unlevered Firm ($V_u$) = [NOI (1 - t)/ke] = 18,00,000 (1 – 0.40)] / 0.18

= ₹60,00,000

$K_e$ of unlevered Firm (given) = 0.18

$K_o$ of unlevered Firm (Same as above = $k_e$ as there is no debt) = 0.18

**Market Value of 'A Ltd' [Levered Firm (I)]**

Total Value of Levered Firm ($V_L$) = $V_u$ + (Debt× Tax)

= ₹ 60,00,000 + (₹ 54,00,000 × 0.4)

= ₹ 81,60,000

**Computation of Weighted Average Cost of Capital (WACC) of 'B Ltd.'**

= 18% (i.e. $K_e$ = $K_o$)

**Computation of Equity Capitalization Rate and Weighted Average Cost of Capital (WACC) of A Ltd**

| Particulars | A Ltd. (₹) |
|---|---|
| Net Operating Income (NOI) | 18,00,000 |
| Less: Interest on Debt (I) | 6,48,000 |
| Earnings Before Tax (EBT) | 11,52,000 |
| Less: Tax @ 40% | 4,60,800 |
| Earnings for equity shareholders (NI) | 6,91,200 |
| Total Value of Firm (V) as calculated above | 81,60,000 |
| Less: Market Value of Debt | 54,00,000 |
| Market Value of Equity (S) | 27,60,000 |
| Equity Capitalization Rate [$k_e$ = NI/S] | 0.2504 |
| Weighted Average Cost of Capital ($k_o$)* $k_o = (k_e \times S/V) + (k_d \times D/V)$ | 13.23 |

*Computation of WACC A Ltd

| Component of Capital | ₹ | Weight | Cost of Capital | WACC |
|---|---|---|---|---|
| Equity | 27,60,000 | 0.338 | 0.2504 | 0.0846 |
| Debt | 54,00,000 | 0.662 | 0.072* | 0.0477 |
| Total | 81,60,000 | | | 0.1323 |

*$K_d$ = 12% (1- 0.4) = 12% × 0.6 = 7.2%

WACC = 13.23%

### Question 9 – Capital Structure - MTP series 1 Sep 2023 Q4

A company needs ₹ 42,50,000 for the construction of a new plant. The following three plans are feasible:

I The company may issue 4,25,000 equity shares at ₹ 10 per share.

II The company may issue 2,12,500 equity shares at ₹ 10 per share and 21,250 debentures of ₹ 100 denominations bearing an 8% rate of interest.

III The company may issue 2,12,500 equity shares at ₹ 10 per share and 21,250 cumulative preference shares at ₹ 100 per share bearing an 8% rate of dividend.

(i) The company's earnings before interest and taxes are ₹ 75,000, ₹ 1,50,000, ₹ 3,00,000, ₹ 4,50,000 and ₹ 7,50,000. DETERMINE earnings per share under each of three financial plans? Assume a corporate income tax rate of 40%.

(ii) IDENTIFY which alternative would you recommend and why?

(iii) DETERMINE the EBIT-EPS indifference points by formulae between Financing Plan I and Plan II and Plan I and Plan III. **(10 Marks)**

### Solution

**(i) Computation of EPS under three-financial plans.**

Plan I: Equity Financing

| | (₹) | (₹) | (₹) | (₹) | (₹) |
|---|---|---|---|---|---|
| EBIT | 75,000 | 1,50,000 | 3,00,000 | 4,50,000 | 7,50,000 |
| Interest | 0 | 0 | 0 | 0 | 0 |
| EBT | 75,000 | 1,50,000 | 3,00,000 | 4,50,000 | 7,50,000 |
| *Less*: Tax @ 40% | 30,000 | 60,000 | 1,20,000 | 1,80,000 | 3,00,000 |
| PAT | 45,000 | 90,000 | 1,80,000 | 2,70,000 | 4,50,000 |

| | | | | | |
|---|---|---|---|---|---|
| No. of equity shares | 4,25,000 | 4,25,000 | 4,25,000 | 4,25,000 | 4,25,000 |
| EPS | 0.11 | 0.21 | 0.42 | 0.64 | 1.06 |

Plan II: Debt – Equity Mix

| | (₹) | (₹) | (₹) | (₹) | (₹) |
|---|---|---|---|---|---|
| EBIT | 75,000 | 1,50,000 | 3,00,000 | 4,50,000 | 7,50,000 |
| *Less*: Interest | 1,70,000 | 1,70,000 | 1,70,000 | 1,70,000 | 1,70,000 |
| EBT | (95,000) | (20,000) | 1,30,000 | 2,80,000 | 5,80,000 |
| *Less*: Tax @ 40% | 38,000* | 8000* | 52,000 | 1,12,000 | 2,32,000 |
| PAT | (57,000) | (12,000) | 78,000 | 1,68,000 | 3,48,000 |
| No. of equity shares | 2,12,500 | 2,12,500 | 2,12,500 | 2,12,500 | 2,12,500 |
| EPS | (₹ 0.27) | (0.056) | 0.37 | 0.79 | 1.64 |

* The Company can set off losses against the overall business profit or may carry forward it to next financial years.

Plan III: Preference Shares – Equity Mix

| | (₹) | (₹) | (₹) | (₹) | (₹) |
|---|---|---|---|---|---|
| EBIT | 75,000 | 1,50,000 | 3,00,000 | 4,50,000 | 7,50,000 |
| *Less:* Interest | 0 | 0 | 0 | 0 | 0 |
| EBT | 75,000 | 1,50,000 | 3,00,000 | 4,50,000 | 7,50,000 |
| *Less:* Tax @ 40% | 30,000 | 60,000 | 1,20,000 | 1,80,000 | 3,00,000 |
| PAT | 45,000 | 90,000 | 1,80,000 | 2,70,000 | 4,50,000 |
| *Less:* Pref. dividend | 1,70,000* | 1,70,000* | 1,70,000 | 1,70,000 | 1,70,000 |
| PAT after Pref. dividend. | (1,25,000) | (80,000) | 10,000 | 1,00,000 | 2,80,000 |
| No. of Equity shares | 2,12,500 | 2,12,500 | 2,12,500 | 2,12,500 | 2,12,500 |
| EPS | (0.59) | (0.38) | 0.05 | 0.47 | 1.32 |

* In case of cumulative preference shares, the company must pay cumulative dividend to preference shareholders, when company earns sufficient profits.

**(ii)** From the above EPS computations tables under the three financial plans we can see that when EBIT is ₹ 4,50,000 or more, Plan II: Debt-Equity mix is preferable over the Plan I and Plan III, as rate of EPS is more under this plan. On the other hand, an EBIT of less than ₹4,50,000, Plan I: Equity Financing has higher EPS than Plan II and Plan III. Plan III Preference Share-Equity mix is not acceptable at any level of EBIT, as EPS under this plan is lower.

The choice of the financing plan will depend on the performance of the company and other macro-economic conditions. If the company is expected to have higher operating profit Plan II: Debt – Equity Mix is preferable. Moreover, debt financing gives more benefit due to availability of tax shield.

**(iii) EBIT – EPS Indifference point: Plan I and Plan II**

$$\frac{EBIT_1 \times (1-t)}{\text{No. of equity shares } (N_1)} = \frac{(EBIT_2 - \text{Interest}) \times (1-t)}{\text{No. of equity shares } (N_2)}$$

$$\frac{EBIT(1-0.40)}{4,25,000 \text{ shares}} = \frac{(EBIT - ₹1,70,000) \times (1-0.40)}{2,12,500 \text{ shares}}$$

$0.6\ EBIT = 1.2\ EBIT - ₹2,04,000$

$EBIT = \frac{₹2,04,000}{0.6} = ₹\ 3,40,000$

Indifference points between Plan I and Plan II is ₹ 3,40,000

**EBIT – EPS Indifference Point: Plan I and Plan III**

$$\frac{EBIT_1 \times (1-t)}{\text{No. of equity shares } (N_1)} = \frac{EBIT_3 \times (1-t) - \text{Pref. dividend}}{\text{No. of equity shares } (N_3)}$$

$$\frac{EBIT_1(1-0.40)}{4,25,000 \text{ shares}} = \frac{EBIT_3(1-0.40) - Rs.1,70,000}{2,12,500 \text{ shares}}$$

$0.6\ EBIT = 1.2\ EBIT - ₹\ 3,40,000$

$EBIT = \frac{₹3,40,000}{0.6} = ₹\ 5,66,667$

Indifference points between Plan I and Plan III is ₹ 5,66,667.

**Question 10 – Leverages - TYK Q9**

*The following particulars relating to Navya Ltd. for the year ended 31st March is given:*

| | |
|---|---|
| *Output* | *1,00,000 units at normal capacity* |
| *Selling price per unit* | *₹ 40* |
| *Variable cost per unit* | *₹ 20* |
| *Fixed cost* | *₹ 10,00,000* |

*The capital structure of the company as on 31st March is as follows:*

| ***Particulars*** | ***₹*** |
|---|---|
| *Equity share capital (1,00,000 shares of ₹ 10 each)* | *10,00,000* |
| *Reserves and surplus* | *5,00,000* |
| *7% debentures* | *10,00,000* |
| *Current liabilities* | *5,00,000* |
| ***Total*** | ***30,00,000*** |

*Navya Ltd. has decided to undertake an expansion project to use the market potential, that will involve ₹ 10 lakhs. The company expects an increase in output by 50%. Fixed cost will be increased by ₹ 5,00,000 and variable cost per unit will be decreased by 10%. The additional output can be sold at the existing selling price without any adverse impact on the market.*

*The following alternative schemes for financing the proposed expansion programme are planned:*

*(i) Entirely by equity shares of ₹ 10 each at par.*

*(ii) ₹ 5 lakh by issue of equity shares of ₹ 10 each and the balance by issue of 6% debentures of ₹ 100 each at par.*

*(iii) Entirely by 6% debentures of ₹ 100 each at par.*

*FIND out which of the above-mentioned alternatives would you recommend for Navya Ltd. with reference to the risk and return involved, assuming a corporate tax of 40%.*

**Solution**

**Statement showing Profitability of Alternative Schemes for Financing**

**(₹ in '00,000)**

| **Particulars** | **Existing** | **Alternative Schemes** | | |
|---|---|---|---|---|
| | | **(i)** | **(ii)** | **(iii)** |
| Equity Share capital (existing) | 10 | 10 | 10 | 10 |
| New issues | - | 10 | 5 | - |
| | **10** | **20** | **15** | **10** |
| 7% debentures | 10 | 10 | 10 | 10 |
| 6% debentures | - | - | 5 | 10 |
| | **20** | **30** | **30** | **30** |
| Debenture interest (7%) | 0.7 | 0.7 | 0.7 | 0.7 |
| Debenture interest (6%) | - | - | 0.3 | 0.6 |
| | **0.7** | **0.7** | **1.0** | **1.3** |
| Output (units in lakh) | 1 | 1.5 | 1.5 | 1.5 |
| Contribution per. unit (₹) (Selling price - Variable Cost) | 20 | 22 | 22 | 22 |

| **Contribution (₹ lakh)** | **20** | **33** | **33** | **33** |
|---|---|---|---|---|
| *Less:* Fixed cost | 10 | 15 | 15 | 15 |
| **EBIT** | **10** | **18** | **18** | **18** |
| *Less:* Interest (as calculated above) | 0.7 | 0.7 | 1.0 | 1.3 |
| **EBT** | **9.3** | **17.3** | **17** | **16.7** |
| *Less:* Tax (40%) | 3.72 | 6.92 | 6.8 | 6.68 |
| EAT | 5.58 | 10.38 | 10.20 | 10.02 |
| Operating Leverage (Contribution /EBIT) | 2.00 | 1.83 | 1.83 | 1.83 |
| Financial Leverage (EBIT/EBT) | 1.08 | 1.04 | 1.06 | 1.08 |
| Combined Leverage (Contribution/EBT) | 2.15 | 1.91 | 1.94 | 1.98 |
| EPS (EAT/No. of shares) (₹) | 5.58 | 5.19 | 6.80 | 10.02 |

| **Risk** | **-** | **Lowest** | **Lower than option (3)** | **Highest** |
|---|---|---|---|---|
| **Return** | **-** | **Lowest** | **Lower than option (3)** | **Highest** |

From the above figures, we can see that the Operating Leverage is same in all alternatives though Financial Leverage differs. Alternative (iii) uses the maximum amount of debt and result into the highest degree of financial leverage, followed by alternative (ii). Accordingly, risk of the company will be maximum in these options. Corresponding to this scheme, however, maximum EPS (i.e., ₹ 10.02 per share) will be also in option (iii).

