Chapter 22

PLANNING FOR CAPITAL EXPENDITURES

MULTIPLE CHOICE

Question No. 4 is AICPA adapted.
Question No. 3 is ICMA adapted.
Question No. 2 is CIA adapted.

D **1.** **The type of costs presented to management for a decision to replace equipment should be limited to:**

- **A. controllable costs**
- **B. conversion costs**
- **C. historical costs**
- **D. relevant costs**
- **E. standard costs**

B **2.** **A company can replace the machinery currently used to manufacture its product with more efficient machinery. The new machinery will reduce labor and also will reduce the percentage of spoiled units. It is expected to have a useful life of 5 years. The most appropriate technique for determining whether or not the company should replace its machinery with the new, more efficient machinery is:**

- **A. cost-volume-profit analysis**
- **B. capital-budgeting analysis**
- **C. regression analysis**
- **D. linear programming**
- **E. none of the above**

D **3.** **Depreciation is incorporated explicitly in the cash flow analysis of an investment proposal because it:**

- **A. is a cost of operations that cannot be avoided**
- **B. results in an annual cash outflow**
- **C. is a cash inflow**
- **D. reduces the cash outlay for income taxes**
- **E. represents the initial cash outflow spread over the life of the investment**

E **4.** **Common problems related to ethical considerations in the capital budgeting include all of the following, *except:***

- **A. superiors and associates sometimes apply pressure to circumvent the approval process**
- **B. pressure may exist to write-off or devalue assets below their true value to justify replacement**
- **C. the economic benefit of capital projects may be exaggerated to increase the likelihood of approval**
- **D. the accountant may mistakenly go to the individuals involved in the ethical conflict first, rather than first discussing it with the accounting supervisor**
- **E. all of the above are ethical problems related to capital budgeting**

D **5.** **Maxwell Company has an opportunity to acquire a new machine to replace one of its present machines. The new machine would cost $90,000, have a 5-year life, and no estimated salvage value. Variable operating costs would be $100,000 per year. The present machine has a book value of $50,000 and a remaining life of 5 years. Its disposal value now is $5,000, but it would be zero after 5 years. Variable operating costs would be $125,000 per year. Ignore income taxes. Considering the 5 years in total, what would be the difference in profit before income taxes by acquiring the new machine as opposed to retaining the present one?**

A. **$10,000 decrease**
B. **$15,000 decrease**
C. **$35,000 increase**
D. **$40,000 increase**
E. **none of the above**

SUPPORTING CALCULATION:

Additional depreciation on the new machine	**$ (40,000)**
Loss on sale of old machine	**(45,000)**
Operating cost savings	**125,000**
Increase in income	**$ 40,000**

D **6.** **Effective planning and control is important for the effective administration of a capital expenditure program because:**

A. **the long-term commitment increases financial risk**
B. **the magnitude of expenditures is substantial and the economic penalties for unwise decisions are usually severe**
C. **decisions made in this area provide the structure for operation of the firm**
D. **all of the above**
E. **none of the above**

D **7.** **A company manual used for detailing policies and procedures required for administering the capital expenditure program should:**

A. **encourage people to work on and submit new ideas**
B. **focus attention on useful analytical tasks**
C. **facilitate rapid project development and expeditious review**
D. **all of the above**
E. **none of the above**

D **8.** **A number of evaluations of a single capital expenditure proposal may be necessary because of:**

A. **circumstances that change during the time span from the origin of the project idea to its completion**
B. **alternative solutions of the problem for which the project is designed**
C. **assumptions that vary as to the amount and timing of cash flows**
D. **all of the above**
E. **none of the above**

A **9.** **The following capital expenditures that compare the future costs of the old assets with the future costs of the new assets as a basis for making a decision are:**
- **A. replacement expenditures**
- **B. expansion expenditures**
- **C. improvement expenditures**
- **D. allowance expenditures**
- **E. none of the above**

B **10.** **In which of the following types of capital expenditure decisions does the basis for a decision most markedly shift from cost savings to increased profits and cash flow?**
- **A. replacement expenditures**
- **B. expansion expenditures**
- **C. improvement expenditures**
- **D. allowance expenditures**
- **E. none of the above**

C **11.** **The capital expenditures in which the benefits are most difficult to quantify are:**
- **A. replacement expenditures**
- **B. expansion expenditures**
- **C. improvement expenditures**
- **D. allowance expenditures**
- **E. none of the above**

C **12.** **Primary motivations for computer integrated manufacturing, robotics, and flexible manufacturing systems include all of the following, *except:***
- **A. the need to improve product quality in the face of increasing competition**
- **B. the desire to be able to adjust production output quantity quickly to satisfy changing consumer demand**
- **C. cost savings**
- **D. the desire to be able to adjust production output variety quickly to satisfy changing consumer demand**
- **E. all of the above are primary motivations**

