

Chapter 010 Making Capital Investment Decisions

Multiple Choice Questions

1. The changes in a firm's future cash flows that are a direct consequence of accepting a project are called _____ cash flows.

- A.** incremental
- b. stand-alone
- c. after-tax
- d. net present value
- e. erosion

SECTION: 10.1
TOPIC: INCREMENTAL CASH FLOWS
TYPE: DEFINITIONS

2. The evaluation of a project based solely on its incremental cash flows is the basis of the:

- a. future cash flow method.
- B.** stand-alone principle.
- c. dividend growth model.
- d. salvage value model.
- e. equivalent cost principle.

SECTION: 10.1
TOPIC: STAND-ALONE PRINCIPLE
TYPE: DEFINITIONS

3. A cost that has already been incurred and cannot be recouped is a(n):

- a. salvage value expense.
- b. net working capital expense.
- C.** sunk cost.
- d. opportunity cost.
- e. erosion cost.

SECTION: 10.2
TOPIC: SUNK COSTS
TYPE: DEFINITIONS

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4. The most valuable investment given up if an alternative investment is chosen is a(n):
- a. salvage value expense.
 - b. net working capital expense.
 - c. sunk cost.
 - D.** opportunity cost.
 - e. erosion cost.

SECTION: 10.2
TOPIC: OPPORTUNITY COSTS
TYPE: DEFINITIONS

5. Erosion is best described as:
- a. expenses that have already been incurred and cannot be reversed.
 - b. net working capital expenses.
 - C.** the cash flows of a new project that come at the expense of a firm's existing cash flows.
 - d. the next alternative that is forfeited when a fixed asset is utilized for a project.
 - e. the differences in a firm's cash flows with and without a particular project.

SECTION: 10.2
TOPIC: EROSION
TYPE: DEFINITIONS

6. A pro forma financial statement is one that:
- A.** projects future years' operations.
 - b. is expressed as a percentage of the total assets of the firm.
 - c. is expressed as a percentage of the total sales of the firm.
 - d. is expressed relative to a chosen base year's financial statement.
 - e. reflects the past and current operations of a firm.

SECTION: 10.3
TOPIC: PRO FORMA FINANCIAL STATEMENTS
TYPE: DEFINITIONS

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7. The depreciation method currently allowed under U.S. tax law governing the accelerated write-off of property under various lifetime classifications is called:

- a. FIFO.
- B. MACRS.**
- c. straight-line depreciation.
- d. sum-of-years depreciation.
- e. erosion.

SECTION: 10.4
TOPIC: MACRS DEPRECIATION
TYPE: DEFINITIONS

8. The tax savings generated as a result of a firm's depreciation expense is called the:

- a. aftertax depreciation savings.
- b. depreciable basis.
- C. depreciation tax shield.**
- d. operating cash flow.
- e. aftertax salvage value.

SECTION: 10.5
TOPIC: DEPRECIATION TAX SHIELD
TYPE: DEFINITIONS

9. The annual annuity stream of payments with the same present value as a project's costs is called the project's _____ cost.

- a. incremental
- b. sunk
- c. opportunity
- d. erosion
- E. equivalent annual**

SECTION: 10.6
TOPIC: EQUIVALENT ANNUAL COST
TYPE: DEFINITIONS

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10. Lester's Dairy gathers and processes cow's milk for distribution to retail outlets. Lester's is currently considering processing goat's milk as well. Which one of the following is most apt to be an incremental cash flow related to the goat milk project?
- a. processing the goat's milk in the same building as the cow's milk
 - b. utilizing the same pasteurizing equipment to process both kinds of milk
 - C.** purchasing additional milk jugs to handle the increased volume of milk
 - d. researching the market to ascertain if goat milk sales might be profitable before deciding to proceed
 - e. reducing the projected interest expense by assuming the proceeds of the goat milk sales will reduce the outstanding debt

SECTION: 10.1 AND 10.2
TOPIC: INCREMENTAL CASH FLOW
TYPE: CONCEPTS

11. Russell's of Westerfield is a furniture store which is considering offering carpet for sale. Which of the following should be considered incremental cash flows of the project?
- I. utilizing the credit offered by a carpet supplier to build an initial inventory
 - II. granting credit to a customer so she can purchase carpet and pay for it at a later date
 - III. borrowing money from a bank to fund the carpet project
 - IV. purchasing carpet to hold in inventory
- a. I and II only
 - b. III and IV only
 - C.** I, II, and IV only
 - d. II, III, and IV only
 - e. I, II, III, and IV

SECTION: 10.1 AND 10.2
TOPIC: INCREMENTAL CASH FLOW
TYPE: CONCEPTS

Chapter 010 Making Capital Investment Decisions

12. The stand-alone principle advocates that project analysis should focus on _____ costs.
- a. sunk
 - b. total
 - c. variable
 - D.** incremental
 - e. fixed

SECTION: 10.1
TOPIC: STAND-ALONE PRINCIPLE
TYPE: CONCEPTS

13. Sunk costs include any cost that will:
- a. change if a project is undertaken.
 - b. be incurred if a project is accepted.
 - C.** not change as it was previously incurred and cannot be recouped.
 - d. be paid to a third party and cannot be recouped.
 - e. occur if a project is accepted and once incurred, cannot be recouped.

SECTION: 10.2
TOPIC: SUNK COST
TYPE: CONCEPTS

14. You spent \$600 last week repairing the brakes on your car. Now, the starter is acting up and you are trying to decide whether to fix the starter or trade the car in for a newer model. In analyzing the starter situation, the \$600 you spent fixing the brakes is a(n) _____ cost.
- a. opportunity
 - b. fixed
 - c. incremental
 - d. erosion
 - E.** sunk

SECTION: 10.2
TOPIC: SUNK COST
TYPE: CONCEPTS

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15. Which one of the following best illustrates erosion as it relates to project analysis?
- a. providing both ketchup and mustard for your customer's use
 - b. repairing the roof of your hamburger stand because of water damage
 - C.** selling less hamburgers because you also started selling hot dogs
 - d. opting to sell french fries but not onion rings
 - e. opting to increase your work force by hiring two part-time employees

SECTION: 10.2
TOPIC: EROSION
TYPE: CONCEPTS

16. Which of the following are examples of erosion?
- I. the loss of current sales due to increased competition in the product market
 - II. the loss of current sales because your chief competitor just opened a store across the street from your store
 - III. the loss of current sales due to a new product which you recently introduced
 - IV. the loss of current sales due to a new product recently introduced by your competitor
- A.** III only
- b. III and IV only
 - c. I, III, and IV only
 - d. II and IV only
 - e. I, II, III, and IV

SECTION: 10.2
TOPIC: EROSION
TYPE: CONCEPTS

17. You are considering the purchase of new equipment. Your analysis includes the evaluation of two machines which have differing initial and ongoing costs and differing lives. Whichever machine is purchased will be replaced at the end of its useful life. You should select the machine which has the:
- a. longest life.
 - b. highest annual operating cost.
 - c. lowest annual operating cost.
 - d. highest equivalent annual cost.
 - E.** lowest equivalent annual cost.

SECTION: 10.6
TOPIC: EQUIVALENT ANNUAL COSTS
TYPE: CONCEPTS

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18. The bid price is:

- a. an aftertax price.
- b. the aftertax contribution margin.
- c. the highest price you should charge if you want the project.
- d. the only price you can bid if the project is to be profitable.
- E.** the minimum price you should charge if you want to financially breakeven.