So, if Navya Ltd. is ready to take a high degree of risk, then alternative (iii) is strongly recommended. In case of opting for less risk, alternative (ii) is the next best option with a reduced EPS of ₹ 6.80 per share. In case of alternative (i), EPS is even lower than the existing option, hence not recommended.

**Question 11 – Leverages – Illustration 4**

The following information is related to Yizi Company Ltd. for the current Financial Year:

| | |
|---|---|
| Equity share capital (of ₹ 10 each) | ₹ 50 lakhs |
| 12% Bonds of ₹ 1,000 each | ₹ 37 lakhs |
| Sales | ₹ 84 lakhs |
| Fixed cost (excluding interest) | ₹ 6.96 lakhs |
| Financial leverage | 1.49 |
| Profit-volume Ratio | 27.55% |
| Income Tax Applicable | 40% |

You are required to CALCULATE:

(i) Operating Leverage;

(ii) Combined leverage; and

(iii) Earnings per share.

Show calculations up-to two decimal points.

**SOLUTION**

**Computation of Profits after Tax (PAT)**

| Particulars | (₹) |
|---|---|
| Sales | 84,00,000 |
| Contribution (Sales × P/V ratio) | 23,14,200 |
| Less: Fixed cost (excluding Interest) | (6,96,000) |
| EBIT (Earnings before interest and tax) | 16,18,200 |
| Less: Interest on debentures (12% × ₹37 lakhs) | (4,44,000) |
| Less: Other fixed Interest (balancing figure) | (88,160)* |
| EBT (Earnings before tax) | 10,86,040 |
| Less: Tax @ 40% | 4,34,416 |
| PAT (Profit after tax) | 6,51,624 |

**(i) Operating Leverage:**

$$= \frac{\text{Contribution}}{\text{EBIT}} = \frac{₹23,14,200}{₹16,18,200} = 1.43$$

**(ii) Combined Leverage:**

= Operating Leverage × Financial Leverage

= 1.43 × 1.49 = 2.13

Or,

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}}$$

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBT}} = \frac{₹23,14,200}{₹10,86,040} = 2.13$$

$$\text{*Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}} = \frac{₹\,16,18,200}{\text{EBT}} = 1.49$$

$$\text{So, EBT} = \frac{₹\,16,18,200}{1.49} = ₹10,86,040$$

Accordingly, other fixed interest = ₹ 16,18,200 - ₹ 10,86,040 - ₹ 4,44,000

= ₹ 88,160

**(iii) Earnings per share (EPS):**

$$= \frac{\text{PAT}}{\text{No. of shares outstanding}} = \frac{₹\ 6,51,624}{5,00,000 \text{ equity shares}} = ₹\ 1.30$$

**Question 12 – Leverages – Nov 2021 Exam Q5**

*Information of A Ltd. is given below:*

- *Earnings after tax: 5% on sales*
- *Income tax rate: 50%*
- *Degree of Operating Leverage: 4 times*
- *10% Debenture in capital structure: ₹ 3 lakhs*
- *Variable costs: ₹ 6 lakhs*

*Required:*

*(i) From the given data complete following statement:*

| | |
|---|---|
| *Sales* | *XXXX* |
| *Less: Variable costs* | *₹ 6,00,000* |
| *Contribution* | *XXXX* |
| *Less: Fixed costs* | *XXXX* |
| *EBIT* | *XXXX* |
| *Less: Interest expenses* | *XXXX* |
| *EBT* | *XXXX* |
| *Less: Income tax* | *XXXX* |
| *EAT* | *XXXX* |

*(ii) Calculate Financial Leverage and Combined Leverage.*

*(iii) Calculate the percentage change in earning per share, if sales increased by 5%.*

***(10 Marks)***

**Solution**

**(i) Working Notes**

Earning after tax (EAT)is 5% of sales

Income tax is 50%

So, EBT is 10% of Sales

Since Interest Expenses is ₹ 30,000

EBIT = 10% of Sales + ₹30,000 ..... (Equation i)

Now Degree of operating leverage = 4

$$\text{So, } \frac{\text{Contribution}}{\text{EBIT}} = 4$$

Or, Contribution = 4 EBIT

Or, Sales – Variable Cost = 4 EBIT

Or, Sales – ₹ 6,00,000 = 4 EBIT ..... (Equation ii)

Replacing the value of EBIT of equation (i) in Equation (ii)

We get, Sales – ₹ 6,00,000 = 4 (10% of Sales + ₹ 30,000)

Or, Sales – ₹ 6,00,000 = 40% of Sales + ₹ 1,20,000

Or, 60% of Sales = ₹ 7,20,000

$$\textbf{So, Sales} = \frac{₹\ 7,20,000}{60\%} = \textbf{₹ 12,00,000}$$

Contribution = Sales – Variable Cost = ₹ 12,00,000 – ₹ 6,00,000 =₹ 6,00,000

$$\textbf{EBIT} = \frac{₹\ 6,00,000}{4} = \textbf{₹ 1,50,000}$$

Fixed Cost = Contribution – EBIT = ₹ 6,00,000 – ₹ 1,50,000 = ₹ 4,50,000

**EBT** = EBIT – Interest = ₹ 1,50,000 – ₹ 30,000 = **₹ 1,20,000**

EAT = 50% of ₹ 1,20,000 = ₹ 60,000

**Income Statement**

| Particulars | (₹) |
|---|---|
| **Sales** | **12,00,000** |
| *Less:* Variable cost | 6,00,000 |
| Contribution | 6,00,000 |
| *Less:* Fixed cost | 4,50,000 |
| **EBIT** | **1,50,000** |
| *Less:* Interest | 30,000 |
| **EBT** | **1,20,000** |
| *Less:* Tax (50%) | 60,000 |
| EAT | 60,000 |

**(ii)** Financial Leverage $= \frac{EBIT}{EBT} = \frac{1,50,000}{1,20,000} =$ **1.25 times**

Combined Leverage = Operating Leverage × Financial Leverage

$= 4 \times 1.25 =$ **5 times**

Or,

Combined Leverage $= \frac{Contribution}{EBIT} \times \frac{EBIT}{EBT}$

Combined Leverage $= \frac{Contribution}{EBT} = \frac{₹\ 6,00,000}{₹\ 1,20,000} =$ **5 times**

**(iii)** Percentage Change in Earnings per share

Combined Leverage $= \frac{\%\ Change\ in\ EPS}{\%\ change\ in\ Sales} = 5 = \frac{\%\ change\ in\ EPS}{5\%}$

$\therefore$ % Change in EPS = **25%**

Hence, if sales increased by 5 %, EPS will be increased by 25 %.

**Question 13 – Investment Decisions – Illustration 15**

*Alpha Company is considering the following investment projects:*

| | Cash Flows (₹) | | | |
|---|---|---|---|---|
| **Projects** | $C_0$ | $C_1$ | $C_2$ | $C_3$ |
| A | -10,000 | +10,000 | | |
| B | -10,000 | +7,500 | +7,500 | |
| C | -10,000 | +2,000 | +4,000 | +12,000 |
| D | -10,000 | +10,000 | +3,000 | +3,000 |

(a) *ANALYSE and rank the projects according to each of the following methods: (i) Payback, (ii) ARR, (iii) IRR and (iv) NPV, assuming discount rates of 10 and 30 per cent.*

(b) *Assuming the projects are independent, which one should be accepted? If the projects are mutually exclusive, IDENTIFY which project is the best?*

**Solution**

**(a) (i) Payback Period**

Project A: ₹ 10,000/₹ 10,000 = 1 year

Project B: ₹ 10,000/₹ 7,500 = $1\frac{1}{3}$ years

Project C: $2 \text{ years} + \frac{₹\ 10,000 - ₹\ 6,000}{₹\ 12,000} = 2\frac{1}{3}$ years

Project D: 1 year

**(ii) ARR (Figures in ₹)**

Project A: $\frac{(10,000-10,000)1/2}{(10,000)1/2} = 0$

Project B: $\frac{(15,000-10,000)1/2}{(10,000)1/2} = \frac{2,500}{5,000} = 50\%$

Project C: $\frac{(18,000-10,000)1/3}{(10,000)1/2} = \frac{2,667}{5,000} = 53\%$

Project D: $\frac{(16,000-10,000)1/3}{(10,000)1/2} = \frac{2,000}{5,000} = 40\%$

**Note:** This net cash proceed includes recovery of investment also. Therefore, net cash earnings are found by deducting initial investment.

**(iii) IRR**

| | |
|---|---|
| Project A: | The net cash proceeds in year 1 are just equal to investment. Therefore, r = 0%. |
| Project B: | This project produces an annuity of ₹ 7,500 for two years. Therefore, the required PVAF is: ₹ 10,000/₹ 7,500 = 1.33.<br>This factor is found under 32% column.<br>Therefore, r = 32% |
| Project C: | Since cash flows are uneven, the trial and error method will be followed. Using 20% rate of discount, the NPV is + ₹ 1,389. At 30% rate of discount, the NPV is - ₹ 633. The true rate of return should be less than 30%. At 27% rate of discount, it is found that the NPV is - ₹ 86 and + ₹ 105 at 26%. Through interpolation, we find r = 26.5% |
| Project D: | In this case also by using the trial and error method, it is found that at 37.6% rate of discount, NPV becomes almost zero.<br>Therefore, r = 37.6%. |

**(iv) NPV**

Project A:

at 10% -10,000+10,000×0.909 = -910

at 30% -10,000+10,000×0.769 = -2,310

Project B:

at 10% -10,000+7,500(0.909+0.826) = +3,013

at 30% -10,000+7,500(0.769+0.592) = +208

Project C:

at 10% -10,000+2,000×0.909+4,000×0.826+12,000×0.751= +4,134

at 30% -10,000+2,000×0.769+4,000×0.592+12,000×0.455 =-633

Project D:

at 10% -10,000+10,000×0.909+3,000×(0.826+0.751) =+ 3,821

at 30% -10,000+10,000×0.769+3,000×(0.592+0.455) =+ 831

**The projects are ranked as follows according to the various methods:**

| Projects | PBP | ARR | IRR | NPV (10%) | NPV (30%) |
|---|---|---|---|---|---|
| A | 1 | 4 | 4 | 4 | 4 |
| B | 2 | 2 | 2 | 3 | 2 |
| C | 3 | 1 | 3 | 1 | 3 |
| D | 1 | 3 | 1 | 2 | 1 |

**(b)** Payback and ARR are theoretically unsound method for choosing between the investment projects. Between the two time-adjusted (DCF) investment criteria, NPV and IRR, NPV gives consistent results. If the projects are independent (and there is no capital rationing), either IRR or NPV can be used since the same set of projects will be accepted by any of the methods. In the present case, except Project A all the three projects should be accepted if the discount rate is 10%. Only Projects B and D should be undertaken if the discount rate is 30%.