B **13.** **All of the following are common cash inflows related to capital expenditure proposals, *except:***
- **A. additional revenues from increased sales**
- **B. increased working capital requirements**
- **C. reduction in inventory carrying costs**
- **D. salvage value at the end of the project**
- **E. all of the above are cash inflows**

E **14.** **All of the following are common cash outflows from capital expenditure programs, *except:***
- **A. equipment installation**
- **B. employee training**
- **C. computer programming and fine tuning**
- **D. increased working capital requirements**
- **E. salvage value at the end of the project**

C **15.** **The system for recovering the cost of capital expenditures through federal income tax deductions that was required for tangible, depreciable property placed in service after 1980 is known as:**
- **A. MACRS**
- **B. 200% declining balance**
- **C. ACRS**
- **D. 150% declining balance**
- **E. none of the above**

A **16.** **Under the Tax Reform Act of 1986, the system that increased the number of property classes and lengthened the recovery periods of most kinds of depreciable property is known as:**
- **A. MACRS**
- **B. 200% declining balance**
- **C. ACRS**
- **D. 150% declining balance**
- **E. none of the above**

D **17.** **An example of 5-year property under MACRS is:**
- **A. most manufacturing machinery**
- **B. railroad cars**
- **C. commercial aircraft**
- **D. light trucks**
- **E. none of the above**

B **18.** **An example of 7-year property under MACRS is:**
- **A. automobiles**
- **B. most manufacturing machinery**
- **C. light trucks**
- **D. small aircraft**
- **E. none of the above**

A **19.** **An example of 27.5-year property under MACRS is:**
- **A. residential rental property**
- **B. commercial aircraft**
- **C. nonresidential buildings**
- **D. railroad cars**
- **E. none of the above**

C **20.** **Under MACRS, the depreciation on tangible personal property is computed as if the property were placed into service at the:**
- **A. beginning of the year**
- **B. end of the year**
- **C. midpoint of the year**
- **D. midpoint of the month**
- **E. none of the above**

D **21.** **Under MACRS, the depreciation on real property is computed as if the property were placed into service at the:**
- **A. beginning of the year**
- **B. end of the year**
- **C. midpoint of the year**
- **D. midpoint of the month**
- **E. none of the above**

D **22.** **A machine that cost $50,000 and is fully depreciated is sold for $10,000. The $10,000 is then used as a down payment on the purchase of a new machine costing $75,000. Assuming a 40% tax rate, the out-of-pocket cost of the new machine is:**

A. $75,000
B. $71,000
C. $65,000
D. $69,000
E. none of the above

SUPPORTING CALCULATION:

Cost of new machine	**$75,000**
Less: After-tax inflow from old machine ($10,000 x .60)	**6,000**
	$69,000

C **23.** **A machine that cost $50,000 and is fully depreciated is allowed as a $10,000 trade-in on a machine costing $75,000. Assuming a 40% tax rate, the out-of-pocket cost of the new machine is:**

A. $75,000
B. $71,000
C. $65,000
D. $69,000
E. none of the above

SUPPORTING CALCULATION:

Cost of new machine	**$75,000**
Less: Trade-in allowance	**10,000**
	$65,000

PROBLEMS

PROBLEM

1.

Estimating Pretax Cash Inflows. Skyway Corporation is considering purchasing a new machine to be used to manufacture a new product, called Jax, which will sell for $15 a unit. Variable manufacturing cost is expected to be $5 for each unit of Jax manufactured, and variable marketing cost, $2 for each unit sold. The machine being considered could produce 10,000 units a year, all of which the Marketing Department believes could be sold for $15 a unit. The proposed machine would cost $250,000. Although the machine would probably last 8 years, management believes that the product's life cycle would be only 5 years. The salvage value of the new machine at the end of the product's 5-year life cycle is expected to be $50,000. Management does not believe the machine could be used to manufacture any of the company's other products.

