



J.K. SHAH[®]
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SUGGESTED SOLUTION

CA INTERMEDIATE

SUBJECT- F.M.

Test Code – CIM 8719

BRANCH - () (Date :)

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- NOTES: (1) WORKING NOTES SHOULD FORM PART OF ANSWERS.
 (2) INTERNAL WORKING NOTES SHOULD ALSO BE CONSIDERED.
 (3) NEW QUESTION SHOULD BE ON NEW PAGE

ANSWER - 1

- (i) Estimation of net present value (NPV) of the Project 'P' and 'J' using 15% as the hurdle rate:

NPV of Project 'P' :

$$= -40,000 + \frac{13,000}{(1.15)^1} + \frac{8,000}{(1.15)^2} + \frac{14,000}{(1.15)^3} + \frac{12,000}{(1.15)^4} + \frac{11,000}{(1.15)^5} + \frac{15,000}{(1.15)^6}$$

$$= -40,000 + 11,304.35 + 6,049.15 + 9,205.68 + 6,861.45 + 5,469.37 + 6,485.65$$

$$= \text{Rs. } 5,375.65 \text{ or } \text{Rs. } 5,376$$

NPV of Project 'J' :

$$= -20,000 + \frac{7,000}{(1.15)^1} + \frac{13,000}{(1.15)^2} + \frac{12,000}{(1.15)^3}$$

$$= -20,000 + 6,086.96 + 9,829.87 + 7,890.58 = \text{Rs. } 3,807.41$$

(3.5 MARKS)

- (ii) Estimation of internal rate of return (IRR) of the Project 'P' and 'J'

Internal rate of return r (IRR) is that rate at which the sum of cash inflows after discounting equals to the discounted cash out flows. The value of r in the case of given projects can be determined by using the following formula:

$$CO_0 = \frac{CF_0}{(1+r)^0} + \frac{CF_t}{(1+r)^1} + \dots + \frac{CF_n}{(1+r)^n} + \frac{SV + WC}{(1+r)^n}$$

Where,

- CO = Cash flows at the time 0
 CF_t = Cash inflow at the end of year t
 r = Discount rate
 n = Life of the project

SV & WC=Salvage value and working capital at the end of n years.

In the case of project 'P' the value of r (IRR) is given by the following relation:

$$40,000 = \frac{13,000}{(1+r\%)^1} + \frac{8,000}{(1+r\%)^2} + \frac{14,000}{(1+r\%)^3} + \frac{12,000}{(1+r\%)^4} + \frac{11,000}{(1+r\%)^5} + \frac{15,000}{(1+r\%)^6}$$

$$r=19.73\%$$

Similarly we can determine the internal rate of return for the project 'J'. In the case of project 'J' it comes to:

$$r = 25.20\%$$

(3.5 MARKS)

- (iii) The conflict between NPV and IRR rule in the case of mutually exclusive project situation arises due to re-investment rate assumption. NPV rule assumes that intermediate cash flows are reinvested at k and IRR assumes that they are reinvested at r . The assumption of NPV rule is more realistic.

(1 MARK)

- (iv) When there is a conflict in the project choice by using NPV and IRR criterion, we would prefer to use "Equal Annualized Criterion". According to this criterion the net annual cash inflow in the case of Projects 'P' and 'J' respectively would be:

$$\begin{aligned} \text{Project 'P'} &= (\text{Net present value} / \text{cumulative present value of Re.1 p.a.} \\ &\quad @15\% \text{ for 6 years}) \end{aligned}$$

$$= (\text{Rs. } 5,375.65 / 3.7845) = \text{Rs. } 1,420.44$$

$$\text{Project 'J'} = (\text{Rs. } 3807.41 / 2.2832) = \text{Rs. } 1667.58$$

Advise: Since the cash inflow per annum in the case of project 'J' is more than that of project 'P', so Project J is recommended.