If it is assumed that the projects are mutually exclusive, then under the assumption of 30% discount rate, the choice is between B and D (A and C are unprofitable). Both criteria IRR and NPV give the same results – D is the best. Under the assumption of 10% discount rate, ranking according to IRR and NPV conflict (except for Project A). If the IRR rule is followed, Project D should be accepted. But the NPV rule tells that Project C is the best. The NPV rule generally gives consistent results in conformity with the wealth maximization principle. Therefore, Project C should be accepted following the NPV rule.

**Question 14 – investment Decisions – TYK Q6**

*Ae Bee Cee Ltd. is planning to invest in machinery, for which it has to make a choice between the two identical machines, in terms of Capacity, 'X' and 'Y'. Despite being designed differently, both machines do the same job. Further, details regarding both the machines are given below:*

| ***Particulars*** | ***Machine 'X'*** | ***Machine 'Y'*** |
|---|---|---|
| *Purchase Cost of the Machine (₹)* | *15,00,000* | *10,00,000* |
| *Life (years)* | *3* | *2* |
| *Running cost per year (₹)* | *4,00,000* | *6,00,000* |

*The opportunity cost of capital is 9%.*

*You are required to IDENTIFY the machine which the company should buy?*

*The present value (PV) factors at 9% are:*

| *Year* | $t_1$ | $t_2$ | $t_3$ |
|---|---|---|---|
| $PVIF_{0.09,t}$ | *0.917* | *0.842* | *0.772* |

**Solution**

**Statement Showing the Evaluation of Two Machines**

| | **Particulars** | **Machine 'X'** | **Machine 'Y'** |
|---|---|---|---|
| (i) | Purchase Cost | ₹ 15,00,000 | ₹ 10,00,000 |
| (ii) | Life of Machine | 3 years | 2 years |
| (iii) | Running Cost of Machine per year | ₹ 4,00,000 | ₹ 6,00,000 |
| (iv) | PVIFA (0.09, 3) | 2.531 | |
| | PVIFA (0.09, 2) | | 1.759 |
| (v) | PV of Running Cost of Machine {(iii) × (iv)} | ₹ 10,12,400 | ₹ 10,55,400 |
| (vi) | Cash outflows of Machine {(i) + (v)} | ₹ 25,12,400 | ₹ 20,55,400 |
| (vii) | Equivalent PV of Annual Cash outflow {(vi)/(iv)} | ₹ 9,92,651 | ₹ 11,68,505 |

Recommendation: Ae Bee Cee Ltd. should buy Machine 'X' since equivalent annual cash outflow is less than that of Machine 'Y'.

**Question 15 – investment Decisions – TYK Q11**

*Xavly Ltd. has a machine which has been in operation for 3 years. The machine has a remaining estimated useful life of 5 years with no salvage value in the end. Its current market value is ₹2,00,000. The company is considering a proposal to purchase a new model of machine to replace the existing machine. The relevant information is as follows:*

| | Existing Machine | New Machine |
|---|---|---|
| Cost of machine | ₹3,30,000 | ₹10,00,000 |
| Estimated life | 8 years | 5 years |
| Salvage value | Nil | ₹40,000 |
| Annual output | 30,000 units | 75,000 units |
| Selling price per unit | ₹15 | ₹15 |
| Annual operating hours | 3,000 | 3,000 |
| Material cost per unit | ₹4 | ₹4 |
| Labour cost per hour | ₹40 | ₹70 |
| Indirect cash cost per annum | ₹50,000 | ₹65,000 |

*The company uses written down value of depreciation @ 20% and it has several other machines in the block of assets. The Income tax rate is 30 per cent and Xavly Ltd. does not make any investment, if it yields less than 12 per cent.*

*ADVISE Xavly Ltd. whether the existing machine should be replaced or not.*

*PV factors @12%:*

| Year | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| PVF | 0.893 | 0.797 | 0.712 | 0.636 | 0.567 |

**Solution**

**(i) Calculation of Net Initial Cash Outflows:**

| | ₹ |
|---|---|
| Cost of new machine | 10,00,000 |
| Less: Sale proceeds of existing machine | 2,00,000 |
| Net initial cash outflows | 8,00,000 |

**(ii) Calculation of Base for depreciation**

| **Particulars** | | ₹ |
|---|---|---|
| **WDV of Existing Machine** | | |
| Cost of existing machine | | 3,30,000 |
| Less: Depreciation for year 1 | 66,000 | |
| Depreciation for Year 2 | 52,800 | |
| Depreciation for Year 3 | 42,240 | 1,61,040 |
| **WDV of Existing Machine (i)** | | **1,68,960** |
| **Depreciation base of New Machine** | | |
| Cost of new machine | | 10,00,000 |
| Add: WDV of existing machine | | 1,68,960 |
| Less: Sales value of existing machine | | 2,00,000 |
| **Depreciation base of New Machine (ii)** | | 9,68,960 |
| **Base for incremental depreciation [(ii) – (i)]** | | 8,00,000 |

**(iii) Calculation of annual Profit Before Tax and depreciation**

| **Particulars** | **Existing machine** | **New Machine** | **Differential** |
|---|---|---|---|
| **(1)** | **(2)** | **(3)** | **(4)=(3)–(2)** |
| Annual output | 30,000 units | 75,000 units | 45,000 units |
| | ₹ | ₹ | ₹ |
| (A) Sales revenue @ ₹ 15 per unit | 4,50,000 | 11,25,000 | 6,75,000 |
| (B) Less: Cost of Operation | | | |
| Material @ ₹ 4 per unit | 1,20,000 | 3,00,000 | 1,80,000 |

| | | | |
|---|---|---|---|
| Labour | | | |
| Old = 3,000 × ₹ 40 | 1,20,000 | | 90,000 |
| New = 3,000 × ₹ 70 | | 2,10,000 | |
| Indirect cash cost | 50,000 | 65,000 | 15,000 |
| Total Cost (B) | 2,90,000 | 5,75,000 | 2,85,000 |
| Profit Before Tax and depreciation (PBTD) (A – B) | 1,60,000 | 5,50,000 | 3,90,000 |

**(iv) Calculation of Incremental Net Present Value:**

| Year | PBTD | Dep. @ 20% | PBT | Tax @ 30% | Net cash flow | PVF @ 12% | PV |
|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4=2-3) | (5) | (6=4-5+3) | (7) | (8=6 x 7) |
| 1 | 3,90,000 | 1,60,000 | 2,30,000 | 69,000.00 | 3,21,000.00 | 0.893 | 2,86,653.00 |
| 2 | 3,90,000 | 1,28,000 | 2,62,000 | 78,600.00 | 3,11,400.00 | 0.797 | 2,48,185.80 |
| 3 | 3,90,000 | 1,02,400 | 2,87,600 | 86,280.00 | 3,03,720.00 | 0.712 | 2,16,248.64 |
| 4 | 3,90,000 | 81,920 | 3,08,080 | 92,424.00 | 2,97,576.00 | 0.636 | 1,89,258.34 |
| 5 | 3,90,000 | 65,536 | 3,24,464 | 97,339.20 | 2,92,660.80 | 0.567 | 1,65,938.67 |
| | | | | | | | 11,06,284.45 |
| Add: PV of Salvage Value of new machine (₹ 40,000 x 0.567) | | | | | | | 22,680.00 |
| Less: Initial Cash Outflow | | | | | | | 8,00,000.00 |
| NPV | | | | | | | 3,28,964.45 |

**Advice:** Since the incremental NPV is positive, existing machine should be replaced.

**Question 16 – Investment Decisions – RTP May 2024 Q5**

HMR Ltd. is considering replacing a manually operated old machine with a fully automatic new machine. The old machine had been fully depreciated for tax purpose but has a book value of ₹ 2,50,000 on 31st March. The machine has begun causing problems with breakdowns and it cannot fetch more than ₹ 40,000 if sold in the market at present. It will have no realizable value after 10 years. The company has been offered ₹ 1,50,000 for the old machine as a trade in on the new machine which has a price (before allowance for trade in) of ₹ 6,00,000. The expected life of new machine is 10 years with salvage value of ₹ 35,000.

Further, the company follows written down value method depreciation @ 10% but for tax purpose, straight line method depreciation is used considering that this is the only machine in the block of assets. A working capital of ₹ 50,000 will be needed and it will be released at the end of tenth year.

Given below are the expected sales and costs from both old and new machine:

| | Old machine | New machine |
|---|---|---|
| Annual output | 60,000 units | 80,000 units |
| Selling price per unit | ₹ 18 | ₹ 18 |
| Annual operating hours | 2,800 | 2,800 |
| Material cost per unit | ₹ 5 | ₹ 5 |
| Labour cost per hour | ₹ 50 | ₹ 75 |
| Indirect cash cost per annum | ₹ 1,00,000 | ₹ 1,75,000 |

From the above information, ANALYSE whether the old machine should be replaced or not if the opportunity cost of capital of the Company is 10%?

The Income tax rate is 30%. Further assume that book profit is treated as ordinary income for tax purpose.

Also ESTIMATE the internal rate of return of the replacement decision.

All calculations to be calculated to 3 decimal places.

