Analysis of Projects

1. Independent
2. Mutually excusive (service / revenue)

Techniques

a) Net Present Worth
b) Net Future Worth
c) Capitalized cost
d) Net Annual worth
e) Rate of Return

Independent Projects

Selection / Rejection criteria

a) NPW (Net Present Worth) *

NPW> 0 , select
NPW= 0 indifferent
NPW < 0 reject

b) NFW (Net Future Worth) *

NFW> 0 , select
NFW= 0, indifferent
NFW< 0, reject

* Assuming positive sign to revenue

Analysis Period

Alternatives with equal life – Study period or Project life

Alternatives with unequal life - LCM

1) The details of the feasibility report of a project are shown below. Check the feasibility of the project based on Present Worth Method if i=20%.

Initial outlay- Rs.50,00,000

Life of Project- 20 years

Annual Equivalent Revenues- Rs.15,00,000

Modernizing cost at the end of 10^{th} year- Rs.20,00,000

Salvage value at the end of project life- Rs.5,00,000

A large food-processing corporation is considering using laser technology to speed up and eliminate waste in the potato-peeling process. To implement the system, the company anticipates needing $3.5 million to purchase the industrial-strength lasers. The system will save $1,550,000 per year in labor and materials. However, it will require an additional operating and maintenance cost of $350,000. Annual income taxes will also increase by $150,000. The system is expected to have a 10-year service life and will have a salvage value of about $200,000. If the company's MARR is 18%, use the NPW method to justify the economics of the project.

Ans: $1,257,025

Investment proposals A and B have the net cash flows as follows:

Proposal	End of Years				
	0	1	2	3	4
A	-10000	3000	3000	7000	6000
B	-10000	6000	6000	3000	3000

Which proposal should be selected with an interest rate of 18%?

Two types of trucks are available for transportation use. They are needed for 10 years. The details are given in the table below. Determine the best alternative using the present worth method with i=18%?. Also, apply the future worth method to select the alternative for the same data?

	Truck A	Truck B
First cost	10,00,000	15,00,000
Estimated Annual Maintenance Cost	20,000	15,000
Estimated life	5 years	10 years
Estimated salvage value	2,00,000	5,00,000

1) Assets A1 and A2 have the capability of satisfactorily performing a required function. Asset A2 has an initial cost of ₹32000 and an expected salvage value of ₹4000 at the end of its 4 years' service life. Assets A1 costs ₹9000 less initially, with an economic life 1 year shorter than that of A2; but A1 has no salvage value, and its annual operating costs exceed those of A2 by ₹2500. When the required rate of return is 15% state which alternative is preferred?

A new rock pit will be operated for a construction project that will last 5 years. Rock can be loaded from an elevated box loader served by a conveyor from the pit or by mobile shovel loaders. The box loader and conveyor have an initial cost of ₹ 2,64,000 and will have no salvage value at the end of the project. Two shovel loaders each priced at ₹42,000 can provide the same capacity, but their operating costs together will be ₹ 36,000 per year more than the box loader. Normal service life for a shovel loader is 3 years with zero salvage value, but a 2 year old machine can likely be sold for ₹10,000. Which alternative is preferred when the interest rate is 13%?

An electric utility is taking bids on the purchase, installation, and operation of microwave towers. Following are some details associated with the two bids that were received:

	Cost per Tower	
	Bid A	**Bid B**
Equipment cost	$112,000	$98,000
Installation cost	$25,000	$30,000
Annual maintenance and inspection fee	$2,000	$2,500
Annual extra income taxes		$800
Life	40 years	35 years
Salvage value	$0	$0

Which is the most economical bid if the interest rate is considered to be 11%? Either tower will have no salvage value after 20 years of use.

Use the NPW method to compare these two mutually exclusive plans.

Your R&D group has developed and tested a computer software package that assists engineers to control the proper chemical mix for the various process-manufacturing industries. If you decide to market the software, your first-year operating net cash flow is estimated to be $1,000,000. Because of market competition, product life will be about 4 years, and the product's market share will decrease by 25K each year over the previous year's share. You are approached by a big software house which wants to purchase the right to manufacture and distribute the product. Assuming that your interest rate is 15%, for what minimum price would you be willing to sell the software?

Refer to example 5.7 and solve this