ASSIGNMENT SHEET-1

CAMPUS: PCE	COURSE: B.TECH	CLASS/SECTION: IV/VIII	DATE:
NAME OF FACULTY: DIVYA VISHNOI	NAME OF LAB: PROJECT PLANNING & CONSTRUCTION MANAGEMENT LAB		SUBJECT CODE: 8CE4-21
DATE OF PREPARATION:		DATE OF SUBMISSION:	
Topic: Capital budgeting and Benefit cost ratio			MM: 40

Q.	QUESTION	LO	PO	PSO
1	Write the differences between NPV and IRR methods. Also write their advantages and disadvantages.	LO2	PO1	PSO1
2	Mr. Vasil invested $5000000 in a precast industry. He got income in 7 consecutive years $ 700000, $730000, $770000, $825000, $1500000, $1500000, $2000000 respectively. Calculate the NPV and IRR of project, if discounted rate is 10%.	LO3	PO2	PSO2
3	Prince want to invest his money in a project for getting for good return of his money. Help him to find the best project for investment. Also give the statement not to select the other projects. Assume the discounted rate is 10%.	LO3	PO2	PSO2

Year	Project A	Project B	Project C
0	-6500000	-5500000	-5000000
1	1000000	1000000	1000000
2	1500000	1200000	1100000
3	2200000	1700000	1500000
4	2400000	2100000	1800000
5	2700000	2000000	2050000

4	A government has planning for a hydroelectric project which will also provide flood control, irrigation &recreation benefits. The established benefits & cost of three alternatives are given below. The interest rate to be used for the analysis is 5% and the life of each of the alternatives X, Y and Z is to be assumed as 50 years. Choose the best alternative. (All values are in million)	LO3	PO2	PSO2

Alternatives	X	Y	Z
Initial Cost	350	400	500
Annual Power sales	13	15	18
Annual flood Control	3.5	4	5
Annual irrigation benefits	4	5	6
Annual recreation benefits	1.5	2.5	3.5
Annual operation and maintenance	2.5	3	3.5

Solution: 1

The differences between NPV and IRR methods

Basis of comparison	NPV	IRR
Full form	The full form for NPV is Net Present Value.	The full form for IRR is the Internal Rate of Return.
Definition	NPV may be defined as a difference arrived when the present value of the cash outflows is deducted from the present value of cash inflow.	IRR can be defined as the discount rate that can make the net present value of all the cash inflow equal to 0.
Calculation	Net Present Value is calculated in the form of currency or monetary return.	Internal Rate of Return is calculated in the form of percentage return.

Measure	Absolute measure.	Relative measure.
Evaluation of projects when there are constant movements in cash flows.	The NPV method can be used for the evaluation of projects/ investment plans even when there is a constant movement in cash flows.	IRR method cannot be taken into use for the evaluation of projects when there is a constant movement in cash flows; that is, when there is a combination of negative and positive cash flows.
Flexibility	Flexible.	Not that flexible.
Additional wealth	The Net Present Value method can evaluate additional wealth.	The internal Rate of Return method cannot evaluate additional wealth.
ROI or rate of interest	The net present value method considers ROI to be a known factor.	The internal rate of return method does not consider ROI to be a known factor.
Suitability with respect to the tenure of the projects.	The net present value method is suitable with respect to the projects that are supposed to continue for a longer duration of time.	The internal rate of return method is suitable with respect to the projects that are supposed to continue for a shorter span of time.
Receptivity	The net present value method can be easily understood by the public.	The internal rate of return method can be easily understood by the business managers only.
Acceptance of the project	In this method, if the NPV of a project comes out to be positive, then the same can be accepted.	In this method, if r>k, then the project can be accepted.
Market ROI (rate of interest)	The net present value method recognizes the significance of the cost of capital or market ROI.	The internal rate of return method does not recognize the market ROI.
Assumption	The net present value method assumes that the cash inflows and outflows are reinvested at the required ROR (Rate of return).	The internal rate of return assumes that the cash inflows and outflows are reinvested at the internal rate of return.

Calculation	The net present value method calculates the actual amount of investment.	The internal rate of return method calculates maximum ROI.
Purpose	The net present value method is concerned with project surpluses.	The internal rate of return method is more concerned about the break-even cash flows of a particular project.

Advantages of Net Present Value

1. It takes into account that a dollar today is worth more than a dollar tomorrow.
2. NPV allows risk factors to enter into the calculation.
3. It takes the cost of capital and risk factors into consideration.
4. NPV can determine what the value outcomes could be.
5. It takes all cash flows from a project into consideration.