**Solution**

**Workings:**

**(i) Initial Cash Outflow:**

| | Amount (₹) |
|---|---|
| Cost of new machine | 6,00,000 |
| Less: Sale Price of existing machine | 1,05,000 |
| Net of Tax (₹ 1,50,000 × 0.70) | |
| | 4,95,000 |

**(ii) Terminal Cash Flows:**

**New Machine**

| | Amount (₹) |
|---|---|
| Salvage value of Machine | 35,000 |
| Less: Depreciated WDV | 35,000 |
| {₹ 6,00,000 - (₹ 56,500 × 10 years)} | |
| Short Term Capital Gain (STCG) | Nil |
| Tax | Nil |
| Net Salvage Value (cash flows) | 35,000 |

**(iii) Computation of additional cash flows (yearly)**

| Particulars | Existing machine | New Machine | Incremental |
|---|---|---|---|
| (1) | (2) | (3) | (4)=(3)–(2) |
| Annual output | 60,000 units | 80,000 units | 20,000 units |
| | ₹ | ₹ | ₹ |
| (A) Sales revenue @ ₹ 18 per unit | 10,80,000 | 14,40,000 | 3,60,000 |
| (B) Less: Cost of Operation | | | |
| Material @ ₹ 5 per unit | 3,00,000 | 4,00,000 | 1,00,000 |
| Labour | | | |
| Old = 2,800 x ₹ 50 | 1,40,000 | | 70,000 |

| | | | |
|---|---|---|---|
| New = 2,800 x ₹ 75 | | 2,10,000 | |
| Indirect cash cost | 1,00,000 | 1,75,000 | 75,000 |
| Total Cost (B) | 5,40,000 | 7,85,000 | 2,45,000 |
| Profit Before Tax and depreciation (PBTD) (A – B) | 5,40,000 | 6,55,000 | 1,15,000 |
| Less: Depreciation $(\frac{6,00,000 - 35,000}{10})$ | | | 56,500 |
| Earning after depreciation before Tax | | | 58,500 |
| Less: Tax @30% | | | 17,550 |
| Earning after depreciation and Tax | | | 40,950 |
| Add: Depreciation | | | 56,500 |
| Net Cash inflow | | | 97,450 |

**Analysis:** Since the Incremental Cash flow is positive, the old machine should be replaced.

**Note:** As mentioned in the question WDV of Machine is zero for tax purpose hence no depreciation shall be provided in existing machine.

**(iv) Calculation of IRR**

**Computation of NPV @ 10%**

| | Period | Cash flow (₹) | PVF @ 10% | PV (₹) |
|---|---|---|---|---|
| Incremental cash flows | 1-10 | 97,450 | 6.144 | 5,98,733 |
| *Add:* Release of Working Capital | 10 | 50,000 | 0.386 | 19,300 |
| *Add:* Terminal year cash | 10 | 35,000 | 0.386 | 13,510 |
| | | | | 6,31,543 |

| | | | | |
|---|---|---|---|---|
| *Less:* Initial cash outflow | 0 | 4,95,000 | 1 | 4,95,000 |
| *Less:* Working capital | 0 | 50,000 | 1 | 50,000 |
| | | | NPV | 86,543 |

Since NPV computed in Part (i) is positive. Let us discount cash flows at higher rate say at 20%

| | Period | Cash flow (₹) | PVF @ 20% | PV (₹) |
|---|---|---|---|---|
| Incremental cash flows | 1-10 | 97,450 | 4.192 | 4,08,510 |
| *Add:* Release of Working Capital | 10 | 50,000 | 0.162 | 8,100 |
| *Add:* Terminal year cash | 10 | 35,000 | 0.162 | 5,670 |
| | | | | 4,22,280 |
| *Less:* Initial cash outflow | 0 | 4,95,000 | 1 | 4,95,000 |
| *Less:* Working capital | 0 | 50,000 | 1 | 50,000 |
| | | | NPV | (1,22,720) |

Now we use interpolation formula:

$$10\% + \frac{86,543}{86,543 - (-1,22,720)} \times 10\%$$

$$10\% + \frac{86,543}{2,09,263} \times 10\%$$

IRR = 10% + 4.14% = 14.14%

**Summary of Results**

| | | Decision |
|---|---|---|
| Incremental Cash Flow | ₹ 97,450 | Accept |
| IRR | 14.14% > Cost of Capital (10%) | Accept |

**Question 17 – Investment Decisions – TYK Q13**

*A chemical company is presently paying an outside firm ₹ 1 per gallon to dispose off the waste resulting from its manufacturing operations. At normal operating capacity, the waste is about 50,000 gallons per year.*

*After spending ₹ 60,000 on research, the company discovered that the waste could be sold for ₹ 10 per gallon if it was processed further. Additional processing would, however, require an investment of ₹ 6,00,000 in new equipment, which would have an estimated life of 10 years with no salvage value. Depreciation would be calculated by straight line method.*

*Except for the costs incurred in advertising ₹ 20,000 per year, no change in the present selling and administrative expenses is expected, if the new product is sold. The details of additional processing costs are as follows:*

*Variable : ₹ 5 per gallon of waste put into process.*

*Fixed : (Excluding Depreciation) ₹ 30,000 per year.*

*There will be no losses in processing, and it is assumed that the total waste processed in a given year will be sold in the same year. Estimates indicate that 50,000 gallons of the product could be sold each year.*

*The management when confronted with the choice of disposing off the waste or processing it further and selling it, seeks your ADVICE. Which alternative would you recommend? Assume that the firm's cost of capital is 15% and it pays on an average 50% Tax on its income.*

*You should consider Present value of Annuity of ₹ 1 per year @ 15% p.a. for 10 years as 5.019.*

**Solution**

**Evaluation of Alternatives:**

**Savings in disposing off the waste**

| Particulars | (₹) |
|---|---|
| Outflow (50,000 × ₹ 1) | 50,000 |
| *Less:* tax savings @ 50% | 25,000 |
| **Net Outflow per year** | **25,000** |

**Calculation of Annual Cash inflows in Processing of waste Material**

| Particulars | Amount (₹) | Amount (₹) |
|---|---|---|
| Sale value of waste (₹ 10 × 50,000 gallon) | | 5,00,000 |
| *Less:* Variable processing cost (₹ 5 × 50,000 gallon) | 2,50,000 | |
| *Less:* Fixed processing cost | 30,000 | |
| *Less:* Advertisement cost | 20,000 | |
| *Less:* Depreciation | 60,000 | (3,60,000) |
| Earnings before tax (EBT) | | **1,40,000** |
| *Less:* Tax @ 50% | | (70,000) |
| Earnings after tax (EAT) | | 70,000 |
| *Add:* Depreciation | | 60,000 |
| **Annual Cash inflows** | | **1,30,000** |

Total Annual Benefits = Annual Cash inflows + Net savings (adjusting tax) in disposal cost

= ₹ 1,30,000 + ₹ 25,000 = ₹ 1,55,000

**Calculation of Net Present Value**

| Year | Particulars | Amount (₹) |
|---|---|---|
| 0 | Investment in new equipment | (6,00,000) |
| 1 to 10 | Total Annual benefits × PVAF (10 years, 15%) | |

| | | |
|---|---|---|
| | ₹ 1,55,000 × 5.019 | 7,77,945 |
| | Net Present Value | 1,77,945 |

**Recommendation:** Processing of waste is a better option as it gives a positive Net Present Value.

**Note**- Research cost of ₹ 60,000 is not relevant for decision making as it is sunk cost.

**Question 18 – Dividend Decisions – TYK Q2**

*The following information is supplied to you:*

| | ₹ |
|---|---|
| *Total Earnings* | *2,00,000* |
| *No. of equity shares (of ₹ 100 each)* | *20,000* |
| *Dividend paid* | *1,50,000* |
| *Price/ Earnings ratio* | *12.5* |

*Applying Walter's Model:*

*(i) ANALYSE whether the company is following an optimal dividend policy.*

*(ii) COMPUTE P/E ratio at which the dividend policy will have no effect on the value of the share.*

*(iii) Will your decision change, if the P/E ratio is 8 instead of 12.5? ANALYSE.*

**Solution**

**(i)** The EPS of the firm is ₹ 10 (i.e., ₹ 2,00,000/ 20,000), r = ₹ 2,00,000/ (20,000 shares × ₹ 100) = 10%. The P/E Ratio is given at 12.5 and the cost of capital ($K_e$) may be taken at the inverse of P/E ratio. Therefore, $K_e$ is 8 (i.e., 1/12.5). The firm is distributing total dividends of ₹ 1,50,000 among 20,000 shares, giving a dividend per share of ₹ 7.50. the value of the share as per Walter's model may be found as follows:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.08}(10 - 7.5)}{0.08} = ₹\ 132.81$$

The firm has a dividend payout of 75% (i.e., ₹ 1,50,000) out of total earnings of ₹ 2,00,000. Since, the rate of return of the firm (r) is 10% and it is more than the $K_e$ of 8%, therefore, by distributing 75% of earnings, the firm is not following an optimal dividend policy. The optimal dividend policy for the firm would be to pay zero dividend and in such a situation, the market price would be:

$$= \frac{0 + \frac{0.1}{0.08}(10 - 0)}{0.08} = ₹\ 156.25$$

So, theoretically the market price of the share can be increased by adopting a zero payout.

(ii) The P/E ratio at which the dividend policy will have no effect on the value of the share is such at which the $K_e$ would be equal to the rate of return (r) of the firm. The $K_e$ would be 10% (= r) at the P/E ratio of 10. Therefore, at the P/E ratio of 10, the dividend policy would have no effect on the value of the share.

(iii) If the P/E is 8 instead of 12.5, then the $K_e$ which is the inverse of P/E ratio, would be 12.5 and in such a situation $k_e$> r and the market price, as per Walter's model would be:

$$P = \frac{D + \frac{r}{K_e}(E - D)}{K_e} = \frac{7.5 + \frac{0.1}{0.125}(10 - 7.5)}{0.125} = ₹\ 76$$

**Question 19 – Dividend Decisions – TYK Q5**

*A&R Ltd. is a large-cap multinational company listed in BSE in India with a face value of ₹ 100 per share. The company is expected to grow @ 15% p.a. for next four years then 5% for an indefinite period. The shareholders expect 20% return on their share investments. Company paid ₹ 120 as dividend per share for the current Financial Year. The shares of the company traded at an average price of ₹ 3,122 on last day. FIND out the intrinsic value per share and state whether shares are overpriced or underpriced.*

**Solution - ICAI**

**As per Dividend discount model, the price of share is calculated as follows:**

$$P = \frac{D_1}{(1+K_e)^1} + \frac{D_2}{(1+K_e)^2} + \frac{D_3}{(1+K_e)^3} + \frac{D_4}{(1+K_e)^4} + \frac{D_5}{(K_e-g)} \times \frac{1}{(1+K_e)^5}$$

Where,

P = Price per share

$K_e$ = Required rate of return on equity

g = Growth rate

$$P = \frac{₹120x1.15}{(1+0.2)^1} + \frac{₹138x1.15}{(1+0.2)^2} + \frac{₹158.7x1.15}{(1+0.2)^3} + \frac{₹182.5x1.15}{(1+0.2)^4} + \frac{₹209.88x1.05}{(0.2-0.05)^1} \times \frac{1}{(1+0.2)^5}$$

P= 115 + 110.2 + 105.6 + 101.2 + 590.42 = ₹ 1,022.42

Intrinsic value of share is ₹ 1,022.42 as compared to latest market price of ₹ 3,122. Market price of a share is overpriced by ₹ 2,099.58.