Required: **Compute the pretax net cash inflows expected from the capital expenditure proposal for each year, and ignoring the effect of income taxes, determine the excess of cash inflows from all sources over the cost of the machine.**

SOLUTION

Year	Estimated Demand in Units	Unit Sales Price	Unit Variable Cost	Unit Contribution Margin	Net Pretax Cash Inflows From Sales
1	10,000	$15	$7	$8	$ 80,000
2	10,000	15	7	8	80,000
3	10,000	15	7	8	80,000
4	10,000	15	7	8	80,000
5	10,000	15	7	8	80,000
Total net pretax cash inflows from sales					$ 400,000
Initial cash outflow (cost of asset)				$ 250,000	
Less pretax estimated salvage value				(50,000)	200,000
Excess of net pretax cash inflows over cost					$ 200,000

PROBLEM

2.
Estimating Pretax Cash Inflows With Inflation. Speedi Corporation is considering a capital expenditure proposal which will require an initial cash outlay of $50,000. The project life is expected to be 6 years. The estimated salvage value for the equipment (based on today's market price for similar used 6-year old equipment) is $2,500. Estimated annual net cash inflows from operations during the life of the project follow:

Year	Estimated Annual Cash Inflow
1	$10,000
2	15,000
3	15,000
4	15,000
5	10,000
6	5,000

Required: **Compute the excess of cash inflows over cash outflows assuming management expects a constant 4% rate of inflation during the 6-year period. (Round your price level index to three decimal places.)**

SOLUTION

Year	Estimated Net Pretax Cash Inflows	4% Annual Price-level Adjustment	Price-level Adjusted Net Cash Inflows
1	$10,000	$(1 + .04)^1 = 1.040$	$ 10,400
2	15,000	$(1 + .04)^2 = 1.082$	16,230
3	15,000	$(1 + .04)^3 = 1.125$	16,875
4	15,000	$(1 + .04)^4 = 1.170$	17,550
5	10,000	$(1 + .04)^5 = 1.217$	12,170
6	5,000	$(1 + .04)^6 = 1.265$	6,325

Total price-level adjusted net pretax cash inflows from operations		$ 79,550
Plus cash inflow from salvage	$2,500	
Price-level adjustment	1.265	3,163
Total price-level adjusted net pretax cash inflows over initial cash outflow		$ 82,713
Less initial cash outflow		50,000
Excess of net pretax cash inflows over initial cash outflow		$ 32,713

PROBLEM

3.
Estimating After-tax Cash Flows for CIM Project. Athens Corporation is considering the various benefits that may result from the shortening of its production cycle by changing from the company's present manufacturing system to a computer integrated manufacturing (CIM) system. The proposed system can provide productive time equivalency close to the 25,000 hours available annually with the company's present system. The present system costs $50 per hour more to operate than the proposed CIM system. The company expects to operate the system at full capacity. The annual out-of-pocket costs of maintaining the proposed CIM system is $500,000 more than the company's present system. The proposed CIM system will require an initial investment of $1,000,000. The system is expected to have a useful life of 6 years with no expected salvage value. The company is in a 40% tax-rate bracket.

Required: **Compute the relevant annual after-tax cash flows expected from the CIM project. (Assume the equipment is 5-year class MACRS property and use the rates provided below.)**

(AICPA adapted)

Year	MACRS 5-year Recovery Rate
1	0.200
2	0.320
3	0.192
4	0.115
5	0.115
6	0.058
	1.000

SOLUTION

Year	(1) Annual Operating Savings With CIM*	(2) Additional Maintenance Cost With CIM	(3) Tax Depreciation**	(4) Taxable Income (Loss) (1)-(2)-(3)	(5) Tax Liability With 40% Tax Rate 40% x (4)	(6) Net After-tax Cash Inflows (1)-(2)-(5)
1	$1,250,000	$500,000	$200,000	$550,000	$220,000	$530,000
2	1,250,000	500,000	320,000	430,000	172,000	578,000
3	1,250,000	500,000	192,000	558,000	223,200	526,800
4	1,250,000	500,000	115,000	635,000	254,000	496,000
5	1,250,000	500,000	115,000	635,000	254,000	496,000
6	1,250,000	500,000	58,000	692,000	276,800	473,200

Total net after-tax cash inflows	$ 3,100,000
Less initial cash outflow to purchase system	1,000,000
Excess of net after-tax cash inflows over initial cash outflow	$ 2,100,000
*Annual hours of operating capacity	25,000
Savings per hour with CIM	x $50
	$ 1,250,000

** Year	MACRS 5-year Recovery Rate	Depreciable Basis	Tax Depreciation
1	0.200	$1,000,000	$ 200,000
2	0.320	1,000,000	320,000
3	0.192	1,000,000	192,000
4	0.115	1,000,000	115,000
5	0.115	1,000,000	115,000
6	0.058	1,000,000	58,000
	1.000		$ 1,000,000

PROBLEM

4.
Computing After-tax Cash Inflows. Stevie Company is considering a capital expenditure with the following estimated net cash inflows:

Year	Estimated Pretax Inflation Adjusted Net Cash Inflow
1	$ 70,000
2	80,000
3	90,000
4	110,000
5	100,000
6	80,000

The equipment required for the project would have an initial cost of $500,000, and it is not expected to have any salvage value at the end of the life of the project. The equipment will be depreciated using the straight-line method over its economic life of 6 years for book purposes; however, it qualifies as 5-year property for tax purposes. The company's effective tax rate is 40%.

