



Questions for Section E: Investment Decisions

(Câu hỏi cho Phần E: Quyết định đầu tư)

1. Capital investment projects include proposals for all of the following **except**
 - a. the acquisition of government mandated pollution control equipment.
 - b. the expansion of existing product offerings.
 - c. additional research and development facilities.
 - d. refinancing existing working capital agreements.
2. Which one of the following items is **least** likely to directly impact an equipment replacement capital expenditure decision?
 - a. The net present value of the equipment that is being replaced.
 - b. The depreciation rate that will be used for tax purposes on the new asset.
 - c. The amount of additional accounts receivable that will be generated from increased production and sales.
 - d. The sales value of the asset that is being replaced.
3. All of the following need to be considered in determining cash inflows from capital investments **except**
 - a. proceeds from financing.
 - b. reduction in working capital.
 - c. cash savings on regular expenses.
 - d. salvage value of old machine.
4. Wilcox Corporation won a settlement in a law suit and was offered four different payment alternatives by the defendant's insurance company. A review of interest rates indicates that 8% is appropriate for analyzing this situation. Ignoring any tax considerations, which one of the following four alternatives should the controller recommend to Wilcox management?
 - a. \$135,000 now.
 - b. \$40,000 per year at the end of each of the next four years.
 - c. \$5,000 now and \$20,000 per year at the end of each of the next ten years.
 - d. \$5,000 now and \$5,000 per year at the end of each of the next nine years, plus a lump-sum payment of \$200,000 at the end of the tenth year.
5. Olson Industries needs to add a small plant to accommodate a special contract to supply building materials over a five-year period. The required initial cash outlays at Time 0 are as follows.



Land	\$ 500,000
New building	2,000,000
Equipment	3,000,000

Olson uses straight-line depreciation for tax purposes and will depreciate the building over 10 years and the equipment over 5 years. Olson's effective tax rate is 40%.

Revenues from the special contract are estimated at \$1.2 million annually, and cash expenses are estimated at \$300,000 annually. At the end of the fifth year, the assumed sales values of the land and building are \$800,000 and \$500,000, respectively. It is further assumed the equipment will be removed at a cost of \$50,000 and sold for \$300,000.

As Olson utilizes the net present value (NPV) method to analyze investments, the net cash flow for period 3 would be

- a. \$60,000.
 - b. \$860,000.
 - c. \$880,000.
 - d. \$940,000.
6. Skyline Industries is analyzing a capital investment project. The new equipment is required by the project and will cost \$350,000 with \$25,000 installation and transportation costs. A five-year MACRS depreciation schedule (20%, 32%, 19.2%, 11.52%, 11.52%, 5.76%) with the half-year convention will be employed. Existing equipment, with a book value of \$200,000 and an estimated market value of \$100,000, will be sold immediately after installation of the new equipment. Annual incremental pre-tax cash inflows are estimated at \$175,000. Skyline's effective income tax rate is 40%. After-tax operating cash flow for the first year of the project would amount to
- a. \$105,000.
 - b. \$133,000.
 - c. \$135,000.
 - d. \$175,000.
7. Colvern Corporation is considering the acquisition of a new computer-aided machine tool to replace an existing, outdated model. Relevant information includes the following.

Projected annual cash savings	\$28,400
Annual depreciation - new machine	16,000
Annual depreciation - old machine	1,600
Income tax rate	40%



Annual after-tax cash flows for the project would amount to

- a. \$5,600.
- b. \$7,440.
- c. \$17,040.
- d. \$22,800.

8. Bell Inc. has a new project available which is expected to generate annual sales of 200,000 units for the next 8 years and then be discontinued. New equipment will be purchased for \$1,600,000 and cost \$200,000 to install. The equipment will be depreciated on a double-declining basis over its useful life. At the end of the eighth year, it will cost \$50,000 to remove the equipment, which can be sold for \$150,000. Additional working capital of \$400,000 will be required immediately and needed for the life of the product. Annual indirect costs will increase by \$300,000. Bell's effective tax rate is 40%.

In a capital budgeting analysis, what is the cash outflow at time 0 (initial investment) that Bell should use to compute the net present value?

- a. \$1,600,000.
- b. \$1,750,000.
- c. \$1,800,000.
- d. \$2,200,000.

9. Skytop Industries is analyzing a capital investment project using discounted cash flow (DCF) analysis. The new equipment will cost \$250,000. Installation and transportation costs aggregating \$25,000 will be capitalized. Existing equipment will be sold immediately after installation of the new equipment. The existing equipment has a tax basis of \$100,000 and an estimated market value of \$80,000. Skytop estimates that the new equipment's capacity will generate additional receivables and inventory of \$30,000, while payables will increase by \$15,000. Annual incremental pre-tax cash inflows are estimated at \$75,000. Skytop's effective income tax rate is 40%. Total after-tax cash outflows occurring in Year 0 would be

- a. \$177,000.
- b. \$182,000.
- c. \$198,000.
- d. \$202,000.

10. Mintz Corporation is considering the acquisition of a new technologically efficient packaging machine at a cost of \$300,000. The equipment requires an immediate, fully recoverable, investment in working capital of \$40,000. Mintz plans to use the machine for five years, is subject to a 40% income tax rate, and uses a 12% hurdle rate when analyzing capital investments. The company employs the net present value method (NPV) to analyze projects.



The overall impact of the working capital investment on Mintz's NPV analysis is

- a. \$(10,392).
- b. \$(13,040).
- c. \$(17,320).
- d. \$(40,000).

11. In estimating "after-tax incremental cash flows," under discounted cash flow analyses for capital project evaluations, which one of the following options reflects the items that should be included in the analyses?