**Solution – Correct – Similar Q in Dec 21 exam Q 1 (c ) – Correctly solved there**

(a) Calculation of Dividend

| Year | Growth rate | Dividend |
|---|---|---|
| Year 0 | | 120 |
| year 1 | 15% | 138.00 |
| Year 2 | 15% | 158.70 |
| Year 3 | 15% | 182.51 |
| Year 4 | 15% | 209.88 |
| Year 5 | 5% | 220.37 |

(b) Calculation of Share price at end of year 4 ($P_4$) = $\frac{D_5}{Ke - g}$ = $\frac{220.37}{20\% - 5\%}$

= 1469.17

**(c ) Calculation of Intrinsic value of share**

| Year | | Cash Flow | PVF @20% | PV |
|---|---|---|---|---|
| Year 1 | Dividend | 138.00 | 0.833 | 115.00 |
| Year 2 | Dividend | 158.70 | 0.694 | 110.21 |
| Year 3 | Dividend | 182.51 | 0.579 | 105.62 |
| Year 4 | Dividend | 209.88 | 0.482 | 101.22 |
| Year 4 | Share Price | 1469.17 | 0.482 | 708.51 |
| | | | Total | **1140.55** |

## Question 20 – Dividend Decisions – MTP Series 2 April 2023

Rex Ltd has 20 lakh equity shares outstanding at the start of the accounting year 2023. The existing market price per share is ₹ 300. Expected dividend is ₹ 20 per share. The rate of capitalization appropriate to the risk class to which the company belongs is 20%.

CALCULATE the market price per share when expected dividends are: (a) declared, and (b) not declared, based on the Miller – Modigliani approach.

CALCULATE number of shares to be issued by the company at the end of the accounting year on the assumption that the net income for the year is ₹ 5 crore; investment budget is ₹ 8 crores, when (a) Dividends are declared, and (b) Dividends are not declared.

PROVE that the market value of the shares at the end of the accounting year will remain unchanged irrespective of whether (a) Dividends are declared, or (ii) Dividends are not declared.

WHAT is the implied growth rate in dividends as per Gordon's model, if expected dividend payment is considered imminent? **(10 Marks)**

## Solution

**(a) (i) Calculation of market price per share**

According to Miller – Modigliani (MM) Approach:

$$P_o = \frac{P_1 + D_1}{1 + K_e}$$

Where,

Existing market price ($P_o$) = ₹ 300

Expected dividend per share ($D_1$) = ₹ 20

Capitalization rate ($k_e$) = 0.20 Market price at year end ($P_1$) = ?

a. If expected dividends are declared, then

300=(P1+20)/(1+0.2)

300 x 1.2 = P1+20

P1= 340

b. If expected dividends are not declared, then

300=(P1+0)/(1+0.2)

300 x 1.2 = P1

P1= 360

**(ii) Calculation of number of shares to be issued**

| | (a) | (b) |
|---|---|---|
| | **Dividends are declared. (₹ lakh)** | **Dividends are not Declared (₹ lakh)** |
| Net income | 500 | 500 |
| Total dividends | (400) | - |
| Retained earnings | 100 | 500 |
| Investment budget | 800 | 800 |
| Amount to be raised by new issues | 700 | 300 |
| Relevant market price (₹ per share) | 340 | 360 |
| No. of new shares to be issued (in lakh) (₹ 700 ÷ 340; ₹ 300 ÷ 360) | 2.0588 | 0.8333 |

**(iii) Calculation of market value of the shares**

| | (a) | (b) |
|---|---|---|
| **Particulars** | **Dividends are declared** | **Dividends are not Declared** |
| Existing shares (in lakhs) | 20.00 | 20.00 |
| New shares (in lakhs) | 2.0588 | 0.8333 |
| Total shares (in lakhs) | 22.0588 | 20.8333 |
| Market price per share (₹) | 340 | 360 |
| Total market value of shares at the end of the year (₹ in lakh) | 22.0588 × 340 = 7,500 (approx.) | 20.8333 × 360 = 7,500 (approx.) |

Hence, it is proved that the total market value of shares remains unchanged irrespective of whether dividends are declared, or not declared.

**(iv) P0=D1/(Ke-g)**

300 = 20/(0.2-g)

0.2-g = 20/300

0.2-g = 0.0667

G = 0.133333

**g = 13.3333%**

**Question 21 – Dividend Decisions – RTP Nov 2022 Q7**

Ordinary shares of a listed company are currently trading at ₹ 10 per share with two lakh shares outstanding. The company anticipates that its earnings for next year will be ₹ 5,00,000. Existing cost of capital for equity shares is 15%. The company has certain investment proposals under discussion which will cause an additional 26,089 ordinary shares to be issued if no dividend is paid or an additional 47,619 ordinary shares to be issued if dividend is paid.

Applying the MM hypothesis on dividend decisions, CALCULATE the amount of investment and dividend that is under consideration by the company.

**Solution**

$P_0$ = ₹ 10 n = 2,00,000, E = ₹ 5,00,000

$K_e$ = 15%, $\Delta n$ = 26,089, I = ?

$$P_0 = \frac{P_1}{1+K_e}$$

$$10 = \frac{P_1}{1.15}$$

$\therefore P_1 = 11.5$

$$\Delta n = \frac{I - E + nD_1}{P_1}$$

$$26{,}089 = \frac{I - 5{,}00{,}000}{11.5}$$

$I = 8{,}00{,}024$

Now,

$P_0 = ₹\ 10$, $n = ₹\ 2{,}00{,}000$,

$E = ₹\ 5{,}00{,}000$, $I = 8{,}00{,}024$,

$K_e = 15\%$, $\Delta n$ 47,619, $D_1 = ?$

$$P_0 = \frac{P_1 + D_1}{1 + K_e}$$

$$10 = \frac{P_1 + D_1}{1.15}$$

$P_1 + D_1 = 11.5$

$\therefore P_1 = 11.5 - D_1$ ..... 1

$$\because \Delta n = \frac{I - E + nD_1}{P_1}$$

$$47{,}619 = \frac{8{,}00{,}024 - 5{,}00{,}000 + 2{,}00{,}000D_1}{P_1}$$

$47{,}619\ P_1 = 2{,}00{,}000\ D_1 + 3{,}00{,}024$

From 1,

$47619\ (11.5 - D_1) = 2{,}00{,}000\ D_1 + 3{,}00{,}024$

$5{,}47{,}618.5 - 47{,}619D_1 = 2{,}00{,}000D_1 + 3{,}00{,}024$

$\therefore\ 2{,}47{,}594.5 = 2{,}00{,}000D_1 + 47{,}619\ D_1$

$\therefore$ 2,47,594.5 = 2,47,619 $D_1$

$\therefore D_1 = \frac{2,47,594.5}{2,47,619} = 0.99 \approx ₹ 1$

$\therefore P_1 = 11.5 - D_1$

$P_1 = 11.5 - 1$

$P_1 = 10.5$

$\because n.P_0 = \frac{(n+\Delta n)P_1 - I + E}{1+K_e}$

$= \frac{(2,00,000+47,619)(10.5)-8,00,024+5,00,000}{1.15}$

$n.P_0 = ₹19,99,979 \approx ₹20,00,000$

Using direct calculation,

$n.P_0 = 2,00,000 \times 10 = ₹ 20,00,000$

## Question 22 – Ratio Analysis – RTP Nov 2019 Q1

The following is the Profit and loss account and Balance sheet of KLM LLP.

**Trading and Profit & Loss Account**

| Particulars | Amount (₹) | Particulars | Amount (₹) |
|---|---|---|---|
| To Opening stock | 12,46,000 | By Sales | 1,96,56,000 |
| To Purchases | 1,56,20,000 | By Closing stock | 14,28,000 |
| To Gross profit c/d | 42,18,000 | | |
| | 2,10,84,000 | | 2,10,84,000 |
| | | By Gross profit b/d | 42,18,000 |
| To Administrative expenses | 18,40,000 | By Interest on investment | 24,600 |
| To Selling & distribution expenses | 7,56,000 | By Dividend received | 22,000 |
| To Interest on loan | 2,60,000 | | |
| To Net profit | 14,08,600 | | |
| | 42,64,600 | | 42,64,600 |

**Balance Sheet as on.....**

| Capital & Liabilities | Amount (₹) | Assets | Amount (₹) |
|---|---|---|---|
| Capital | 20,00,000 | Plant & machinery | 24,00,000 |
| Retained earnings | 42,00,000 | Building | 42,00,000 |
| General reserve | 12,00,000 | Furniture | 12,00,000 |
| Term loan from bank | 26,00,000 | Sundry receivables | 13,50,000 |
| Sundry Payables | 7,20,000 | Inventory | 14,28,000 |
| Other liabilities | 2,80,000 | Cash & Bank balance | 4,22,000 |
| | 1,10,00,000 | | 1,10,00,000 |

You are required to COMPUTE:

(i) Gross profit ratio (ii) Net profit ratio (iii) Operating cost ratio

(iv) Operating profit ratio (v) Inventory turnover ratio (vi) Current ratio

(vii) Quick ratio (viii) Interest coverage ratio (ix) Return on capital employed

(x) Debt to assets ratio.

## Solution

(i) Gross profit ratio = $\frac{\text{Gross profit}}{\text{Sales}} \times 100 = \frac{₹42,18,000}{₹1,96,56,000} \times 100 = 21.46\%$

(ii) Net profit ratio = $\frac{\text{Net profit}}{\text{Sales}} \times 100 = \frac{₹14,08,600}{₹1,96,56,000} \times 100 = 7.17\%$

(iii) Operating ratio = $\frac{\text{Operating cost}}{\text{Sales}} \times 100$

Operating cost = Cost of goods sold + Operating expenses

Cost of goods sold = Sales – Gross profit

= 1,96,56,000 - 42,18,000 = 1,54,38,000

Operating expenses = Administrative expenses + Selling & distribution expenses

= 18,40,000 + 7,56,000 = 25,96,000

Therefore, Operating ratio = $\frac{1,54,38,000 + 25,96,000}{1,96,56,000} \times 100$

= $\frac{1,80,34,000}{1,96,56,000} \times 100 = 91.75\%$

(iv) Operating profit ratio = 100 – Operating cost ratio

= 100 – 91.75% = 8.25%

(v) Inventory turnover ratio = $\frac{\text{Cost of goods sold}}{\text{Average stock}}$

= $\frac{1,54,38,000}{(14,28,000 + 12,46,000)/2}$

= $\frac{1,54,38,000}{13,37,000} = 11.55$ times

(vi) Current ratio = $\frac{\text{Current assets}}{\text{Current liablities}}$

Current assets = Sundry receivables + Inventory + Cash & Bank balance

= 13,50,000 + 14,28,000 + 4,22,000 = 32,00,000

Current liabilities = Sundry Payables + Other liabilities

$$= 7,20,000 + 2,80,000 = 10,00,000$$

$$\text{Current ratio} = \frac{32,00,000}{10,00,000} = 3.2 \text{ times}$$

(vii) $$\text{Quick Ratio} = \frac{\text{Current assets} - \text{Inventories}}{\text{Current liablities}}$$

$$= \frac{32,00,000 - 14,28,000}{10,00,000} = 1.77 \text{ times}$$

(viii) $$\text{Interest coverage ratio} = \frac{\text{EBIDT}}{\text{Interest}} = \frac{\text{Net profit} + \text{Interest}}{\text{Interest}}$$

$$= \frac{14,08,600 + 2,60,000}{2,60,000} = 6.42 \text{ times}$$

(ix) $$\text{Return on capital employed (ROCE)} = \frac{\text{EBIT}}{\text{Capital employed}} \times 100$$

