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SUGGESTED SOLUTION
INTERMEDIATE MAY 2019 EXAM

SUBJECT - FM

Test Code – CIM 8109

BRANCH - () (Date :)

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Answer 1:

Particulars	Rs. (in crore)
Cost of machine	220
Salvage value after 10 years	20
Annual depreciation (220-20)/10	20
Calculation of cash flow and Net Present Value	Rs. (Crore)
Profit before taxes(PBT)	30
Less Taxes @ 35	10.5
Profit after tax(PBT-Tax)	19.5
Add: Depreciation	20
Cash flow per year	39.5
A. Present value of cash flows for 10 years	$39.5 \times PVAF(0.1,10)$
	$= 39.5 \times 5.6502 = 223.18$
B. Present value of the salvage value	$20 \times PVF(0.1,10)$
	$= 20 \times 0.3220 = 6.44$
C. Total present value of cash inflows (A+B)	229.62
D. Initial Investment	220
Net Present Value(NPV)	9.62

From the above calculation, it is clear that Net Present Value is positive and Hence, Rounak Ltd. should buy the lathe machine.

Answer 2:

	in lakhs
Net Profit	30
Less: Preference dividend	12
Earning for equity shareholders	18
Therefore earning per share	$18/3 = ₹ 6.00$

Let, the dividend pay-out ratio be X and so the share price will be:

$$P = [D + (E - D) \times r / K_e] / K_e$$

$$42 = [6 + (6 - D) \times 0.20 / 0.16] / 0.16$$

$$6.72 = [0.16D + 0.12 - 0.20D] / 0.12$$

$$1.0752 = 1.2 - 0.04D$$

$$-0.1248 = 1.2 - 0.04D$$

$$-0.1248 = -0.04D$$

$$D = 3.12$$

$$\begin{aligned} \text{D/P ratio} &= (\text{DPS} / \text{EPS}) \times 100 \\ &= (3.12 / 6) \times 100 \\ &= 52\% \end{aligned}$$

So, the required dividend payout ratio will be = 52%.

Answer 3:

Note: Discount Factor to be used = After Tax Cost of debt = $10\% \times (1 - 0.3) = 7\%$

1. Computation of Outflows under Lease Option

(a) Let lease Rentals be Rs. x p.a. So, Post Tax Lease Rentals p.a. = $(x) \times (1 - 0.3) = 0.7x$

(b) Annuity Factor at 7% for 5 Years = 4.099

(c) So, PV of Post Tax Lease Rentals = Outflows under Lease Option = $(a \times b) = 2.8693x$

2. Computation of Tax Savings on Depreciation

Particulars	Rs.
(a) Depreciation p.a. = $\frac{\text{Cost}}{\text{Life in Years}} = \frac{5,00,000}{5 \text{ Years}} =$	1,00,000
(b) Tax Savings on Annual Depreciation [Tax Rate 30% x Annual Depn. Rs.1,00,000]	30,000

3. Computation of Loan and Interest Paid

Year	Opening Loan Balance	Principal Paid	Interest	Tax Savings on Interest	Total Outflow
(1)	(2)	(3)	(4) = (2) x 10%	(5) = (4) x 30%	(6) = (3) + (4) - (5) - Tax Savings on depn (30,000)
1	5,00,000	1,00,000	50,000 [5,00,000 x 10%]	15,000 [50,000 x 30%]	1,05,000
2	4,00,000 [5,00,000 - 4,00,000]	1,00,000	40,000 [4,00,000 x 10%]	12,000 [40,000 x 30%]	98,000
3	3,00,000 [4,00,000 - 1,00,000]	1,00,000	30,000 [3,00,000 x 10%]	9,000 [30,000 x 30%]	91,000
4	2,00,000 [2,00,000 - 1,00,000]	1,00,000	20,000 [2,00,000 x 10%]	6,000 [20,000 x 30%]	84,000
5	1,00,000 [1,00,000 - 1,00,000]	1,00,000	10,000 [1,00,000 x 10%]	3,000 [10,000 x 30%]	77,000

4. Computation of Present Value of Cash Outflows under Loan Option

Particulars	Cash Flow	Year	Disc. Factor 7%	Disc. Cash Flow
Outflows as per WN 2	1,05,000	1	0.934	98,070
	98,000	2	0.873	85,554

	91,000	3	0.816	74,256
	84,000	4	0.763	64,092
	77,000	5	0.713	54,901
Present Value of Outflows				
Less : Salvage Value [Rs.50,000 x (1 – Tax Rate of 30%)]	35,000	5	0.713	3,76,873 24,955
Present Value of Outflows				3,51,918

5. Computation of Lease Rental

Particulars	Rs.
(a) Present Value of Outflows under Lease Option = Present Value of Outflows under Loan Option	3,51,918
(c) So, $2.8693 \times x = 3,51,918$. Hence $x = \frac{3,51,918}{2.8693} = 1,22,649$	1,22,649
Required Lease Rentals p.a. =	

Answer 4:

1. Project S (Rs. Lakhs)

NPV Estimate (N)	Probability CP)	Expected NPV ,	Deviation from Expected NPV (D)	Square of Deviation [D ²]	Variance [P x D ²]
(1)	(2)	(3) = (1) x (2)	(4) = (1) - Σ (3)	(5)	(6) = (2) x (5)
3	0.1	0.3	(6.0)	36.0	3.6
6	0.4	2.4	(3.0)	9.0	3.6
12	0.4	4.8	3.0	9.0	3.6
15	0.1	1.5	6.0	36.0	3.6
Expected NPV	9.0				14.4

