EVALUATION OF ALTERNATIVES: PRESENT WORTH, FUTURE WORTH AND CAPITALISED COST METHOD

1.Tiger Machine tool company is considering a new metal-cutting machine. The required initial investment is $76,000 and the projected cash benefits over the projects 4 year life are as follows.

Period (n)	Net Cash Flow ($)
1	35,000
2	37,000
3	32,000
4	34,000

You have been asked by the president of the company to evaluate the economic merit of the acquisition. The firms MARR is known to be 12%.

3. National Homebuilders, Inc., plans to purchase new cut-and-finish equipment. Two manufacturers offered the estimates below.

	Vendor A	Vendor B
First cost, $	−15,000	−18,000
Annual M&O cost, $ per year	−3,500	−3,100
Salvage value, $	1,000	2,000
Life, years	6	9

(*a*) Determine which vendor should be selected on the basis of a present worth comparison, if the MARR is 15% per year.
(*b*) National Homebuilders has a standard practice of evaluating all options over a 5-year period. If a study period of 5 years is used and the salvage values are not expected to change, which vendor should be selected?

4. Assets A1 and A2 have the capability of satisfactorily performing a required function. Asset A2 has an initial cost of $3200 and an expected salvage value of $400 at the end of its 4-year service life. Asset A1 costs $900 less initially, with an economic life of 1 year shorter than that of A2; but A1 has no salvage value, and its annual operating costs exceed of A2 by $250. When the required rate of return is 15 percent, state which alternative is preferred when comparison is by:

(a) The LCM Method
(b) A 2-year study period (assuming the assets are needed for only 2 years). What salvage value would make A2 a better option at the end of 2 years?

5. A British food distribution conglomerate purchased a Canadian food store chain for £75 million 3 years ago. There was a net loss of £10 million at the end of year 1 of ownership. Net cash flow is increasing with an arithmetic gradient of £_5 million per year starting the second year, and this pattern is expected to continue for the foreseeable future. This means that breakeven net cash fl ow was achieved this year. Because of the heavy debt financing used to purchase the Canadian chain, the international board of directors expects a MARR of 25% per year from any sale.
(*a*) The British conglomerate has just been offered £159.5 million by a French company wishing to get a foothold in Canada. Use FW analysis to determine if the MARR will be realized at this selling price.
(*b*) If the British conglomerate continues to own the chain, what selling price must be obtained at the end of 5 years of ownership to just make the MARR? **(FUTURE WORTH METHOD)**

6. Waste Management Company (WMC) has won a contract that requires the firm to remove radioactive material from government-owned property and transport it to a designated dumping site. This task requires a specially made ripper-bulldozer to dig and load the material onto a transportation vehicle. Approximately 400,000 tons of waste must be moved in a period of two years.

- Model A costs $150,000 and has a life of 6,000 hours before it require any major overhaul. Two units of Model A would be required to remove the material within two years, and the operating cost for each unit would run to $40,000/year for 2,000 hours of operation. At this operational rate, the model would be operable for three years, at the end of which time it is estimated that salvage value will be $25,000 for each machine.

- A more efficient model B costs $240,000 each, has a life of 12,000 hours without any major overhaul, and costs $22,500 to operate for 2,000 hours per year to complete the job within two years. The estimated value of model B at the end of six years is $30,000. Once again, two units of model B would be required to remove the material within two years.

  Assuming the firm's MARR is 15% which option would be acceptable, if 1 unit of Model A's salvage value at EOY2 = $45,000 and 1 unit of Model B's salvage value at EOY2 = $125,000

7. The family-operated Foothill Ranching Company (FRC) owns the mineral rights to land used for growing grain and grazing cattle. Recently oil was discovered in this property. The family has decided to extract oil, sell the land, and retire. The company can lease necessary equipment and extract and sell the oil itself, or it can lease the land to an oil-drilling company.

- Drill option: If the company chooses to drill, it would require $300,000 leasing expenses up front, but the net annual cash flow after taxes from drilling operations will be $600,000 at the end of each year for next five years. The company can sell the land for a net cash flow of $1,000,000 in five years, when the oil is depleted.
- Lease option: If the company chooses to lease, the drilling company can extract all the oil in only three years and FRC can sell the land for a net cash flow of $800,000 at that time. (the difference in resale value of land is due to the increasing rate of land appreciation anticipated for this property.) The net cash flow from the lease payments to FRC will be $630,000 at the *beginning* of each of the next three years.

Which option should the firm select at i = 15%

8. The Smith Novelty Company, a mail-order firm, wants to install an automatic mailing system to handle product announcements and invoices. The firm has a choice between two different types of machines. The two machines are designed separately, but have identical capabilities and do exactly the same job. The $12,500 semiautomatic model A will last three years, while the fully automatic model B will cost $15,000 and last four years. The expected cash flows for the two machines, including maintenance, salvage value and tax effects, are as follows.

n	Model A		Model B	
1	-5,000		-4,000	
2	-5,000		-4,000	
3	-5,000	**+2,000**	-4,000	
4			-4,000	**+1,500**
5	Analysis period			

As business grows to a certain level, neither of the models may be able to handle the expanded volume at the end of year 5. If that happens, a fully computerized mail-order system will need to be installed to handle the increased business volume. In the scenario presented, which model should the firm select at MARR = 15% if company considers leasing equipment comparable to Model A at an annual payment of $6,000 payable at EOY.

CAPITALIZED COST METHOD:

9. How much money should the college collect in donation in order to pay annual student scholarships worth $5 million perpetually? i = 4%

10. A $500,000 gift was received by a city for the construction and continued upkeep of a music shell. Annual maintenance for the shell is estimated at $15,000. In addition, $25000 will be needed every 10 years for painting and major repairs. How much will be left for the initial construction costs, after funds are allocated for perpetual upkeep? i=6%

11. A city has developed a plan to provide for future water needs. 2 alternatives are being considered. The first proposes to build a full capacity tunnel now for $556,000. The second proposes to build a half capacity tunnel now at $402,000 which is adequate for 20 years and then build a second parallel half capacity tunnel at the same cost. The maintenance for the full capacity tunnel is $40,000 every 10 years and each half capacity tunnel is $32000 every 10 years. The estimated additional costs in single half capacity tunnel (due to friction losses) is $2000 per year. Based on capitalized cost and a 7% interest rate, which alternative should be selected.

12. The Haverty County Transportation Authority (HCTA) has just installed new software to charge and track toll fees. The director wants to know the total equivalent cost of all future costs incurred to purchase the software system. If the new system will be used for the indefinite future. The system has an installed cost of $150,000 and an additional cost of $50,000 after 10 years. The annual software maintenance contract cost is $5000 for the first 4 years and $8000 thereafter. In addition, there is expected to be a recurring major upgrade cost of $15,000 every 13 years. Assume that i _ 5% per year for county funds. Find : (a*)* Capitalised cost and (b*)* for each year hereafter, an AW value.