Capital employed = Capital + Retained earnings + General reserve + Term loan

= 20,00,000 + 42,00,000 + 12,00,000 + 26,00,000

= 1,00,00,000

$$\text{Therefore, ROCE} = \frac{16,68,600}{1,00,00,000} \times 100 = 16.69\%$$

(x) $$\text{Debt to assets ratio} = \frac{\text{Debts}}{\text{Total assets}} \times 100 = \frac{26,00,000}{1,10,00,000} \times 100 = 23.64\%$$

**Question 23 – Ratio Analysis – RTP Nov 2023 Q1**

From the following table of financial ratios of Prabhu Chemicals Limited, comment on various ratios given at the end:

| Ratios | 2021 | 2022 | Average of Chemical Industry |
|---|---|---|---|
| **Liquidity Ratios** | | | |
| Current ratio | 2.1 | 2.3 | 2.4 |
| Quick ratio | 1.4 | 1.8 | 1.4 |
| Receivable turnover ratio | 8 | 9 | 8 |
| Inventory turnover | 8 | 9 | 5 |
| Receivables collection period | 46 days | 41 days | 46 days |
| **Operating profitability** | | | |
| Operating income –ROI | 24% | 21% | 18% |
| Operating profit margin | 18% | 18% | 12% |
| **Financing decisions** | | | |
| Debt ratio | 45% | 44% | 60% |
| **Return** | | | |
| Return on equity | 26% | 28% | 18% |

COMMENT on the following aspect of Prabhu Chemicals Limited

(i) Liquidity

(ii) Operating profits

(iii) Financing

(iv) Return to the shareholders

**Solution**

| Ratios | Comment |
|---|---|
| Liquidity | Current ratio has improved from last year and matching the industry average.<br>Quick ratio also improved than last year and above the industry average.<br>The reduced inventory levels (evidenced by higher inventory turnover ratio) have led to better quick ratio in FY 2022 compared to FY 2021.<br>Further the decrease in current liabilities is greater than the collective decrease in inventory and debtors as the current ratio have increase from FY2021 to FY 2022. |
| Operating Profits | Operating Income-ROI reduced from last year, but Operating Profit Margin has been maintained. This may happen due to decrease in operating cost. However, both the ratios are still higher than the industry average. |
| Financing | The company has reduced its debt capital by 1% and saved earnings for equity shareholders. It also signifies that dependency on debt compared to other industry players (60%) is low. |
| Return to the shareholders | Prabhu's ROE is 26 per cent in 2021 and 28 per cent in 2022 compared to an industry average of 18 per cent. The ROE is stable and improved over the last year. |

**Question 24 – Ratio Analysis – TYK Q4**

*Ganpati Limited has furnished the following ratios and information relating to the year ended 31st March, 2023:*

| | |
|---|---|
| *Sales* | *₹ 60,00,000* |
| *Return on net worth* | *25%* |
| *Rate of income tax* | *50%* |
| *Share capital to reserves* | *7:3* |
| *Current ratio* | *2* |
| *Net profit to sales* | *6.25%* |
| *Inventory turnover (based on cost of goods sold)* | *12* |
| *Cost of goods sold* | *₹ 18,00,000* |
| *Interest on debentures* | *₹ 60,000* |
| *Receivables* | *₹ 2,00,000* |
| *Payables* | *₹ 2,00,000* |

*You are required to:*

*(a) CALCULATE the operating expenses for the year ended 31st March, 2023.*

*(b) PREPARE a Balance Sheet as on 31st March, 2023 in the following format:*

***Balance Sheet as on 31st March, 2023***

| ***Liabilities*** | ₹ | ***Assets*** | ₹ |
|---|---|---|---|
| *Share Capital* | | *Fixed Assets* | |
| *Reserve and Surplus* | | *Current Assets* | |
| *15% Debentures* | | *Stock* | |
| *Payables* | | *Receivables* | |
| | | *Cash* | |
| | | | |

**Solution**

**(a) Calculation of Operating Expenses for the year ended 31st March, 2023**

| | | (₹) |
|---|---|---|
| Net Profit [@ 6.25% of Sales] | | 3,75,000 |
| *Add:* Income Tax (@ 50%) | | 3,75,000 |
| Profit Before Tax (PBT) | | 7,50,000 |
| *Add:* Debenture Interest | | 60,000 |
| Profit before interest and tax (PBIT) | | 8,10,000 |
| Sales | | 60,00,000 |
| *Less*: Cost of goods sold | 18,00,000 | |
| PBIT | 8,10,000 | 26,10,000 |
| Operating Expenses | | 33,90,000 |

**(b)** **Balance Sheet as on 31st March, 2023**

| Liabilities | ₹ | Assets | ₹ |
|---|---|---|---|
| Share Capital | 10,50,000 | Fixed Assets | 17,00,000 |
| Reserve and Surplus | 4,50,000 | Current Assets: | |
| 15% Debentures | 4,00,000 | Stock | 1,50,000 |
| Payables | 2,00,000 | Receivables | 2,00,000 |
| | | Cash | 50,000 |
| | 21,00,000 | | 21,00,000 |

**Working Notes:**

(i) Share Capital and Reserves and Surplus

The return on net worth is 25%. Therefore, the profit after tax of ₹ 3,75,000 should be equivalent to 25% of the net worth.

$$\text{Net worth} \times \frac{25}{100} = ₹\ 3,75,000$$

$$\therefore \text{Net worth} = \frac{₹\ 3,75,000 \times 100}{25} = ₹\ 15,00,000$$

The ratio of share capital to reserves is 7:3

$$\text{Share Capital} = 15,00,000 \times \frac{7}{10} = ₹\ 10,50,000$$

$$\text{Reserves and Surplus} = 15,00,000 \times \frac{3}{10} = ₹\ 4,50,000$$

(ii) Debentures

Interest on Debentures @ 15% = ₹ 60,000

$$\therefore \text{Debentures} = \frac{60,000 \times 100}{15} = ₹\ 4,00,000$$

(iii) Current Assets

Current Ratio = 2

Payables = ₹ 2,00,000

∴ Current Assets = 2 Current Liabilities = 2 × 2,00,000 = ₹ 4,00,000

(iv) Fixed Assets

| | ₹ |
|---|---|
| Share capital | 10,50,000 |
| Reserves and Surplus | 4,50,000 |
| Debentures | 4,00,000 |
| Payables | 2,00,000 |
| | 21,00,000 |
| *Less:* Current Assets | 4,00,000 |
| Fixed Assets | 17,00,000 |

(v) Composition of Current Assets

Inventory Turnover = 12

$$\frac{\text{Cost of goods sold}}{\text{Closing stock}} = 12$$

$$\text{Closing stock} = \frac{₹\,18,00,000}{12} = ₹\,1,50,000$$

| **Composition** | ₹ |
|---|---|
| Stock | 1,50,000 |
| Receivables | 2,00,000 |
| Cash (balancing figure) | 50,000 |
| Total Current Assets | 4,00,000 |

**Question 25 – Ratio Analysis – TYK Q11**

*From the following information, you are required to PREPARE a summarised Balance Sheet for Rudra Ltd. for the year ended 31st March, 2023:*

| | |
|---|---|
| *Debt Equity Ratio* | *1:1* |
| *Current Ratio* | *3:1* |
| *Fixed Asset Turnover (on the basis of sales)* | *4* |
| *Stock Turnover (on the basis of sales)* | *6* |
| *Cash in hand* | *₹ 5,00,000* |
| *Stock to Debtor* | *1:1* |
| *Sales to Net Worth* | *4* |
| *Capital to Reserve* | *1:2* |

| | |
|---|---|
| *Gross Profit* | *20% of Cost* |
| *COGS to Creditor* | *10:1* |

*Interest for entire year is yet to be paid on Long Term loan @ 10%.*

**Solution**

**Balance Sheet of Rudra Ltd.**

| Liabilities | (₹) | Assets | (₹) |
|---|---|---|---|
| Capital | 10,00,000 | Fixed Assets | 30,00,000 |
| Reserves | 20,00,000 | Current Assets: | |
| Long Term Loan @ 10% | 30,00,000 | Stock in Trade | 20,00,000 |
| Current Liabilities: | | Debtors | 20,00,000 |
| Creditors | 10,00,000 | Cash | 5,00,000 |
| Other Short-term Current Liability (Other STCL) | 2,00,000 | | |
| Outstanding Interest | 3,00,000 | | |
| | 75,00,000 | | 75,00,000 |

**Working Notes:**

Let sales be ₹ x

**Balance Sheet of Rudra Ltd.**

| Liabilities | (₹) | Assets | (₹) |
|---|---|---|---|
| Capital | | Fixed Assets | x/4 |
| Reserves | | Current Assets: | |
| Net Worth | x/4 | Stock in Trade | x/6 |
| Long Term Loan @ 10% | x/4 | Debtors | x/6 |
| | | Cash | 5,00,000 |
| Current liabilities: | | | |
| Creditors | x/12 | | |
| Other Short-term Current Liability | | | |
| Outstanding Interest | | | |
| Total Current Liabilities | x/9+5,00,000/3 | | |
| Total | | Total | |

1. Fixed Asset Turnover = 4 $= \frac{x}{\text{Fixed Assets}}$

   Fixed Assets $= \frac{x}{4}$

2. Stock Turnover = 6 $= \frac{x}{\text{stock}}$

   Stock $= \frac{x}{6}$

3. Sales to net worth = 4 $= \frac{x}{\text{net worth}}$

   Net worth $= \frac{x}{4}$

4. Debt: Equity = 1 : 1

   $\frac{\text{Long Term Loan}}{\text{Net worth}} = \frac{1}{1}$

   Long term loan = Net worth = $\frac{x}{4}$

5. Gross Profit to Cost = 20%

   $\frac{GP}{Sales - GP} = 20\%$

   $\frac{GP}{x - GP} = 20\%$

   GP = 0.2 x – 0.2 GP

   1.2 GP = 0.2 x

   G P $= \frac{0.2x}{1.2}$

   G P = x/6

   Cost of Goods Sold = x – x/6 = 5/6 x

6. COGS to creditors = 10:1

$$\frac{\text{COGS}}{\text{Creditors}} = \frac{10}{1}$$

$$\frac{\frac{5}{6}x}{\text{creditors}} = \frac{10}{1}$$

$$\text{Creditors} = \frac{5x}{60} = \frac{x}{12}$$

7. $\frac{\text{Stock}}{\text{Debtor}} = 1$

$$\text{Debtor} = \text{Stock} = \frac{x}{6}$$

8. Current Ratio = 3 : 1

$$\frac{\text{Stock} + \text{Debtors} + \text{Cash}}{\text{Current Liabilities}} = \frac{3}{1}$$

$$\frac{\frac{x}{6}+\frac{x}{6}+5,00,000}{\text{Current Liabilities}} = 3$$

$$\frac{\frac{x}{3}+5,00,000}{3} = CL$$

$$CL = \frac{x}{9}+\frac{5,00,000}{3}$$

9. $CA = 3CL$

$$= 3\left(\frac{x}{9}+\frac{₹5,00,000}{3}\right)$$

$$CA = \frac{x}{3}+5,00,000$$

10. Net worth + Long Term Loan + Current Liability = Fixed Asset + Current Assets

$$\frac{x}{4}+\frac{x}{4}+\frac{x}{9}+\frac{₹5,00,000}{3} = \frac{x}{4}+\frac{x}{3}+₹5,00,000$$