2. Project T (Rs. Lakhs)

NPV Estimate (N)	Probability(P)	Expected NPV	Deviation from Expected NPV (D)	Square of Deviation [D ²]	Variance [P x D ²]
(1)	(2)	(3) = (1) x (2)	(4) = (1) - 2(3)	(5)	(6) = (2)x(5)
5	0.2	1.0	(9.1)	82.81	16.56
9	0.3	2.7	(5.1)	26.01	7.80
18	0.3	5.4	3.9	15.21	4.56
25	0.2	5.0	10.9	118.81	23.76
Expected NPV	14.1			52.68	

3. Evaluation

Particulars	Project S	Project T
Variance [σ^2]	14.4	52.68
Standard Deviation [σ] [Risk Associated with the Project]	$\sqrt{14.4} = 3.79$	$\sqrt{52.68} = 7.26$
Expected NPV	9.0	14.10

Co-efficient of Variation = $\frac{\text{Standard Deviation}}{\text{Expected NPV}}$	$\frac{3.79}{9} = 0.42$	$\frac{7.26}{14.1} = 0.51$
Investment	30.0	50.0
Total Inflows = Investment + Expected NPV	30 + 9 = 39.0	50 + 14.1 = 64.1
Profitability Index = $\frac{\text{PV of Inflows}}{\text{PV of Outflows}}$	$\frac{39}{30} = 1.30$	$\frac{64.1}{50} = 1.28$

Observation: Project T is more risky than Project S, as the Standard Deviation and co-efficient of Variation is higher for Project T. Project S is also better in terms of return on investment, since the Profitability Index is higher.

Answer 5:

In the present situation, the current MPS is as follows:

$$P = [D_0(1 + g)] / K_e - g$$

$$P = [2(1 + 0.02)] / 0.15 - 0.02$$

$$= \text{Rs. } 20$$

$$P = [D_0(1 + g)] / K_e - g$$

$$= \text{Rs. } 28.80$$

$$P = [D_0(1 + g)] / K_e - g$$

$$= [2(1 + 0.05)] / 0.155 - 0.05$$

$$= \text{Rs. } 16.48$$

Answer 6:

Calculation of Present Value of cash flows

Year	PV factor @ 10%	Project A		Project B	
		Cash flows (Rs.)	Discounted Cash flows	Cash flows (Rs.)	Discounted Cash flows
0	1.00	(2,00,000)	(2,00,000)	(2,00,000)	(2,00,000)
1	0.91	35,000	31,850	2,18,000	1,98,380
2	0.83	80,000	66,400	10,000	8,300
3	0.75	55,000 (90,000-35,000)	41,250	10,000	7,500
4	0.68	75,000	51,000	4,000	2,720
5	0.62	20,000	12,400	3,000	1,860
		Net Present Value	2,900		18,760

(i) The Payback period of the projects:

Project-A: The cumulative cash inflows upto year 3 is Rs.1,70,000 and remaining amount required to equate the cash outflow is Rs. 30,000 i.e. (Rs. 2,00,000 - Rs. 1,70,000) which will be recovered from year-4 cash inflow. Hence, Payback period will be calculated as below :

$$3 \text{ years} + \frac{\text{Rs.}30,000}{75,000} = 3.4 \text{ years Or } 3 \text{ years } 4.8 \text{ months Or } 3 \text{ years } 4 \text{ months and}$$

24 days

Project-B: The cash inflow in year-1 is Rs.2,18,000 and the amount required to equate the cash outflow is Rs. 2,00,000, which can be recovered in a period less than a year. Hence, Payback period will be calculated as below:

$$\frac{\text{Rs.}2,00,000}{\text{Rs.}2,18,000} = 0.917 \text{ years or } 11 \text{ months}$$

(ii) Discounted Payback period for the projects:

Project-A: The cumulative discounted cash inflows upto year 4 is Rs.1,90,500 and remaining amount required to equate the cash outflow is Rs. 9,500 i.e. (Rs. 2,00,000 - Rs. 1,90,500) which will be recovered from year-5 cash inflow. Hence, Payback period will be calculated as below:

$$4 \text{ years} + \frac{\text{Rs.}9,500}{\text{Rs.}12,400} = 4.766 \text{ years Or } 4 \text{ years } 9.19 \text{ months Or } 4 \text{ years } 9 \text{ months and}$$

6 days

Project-B: The cash inflow in year-1 is Rs.1,98,380 and remaining amount required to equate the cash outflow is Rs. 1,620 i.e. (Rs. 2,00,000 - Rs. 1,98,380) which will be recovered from year-2 cash inflow. Hence, Payback period will be calculated as below:

$$1 \text{ year} + \frac{\text{Rs.}1,620}{\text{Rs.}8,300} = 1.195 \text{ years Or } 1 \text{ Year } 2.34 \text{ months Or } 1 \text{ Year } 2 \text{ months and}$$

10 days

(iii) Discounted value of Cash Wows

$$\text{Desirability Factor (Profitability Index)} = \frac{\text{Discounted valu of Cash Inflows}}{\text{Discounted value of Cash Outflows}}$$

$$\text{Project A} = \frac{\text{Rs.}2,02,900}{\text{Rs.}2,00,000} = 1.01$$

$$\text{Project B} = \frac{\text{Rs.}2,18,760}{\text{Rs.}2,00,000} = 1.09$$

(iv) Net Present Value (NPV) of the projects:

Please refer the above table.

Project A- Rs. 2,900

Project B- Rs. 18,760