SECTION: 10.6
TOPIC: BID PRICE
TYPE: CONCEPTS

19. Which of the following should be included in the analysis of a project?

- I. sunk costs
 - II. opportunity costs
 - III. erosion costs
 - IV. noncash expenses
- a. I and II only
 - b. III and IV only
 - c. II and III only
 - D.** II, III, and IV only
 - e. I, II, and IV only

SECTION: 10.2
TOPIC: TYPES OF COSTS
TYPE: CONCEPTS

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20. All of the following are related to a proposed project. Which should be included in the cash flow at time zero?

- I. initial inventory increase of \$2,500
 - II. loan of \$125,000 to commence a project
 - III. depreciation tax shield of \$1,100
 - IV. initial purchase of \$6,500 of fixed assets
- a. I and II only
 - B.** I and IV only
 - c. II and IV only
 - d. I, II, and IV only
 - e. I, II, III, and IV

SECTION: 10.4
TOPIC: NET WORKING CAPITAL
TYPE: CONCEPTS

21. Changes in the net working capital:

- A.** can affect the cash flows of a project every year of the project's life.
- b. only affect the initial cash flows of a project.
- c. are included in project analysis only if they represent cash outflows.
- d. are generally excluded from project analysis due to their irrelevance to the total project.
- e. affect the initial and the final cash flows of a project but not the cash flows of the middle years.

SECTION: 10.4
TOPIC: NET WORKING CAPITAL
TYPE: CONCEPTS

22. Which one of the following is a cash inflow? Ignore any tax effects.

- a. a decrease in accounts payable
- b. an increase in inventory
- C.** a decrease in accounts receivable
- d. depreciation expense
- e. an increase in fixed assets

SECTION: 10.4
TOPIC: NET WORKING CAPITAL
TYPE: CONCEPTS

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23. Net working capital:

- a. can be ignored in project analysis because any expenditure is normally recouped by the end of the project.
- b. requirements generally, but not always, create a cash inflow at the beginning of a project.
- c. expenditures commonly occur at the end of a project.
- D.** is frequently affected by the additional sales generated by a new project.
- e. is the only expenditure where at least a partial recovery can be made at the end of a project.

SECTION: 10.4

TOPIC: NET WORKING CAPITAL

TYPE: CONCEPTS

24. The operating cash flows for a cost reduction project:

- a. cannot be computed since there is no incremental sales revenue.
- b. will equal zero because there will be no incremental sales.
- c. can only be analyzed if all the sales and expenses of a firm are considered.
- D.** must consider the depreciation tax shield.
- e. will always be negative values.

SECTION: 10.3

TOPIC: PRO FORMA INCOME STATEMENT

TYPE: CONCEPTS

25. Pro forma statements for a proposed project should:

- I. be compiled on a stand-alone basis.
 - II. include all the incremental cash flows related to a project.
 - III. generally exclude interest expense.
 - IV. include all project-related fixed asset acquisitions and disposals.
- a. I and II only
 - b. II and III only
 - c. I, II, and IV only
 - d. II, III, and IV only
 - E.** I, II, III, and IV

SECTION: 10.3

TOPIC: PRO FORMA STATEMENTS

TYPE: CONCEPTS

Chapter 010 Making Capital Investment Decisions

26. Which one of the following statements is correct?
- a. Project analysis should only include the cash flows which affect the income statement.
 - B.** A project can create a positive operating cash flow without affecting sales.
 - c. For the majority of projects that increase sales, there will be a cash outflow related to net working capital that occurs at the end of the project.
 - d. Interest expense should always be included as a cash outflow when analyzing a project.
 - e. The opportunity cost of a company-owned building that is going to be used in a new project should be included as a cash inflow to the project.

SECTION: 10.3
TOPIC: PROJECT CASH FLOWS
TYPE: CONCEPTS

27. A company which utilizes the MACRS system of depreciation:
- a. will have equal depreciation costs each year of an asset's life.
 - B.** will have a greater tax shield in year two of a project than they would have if the firm had opted for straight-line depreciation.
 - c. can depreciate the cost of land, if they so desire.
 - d. will expense less than the entire cost of an asset over the asset's class life.
 - e. cannot expense any of the cost of a new asset during the first year of the asset's life.

SECTION: 10.4
TOPIC: MACRS
TYPE: CONCEPTS

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28. Wiley Electric just purchased some MACRS 5-year property at a cost of \$118,000. Which one of the following will correctly give you the book value of this equipment at the end of year 3?

MACRS 5-year property

<u>Year</u>	<u>Rate</u>
1	20.00%
2	32.00%
3	19.20%
4	11.52%
5	11.52%
6	5.76%

- a. $\$118,000 / (1 + .20 + .32 + .192)$
- B.** $\$118,000 \times (1 - .20 - .32 - .192)$
- c. $\$118,000 \times (.20 + .32 + .192)$
- d. $\{[\$118,000 \times (1 - .20)] \times (1 - .32)\} \times (1 - .192)$
- e. $\$118,000 / \{[(1.20 / 1.32)] / 1.192\}$

SECTION: 10.4
TOPIC: MACRS
TYPE: CONCEPTS

29. Jenningson Manor just purchased some equipment at a cost of \$58,000. What is the proper methodology for computing the depreciation expense for year 2 if the equipment is classified as 5-year property for MACRS?

MACRS 5-year property

<u>Year</u>	<u>Rate</u>
1	20.00%
2	32.00%
3	19.20%
4	11.52%
5	11.52%
6	5.76%

- a. $\$58,000 \times (1 - .20) \times .32$
- b. $\$58,000 / (1 - .20 - .32)$
- c. $\$58,000 \times 1.32$
- d. $\$58,000 \times (1 - .32)$
- E.** $\$58,000 \times .32$

SECTION: 10.4
TOPIC: MACRS
TYPE: CONCEPTS

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30. The book value of a fixed asset must be used in the computation of which one of the following?

- a. annual tax shield
- B.** tax due on the sale of a fixed asset
- c. operating cash flow
- d. change in net working capital
- e. MACRS depreciation

SECTION: 10.4
TOPIC: BOOK VALUE
TYPE: CONCEPTS

31. The book value of equipment will:

- a. remain constant over the life of the equipment.
- b. vary in response to changes in the market value.
- c. decrease at a constant rate when MACRS depreciation is used.
- d. increase over the taxable life of an asset.
- E.** decrease slower under straight-line depreciation than under MACRS.

SECTION: 10.4
TOPIC: BOOK VALUE
TYPE: CONCEPTS

32. The aftertax salvage value = Sales price:

- a. $+(Sales\ price - Book\ value) \times T$.
- b. $+(Sales\ price - Book\ value) \times (1 - T)$.
- C.** $-(Sales\ price - Book\ value) \times T$.
- d. $-(Sales\ price - Book\ value) \times (1 - T)$.
- e. $\times (1 - T)$.

SECTION: 10.4
TOPIC: SALVAGE VALUE
TYPE: CONCEPTS

Chapter 010 Making Capital Investment Decisions

33. The pre-tax salvage value of an asset is equal to the:
- a. book value if straight-line depreciation is used.
 - b. book value if MACRS depreciation is used.
 - c. market value minus the book value.
 - d. book value minus the market value.
 - E.** market value.

SECTION: 10.4
TOPIC: SALVAGE VALUE
TYPE: CONCEPTS

34. A project's operating cash flow will increase when:
- a. the tax rate increases.
 - b. sales decrease.
 - c. interest expense decreases.
 - D.** depreciation expense increases.
 - e. earnings before interest and taxes decreases.