$$\frac{x}{4}+\frac{x}{9}-\frac{x}{3} = ₹5,00,000-\frac{₹5,00,000}{3}$$

$$\frac{9x+4x-12x}{36} = \frac{₹15,00,000-₹5,00,000}{3}$$

$$\frac{x}{36} = \frac{₹10,00,000}{3}$$

$$x = ₹\ 1,20,00,000$$

11. Now, from above calculations, we get,

Fixed Asset $= \frac{x}{4} = \frac{₹1,20,00,000}{4} = ₹\ 30,00,000$

Stock $= \frac{x}{6} = \frac{₹1,20,00,000}{6} = ₹\ 20,00,000$

Debtor $= \frac{x}{6} = \frac{₹1,20,00,000}{6} = ₹\ 20,00,000$

Net Worth = x / 4 = ₹ 30,00,000

Now, Capital to Reserve is 1 : 2

Capital = ₹ 10,00,000

and, Reserve = ₹ 20,00,000

Long Term Loan = $\frac{x}{4}$ = 30,00,000

Outstanding Interest = 30,00,000 × 10% = 3,00,000

Creditors = $\frac{x}{12} = \frac{₹\,1,20,00,000}{12}$ = ₹ 10,00,000

Current Liabilities = Creditors + Other STCL + Outstanding Interest

$\frac{x}{9} + \frac{₹\,5,00,000}{3}$ = ₹ 10,00,000 + Other STCL + ₹ 3,00,000

$\frac{₹\,1,20,00,000}{9} + \frac{₹\,5,00,000}{3}$ = ₹ 13,00,000 + Other STCL

₹ 15,00,000 = Other STCL + ₹ 13,00,000

Other STCL = ₹ 2,00,000

**Question 26 - – Working Cap Mgt – RTP May 2021 Q9**

While applying for financing of working capital requirements to a commercial bank, TN Industries Ltd. projected the following information for the next year:

| Cost Element | Per unit (₹) | Per unit (₹) |
|---|---|---|
| Raw materials | | |
| X | 30 | |
| Y | 7 | |
| Z | 6 | 43 |
| Direct Labour | | 25 |
| Manufacturing and administration overheads (excluding depreciation) | | 20 |
| Depreciation | | 10 |
| Selling overheads | | 15 |
| | | 113 |

**Additional Information:**

(a) Raw Materials are purchased from different suppliers leading to different credit period allowed as follows:

X – 2 months; Y– 1 months; Z – ½ month

(b) Production cycle is of ½ month. Production process requires full unit of X and Y in the beginning of the production. Z is required only to the extent of half unit in the beginning and the remaining half unit is needed at a uniform rate during the production process.

(c) X is required to be stored for 2 months and other materials for 1 month.

(d) Finished goods are held for 1 month.

(e) 25% of the total sales is on cash basis and remaining on credit basis. The credit allowed by debtors is 2 months.

(f) Average time lag in payment of all overheads is 1 months and ½ months for direct labour.

(g) Minimum cash balance of ₹ 8,00,000 is to be maintained.

CALCULATE the estimated working capital required by the company on cash cost basis if the budgeted level of activity is 1,50,000 units for the next year. The company also intends to increase the estimated working capital requirement by 10% to meet the contingencies. (You may assume that production is carried on evenly throughout the year and direct labour and other overheads accrue similarly.)

**Solution**

**Statement showing Working Capital Requirements of TN Industries Ltd. (on cash cost basis)**

| | Amount in (₹) | Amount in (₹) |
|---|---|---|
| **A. Current Assets** | | |
| (i) Inventories: | | |
| Raw material | | |
| X $\left(\frac{1,50,000 \text{ units} \times ₹ 30}{12 \text{ months}} \times 2 \text{ months}\right)$ | 7,50,000 | |
| Y $\left(\frac{1,50,000 \text{ units} \times ₹ 7}{12 \text{ months}} \times 1 \text{ month}\right)$ | 87,500 | |
| Z $\left(\frac{1,50,000 \text{ units} \times ₹ 6}{12 \text{ months}} \times 1 \text{ month}\right)$ | 75,000 | |
| WIP $\left(\frac{1,50,000 \text{ units} \times ₹ 64}{12 \text{ months}} \times 0.5 \text{ month}\right)$ | 4,00,000 | |
| Finished goods $\left(\frac{1,50,000 \text{ units} \times ₹ 88}{12 \text{ months}} \times 1 \text{ month}\right)$ | 11,00,000 | 24,12,500 |
| (ii) Receivables (Debtors) $\left(\frac{1,50,000 \text{ units} \times ₹ 103}{12 \text{ months}} \times 2 \text{ months}\right) \times 0.75$ | | 19,31,250 |
| (iii) Cash and bank balance | | 8,00,000 |
| **Total Current Assets** | | **51,43,750** |
| **B. Current Liabilities:** | | |
| (i) Payables (Creditors) for Raw materials | | |
| X $\left(\frac{1,50,000 \text{ units} \times ₹ 30}{12 \text{ months}} \times 2 \text{ months}\right)$ | 7,50,000 | |
| Y $\left(\frac{1,50,000 \text{ units} \times ₹ 7}{12 \text{ months}} \times 1 \text{ month}\right)$ | 87,500 | |

| | | |
|---|---|---|
| $Z\left(\frac{1,50,000\text{ units} \times ₹\ 6}{12\text{ months}} \times 0.5\text{ month}\right)$ | 37,500 | 8,75,000 |
| (ii) Outstanding Direct Labour $\left(\frac{1,50,000\text{ units} \times ₹\ 25}{12\text{ months}} \times 0.5\text{ month}\right)$ | | 1,56,250 |
| (iii) Outstanding Manufacturing and administration overheads $\left(\frac{1,50,000\text{ units} \times ₹\ 20}{12\text{ months}} \times 1\text{ month}\right)$ | | 2,50,000 |
| (iv) Outstanding Selling overheads $\left(\frac{1,50,000\text{ units} \times ₹\ 15}{12\text{ months}} \times 1\text{ month}\right)$ | | 1,87,500 |
| **Total Current Liabilities** | | **14,68,750** |
| **Net Working Capital Needs (A – B)** | | **36,75,000** |
| **Add**: Provision for contingencies @ 10% | | 3,67,500 |
| **Working capital requirement** | | **40,42,500** |

**Workings**:

1.

| (i) Computation of Cash Cost of Production | Per unit (₹) |
|---|---|
| Raw Material consumed | 43 |
| Direct Labour | 25 |
| Manufacturing and administration overheads | 20 |
| Cash cost of production | 88 |
| **(ii) Computation of Cash Cost of Sales** | **Per unit (₹)** |
| Cash cost of production as in (i) above | 88 |
| Selling overheads | 15 |
| Cash cost of sales | 103 |

2. **Calculation of cost of WIP**

| Particulars | Per unit (₹) |
|---|---|
| Raw material (added at the beginning): | |
| X | 30 |

| | |
|---|---|
| Y | 7 |
| Z (₹ 6 x 50%) | 3 |
| Cost during the year: | |
| Z {(₹ 6 x 50%) x 50%} | 1.5 |
| Direct Labour (₹ 25 x 50%) | 12.5 |
| Manufacturing and administration overheads (₹ 20 x 50%) | 10 |
| | 64 |

**Question 27 – Working Cap Mgt – RTP May 2021 Q8 or Illustration 5**

MT Ltd. has been operating its manufacturing facilities till 31.3.2021 on a single shift working with the following cost structure:

| | Per unit (₹) |
|---|---|
| Cost of Materials | 24 |
| Wages (out of which 60% variable) | 20 |
| Overheads (out of which 20% variable) | 20 |
| | 64 |
| Profit | 8 |
| Selling Price | 72 |

As at 31.3.2021 with the sales of ₹ 17,28,000, the company held:

| | (₹) |
|---|---|
| Stock of raw materials (at cost) | 1,44,000 |
| Work-in-progress (valued at prime cost) | 88,000 |
| Finished goods (valued at total cost) | 2,88,000 |
| Sundry debtors | 4,32,000 |

In view of increased market demand, it is proposed to double production by working an extra shift. It is expected that a 10% discount will be available from suppliers of raw materials in view of increased volume of business. Selling price will remain the same. The credit period allowed to customers will remain unaltered. Credit availed from suppliers will continue to remain at the present level i.e. 2 months. Lag in payment of wages and overheads will continue to remain at one month.

You are required to CALCULATE the additional working capital requirements, if the policy to increase output is implemented, to assess the impact of double shift for long term as a matter of production policy.

**Solution**

**Workings:**

(1) Statement of cost at single shift and double shift working

| | 24,000 units | | 48,000 Units | |
|---|---|---|---|---|
| | Per unit (₹) | Total (₹) | Per unit (₹) | Total (₹) |
| Raw materials | 24 | 5,76,000 | 21.6 | 10,36,000 |
| Wages: | | | | |
| Variable | 12 | 2,88,000 | 12 | 5,76,000 |
| Fixed | 8 | 1,92,000 | 4 | 1,92,000 |
| Overheads: | | | | |
| Variable | 4 | 96,000 | 4 | 1,92,000 |
| Fixed | 16 | 3,84,000 | 8 | 3,84,000 |
| Total cost | 64 | 15,36,000 | 49.6 | 23,80,800 |
| Profit | 8 | 1,92,000 | 22.4 | 10,75,200 |
| Sales | 72 | 17,28,000 | 72 | 34,56,000 |

(2) Sales in units 2020-21 $= \frac{\text{Sales}}{\text{Unit selling price}} = \frac{₹\ 17,28,000}{₹\ 72}$ = 24,000 units

(3) Stock of Raw Materials in units on 31.3.2021

$= \frac{\text{Value of stock}}{\text{Cost per unit}} = \frac{₹\ 1,44,000}{₹\ 24}$ = 6,000 units

(4) Stock of work-in-progress in units on 31.3.2021

$= \frac{\text{Value of work-in-progress}}{\text{Prime Cost per unit}} = \frac{₹\ 88,000}{₹\ (24+20)} = 2,000 \text{ units}$

(5) Stock of finished goods in units 2020-21

$= \frac{\text{Value of stock}}{\text{Total Cost per unit}} = \frac{₹\ 2,88,000}{₹\ 64} = 4,500$ units.