6. It gives you ranking information about projects while rationing capital.
7. NPV tells you if an investment can create value.
8. Net Present Value ratio is easy for the average investor.
9. It doesn't work on the assumption of reinvestment.

Disadvantages of Net Present Value

1. It is highly sensitive to the discount rate used.
2. The only way to get to the value is through guesswork.
3. NPV typically focuses on short-term projects because of future uncertainties.
4. NPV ignores the "sunk cost" figures in cash flow calculations.
5. Some costs can be almost impossible to estimate when calculating the NPV.
6. It does not compare two projects of different sizes.
7. NPV often takes an optimistic approach to future calculations.
8. Choosing a specific discount rate can be almost impossible with NPV.
9. Risk levels can change for a project as time passes.
10. NPV may not boost the earnings or return on equity for a company.

Advantages of the Internal Rate of Return Method

1. It incorporates the time value of money into the calculation.
2. It is a simple calculation.
3. It offers a method to rank projects for profitability.
4. It works well with other evaluation factors.
5. It is not linked with the required rate of return.

Disadvantages of the internal Rate of Return Method

1. It can provide an incomplete picture of the future.
2. It ignores the overall size and scope of the project.
3. It ignores future costs within the calculation.
4. It does not account for reinvestments.
5. It struggles to keep up with multiple cash flows.
6. It requires calculations that are quite tedious for the average person.
7. It places the top priority of the calculation on profitability.

Sol. 2

$\text{NPV} = \frac{Cash\ Flows}{(1+i)^n} - Initial\ investment$

where:

i= Required return or discount rate

n=Number of time periods

For IRR;   NPV = 0

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

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

Year	Cash flows	Rate asset
0	-5000000	10%
1	700000	
2	730000	
3	770000	
4	825000	
5	1500000	
6	1500000	
7	2000000	
NPV	186077.03	
IRR	10.92%	

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Sol. 3

Year	Project A	Project B	Project C	Rate asset
0	-6500000	-5500000	-5000000	10%
1	1000000	1000000	1000000	
2	1500000	1200000	1100000	
3	2200000	1700000	1500000	
4	2400000	2100000	1800000	
5	2700000	2000000	2050000	
NPV	617372.758	354232.510	447466.951	
IRR	13.12%	12.19%	13.02%	

Project A is choose due to greater NPV

Sol. 4

$$A/P = \frac{i(1+i)^n}{\{(1+i)^n - 1\}}$$

i= Rate of interest
n= No. of Years

Alternatives	X	Y	Z
Initial Cost	350	400	500
Annual Power sales	13	15	18
Annual flood Control	3.5	4	5
Annual irrigation benefits	4	5	6
Annual recreation benefits	1.5	2.5	3.5
Annual operation and maintenance	2.5	3	3.5

Annual Cost computation	X	Y	Z	Rate of Asset	Life	$A/P = \frac{i(1+i)^n}{\{(1+i)^n - 1\}}$

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Annual cost equivalent = p x (A/P, 6%, 50)	19.17186	21.91069	27.38837	5%	50
operation and maintenance	2.5	3	3.5	105%	11.46739979
Reciepts of Power sales	13	15	18	0.054776735	
Total annual cost equivalent	8.671857	9.910694	12.88837		

Annual Benefit (B) computation	X	Y	Z
Annual flood Control	3.5	4	5
Annual irrigation benefits	4	5	6
Annual recreation benefits	1.5	2.5	3.5
Total Benefit	9	11.5	14.5
Total Cost	8.671857	9.910694	12.88837
B/C ratio	1.03784	1.160363	1.125045

Annual Cost computation	Y-X	Z-X		Rate of Asset	Life
Annual cost equivalent = p x (A/P, 6%, 50)	2.738837	8.21651		5%	50
operation and maintenance	0.5	1		105%	11.46739979
Reciepts of Power sales	2	5		0.054776735	
Total annual cost equivalent	1.238837	4.21651			

Annual Benefit (B) computation	Y-X	Z-X	
Annual flood Control	0.5	1.5	
Annual irrigation benefits	1	2	
Annual recreation benefits	1	2	

Total Benefit	2.5	5.5	
Total Cost	1.238837	4.21651	
B/C ratio	2.018022	1.304396	
Remarks	B/C>1, But B/C is greater than Z, So Accept	B/C>1, But B/C is less than Y, So Reject	