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.

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%.

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.