(2 MARKS)

ANSWER - 2

(i) Statement Showing the Net Present Value of Project M

Year end	Cash Flow (₹) (a)	C.E. (b)	Adjusted Cash flow (₹) (c) = (a) x (b)	Present value factor at 6%(d)	Total Present value (₹) (e) = (c) X (d)
1	4,50,000	0.8	3,60,000	0.943	3,39,480
2	5,00,000	0.7	3,50,000	0.890	3,11,500
3	5,00,000	0.5	2,50,000	0.840	2,10,000
					8,60,980
Less: Initial Investment					8,50,000
Net Present Value					10,980

(4 MARKS)

(ii) Statement Showing the Net Present Value of Project N

Year end	Cash Flow (₹) (a)	C.E. (b)	Adjusted Cash flow (₹) (c) = (a) x (b)	Present value factor at 6%(d)	Total Present value (₹) (e) = (c) X (d)
1	4,50,000	0.9	4,05,000	0.943	3,81,915
2	4,50,000	0.8	3,60,000	0.890	3,20,400
3	5,00,000	0.7	3,50,000	0.840	2,94,000
					9,96,315
Less: Initial Investment					8,25,000
Net Present Value					1,71,315

Decision : Since the net present value of Project N is higher, so the project N should be accepted.

(4 MARKS)

(ii) Certainty - Equivalent (C.E.) Co-efficient of Project M (2.0) is lower than Project N (2.4). This means Project M is riskier than Project N as "higher the riskiness of a cash flow, the lower will be the CE factor". If risk adjusted discount rate (RADR) method is used, Project M would be analysed with a higher rate.

(2 MARKS)

ANSWER - 3

(i) Calculation of after tax cost of the followings:

$$(a) \text{ New 14\% Debentures } (K_d) = \frac{1(1-t)}{NP} = \frac{Rs.14(1-0.5)}{Rs.98} = 0.0714 \text{ or } 7.14\%$$

$$\text{New 12\% Preference Shares } (K_p) = \frac{PD}{NP} = \frac{Rs.1.20}{Rs.9.80} = 0.1224 \text{ or } 12.24\%$$

(b) Equity Shares (Retained Earnings) (K_e) =

$$= \frac{\text{Expected Dividend } (D_1)}{\text{Current market price } (P_0)} + \text{Growth rate } (g)$$

$$= \frac{50\% \text{ of } Rs.2.773}{Rs.27.75} + 0.12 = 0.17 \text{ or } 17\%$$

* Growth rate (on the basis of EPS) is calculated as below :

$$\frac{\text{EPS in current year} - \text{EPS in previous year}}{\text{EPS in previous year}} = \frac{Rs.2.773 - Rs.2.476}{Rs.2.476} = 0.12$$

(Students may verify the growth trend by applying the above formula to last three or four years)

(4 MARKS)

(ii) Calculation of marginal cost of capital (on the basis of existing capital structure):

Source of capital	Weight (a)	After tax Cost of capital (%) (b)	WACC (%) (a) × (b)
14% Debenture	0.15	7.14	1.071
12% Preference shares	0.05	12.24	0.612
Equity shares	0.80	17.00	13.600
Marginal cost of capital			15.283

(2 MARKS)

(iii) The company can spend for capital investment before issuing new equity shares and without increasing its marginal cost of capital:

Retained earnings can be available for capital investment

= 50% of 2015 EPS × equity shares outstanding

= 50% of Rs. 2.773 × 2,00,000 shares = Rs.2,77,300

Since, marginal cost of capital is to be maintained at the current level i.e. 15.28%, the retained earnings should be equal to 80% of total additional capital for investment.

Thus investment before issuing equity $\left(\frac{\text{Rs.}2,77,300}{80} \times 100 \right) = \text{Rs.}3,46,625$

The remaining capital of Rs. 69,325 i.e. Rs. 3,46,625 – Rs. 2,77,300 shall be financed by issuing 14% Debenture and 12% preference shares in the ratio of 3 : 1 respectively.