SECTION: 10.5
TOPIC: PROJECT OCF
TYPE: CONCEPTS

35. The cash flows of a project should:
- a. be computed on a pre-tax basis.
 - b. include all sunk costs and opportunity costs.
 - C.** include the effects of erosion.
 - d. be included in the year when the related expense or income is recognized by GAAP.
 - e. include all financing costs related to the project.

SECTION: 10.2
TOPIC: PROJECT CASH FLOWS
TYPE: CONCEPTS

Chapter 010 Making Capital Investment Decisions

36. Which one of the following is correct method for computing the operating cash flow of a project assuming that the interest expense is equal to zero?

- a. EBIT + D
- b. EBIT - T
- C.** NI + D
- d. $(\text{Sales} - \text{Costs}) \times (1 - D) \times (1 - T)$
- e. $(\text{Sales} - \text{Costs}) \times (1 - T)$

SECTION: 10.5
TOPIC: PROJECT OCF
TYPE: CONCEPTS

37. The cash flows of a project should exclude the incremental changes in which one of the following accounts?

- a. taxes
- b. accounts payable
- c. fixed assets
- D.** long-term debt
- e. depreciation

SECTION: 10.2
TOPIC: PROJECT CASH FLOWS
TYPE: CONCEPTS

38. The bottom-up approach to computing the operating cash flow applies only when:

- a. both the depreciation expense and the interest expense are equal to zero.
- B.** the interest expense is equal to zero.
- c. the project is a cost-cutting project.
- d. no fixed assets are required for a project.
- e. taxes are ignored and the interest expense is equal to zero.

SECTION: 10.5
TOPIC: BOTTOM-UP OCF
TYPE: CONCEPTS

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39. The top-down approach to computing the operating cash flow:

- A. ignores all noncash items.
- b. applies only if a project increases sales.
- c. can only be used if the entire cash flows of a firm are analyzed.
- d. is equal to sales - costs - taxes + depreciation.
- e. includes the interest expense related to a project.

SECTION: 10.5
TOPIC: TOP-DOWN OCF
TYPE: CONCEPTS

40. Increasing which one of the following will increase the operating cash flow?

- a. erosion
- b. taxes
- c. fixed expenses
- d. salaries
- E. depreciation

SECTION: 10.5
TOPIC: TAX SHIELD
TYPE: CONCEPTS

41. Which one of the following creates a tax shield?

- a. dividend payment
- b. increase in accounts payable
- c. decrease in inventory
- D. noncash expense
- e. sunk cost

SECTION: 10.5
TOPIC: TAX SHIELD
TYPE: CONCEPTS

Chapter 010 Making Capital Investment Decisions

42. A project which improves the operating efficiency of a firm but which generates no revenue is referred to as a(n) _____ project.
- a. sunk cost
 - b. opportunity
 - C.** cost-cutting
 - d. erosion
 - e. cashless

SECTION: 10.6
TOPIC: COST-CUTTING
TYPE: CONCEPTS

43. Which of the following statements are correct regarding the analysis of a cost-cutting project that has an initial cash outflow for fixed assets?
- I. The costs shown on the pro forma income statement represent a cash inflow.
 - II. The depreciation expense related to the fixed assets creates a tax shield.
 - III. The project operating cash flow can be computed as (Costs - Taxes).
 - IV. The earnings before interest and taxes are equal to the costs.
- a. I and II only
 - b. III and IV only
 - c. I and III only
 - d. II and IV only
 - E.** I, II, and III only

SECTION: 10.6
TOPIC: COST-CUTTING
TYPE: CONCEPTS

44. Which one of the following statements is correct concerning bid prices?
- a. The competitor who wins the bid is the one who submits the highest bid price.
 - B.** The winning bid may be at a price that is below break-even especially if there is a related aftermarket for the product.
 - c. A bid price is computed based on 110 percent of a firm's normal required return.
 - d. A bid price should be computed based solely on the operating cash flows of the proposed project.
 - e. A bid price should be computed based on a zero percent required rate of return.

SECTION: 10.6
TOPIC: BID PRICE
TYPE: CONCEPTS

Chapter 010 Making Capital Investment Decisions

45. Frederick is comparing machines to determine which one to purchase. The machines sell for differing prices, have differing operating costs, differing machine lives, and will be replaced when worn out. These machines should be compared using:

- a. their internal rates of return.
- b. both net present value and the internal rate of return.
- C.** their effective annual costs.
- d. the depreciation tax shield approach.
- e. the replacement parts approach.

SECTION: 10.6
TOPIC: EQUIVALENT ANNUAL COST
TYPE: CONCEPTS

46. The equivalent annual cost method is useful in determining:

- a. which one of two machines to purchase if the machines are mutually exclusive, have differing lives, and are a one-time purchase.
- b. the tax shield benefits of depreciation given the purchase of new assets for a project.
- c. operating cash flows for cost-cutting projects of unequal duration.
- d. which one of two investments to accept when the investments have different required rates of return.
- E.** which one of two machines to purchase when the machines are mutually exclusive, have different machine lives, and will be replaced once they are worn out.

SECTION: 10.6
TOPIC: EQUIVALENT ANNUAL COST
TYPE: CONCEPTS

Chapter 010 Making Capital Investment Decisions

47. Justin's Manufacturing purchased a lot in Lake City ten years ago at a cost of \$790,000. Today, that lot has a market value of \$1.2 million. At the time of the purchase, the company spent \$100,000 to grade the lot and another \$20,000 to build a small garage on the lot to house additional equipment. The company now wants to build a new facility on the site. The building cost is estimated at \$1.7 million. What amount should be used as the initial cash flow for this project?

- a. -\$2,490,000
- b. -\$2,610,000
- C.** -\$2,900,000
- d. -\$3,020,000
- e. -\$3,690,000

$$CF_0 = -\$1,200,000 + (-\$1,700,000) = -\$2,900,000$$

*AACSB TOPIC: ANALYTIC
SECTION: 10.2
TOPIC: RELEVANT CASH FLOWS
TYPE: PROBLEMS*

48. McLain, Inc. currently produces boat sails and is considering expanding its operations to include awnings for homes and travel trailers. The company owns land beside its current manufacturing facility that could be used for the expansion. The company bought this land eight years ago at a cost of \$500,000. At the time of purchase, the company paid \$70,000 to level out the land so it would be suitable for future use. Today, the land is valued at \$750,000. The company currently has some unused equipment which it currently owns valued at \$40,000. This equipment could be used for producing awnings if \$10,000 is spent for equipment modifications. Other equipment costing \$400,000 will also be required. What is the amount of the initial cash flow for this expansion project?

- a. -\$870,000
- b. -\$1,020,000
- C.** -\$1,200,000
- d. -\$1,620,000
- e. -\$2,020,000

$$CF_0 = -\$750,000 + (-\$40,000) + (-\$10,000) + (-\$400,000) = -\$1,200,000$$

*AACSB TOPIC: ANALYTIC
SECTION: 10.2
TOPIC: RELEVANT CASH FLOWS
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

49. Keller Co. paid \$50,000, in cash, for a piece of equipment four years ago. At the beginning of the year, the company spent \$5,000 to update the equipment with the latest technology. The company no longer uses this equipment in their current operations and has received an offer of \$75,000 from a firm who would like to purchase it. Keller Co. is debating whether to sell the equipment or to expand their operations such that the equipment can be used. When evaluating the expansion option, what value, if any, should Keller Co. assign to this equipment as an initial cost of the project?

