IE2111 ISE Principles & Practice II Tutorial #5 (Financial Analysis with Depreciations & Taxes)

Question 1 (based on Sullivan et al 2020, P7-8)

An asset for drilling was purchased and placed in service by a petroleum production company. Its cost basis is \$60,000, and it has an estimated MV of \$12,000 at the end of an estimated useful life of 14 years. Compute the depreciation amounts in the third years and the BV at the end of the fifth year of life by each of these depreciation methods:

- (a) The classical straight line method.
- **(b)** The 200% DB method.
- (c) 3-year Capital Allowance Scheme under Singapore income tax law.
- (d) 1-year Capital Allowance Scheme under Singapore income tax law.

Question 2 (based on Sullivan *et al* 2014, P7-11)

Your company has purchased a large new truck-tractor for over-the-road use. It has a basic cost of \$180,000. With additional options costing \$15,000, the cost basis for depreciation purpose is \$195,000. It's *MV* at the end of 6 years of service is estimated as \$20,000. Assume that the asset is subject to the 3-year capital allowance claim and the corporate tax rate is 17%.

- (a) What are the annual depreciation amounts and book values at the end of each year?
- (b) If the tractor is disposed at its estimated MV at the end its 6 years of service, what is the balancing allowance or charge to the company in that year, and how much tax does the company pay or save?
- (c) Suppose the tractor becomes obsolete and is disposed at the end of 2 years at \$40,000, what is the balancing allowance or charge to the company in that year, and how much tax does the company pay or save?

Question 3 (based on Sullivan *et al* 2014, P7-26)

An assembly operation at a software company currently require \$100,000 per year in labor costs. A robot can be purchased and installed to automate this operation, and the robot will cost \$200,000 with no MV at the end of its 10-year life. The robot, if acquired, is entitled to the 1-year capital allowance scheme. Maintenance and operation expenses of the robot are estimated to be \$64,000 per year. The corporate income tax rate is 17%. Invested capital must earn at least 8% after income taxes are taken into account. Use the IRR method to determine if the robot is a justifiable investment.

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Question 4 (based on Sullivan et al 2020, P7-38)

Storage tanks to hold a highly corrosive chemical are currently made of material Z26. The capital investment in a tank is \$30,000, and its useful life is eight years. Your company manufactures electronic components and uses claim depreciation for these tanks under the 3-year capital allowance scheme. The net MV of the tanks at the end of their useful life is zero. When a tank is four years old, it must be relined at a cost of \$10,000. This cost may be claimed as an expense during year four.

Instead of purchasing the tanks, they can be leased. A contract for up to 20 years of storage tank service can be written with the Rent-All-Company. If your firm's after-tax *MARR* is 12%, what is the greatest annual amount that you can afford to pay for tank leasing without causing purchasing to be the more economical alternative? The income-tax rate is 17%. State any assumption you make.

Question 5 (based on Sullivan *et al* 2014, P7-41)

Two alternative machines will produce the same product, but one is capable of higher-quality work, which can be expected to return greater revenue. The following are relevant data:

	Machine A	Machine B
Capital Investment	\$ 20,000	\$ 30,000
Useful Life	12 years	8 years
MV at end of useful life	\$ 4,000	\$ 0
Annual receipts	\$ 150,000	\$ 188,000
Annual expenses	\$ 138,000	\$ 170,000

Determine which is the better alternative, assuming "repeatability", 3-year capital allowances claim, a corporate tax rate of 17%, and an after-tax *MARR* of 10%.

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Question 6 (based on Sullivan *et al* 2020, P7-43)

Alternative Methods I and II are proposed for a security system. The following is comparative information for the two alternatives:

	Method I	Method II
Initial Investment	\$10,000	\$40,000
Useful Life	5 years	10 years
MV at end of useful life	\$1,000	\$5,000
Annual expenses		
Labor	\$12,000	\$4,000
Power	\$600	\$300
Rent	\$1,000	\$500
Maintenance	\$500	\$200
Property taxes and insurance	\$400	\$2,000
Total annual expenses	\$14,500	\$7,000

Assuming that both systems are entitled to 3-year capital allowance claims, determine which is the better alternative based on an after-tax cost analysis with a tax rate of 17% and an after-tax *MARR* of 15%. Use a study period of 10 years.

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