(3 MARKS)

(iv) If the company spends more than Rs. 3,46,625 as calculated in part (iii) above, it will have to issue new shares at Rs. 20 per share.

The cost of new issue of equity shares will be:

$$K_e = \frac{\text{Expected Dividend (D}_1\text{)}}{\text{Current market price (P}_0\text{)}} + \text{Growth rate (g)} =$$

$$= \frac{50\% \text{ of Rs.}2.773}{\text{Rs.}20} + 0.12 = 0.1893 \text{ or } 18.93\%$$

Calculation of marginal cost of capital (assuming the existing capital structure will be maintained):

Source of capital	Weight (a)	Cost (%) (b)	WACC (%) (a) × (b)
14% Debenture	0.15	7.14	1.071
12% Preference shares	0.05	12.24	0.612
Equity shares	0.80	18.93	15.144
Marginal cost of capital			16.827

(3 MARKS)

ANSWER - 4**1. Computation of CFAT and Purchase decision**

Particulars	Machine R	Machine S
Sale Value (1,50,000 units at Rs. 6 pu)	Rs. 9,00,000	Rs. 9,00,000
Less: Operating Cost (Excluding Depreciation)	Rs. 2,00,000	Rs. 1,80,000
Contribution	Rs. 7,00,000	Rs. 7,20,000
Less: Fixed Cost (1,50,000 units at Rs. 3 pu)	Rs. 4,50,000	Rs. 4,50,000
Profit = CFAT p.a. (since there is no tax or depreciation) (See Note)	Rs. 2,50,000	Rs. 2,70,000
Annuity Factor for 5 years at 14% (0.877 + 0.769 + 0.675 + 0.592 + 0.519)	3.432	3.432
Present Value of Cash Flows (7 x 8)	Rs. 8,58,000	Rs. 9,26,640
Less: Initial Investment = Cost of Asset	Rs. 2,00,000	Rs. 2,50,000
Net Present Value	Rs. 6,58,000	Rs. 6,76,640

Conclusion: Machine S may be selected due to higher NPV.

Note: As the Company is a zero-tax Company for seven years (Machine Life in both cases is only five years), Depreciation and Tax Effect thereon are not relevant for analysis.

(5 MARKS)

2. Replacement of Machine -R with Machine S

Particulars	Rs.
(a) Purchase Cost of Machine S	2,50,000
(b) Net Realizable Value of Machine R (Rs. 1,00,000 -Rs. 30,000)	70,000
(c) Net Initial Outflow in Year 0, due to replacement decision	Rs. 1,80,000
(d) Incremental Cash Inflow from Machine S (Rs. 2,70,000 -Rs. 2,50,000) (from WN 1)	Rs. 20,000
(e) Annuity Factor for 5 years at 14% (0.877 + 0.769 + 0.675 + 0.592 + 0.519)	3.432
(f) Present Value of Incremental Cash Inflows due to replacement (d x e)	Rs. 68,640
(g) NPV of Replacement of Machine R with Machine S (f - c)	Rs. 1,11,360

Note: Rs. 2,00,000 spent on Machine R is a sunk cost and hence it is not relevant for deciding the replacement.

Decision: Since NPV is negative, replacement of Machine R with Machine S is **not advisable**.

(5 MARKS)

ANSWER – 5

(a) Pattern of Raising Additional Finance

Equity = 10,00,000 × 60/100 = Rs. 6,00,000

Debt = 10,00,000 × 40/100 = Rs. 4,00,000

Capital structure after Raising Additional Finance

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

(2 MARKS)

(b) Post-tax Average Cost of Additional Debt

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

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

On Rs. 2,20,000 = 16% (1 - 0.5) = 8% or 0.08

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

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

(2 MARKS)

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

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

$$\text{Then, } K_e = \frac{2 \times 1.1}{44} + 0.10 = \frac{22}{44} + 0.10 = 0.15 \text{ or } 15\%$$

(2 MARKS)

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

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

(2 MARKS)