- a. \$0
- b. \$5,000
- c. \$50,000
- D. \$75,000**
- e. \$80,000

$$CF_0 = \$75,000$$

AACSB TOPIC: ANALYTIC
SECTION: 10.2
TOPIC: RELEVANT CASH FLOWS
TYPE: PROBLEMS

50. Elite Design, Inc. sells customized handbags. Currently, they sell 30,000 handbags annually at an average price of \$79 each. They are considering adding a lower-priced line of handbags which sell for \$45 each. Elite Design estimates they can sell 12,000 of the lower-priced handbags but will sell 4,000 less of the higher-priced handbags by doing so. What is the amount of the sales that should be used when evaluating the addition of the lower-priced handbags?

- A. \$224,000**
- b. \$540,000
- c. \$856,000
- d. \$1,234,000
- e. \$1,514,000

$$\text{Sales} = (12,000 \times \$45) - (4,000 \times \$79) = \$224,000$$

AACSB TOPIC: ANALYTIC
SECTION: 10.2
TOPIC: RELEVANT CASH FLOWS
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

51. Expansion, Inc. purchased a building for \$485,000 seven years ago. Five years ago, repairs were made to the building which cost \$80,000. The annual taxes on the property are \$30,000. The building has a current market value of \$424,000 and a current book value of \$399,000. The building is totally paid for and solely owned by the firm. If the company decides to assign this building to a new project, what value, if any, should be included in the initial cash flow of the project for this building?

- a. \$0
- B.** \$424,000
- c. \$454,000
- d. \$485,000
- e. \$504,000

Opportunity cost = \$424,000

*AACSB TOPIC: ANALYTIC
SECTION: 10.2
TOPIC: OPPORTUNITY COST
TYPE: PROBLEMS*

52. You own a house that you rent for \$1,600 a month. The maintenance expenses on the house average \$300 a month. The house cost \$110,000 when you purchased it six years ago. A recent appraisal on the house valued it at \$295,000. If you sell the house you will incur \$15,000 in real estate fees. The annual property taxes are \$25,000. You are deciding whether to sell the house or convert it for your own use as a professional office. What value should you place on this house when analyzing the option of using it as a professional office?

- a. \$150,000
- b. \$255,000
- C.** \$280,000
- d. \$293,100
- e. \$310,000

Opportunity cost = \$295,000 - \$15,000 = \$280,000

*AACSB TOPIC: ANALYTIC
SECTION: 10.2
TOPIC: OPPORTUNITY COST
TYPE: PROBLEMS*

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53. Janson's Auto Parts owns a manufacturing facility that is currently sitting idle. The facility is located on a piece of land that originally cost \$134,000. The facility itself cost \$700,000 to build. As of now, the book value of the land and the facility are \$134,000 and \$214,000, respectively. Janson's Auto Parts received a bid of \$640,000 for the land and facility last week. They rejected this bid even though they were told that it is a reasonable offer in today's market. If Janson's Auto Parts were to consider using this land and facility in a new project, what cost, if any, should they include in the project analysis?

- a. \$348,000
- B.** \$640,000
- c. \$700,000
- d. \$774,000
- e. \$834,000

$$CF_0 = \$640,000$$

AACSB TOPIC: ANALYTIC
SECTION: 10.2
TOPIC: OPPORTUNITY COST
TYPE: PROBLEMS

54. Jenna's Home Spa Sales currently sells 2,000 Class A spas, 5,000 Class C spas, and 1,000 deluxe model spas each year. Jenna is considering adding a mid-class spa and expects that if she does she can sell 2,500 of them. However, if the new spa is added, Jenna expects that her Class A sales will decline to 1,700 units while the Class C sales decline to 4,500. The sales of the deluxe model will not be affected. Class A spas sell for an average of \$75,000 each. Class C spas are priced at \$25,000 and the deluxe model sells for \$100,000 each. The new mid-range spa will sell for \$50,000. What is the erosion cost?

- A.** \$35,000,000
- b. \$90,000,000
- c. \$125,000,000
- d. \$205,000,000
- e. \$240,000,000

$$\text{Erosion cost} = [(1,700 - 2,000) \times \$75,000] + [(4,500 - 5,000) \times \$25,000] = \$35,000,000$$

AACSB TOPIC: ANALYTIC
SECTION: 10.2
TOPIC: EROSION COST
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

55. Shelly's Boutique is evaluating a project which will increase annual sales by \$70,000 and annual costs by \$40,000. The project will initially require \$100,000 in fixed assets which will be depreciated straight-line to a zero book value over the 5-year life of the project. The applicable tax rate is 34 percent. What is the operating cash flow for this project?

- a. \$26,400
- B.** \$26,600
- c. \$30,000
- d. \$46,400
- e. \$46,600

$$\text{Tax} = .34 \times [\$70,000 - 40,000 - (\$100,000 / 5)] = \$3,400; \text{OCF} = \$70,000 - \$40,000 - \$3,400 = \$26,600$$

*AACSB TOPIC: ANALYTIC
SECTION: 10.3 AND 10.4
TOPIC: OCF
TYPE: PROBLEMS*

56. The Clothing Co. is looking at a project that will require \$40,000 in net working capital and \$100,000 in fixed assets. The project is expected to produce annual sales of \$90,000 with associated costs of \$60,000. The project has a 10-year life. The company uses straight-line depreciation to a zero book value over the life of the project. The tax rate is 35 percent. What is the operating cash flow for this project?

- a. -\$17,000
- b. \$19,500
- C.** \$23,000
- d. \$33,000
- e. \$90,000

$$\text{Tax} = .35 \times [\$90,000 - 60,000 - (\$100,000 / 10)] = \$7,000; \text{OCF} = \$90,000 - \$60,000 - \$7,000 = \$23,000$$

*AACSB TOPIC: ANALYTIC
SECTION: 10.3 AND 10.4
TOPIC: OCF
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

57. John's Surf Shop has sales of \$620,000 and a profit margin of 8 percent. The annual depreciation expense is \$50,000. What is the amount of the operating cash flow if the company has no long-term debt?

- a. \$45,600
- b. \$49,600
- c. \$53,600
- d. \$95,600
- E.** \$99,600

$$\text{OCF} = (\$620,000 \times .08) + \$50,000 = \$99,600$$

AACSB TOPIC: ANALYTIC
SECTION: 10.5
TOPIC: BOTTOM-UP OCF
TYPE: PROBLEMS

58. Ann's Custom Catering has sales of \$214,000, depreciation of \$9,000, and net working capital of \$16,000. The firm has a tax rate of 34 percent and a profit margin of 7 percent. The firm has no interest expense. What is the amount of the operating cash flow?

- a. \$7,980
- B.** \$23,980
- c. \$30,350
- d. \$39,980
- e. \$53,700

$$\text{OCF} = (\$214,000 \times .07) + \$9,000 = \$23,980$$

AACSB TOPIC: ANALYTIC
SECTION: 10.5
TOPIC: BOTTOM-UP OCF
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

59. Al's Bistro is considering a project which will produce sales of \$23,000 and increase cash expenses by \$13,000. If the project is implemented, taxes will increase from \$25,000 to \$27,500 and depreciation will increase from \$5,000 to \$8,000. What is the amount of the operating cash flow using the top-down approach?

- a. \$4,500
- B.** \$7,500
- c. \$9,950
- d. \$10,000
- e. \$10,500

$$\text{OCF} = \$23,000 - \$13,000 - (\$27,500 - \$25,000) = \$7,500$$

AACSB TOPIC: ANALYTIC
SECTION: 10.5
TOPIC: TOP-DOWN OCF
TYPE: PROBLEMS

60. Ben's Ice Cream Parlor is considering a project which will produce sales of \$8,000 and increase cash expenses by \$3,500. If the project is implemented, taxes will increase by \$1,700. The additional depreciation expense will be \$1,200. An initial cash outlay of \$2,500 is required for net working capital. What is the amount of the operating cash flow using the top-down approach?

