

## MATHEMATICAL PROBLEMS

### □ Pay-back Period Method

1. A project requires an initial investment of ₹ 2,00,000. If it generates an annual cash inflow of ₹ 25,000, calculate the pay-back period.

**Ans.** 8 years

2. A project requires an initial investment of ₹ 4,80,000. If it generates the following cash flows, calculate the pay-back period.

Year	:	1	2	3	4	5	6	7	8
Cash flows (₹)	:	80,000	70,000	90,000	1,00,000	1,20,000	1,00,000	80,000	50,000

**Ans.** 5.2 years

3. A project requires an initial cash outlay of ₹ 16,00,000. It is expected that the project will generate annually a profit of ₹ 4,00,000 after depreciation @ 10% p.a. under straight line method but before tax @40%. Determine the pay-back period of the project.

**Ans.** 4 years

4. Alpha Co. Ltd. is considering an investment project which requires an initial capital outlay of ₹ 8,00,000. The working life of the project is 5 years. Forecast for annual profit after depreciation but before tax is as follows ;

Year	:	1st	2nd	3rd	4th	5th
Profit (₹)	:	1,60,000	2,00,000	2,80,000	2,20,000	1,80,000

If the rate of depreciation is 20% on original cost of the project and the tax rate is 50%, calculate the pay-back period of the project.

**Ans.** 3 years

5. A project requires an initial investment of ₹ 3,20,000. If the following amounts of cash inflow are taken place from the project in different years, calculate the pay-back period of the project :

Year	:	1st	2nd	3rd	4th	5th	6th	7th
Cash inflows (₹ in lakh)	:	0.60	0.80	1	1.2	0.40	0.20	1

**Ans.**  $3\frac{2}{3}$  years



6. Milo Indian Ltd. is considering the purchase of a new machine for a proposed project. The estimated sales and costs for the project are being given below :

**Annual Sales**

**Annual Costs :**

Raw materials

Direct labour

Variable overheads

**Other information :**

Cost of the machine

Scrap value

Estimated life

Tax rate

₹ 12,50,000

₹ 3,00,000

₹ 1,50,000

₹ 1,50,000

₹ 17,00,000

₹ 1,00,000

8 years

50%

You are required to determine the pay-back period of the project on the basis of above information.

**Ans.** 4 years

7. Sahegal Ltd. is considering to purchase of a plant for a proposed project. The estimated incomes and expenses of the project are :

**Annual Expenses :**

Direct materials

Direct wages

Indirect expenses (excluding depreciation)

**Annual Sales**

**Other information :**

Cost of the plant

Residual value of the plant

Expected life of the plant

Tax rate

₹ 3,20,000

₹ 80,000

₹ 1,00,000

₹ 8,00,000

₹ 16,00,000

₹ 1,60,000

12 years

55%

You are required to determine the pay-back period of the project on the basis of above information.

**Ans.** 7.96 years

8. Determine the pay-back periods of the following mutually exclusive projects and which project will you accept and why ?

Projects →	A	B	C	D	E
Initial investment →	₹ 4,00,000	₹ 6,00,000	₹ 8,00,000	₹ 10,00,000	₹ 12,00,000
Year ↓	Cash inflows (₹)	Cash inflows (₹)	Cash inflows (₹)	Cash inflows (₹)	Cash inflows (₹)
1	40,000	80,000	1,20,000	1,60,000	2,00,000
2	60,000	1,20,000	1,60,000	2,00,000	2,40,000
3	80,000	1,60,000	2,00,000	2,40,000	2,80,000
4	1,00,000	2,00,000	2,40,000	2,80,000	3,20,000
5	1,20,000	1,60,000	2,00,000	2,40,000	2,80,000
6	1,40,000	2,00,000	2,40,000	2,80,000	3,20,000

**Ans.** Project — A : 5 years, Project — B :  $4\frac{1}{4}$  years, Project — C :  $4\frac{2}{5}$  years,

Project — D :  $4\frac{1}{4}$  years and Project — E :  $4\frac{4}{7}$  years.

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