**Comparative Statement of Working Capital Requirement**

| | Single Shift (24,000 units) | | | Double Shift (48,000 units) | | |
|---|---|---|---|---|---|---|
| | Units | Rate (₹) | Amount (₹) | Units | Rate (₹) | Amount (₹) |
| **Current Assets** | | | | | | |
| Inventories: | | | | | | |
| Raw Materials | 6,000 | 24 | 1,44,000 | 12,000 | 21.6 | 2,59,200 |
| Work-in-Progress | 2,000 | 44 | 88,000 | 2,000 | 37.6 | 75,200 |
| Finished Goods | 4,500 | 64 | 2,88,000 | 9,000 | 49.6 | 4,46,400 |
| Sundry Debtors | 6,000 | 64 | 3,84,000 | 12,000 | 49.6 | 5,95,200 |
| Total Current Assets (A) | | | 9,04,000 | | | 13,76,000 |
| **Current Liabilities** | | | | | | |
| Creditors for Materials | 4,000 | 24 | 96,000 | 8,000 | 21.6 | 1,72,800 |
| Creditors for Wages | 2,000 | 20 | 40,000 | 4,000 | 16 | 64,000 |
| Creditors for Overheads | 2,000 | 20 | 40,000 | 4,000 | 12 | 48,000 |
| Total Current Liabilities (B) | | | 1,76,000 | | | 2,84,800 |
| **Working Capital (A) – (B)** | | | **7,28,000** | | | **10,91,200** |

**Analysis**: Additional Working Capital requirement = ₹ 10,91,200 – ₹ 7,28,000 = ₹3,63,200, if the policy to increase output is implemented.

**Question 28 – Working Cap Mgt – Study Mat Illustration 14**

*A company is presently having credit sales of ₹ 12 lakh. The existing credit terms are 1/10, net 45 days and average collection period is 30 days. The current bad debts loss is 1.5%. In order to accelerate the collection process further as also to increase sales, the company is contemplating liberalization of its existing credit terms to 2/10, net 45 days. It is expected that sales are likely to increase by 1/3 of existing sales, bad debts increase to 2% of sales and average collection period to decline to 20 days. The contribution to sales ratio of the company is 22% and opportunity cost of investment in receivables is 15 percent (pre-tax). 50 per cent and 80 percent of customers in terms of sales revenue are expected to avail cash discount under existing and liberalization scheme respectively. The tax rate is 30%.*

*ADVISE, should the company change its credit terms? (Assume 360 days in a year).*

**Solution**

**Working Notes:**

**(i) Calculation of Cash Discount**

Cash Discount = Total credit sales × % of customers who take up discount × Rate

Present Policy = $\frac{12,00,000 \times 50 \times .01}{100}$ = ₹ 6,000

Proposed Policy = 16,00,000 × 0.80 × 0.02 = ₹ 25,600

**(ii) Opportunity Cost of Investment in Receivables**

Present Policy = 9,36,000 × (30/360) × (70% of 15)/100 = 78,000 × 10.5/100 = ₹ 8,190

Proposed Policy = 12,48,000 × (20/360) × 10.50/100 = ₹ 7,280

**Statement showing Evaluation of Credit Policies**

| Particulars | Present Policy | Proposed Policy |
|---|---|---|
| Credit Sales | 12,00,000 | 16,00,000 |
| Variable Cost @ 78%* of sales | 9,36,000 | 12,48,000 |
| Bad Debts @ 1.5% and 2% | 18,000 | 32,000 |
| Cash Discount | 6,000 | 25,600 |
| Profit before tax | 2,40,000 | 2,94,400 |
| Tax @ 30% | 72,000 | 88,320 |
| Profit after Tax | 1,68,000 | 2,06,080 |
| Opportunity Cost of Investment in Receivables | 8,190 | 7,280 |
| Net Profit | 1,59,810 | 1,98,800 |

*Only relevant or variable costs are considered for calculating the opportunity costs on the funds blocked in receivables. Since 22% is contribution, hence the relevant costs are taken to be 78% of the respective sales.

**Advise:** Proposed policy should be adopted since the net benefit is increased by (₹1,98,800 – ₹1,59,810) ₹ 38,990.

**Question 29 – Working Cap Mgt – Study Mat Illustration 15**

*A Factoring firm has credit sales of ₹ 360 lakhs and its average collection period is 30 days. The financial controller estimates, bad debt losses are around 2% of credit sales. The firm spends ₹ 1,40,000 annually on debtor's administration. This cost comprises of telephonic and fax bills along with salaries of staff members. These are the avoidable costs. A Factoring firm has offered to buy the firm's receivables. The factor will charge 1% commission and will pay an advance against receivables on an interest @15% p.a. after withholding 10% as reserve. ANALYSE what should the firm do?*

*Assume 360 days in a year.*

**Solution**

**Working notes:**

Average level of receivables = ₹ 360 lakhs × $\frac{30}{360}$ = 30 lakhs

| | | |
|---|---|---|
| Factoring Commission = 1% of ₹ 30,00,000 | = | ₹ 30,000 |
| Reserve = 10% of ₹ 30,00,000 | = | ₹ 3,00,000 |
| Total (i) | = | ₹ 3,30,000 |

Thus, the amount available for advance is

| | |
|---|---|
| Average level of receivables | ₹ 30,00,000 |
| *Less*: Total (i) from above | ₹ 3,30,000 |
| (ii) | ₹ 26,70,000 |
| *Less*: Interest @ 15% p.a. for 30 days | ₹ 33,375 |
| *Net Amount of Advance available.* | ₹ 26,36,625 |

**Evaluation of Factoring Proposal**

| | ***Particulars*** | ₹ | ₹ |
|---|---|---|---|
| **A.** | **Savings (Benefit) to the firm** | | |
| | Cost of Credit administration | ₹ 1,40,000 | ₹ 1,40,000 |
| | Cost of bad-debt losses | (0.02 × 360 lakhs) | ₹ 7,20,000 |
| | **Total** | | ₹ 8,60,000 |

| | | | |
|---|---|---|---|
| **B.** | **Cost to the Firm:** | | |
| | Factoring Commission [Annual credit Sales × % of Commission (or calculated annually)] | ₹ 30,000 × 360/30 | ₹ 3,60,000 |
| | Interest Charges | ₹ 33,375 × 360/30 | ₹ 4,00,500 |
| | **Total** | | ₹ 7,60,500 |
| **C.** | **Net Benefits to the Firm: (A-B)** | | ₹ 99,500 |

**Advice:** Since the savings to the firm exceeds the cost to the firm on account of factoring, therefore, the proposal is acceptable.

**Question 30 – Working Cap Mgt – TYK 10**

*Consider the balance sheet of Maya Limited as on 31 December, 2021. The company has received a large order and anticipates the need to go to its bank to increase its borrowings. As a result, it has to forecast its cash requirements for January, February and March, 2022. Typically, the company collects 20 per cent of its sales in the month of sale, 70 per cent in the subsequent month, and 10 per cent in the second month after the sale. All sales are credit sales.*

| ***Equity & liabilities*** | ***Amount (₹ in '000)*** | ***Assets*** | ***Amount (₹ in '000)*** |
|---|---|---|---|
| *Equity shares capital* | *100* | *Net fixed assets* | *1,836* |
| *Retained earnings* | *1,439* | *Inventories* | *545* |
| *Long-term borrowings* | *450* | *Accounts receivables* | *530* |
| *Accounts payables* | *360* | *Cash and bank* | *50* |
| *Loan from banks* | *400* | | |
| *Other liabilities* | *212* | | |
| | *2,961* | | *2,961* |

*Purchases of raw materials are made in the month prior to the sale and amounts to 60 per cent of sales. Payments for these purchases occur in the month after the purchase. Labour costs, including overtime, are expected to be ₹ 1,50,000 in January, ₹ 2,00,000 in February, and ₹ 1,60,000 in March. Selling, administrative, taxes, and other cash expenses are expected to be ₹ 1,00,000 per month for January through March. Actual sales in November and December and projected sales for January through April are as follows (in thousands):*

| *Month* | *₹* | *Month* | *₹* | *Month* | *₹* |
|---|---|---|---|---|---|
| *November* | *500* | *January* | *600* | *March* | *650* |
| *December* | *600* | *February* | *1,000* | *April* | *750* |

*On the basis of this information:*

*(a) PREPARE a cash budget and DETERMINE the amount of additional bank borrowings necessary to maintain a cash balance of ₹ 50,000 at all times for the months of January, February, and March.*

*(b) PREPARE a pro forma balance sheet for March 31.*

**Solution**

**10. (a) Cash Budget** *(in thousands)*

| | **Nov.** | **Dec.** | **Jan.** | **Feb.** | **Mar.** |
|---|---|---|---|---|---|
| | ₹ | ₹ | ₹ | ₹ | ₹ |
| Opening Balance **(A)** | | | **50** | **50** | **50** |
| Sales | 500 | 600 | 600 | 1,000 | 650 |
| **Receipts:** | | | | | |
| Collections, current month's sales | | | 120 | 200 | 130 |
| Collections, previous month's sales | | | 420 | 420 | 700 |
| Collections, previous 2 month's sales | | | 50 | 60 | 60 |
| Total **(B)** | | | **590** | **680** | **890** |
| Purchases | | 360 | 600 | 390 | 450 |
| **Payments:** | | | | | |
| Payment for purchases | | | 360 | 600 | 390 |
| Labour costs | | | 150 | 200 | 160 |
| Other expenses | | | 100 | 100 | 100 |
| Total **(C)** | | | **610** | **900** | **650** |
| Surplus/Deficit **(D) = (A + B – C)** | | | 30 | (170) | 290 |
| Minimum cash balance **(E)** | | | 50 | 50 | 50 |
| Additional borrowings **(F) = (E - D)** | | | 20 | 220 | (240) |

| | Jan. | Feb. | Mar. |
|---|---|---|---|
| | ₹ | ₹ | ₹ |
| Additional borrowings | 20 | 220 | (240) |
| Cumulative borrowings (Opening balance of 400) | 420 | 640 | 400 |

The amount of financing peaks in February owing to the need to pay for purchases made the previous month and higher labour costs. In March, substantial collections are made on the prior month's billings, causing large net cash inflow sufficient to pay off the additional borrowings.

**(b) Pro forma Balance Sheet, 31st March, 2022**

| Equity & liabilities | Amount (₹ in '000) | Assets | Amount (₹ in '000) |
|---|---|---|---|
| Equity shares capital | 100 | Net fixed assets | 1,836 |
| Retained earnings | 1,529 | Inventories | 635 |
| Long-term borrowings | 450 | Accounts receivables | 620 |
| Accounts payables | 450 | Cash and bank | 50 |
| Loan from banks | 400 | | |
| Other liabilities | 212 | | |
| | 3,141 | | 3,141 |

Accounts receivable = Sales in March × 0.8 + Sales in February × 0.1

= ₹ 650 × 0.8 + ₹ 1,000 × 0.1 = ₹ 620

Inventories = ₹ 545 + Total purchases from January to March – Total sales from January to March ×0.6

= ₹ 545 + (₹ 600 + ₹ 390 + ₹ 450) – (₹ 600 + ₹ 1000 + ₹ 650) × 0.6 = ₹ 635

Accounts payable = Purchases in March = ₹ 450

Retained earnings = ₹ 1,439 + Sales – Payment for purchases – Labour costs and – Other expenses, all for January to March

= ₹ 1,439 + (₹ 600 + ₹ 1000 + ₹ 650) – (₹ 360 + ₹ 600 + ₹ 390) – (₹ 150 + ₹ 200 + ₹ 160) – (₹ 100 + ₹ 100 + ₹ 100) = ₹ 1,529