- a. \$300
- b. \$1,600
- c. \$2,000
- D.** \$2,800
- e. \$3,300

$$\text{OCF} = \$8,000 - \$3,500 - \$1,700 = \$2,800$$

AACSB TOPIC: ANALYTIC
SECTION: 10.5
TOPIC: TOP-DOWN OCF
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

61. A project will increase the sales of Joe's Workshop by \$50,000 and increase cash expenses by \$36,000. The project will cost \$30,000 and be depreciated using straight-line depreciation to a zero book value over the 3-year life of the project. The company has a marginal tax rate of 35 percent. What is the operating cash flow of the project using the tax shield approach?
- a. \$8,400
 - b. \$9,100
 - C.** \$12,600
 - d. \$15,600
 - e. \$17,500

$$\text{OCF} = [(\$50,000 - \$36,000) \times (1 - .35)] + [(\$30,000 / 3) \times .35] = \$12,600$$

*AACSB TOPIC: ANALYTIC
SECTION: 10.5
TOPIC: TAX SHIELD OCF
TYPE: PROBLEMS*

62. A firm is considering a project that will increase sales by \$135,000 and cash expenses by \$105,000. The project will cost \$120,000 and be depreciated using the straight-line method to a zero book value over the 4-year life of the project. The company has a marginal tax rate of 34 percent. What is the value of the depreciation tax shield?
- a. \$6,000
 - B.** \$10,200
 - c. \$13,200
 - d. \$19,800
 - e. \$20,000

$$\text{Depreciation tax shield} = (\$120,000 / 4) \times .34 = \$10,200$$

*AACSB TOPIC: ANALYTIC
SECTION: 10.5
TOPIC: DEPRECIATION TAX SHIELD
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

63. The Barber Shop just purchased some fixed assets classified as 5-year property for MACRS. The assets cost \$26,000. How much depreciation has accumulated by the end of the third year?

MACRS 5-year property

<u>Year</u>	<u>Rate</u>
1	20.00%
2	32.00%
3	19.20%
4	11.52%
5	11.52%
6	5.76%

- a. \$4,992
- b. \$6,656
- c. \$13,520
- d. \$14,572
- E.** \$18,512

$$\text{Depreciation} = \$26,000 \times (.20 + .32 + .192) = \$18,512$$

*AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: MACRS DEPRECIATION
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

64. You just purchased some equipment that is classified as 5-year property for MACRS. The equipment cost \$79,000. What will the book value of this equipment be at the end of two years should you decide to resell the equipment at that point in time?

MACRS 5-year property

<u>Year</u>	<u>Rate</u>
1	20.00%
2	32.00%
3	19.20%
4	11.52%
5	11.52%
6	5.76%

- a. \$5,056
- b. \$22,752
- C.** \$37,920
- d. \$41,080
- e. \$56,248

Book value at the end of year 2 = $\$79,000 - [\$79,000 \times (.20 + .32)] = \$37,920$

*AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: MACRS DEPRECIATION
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

65. Allied Partners just purchased some fixed assets that are classified as 3-year property for MACRS. The assets cost \$2,400. What is the amount of the depreciation expense in year 4?

MACRS 3-year property

<u>Year</u>	<u>Rate</u>
1	33.33%
2	44.44%
3	14.82%
4	7.41%

a. \$0

B. \$177.84

c. \$355.68

d. \$799.92

e. \$1,066.56

Depreciation for year 4 = $\$2,400 \times .0741 = \177.84

*AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: MACRS DEPRECIATION
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

66. Retailers, Inc. purchased some fixed assets four years ago at a cost of \$21,200. They no longer need these assets so are going to sell them today at a price of \$4,400. The assets are classified as 5-year property for MACRS. What is the current book value of these assets?

MACRS 5-year property

<u>Year</u>	<u>Rate</u>
1	20.00%
2	32.00%
3	19.20%
4	11.52%
5	11.52%
6	5.76%

- a. \$1,221.12
- B.** \$3,663.36
- c. \$4,240.00
- d. \$4,400.00
- e. \$5,300.00

Book value at the end of year 4 = $\$21,200 - [\$21,200 \times (.20 + .32 + .192 + .1152)] = \$3,663.36$

*AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: MACRS DEPRECIATION
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

67. You own some equipment which you purchased three years ago at a cost of \$155,000. The equipment is 5-year property for MACRS. You are considering selling the equipment today for \$41,500. Which one of the following statements is correct if your tax rate is 34 percent?

MACRS 5-year property

<u>Year</u>	<u>Rate</u>
1	20.00%
2	32.00%
3	19.20%
4	11.52%
5	11.52%
6	5.76%

- a. The tax due on the sale is \$2,072.40.
- b. The book value today is \$74,400.
- c. The book value today is \$60,600.
- d. The taxable amount on the sale is \$44,640.
- E.** You will receive a tax refund of \$1,067.60 as a result of this sale.

$$\text{Tax refund} = [\$41,500 - \$155,000 \times (1 - .2 - .32 - .192)] \times .34 = -\$1,067.60$$

AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: SALVAGE VALUE
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

68. The Furniture Makers purchased some fixed assets three years ago for \$52,000. The assets are classified as 5-year property for MACRS. The company is considering selling these assets now so they can buy some newer fixed assets which utilize the latest in technology. The company has been offered \$15,500 for these old assets. What is the net cash flow from the salvage value if the tax rate is 34 percent?

MACRS 5-year property

<u>Year</u>	<u>Rate</u>
1	20.00%
2	32.00%
3	19.20%
4	11.52%
5	11.52%
6	5.76%

- a. \$12,283.60
- b. \$14,976.00
- C.** \$15,321.84
- d. \$15,500.00
- e. \$15,678.16

Book value at the end of year 3 = $\$52,000 \times (1 - .2 - .32 - .192) = \$14,976$

Tax on sale = $(\$15,500 - \$14,976) \times .34 = \$178.16$

After-tax cash flow = $\$15,500 - \$178.16 = \$15,321.84$

*AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: SALVAGE VALUE
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

69. Winslow, Inc. is considering the purchase of a \$116,000 piece of equipment. The equipment is classified as 5-year MACRS property. The company expects to sell the equipment after two years at a price of \$50,000. The tax rate is 35 percent. What is the expected after-tax cash flow from the anticipated sale?

MACRS 5-year property

<u>Year</u>	<u>Rate</u>
1	20.00%
2	32.00%
3	19.20%
4	11.52%
5	11.52%
6	5.76%

- a. \$32,500
- b. \$35,020
- c. \$40,012
- d. \$44,193
- E.** \$51,988

Book value at the end of year 2 = $\$116,000 \times (1 - .2 - .32) = \$55,680$

Tax on sale = $(\$50,000 - \$55,680) - .35 = -\$1,988$ (refund)

After-tax cash flow = $\$50,000 + \$1,988 = \$51,988$

*AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: SALVAGE VALUE
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

70. A project is expected to create operating cash flows of \$35,000 a year for four years. The initial cost of the fixed assets is \$100,000. These assets will be worthless at the end of the project. An additional \$5,000 of net working capital will be required throughout the life of the project. What is the project's net present value if the required rate of return is 11 percent?

