Capital Budgeting Conventional Problems

Problem 1: Investment Dilemma at ABC Corporation

(learning point: NPV–IRR Ranking Conflict & Reinvestment Assumption)

ABC Corporation, a mid-sized manufacturing firm, is evaluating two mutually exclusive investment opportunities—**Project A** and **Project B**—each requiring an initial investment of **₹1,15,000**. Due to capital constraints, the company can undertake **only one project**.

The expected cash flows from the two projects are given below:

Year	Project A (₹)	Project B (₹)
0	(1,15,000)	(1,15,000)
1	7,188	51,750
2	21,562	38,812
3	40,250	28,750
4	50,315	21,563
5	57,500	14,375

Additional information:

- Weighted Average Cost of Capital (WACC): **9.40%**
- Reinvestment rate for interim cash flows: **7.50%**

Required

1. Compute the **Net Present Value (NPV)** of each project.
2. Compute the **Profitability Index (PI)** for each project.
3. Compute the **Internal Rate of Return (IRR)** for each project.
4. Compute the **Modified Internal Rate of Return (MIRR)** for each project.
5. Determine the **Crossover Rate** between Project A and Project B.

Decision Question

If Project A shows a **higher IRR** but Project B shows a **higher NPV at the WACC**, which project should ABC Corporation accept?
Explain clearly why such a conflict can arise and justify the final decision.

Problem 2: Investment Decision for Nova Textiles Pvt. Ltd.

(New learning point: Capital Rationing & Role of Profitability Index)

Nova Textiles Pvt. Ltd., a well-known fabric manufacturer, is planning to diversify its operations. The firm has identified two potential projects—**Project Loom** and **Project Weave**—each requiring an initial investment of **₹1,25,000**.

The expected cash flows are as follows:

Year	Project Loom (₹)	Project Weave (₹)
0	(1,25,000)	(1,25,000)
1	10,000	55,000
2	25,000	45,000
3	40,000	30,000
4	50,000	20,000
5	58,000	15,000

Other details:

- WACC: **10.50%**
- Reinvestment rate: **8.25%**

Required

1. Compute **NPV, PI, IRR, and MIRR** for both projects.
2. Compute the **Crossover Rate**.

Capital Rationing Scenario

Assume Nova Textiles has **only ₹1,50,000 available** for investment this year and can **invest partially in one or both projects**.

3. Using the **Profitability Index**, recommend how the limited capital should be allocated.
4. Explain why PI is more appropriate than NPV or IRR under capital rationing.

Problem 3: Expansion Plans for Zenith Packaging Ltd.

(New learning point: Tax and Salvage Value Adjustment)

Zenith Packaging Ltd., a producer of eco-friendly packaging solutions, is evaluating two expansion alternatives—**Project Alpha** and **Project Beta**—each requiring an initial outlay of **₹1,75,000**.

Expected cash inflows are shown below:

Year	Project Alpha (₹)	Project Beta (₹)
0	(1,75,000)	(1,75,000)
1	20,000	70,000
2	40,000	50,000
3	50,000	40,000
4	60,000	30,000
5	65,000	25,000

Additional assumptions:

- WACC: **8.25%**
- Reinvestment rate: **7.50%**
- Corporate tax rate: **30%**
- Estimated salvage value at the end of Year 5: **₹20,000** (for both projects)

Required

1. Compute **after-tax annual cash flows** for both projects.
2. Compute **NPV, IRR, MIRR, and PI** using after-tax cash flows.
3. Compute the **Crossover Rate**.

Interpretation

Briefly explain how **taxes and salvage value** influence capital budgeting decisions compared to pre-tax analysis.

Problem 4: Investment Opportunity for Greenfield Tech Pvt. Ltd.

(New learning point: Sensitivity of NPV to Discount Rate)

Greenfield Tech Pvt. Ltd., a renewable energy startup, is choosing between **Project Solar** and **Project Wind**, each requiring an initial investment of **₹2,00,000**.

The expected cash flows are:

Year	Project Solar (₹)	Project Wind (₹)
0	(2,00,000)	(2,00,000)
1	30,000	80,000
2	47,500	57,500
3	55,000	45,000
4	65,000	35,000
5	70,000	30,000

Assumptions:

- Base WACC: **8.75%**
- Reinvestment rate: **8.00%**

Required

1. Compute **NPV, IRR, MIRR, and PI** at the base WACC.
2. Recompute **NPV at discount rates of 7%, 8.75%, and 10%**.

Analysis Question

Which project's NPV is **more sensitive to changes in the discount rate**? What does this indicate about the **risk profile** of the two projects?

Problem 5: Strategic Expansion for Nexus Energy Ltd.

(New learning point: Incremental Cash Flow & Replacement Decision)

Nexus Energy Ltd. is considering two strategic investment alternatives—**Project Aurora** and **Project Blaze**—each requiring an upfront investment of **₹2,50,000**.

The expected cash inflows are:

Year	Project Aurora (₹)	Project Blaze (₹)
0	(2,50,000)	(2,50,000)
1	40,000	1,05,000
2	55,000	80,000

Year	Project Aurora (₹)	Project Blaze (₹)
3	75,000	60,000
4	85,000	40,000
5	90,000	30,000

Additional information:

- WACC: **8.75%**
- Reinvestment rate: **8.00%**
- Project Aurora will **replace an existing project** that currently generates **₹25,000 per year for 5 years**.

Required

1. Compute **incremental cash flows** for Project Aurora.
2. Compute **NPV, IRR, MIRR, and PI** for both projects using relevant cash flows.
3. Compute the **Crossover Rate**.

Decision Requirement

Based on **incremental analysis and value creation**, recommend which project Nexus Energy Ltd. should undertake and justify your answer.