Required: **Determine the estimated after-tax net cash inflows for each of the project's 6 years, and the total excess of cash inflows over the life of the project over cash outflows. (Use the MACRS rates provided below to compute tax depreciation.)**

Year	MACRS 5-year Recovery Rate
1	0.200
2	0.320
3	0.192
4	0.115
5	0.115
6	0.058
	1.000

SOLUTION

Year	(1) Estimated Inflation Adjusted Net Cash Inflows	(2) Tax Depreciation*	(3) Taxable Income (Loss) (1) - (2)	(4) Tax Liability With 40% Tax Rate 40% x (3)	(5) Net After-tax Cash Inflows (1) - (4)
1	$ 70,000	$100,000	$(30,000)	$(12,000)	$ 82,000
2	80,000	160,000	(80,000)	(32,000)	112,000
3	90,000	96,000	(6,000)	(2,400)	92,400
4	110,000	57,500	52,500	21,000	89,000
5	100,000	57,500	42,500	17,000	83,000
6	80,000	29,000	51,000	20,400	59,600

Total net after-tax cash inflows	$ 518,000
Less initial cash outflow to purchase system	500,000
Excess of net after-tax cash inflows over initial cash outflow	$ 18,000

* MACRS 5-year Recovery Rate

Year	Depreciable Basis	Tax Depreciation
1	0.200	$500,000	$100,000
2	0.320	500,000	160,000
3	0.192	500,000	96,000
4	0.115	500,000	57,500
5	0.115	500,000	57,500
6	0.058	500,000	29,000
	1.000		$500,000

PROBLEM

5.
Effect of Inflation and Taxes on Investment Decision. Weighout Company is evaluating a capital expenditure proposal that will require an initial cash investment of $100,000. The project will have a 6-year life; however, the property will qualify as 5-year property for income-tax depreciation purposes. The income tax rate is 40%. The annual cash inflows from the project, before any adjustment for the effects of inflation or income taxes, are expected to be as follows:

Year	Unadjusted Estimate of Cash Inflows
1	$25,000
2	27,000
3	29,000
4	23,000
5	20,000
6	15,000

The expected salvage value of the property is zero. Cash inflows are expected to increase at the anticipated inflation rate of 4% each year.

Required: **Compute the inflation adjusted after-tax cash inflow from the proposal for each year, and the excess of total net cash inflows over the initial cash outlay. (Use the MACRS depreciation rates provided below to compute tax depreciation, and round the price-level index to three decimal places.)**

Year	MACRS 5-year Recovery Rate
1	0.200
2	0.320
3	0.192
4	0.115
5	0.115
6	0.058
	1.000

SOLUTION

Year	(1) Periodic Cash Inflows	(2) 4% Price-level Adjustment	(3) Inflation Adjusted Estimate of Cash Inflows (1) x (2)
1	$ 25,000	$(1 + .04)^1 = 1.040$	$ 26,000
2	27,000	$(1 + .04)^2 = 1.082$	29,214
3	29,000	$(1 + .04)^3 = 1.125$	32,625
4	23,000	$(1 + .04)^4 = 1.170$	26,910
5	20,000	$(1 + .04)^5 = 1.217$	24,340
6	15,000	$(1 + .04)^6 = 1.265$	18,975
	$ 139,000		$ 158,064

Year	(1) Depreciable Basis of Property	(2) 5-Year Property Recovery Percentage	(3) Tax Depreciation (1) x (2)
1	$100,000	0.200	$ 20,000
2	100,000	0.320	32,000
3	100,000	0.192	19,200
4	100,000	0.115	11,500
5	100,000	0.115	11,500
6	100,000	0.058	5,800
			$ 100,000

Year	(1) Adjusted Estimate of Net Cash Inflows	(2) Tax Depreciation	(3) Taxable Income (Loss) (1) - (2)	(4) Federal and State Income Tax Rate	(5) Income Tax (3) x (4)	(6) Net After-tax Cash Inflows (1) - (5)
1	$26,000	$20,000	$ 6,000	40%	$ 2,400	$23,600
2	29,214	32,000	(2,786)	40%	(1,114)	30,328
3	32,625	19,200	13,425	40%	5,370	27,255
4	26,910	11,500	15,410	40%	6,164	20,746
5	24,340	11,500	12,840	40%	5,136	19,204
6	18,975	5,800	13,175	40%	5,270	13,705

Total estimated net after-tax cash inflows from project	$134,838
Less initial cash outflow for machinery	100,000
Excess of after-tax cash inflows from project over initial cash outflow	$ 34,838