- a. \$1,879.25
- b. \$3,585.60
- C. \$6,879.25**
- d. \$8,585.60
- e. \$11,879.25

$$\text{NPV} = -\$105,000 + \frac{\$35,000}{(1+.11)^1} + \frac{\$35,000}{(1+.11)^2} + \frac{\$35,000}{(1+.11)^3} + \frac{\$35,000 + \$5,000}{(1+.11)^4} = \$6,879.25$$

CF ₀	-\$105,000
C0 ₁	\$35,000
F0 ₁	3
C0 ₂	\$40,000
F0 ₂	1
I = 11%	
NPV CPT	
\$6,879.25	

*AACSB TOPIC: ANALYTIC
SECTION: 10.3 AND 10.4
TOPIC: PROJECT NPV
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

71. A project will produce operating cash flows of \$60,000 a year for four years. During the life of the project, inventory will be lowered by \$20,000 and accounts receivable will increase by \$25,000. Accounts payable will decrease by \$10,000. The project requires the purchase of equipment at an initial cost of \$200,000. The equipment will be depreciated straight-line to a zero book value over the life of the project. The equipment will be salvaged at the end of the project creating a \$30,000 after-tax cash flow. At the end of the project, net working capital will return to its normal level. What is the net present value of this project given a required return of 12 percent?

- a. -\$17,759.04
- b. -\$13,693.50
- C.** -\$4,160.73
- d. \$2,194.46
- e. \$10,839.27

$$CF_0 = \$20,000 - \$25,000 - \$10,000 - \$200,000 = -\$215,000$$

$$C0_4 = \$60,000 - \$20,000 + \$25,000 + \$10,000 + \$30,000 = \$105,000$$

$$NPV = -\$215,000 + \frac{\$60,000}{(1+.12)^1} + \frac{\$60,000}{(1+.12)^2} + \frac{\$60,000}{(1+.12)^3} + \frac{\$105,000}{(1+.12)^4} = -\$4,160.73$$

CF ₀	-\$215,000
C0 ₁	\$60,000
F0 ₁	3
C0 ₂	\$105,000
F0 ₂	1
I = 12%	
NPV CPT	
-\$4,160.73	

*AACSB TOPIC: ANALYTIC
SECTION: 10.3, 10.4 AND 10.5
TOPIC: PROJECT NPV
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

72. A project will produce an operating cash flow of \$10,100 a year for five years. The initial cash investment in the project will be \$32,500. The net after-tax salvage value is estimated at \$6,000 and will be received during the last year of the project's life. What is the net present value of the project if the required rate of return is 10 percent?

- a. \$3,613.72
- b. \$5,515.64
- c. \$5,786.95
- D.** \$9,512.47
- e. \$11,786.95

$$\text{NPV} = -\$32,500 + \frac{\$10,100}{(1+.10)^1} + \frac{\$10,100}{(1+.10)^2} + \frac{\$10,100}{(1+.10)^3} + \frac{\$10,100}{(1+.10)^4} + \frac{\$10,100 + \$6,000}{(1+.10)^5} = \$9,512.47$$

CF ₀	-\$32,500
C0 ₁	\$10,100
F0 ₁	4
C0 ₂	\$16,100
F0 ₂	1
I = 10%	
NPV CPT	\$9,512.47

AACSB TOPIC: ANALYTIC
SECTION: 10.3, 10.4 AND 10.5
TOPIC: PROJECT NPV
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

73. Stall Enterprises is considering the installation of a new wireless computer network that will cut annual operating costs by \$15,000. The system will cost \$66,000 to purchase and install. This system is expected to have a 6-year life and will be depreciated to zero using straight-line depreciation. What is the amount of the earnings before interest and taxes for this project?

- a. -\$5,000
- B.** \$4,000
- c. \$5,000
- d. \$6,000
- e. \$11,000

$$\text{Earnings before interest and taxes} = \$15,000 - (\$66,000 / 6) = \$4,000$$

AACSB TOPIC: ANALYTIC
SECTION: 10.6
TOPIC: COST-CUTTING
TYPE: PROBLEMS

74. The Make-Up Artists is considering replacing the equipment it uses to produce lipstick. The equipment would cost \$1.8 million and lower manufacturing costs by an estimated \$260,000 a year. The equipment will be depreciated using straight-line depreciation to a book value of zero. The life of the equipment is 9 years. The required rate of return is 9 percent and the tax rate is 34 percent. What is the net income from this proposed project?

- a. -\$241,236
- b. -\$180,000
- c. \$20,400
- D.** \$39,600
- e. \$60,000

$$\begin{aligned}\text{Annual depreciation} &= \$1,800,000 / 9 = \$200,000 \\ \text{Net income} &= (\$260,000 - \$200,000) \times (1 - .34) = \$39,600\end{aligned}$$

AACSB TOPIC: ANALYTIC
SECTION: 10.6
TOPIC: COST-CUTTING
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

75. Superior Manufacturers is considering a 3-year project with an initial cost of \$846,000. The project will not directly produce any sales but will reduce operating costs by \$295,000 a year. The equipment is depreciated straight-line to a zero book value over the life of the project. At the end of the project the equipment will be sold for an estimated \$30,000. The tax rate is 34 percent. The project will require \$31,000 in extra inventory for spare parts and accessories. Should this project be implemented if Superior Manufacturing requires an 8 percent rate of return? Why or why not?

a. No; The NPV is -\$128,147.16.

B. No; The NPV is -\$87,820.48.

c. No; The NPV is -\$81,429.28.

d. Yes; The NPV is \$33,769.37.

e. Yes; The NPV is \$153,777.33.

$$CF_0 = -\$846,000 + (-\$31,000) = -\$877,000$$

$$\text{Annual depreciation} = \$846,000 / 3 = \$282,000$$

$$\text{Taxes} = (\$295,000 - \$282,000) \times .34 = \$4,420$$

$$\text{OCF} = \$295,000 - \$4,420 = \$290,580$$

$$C_0_3 = 290,580 + [\$30,000 \times (1 - .34)] + \$31,000 = \$341,380$$

$$\text{NPV} = -\$877,000 + \frac{\$290,580}{(1+.08)^1} + \frac{\$290,580}{(1+.08)^2} + \frac{\$341,380}{(1+.08)^3} = -\$87,820.48$$

$$CF_0 \quad -\$877,000$$

$$C_0_1 \quad \$290,580$$

$$F_0_1 \quad 2$$

$$C_0_2 \quad \$341,380$$

$$F_0_2 \quad 1$$

$$I = 8\%$$

$$\text{NPV CPT}$$

$$-\$87,820.48$$

AACSB TOPIC: ANALYTIC

SECTION: 10.3 AND 10.6

TOPIC: COST-CUTTING

TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

76. You are working on a bid to build three amusement parks a year for the next two years. This project requires the purchase of \$52,000 of equipment which will be depreciated using straight-line depreciation to a zero book value over the two years. The equipment can be sold at the end of the project for \$34,000. You will also need \$16,000 in net working capital over the life of the project. The fixed costs will be \$10,000 a year and the variable costs will be \$70,000 per park. Your required rate of return is 10 percent for this project and your tax rate is 35 percent. What is the minimal amount, rounded to the nearest \$500, you should bid per amusement park?

- a. \$20,000
- b. \$66,500
- c. \$68,000
- d. \$74,000
- E. \$79,500**

$$\text{NPV of OCFs} = \$52,000 + \$16,000 - \frac{[\$34,000 \times (1 - .35)] + \$16,000}{(1 + .10)^2} = \$36,512.40$$

$$\$36,512.40 = \text{OCF} \times \left\{ \frac{1 - [1/(1+.10)^2]}{.10} \right\}; \text{OCF} = \$21,038.10$$

$$\text{NI} = \$21,038.10 - \$26,000 = -\$4,961.90; \text{EBT} = -\$4,961.90 / (1 - .35) = -\$7,633.69$$

$$\text{Sales} = -\$7,633.69 + (\$52,000 / 2) + \$10,000 + (\$70,000 \times 3) = \$238,366.31$$

$$\text{Bid per amusement park} = \$238,366 / 3 = \$79,455$$

When rounded to the nearest \$500, the bid price is \$79,500.

