Financial Management & Corporate Finance

Important Questions
Internal Rate of Return

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		Marks	CO
4.	**Attempt any *one* part of the following:**		
a.	A project costs Rs. 15,500 and is expected to generate cash inflows of Rs. 8000, Rs. 7000 and Rs. 6000 at the end of each year for next 3 years. Find out the project's IRR by trial and error method.	10	2

- **Question 1:** A project costs Rs. 20,000 and is expected to generate cash inflows of Rs. 9,000, Rs. 8,000, and Rs. 7,000 at the end of each year for the next 3 years. Calculate the IRR of the project using the trial and error method.
- Solution

1. To calculate the Internal Rate of Return (IRR) using the trial and error method, we will follow these steps:
2. Make an initial guess of the IRR.
3. Calculate the Net Present Value (NPV) of the project using that guessed IRR.
4. Adjust the IRR based on whether the NPV is positive or negative.
5. Repeat the process until the NPV is close to zero.

	A	B	AB	C	AC	D	AD
	Cash Inflow	10%		15%		12%	
	9000	0.9090909	8181.82	0.86957	7826.09	0.89286	8035.71
	8000	0.8264463	6611.57	0.75614	6049.15	0.79719	6377.55
	7000	0.7513148	5259.2	0.65752	4602.61	0.71178	4982.46
Total	24000	2.486852	20052.6	2.28323	18477.8	2.40183	19395.7
Investment	20000		20000		20000		20000
			52.592		-1522.15		-604.273

$$IRR \approx r_1 + \left(\frac{NPV_1}{NPV_1 - NPV_2} \right) (r_2 - r_1)$$

Where:

- $r_1 = 10\% = 0.10$
- $r_2 = 12\% = 0.12$
- $NPV_1 = 51.70$ (NPV at 10%)
- $NPV_2 = -602.48$ (NPV at 12%)

Plugging in the values:

$$IRR \approx 0.10 + \left(\frac{51.70}{51.70 - (-602.48)} \right) (0.12 - 0.10)$$

$$IRR \approx 0.10 + \left(\frac{51.70}{51.70 + 602.48} \right) (0.02)$$

$$IRR \approx 0.10 + 0.079 \times 0.02$$

$$IRR \approx 0.10 + 0.00158$$

$$IRR \approx 0.10158$$

Converting to a percentage:

$$IRR \approx 10.158\%$$

Rounding to a practical figure:

$$IRR \approx 10.2\%$$

- Practice Question
- A project costs Rs. 18,000 and is expected to generate cash inflows of Rs. 7,000, Rs. 6,000, and Rs. 8,000 at the end of each year for the next 3 years. Calculate the IRR of the project using the trial and error method.

Question no .2

A project costs Rs. 30,000 and is expected to generate equal cash inflows of Rs. 10,000 at the end of each year for the next 4 years.

PV 12% 3.03

PV 13 % 2.97

$$0 = \text{NPV} = \sum_{t=1}^{T} \frac{C_t}{(1+IRR)^t} - C_0$$

where:

C_t = Net cash inflow during the period t

C_0 = Total initial investment costs

IRR = The internal rate of return

t = The number of time periods

$$IRR = r_1 + \frac{V_1 - V}{V_1 - V_2}(r_2 - r_1)$$

- **Practice Question 2:** A project costs Rs. 50,000 and is expected to generate equal cash inflows of Rs. 15,000 at the end of each year for the next 5 years.
- PV 12% : 3.60
- PV 13% : 3.51