*AACSB TOPIC: ANALYTIC
SECTION: 10.6
TOPIC: BID PRICE
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

77. You are working on a bid to build four small apartment buildings a year for the next three years for a local community. This project requires the purchase of \$900,000 of equipment which will be depreciated using straight-line depreciation to a zero book value over the three years. The equipment can be sold at the end of the project for \$400,000. You will also need \$200,000 in net working capital over the life of the project. The fixed costs will be \$475,000 a year and the variable costs will be \$140,000 per building. Your required rate of return is 12 percent for this project and your tax rate is 34 percent. What is the minimal amount, rounded to the nearest \$500, that you should bid per building?

- a. \$292,500
- b. \$316,500
- c. \$330,500
- D. \$341,500**
- e. \$365,000

$$\text{NPV of OCFs} = \$900,000 + \$200,000 - \frac{[\$400,000 \times (1 - .34)] + \$200,000}{(1 + .12)^3} = \$769,733.97$$

$$\$769,733.97 = \text{OCF} \times \left\{ \frac{1 - [1/(1 + .12)^3]}{.12} \right\}; \text{OCF} = \$320,477.95$$

$$\text{NI} = \$320,477.95 - \$300,000 = \$20,477.95; \text{EBT} = \$20,477.95 / (1 - .34) = \$31,027.20$$

$$\text{Sales} = \$31,027.20 + (\$900,000 / 3) + \$475,000 + (\$140,000 \times 4) = \$1,366,027.20$$

$$\text{Bid per building} = \$1,366,027.20 / 4 = \$341,506.80$$

When rounded to the nearest \$500, the bid price is \$341,500.

AACSB TOPIC: ANALYTIC
SECTION: 10.6
TOPIC: BID PRICE
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

78. Office Furniture Makers, Inc. uses machines to produce high quality office chairs for other firms. The initial cost of one customized machine is \$750,000. This machine costs \$12,000 a year to operate. Each machine has a life of 3 years before it is replaced. What is the equivalent annual cost of this machine if the required return is 10 percent? (Round your answer to whole dollars)

- a. -\$259,947
- b. -\$285,942
- c. -\$301,586
- D.** -\$313,586
- e. -\$326,947

$$\text{NPV} = -\$750,000 - \$12,000 \times \left\{ \frac{1 - [1/(1.10)^3]}{.10} \right\} = -\$779,842.22$$

$$-\$779,842.22 = \text{EAC} \times \left\{ \frac{1 - [1/(1+.10)^3]}{.10} \right\}; \text{EAC} = -\$313,586.10 = -\$313,586 \text{ (rounded)}$$

AACSB TOPIC: ANALYTIC
SECTION: 10.6
TOPIC: EQUIVALENT ANNUAL COST
TYPE: PROBLEMS

79. Glassparts, Inc. uses machines to manufacture windshields for automobiles. One machine costs \$142,000 and lasts about 5 years before it needs replaced. The operating cost per machine is \$7,000 a year. What is the equivalent annual cost of one machine if the required rate of return is 11 percent? (Round your answer to whole dollars)

- a. \$30,811
- b. \$33,574
- c. \$35,400
- d. \$37,267
- E.** \$45,421

$$\text{NPV} = -\$142,000 - \$7,000 \times \left\{ \frac{1 - [1/(1+.11)^5]}{.11} \right\} = -\$167,871.28 = -\$167,871.28$$

$$\$167,871.28 = \text{EAC} \times \left\{ \frac{1 - [1/(1+.11)^5]}{.11} \right\}; \text{EAC} = \$45,420.98 = \$45,421 \text{ (rounded)}$$

AACSB TOPIC: ANALYTIC
SECTION: 10.6
TOPIC: EQUIVALENT ANNUAL COST
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

80. Great Enterprises is analyzing two machines to determine which one they should purchase. The company requires a 13 percent rate of return and uses straight-line depreciation to a zero book value. Machine A has a cost of \$285,000, annual operating costs of \$8,500, and a 3-year life. Machine B costs \$210,000, has annual operating costs of \$14,000, and has a 2-year life. Whichever machine is purchased will be replaced at the end of its useful life. Great Enterprises should select machine _____ because it will save the company about _____ a year in costs.

- A.** A; \$10,688
- b. A; \$ 17,716
- c. B; \$5,500
- d. B; \$14,987
- e. B; \$16,204

$$NPV_A = -\$285,000 - \$8,500 \times \left\{ \frac{1 - [1/(1+.13)^3]}{.13} \right\} = -\$305,069.80$$

$$\$305,069.80 = EAC_A \times \left\{ \frac{1 - [1/(1+.13)^3]}{.13} \right\}; EAC = \$129,203.76 = \$129,204 \text{ (rounded)}$$

$$NPV_B = -\$210,000 - \$14,000 \times \left\{ \frac{1 - [1/(1+.13)^2]}{.13} \right\} = -\$233,353.43$$

$$\$233,353.43 = EAC \times \left\{ \frac{1 - [1/(1+.13)^2]}{.13} \right\}; EAC = \$139,891.55 = \$139,892 \text{ (rounded)}$$

Machine A lowers the annual cost of the equipment by about \$10,688, which is \$139,892 less \$129,204.

*AACSB TOPIC: ANALYTIC
SECTION: 10.6
TOPIC: EQUIVALENT ANNUAL COST
TYPE: PROBLEMS*

Chapter 010 Making Capital Investment Decisions

81. Dollar Diamond is considering a project which will require additional inventory of \$134,000 and will also increase accounts payable by \$37,000 as suppliers are willing to finance part of these purchases. Accounts receivable are currently \$100,000 and are expected to increase by 8 percent if this project is accepted. What is the initial project cash flow related to net working capital?

- A. - \$105,000
- b. - \$97,000
- c. - \$89,000
- d. \$8,560
- e. \$94,720

$$\text{Initial cash flow for NWC} = -\$134,000 + \$37,000 - (\$100,000 \times .08) = - \$105,000$$

AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: NET WORKING CAPITAL
TYPE: PROBLEMS

82. Joel's Shop needs to maintain 15 percent of its sales in net working capital. Joel's is considering a 4-year project which will increase sales from their current level of \$130,000 to \$150,000 the first year and to \$165,000 a year for the following three years. What amount should be included in the project analysis for net working capital in year four of the project?

- a. - \$19,500
- b. \$0
- C. \$5,250
- d. \$7,000
- e. \$24,750

$$\text{NWC recovery} = (\$165,000 - \$130,000) \times .15 = \$5,250$$

AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: NET WORKING CAPITAL
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

83. Bright Lighting is expanding its product offerings to reach a wider range of customers. The expansion project includes increasing the floor inventory by \$175,000 and increasing its debt to suppliers by 60 percent of that amount. The company will also spend \$180,000 for a building contractor to expand the size of the showroom. As part of the expansion plan, the company will be offering credit to its customers and thus expects accounts receivable to rise by \$35,000. For the project analysis, what amount should be used as the initial cash flow for net working capital?

- a. -\$35,000
- b. -\$70,000
- C.** -\$105,000
- d. -\$175,000
- e. -\$210,000

$$\text{Initial NWC requirement} = -\$175,000 + (.60 \times \$175,000) - \$35,000 = -\$105,000$$

*AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: NET WORKING CAPITAL
TYPE: PROBLEMS*

Johnson, Inc. is considering a new project. The project will require \$350,000 for new fixed assets, \$140,000 for additional inventory, and \$45,000 for additional accounts receivable. Short-term debt is expected to increase by \$110,000 and long-term debt is expected to increase by \$330,000. The project has a 7-year life. The fixed assets will be depreciated straight-line to a zero book value over the life of the project. At the end of the project, the fixed assets can be sold for 30 percent of their original cost. The net working capital returns to its original level at the end of the project. The project is expected to generate annual sales of \$600,000 and costs of \$400,000. The tax rate is 35 percent and the required rate of return is 12 percent.

Chapter 010 Making Capital Investment Decisions

84. What is the project's cash flow at time zero?

- a. -\$195,000
- b. -\$350,000
- C.** -\$425,000
- d. -\$490,000
- e. -\$535,000

$$\text{Initial cash flow} = -\$350,000 - \$140,000 - \$45,000 + \$110,000 = -\$425,000$$

AACSB TOPIC: ANALYTIC
SECTION: 10.2
TOPIC: RELEVANT COSTS
TYPE: PROBLEMS

85. What is the amount of the earnings before interest and taxes for the first year of this project?

- a. \$97,500
- b. \$130,000
- C.** \$150,000
- d. \$200,000
- e. \$250,000

$$\text{EBIT} = \$600,000 - \$400,000 - (\$350,000 / 7) = \$150,000$$

AACSB TOPIC: ANALYTIC
SECTION: 10.3
TOPIC: EBIT
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

86. What is the amount of the after-tax cash flow from the sale of the fixed assets at the end of this project?

- a. \$0
- b. \$32,500
- c. \$36,750
- D.** \$68,250
- e. \$105,000

$$\text{After-tax salvage value} = .30 \times \$350,000 \times (1 - .35) = \$68,250$$

AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: AFTER-TAX SALVAGE VALUE
TYPE: PROBLEMS

87. What is the cash flow recovery from net working capital at the end of this project?

- a. \$30,000
- B.** \$75,000
- c. \$90,000
- d. \$185,000
- e. \$205,000

$$\text{Net working capital recovery} = \$140,000 + \$45,000 - \$110,000 = \$75,000$$

AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: RECOVERY OF NET WORKING CAPITAL
TYPE: PROBLEMS

Layla's Distribution Co. is considering a project which will require the purchase of \$1.8 million in new equipment. The equipment will be depreciated straight-line to a zero book value over the 5-year life of the project. Layla's expects to sell the equipment at the end of the project for 10 percent of its original cost. Annual sales from this project are estimated at \$1.3 million. Net working capital equal to 30 percent of sales will be required to support the project. All of the net working capital will be recouped at the end of the project. The firm desires a minimal 15 percent rate of return on this project. The tax rate is 34 percent.

Chapter 010 Making Capital Investment Decisions

88. What is the value of the depreciation tax shield in year 3 of the project?

- A. \$122,400
- b. \$237,600
- c. \$367,200
- d. \$612,000
- e. \$712,800

$$\text{Depreciation tax shield} = \$1,800,000 / 5 \times .34 = \$122,400$$

AACSB TOPIC: ANALYTIC
SECTION: 10.5
TOPIC: DEPRECIATION TAX SHIELD
TYPE: PROBLEMS

89. What is the amount of the after-tax salvage value of the equipment?

- a. \$0
- b. \$61,200
- C. \$118,800
- d. \$180,000
- e. \$237,600

$$\text{After-tax salvage value} = \$1,800,000 \times .10 \times (1 - .34) = \$118,800$$

AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: AFTER-TAX SALVAGE VALUE
TYPE: PROBLEMS

Chapter 010 Making Capital Investment Decisions

90. What is the recovery amount attributable to net working capital at the end of the project?

- a. \$130,000
- b. \$260,000
- c. \$360,000
- D. \$390,000**
- e. \$540,000

$$\text{NWC recapture} = .30 \times \$1,300,000 = \$390,000$$

AACSB TOPIC: ANALYTIC
SECTION: 10.4
TOPIC: CHANGE IN NET WORKING CAPITAL
TYPE: PROBLEMS

Essay Questions

91. Explain how a manager can determine which cash flows should be included and which cash flows should be excluded from the analysis of a proposed project. Assume the analysis adheres to the stand-alone principle.

Any changes in cash flows that will result from accepting a new investment should be included in the analysis of that investment.

AACSB TOPIC: REFLECTIVE THINKING
SECTION: 10.1
TOPIC: STAND-ALONE PRINCIPLE

92. What is the formula for the tax-shield approach to OCF? Explain the two key points the formula illustrates.

$$\text{OCF} = (\text{Sales} - \text{Costs}) \times (1 - T) + \text{Depreciation} \times T$$

The formula illustrates that cash income and expenses affect OCF on an aftertax basis. The formula also illustrates that even though depreciation is a non-cash expense it does affect OCF because of the tax savings realized from the depreciation expense.

AACSB TOPIC: REFLECTIVE THINKING
SECTION: 10.5
TOPIC: DEPRECIATION TAX SHIELD

Chapter 010 Making Capital Investment Decisions

93. What is the primary purpose behind computing the equivalent annual cost of two machines? What is the assumption that is being made about each machine?

The primary purpose is to compute the annual cost of each machine on a comparable basis so that the least expensive machine can be identified given that the machines have differing lives. The assumption is that whichever machine is employed, it will be replaced at the end of its useful life.

*AACSB TOPIC: REFLECTIVE THINKING
SECTION: 10.6
TOPIC: EQUIVALENT ANNUAL COST*

94. Assume a firm sets its bid price for a project at the minimum level as computed using the discounted cash flow analysis presented in chapter 10. Given this, what do you know about the net present value, the internal rate of return, and the payback period for this project?

The discounted cash flow approach to setting a bid price assumes the net present value of the project will be zero which means the internal rate of return will equal the required rate. The payback period must be less than the life of the project.

*AACSB TOPIC: REFLECTIVE THINKING
SECTION: 10.6
TOPIC: MINIMUM BID PRICE*

95. Can the initial cash flow at time zero for a project ever be a positive value? If yes, give an example. If no, explain why not.

The initial cash flow can be a positive value. For example, if a project reduced net working capital by an amount which exceeded the initial cost for fixed assets, the initial cash flow would be a positive amount.

*AACSB TOPIC: REFLECTIVE THINKING
SECTION: 10.3
TOPIC: PROJECT INITIAL CASH FLOW*

Chapter 010 Making Capital Investment Decisions

96. Describe the procedure for setting a bid price and explain the manager's objective in setting this bid price. How is it that two different firms often arrive at different values for the bid price?

The bid process involves determining the price for which the NPV of the project is zero (or some alternative minimum NPV level acceptable to the firm). In setting a bid price, a manager typically forecasts all relevant cash outflows and inflows exclusive of revenues. Then, the manager determines the level of OCF that will make the NPV just equal to zero. Finally, the manager works backwards up through the income statement to determine the bid price that results in the desired level of OCF. The ultimate objective here is to determine the price at which the firm just reaches its financial break-even point. Each bidding firm usually arrives at a different calculated bid price because they may use different assumptions in the evaluation process, such as the estimated time to complete the project, costs and quality of the materials used, estimated labor costs, the required rate of return, the tax rate, and so on.

AACSB TOPIC: REFLECTIVE THINKING

SECTION: 10.6

TOPIC: SETTING A BID PRICE