	<u>Sunk Costs</u>	<u>Project related changes in net working capital</u>	<u>Estimated impacts of inflation</u>
a.	No	No	Yes
b.	No	Yes	Yes
c.	No	Yes	No
d.	Yes	No	No

12. AGC Company is considering an equipment upgrade. AGC uses discounted cash flow (DCF) analysis in evaluating capital investments and has an effective tax rate of 40%. Selected data developed by AGC is as follows.

	<u>Existing Equipment</u>	<u>New Equipment</u>
Original cost	\$50,000	\$95,000
Accumulated depreciation	45,000	-
Current market value	3,000	95,000
Accounts receivable	6,000	8,000
Accounts payable	2,100	2,500

Based on this information, what is the initial investment for a DCF analysis of this proposed upgrade?

- a. \$92,400.
- b. \$92,800.
- c. \$95,800.
- d. \$96,200.

13. Calvin Inc. is considering the purchase of a new state-of-art machine to replace its hand-operated machine. Calvin's effective tax rate is 40%, and its cost of capital is 12%. Data regarding the existing and new machines are presented below.



	Existing <u>Machine</u>	New <u>Machine</u>
Original cost	\$50,000	\$90,000
Installation cost	0	4,000
Freight and insurance	0	6,000
Expected end salvage value	0	0
Depreciation method	straight-line	straight-line
Expected useful life	10 years	5 years

The existing machine has been in service for seven years and could be sold currently for \$25,000. If the new machine is purchased Calvin expects to realize a \$30,000 before-tax annual reduction in labor costs.

If the new machine is purchased, what is the net amount of the initial cash outflow at Time 0 for net present value calculation purposes?

- a. \$65,000.
 - b. \$75,000.
 - c. \$79,000.
 - d. \$100,000.
14. Albany Industries is building a temporary manufacturing plant which will be completely removed after 5 years. The required initial cash outlays at Time 0 are as follows.

Land	\$ 500,000
New building	2,000,000
Equipment	3,000,000

Albany uses straight-line depreciation for tax purposes and will depreciate the building over 10 years and the equipment over 5 years. Albany's effective tax rate is 40%.

Revenues from the new plant are estimated at \$1.5 million annually and cash expenses are estimated at \$300,000 annually. At the end of the fifth year, the assumed sales values of the land and building are \$700,000 and \$800,000, respectively. The equipment will be removed at a cost of \$80,000 and sold for \$200,000.

Albany's net cash flow for period 5 would be

- a. \$1,040,000.
- b. \$1,200,000.
- c. \$2,612,000.
- d. \$2,660,000.



15. In discounted cash flow techniques, which one of the following alternatives **best** reflects the items to be incorporated in the initial net cash investment?

	Capitalized expenditures (e.g., shipping costs)	Changes in net working capital	Net proceeds from sale of old asset in a replacement decision	Impact of spontaneous changes in current liabilities
a.	No	Yes	Yes	Yes.
b.	Yes	No	No	No.
c.	No	Yes	No	No.
d.	Yes	Yes	Yes	Yes.

16. Bison Inc. is considering the purchase of a new automatic machine to replace its current old- fashioned machine. Bison's effective tax rate is 40%, and its cost of capital is 8%. Data regarding the existing and new machines are presented below.

	Existing Machine	New Machine
Original cost	\$100,000	\$180,000
Installation costs	0	25,000
Freight and insurance	0	9,000
Expected end salvage value	0	14,000
Depreciation method	straight-line	straight-line
Expected useful life	10 years	5 years

The existing machine has been in service for five years and could be sold currently for \$30,000. Bison expects to save annual pre-tax labor costs of \$50,000 from the new machine.

If the new machine is purchased, the incremental cash flows for the second year would be

- a. \$18,000.
 - b. \$30,000.
 - c. \$38,000.
 - d. \$42,000.
17. Kell Inc. is analyzing an investment for a new product expected to have annual sales of 100,000 units for the next 5 years and then be discontinued. New equipment will be purchased for \$1,200,000 and cost \$300,000 to install. The equipment will be depreciated on a straight-line



basis over 5 years for financial reporting purposes and 3 years for tax purposes. At the end of the fifth year, it will cost \$100,000 to remove the equipment, which can be sold for \$300,000.

Additional working capital of \$400,000 will be required immediately and needed for the life of the product.

The product will sell for \$80, with direct labor and material costs of \$65 per unit. Annual indirect costs will increase by \$500,000. Kell's effective tax rate is 40%.

In a capital budgeting analysis, what is the expected cash flow at time = 3 (3rd year of operation) that Kell should use to compute the net present value?

- a. \$300,000.
- b. \$720,000.
- c. \$760,000.
- d. \$800,000.

18. A capital investment project has the following expected incremental values next year.

Revenue	\$1,000,000
Operating costs	200,000
Depreciation	300,000

If the income tax rate is 25%, the incremental after-tax operating cash flow is

- a. \$125,000.
- b. \$375,000.
- c. \$675,000.
- d. \$900,000.

19. All of the following would increase the present value of the incremental tax savings associated with the depreciation of an asset **except** a decrease in the

- a. useful life of the asset.
- b. marginal income tax rate.
- c. discount rate.
- d. salvage value of the asset.

20. At the conclusion of a capital budgeting project, a piece of equipment is expected to be sold for \$500,000. At the time of sale, the book value of the equipment would be \$400,000. If the income tax rate is 35%, what is the after-tax cash flow from the sale of the machine?

- a. \$325,000.
- b. \$400,000.



- c. \$465,000.
- d. \$535,000.

21. Sarah Birdsong has prepared a net present value (NPV) analysis for a 15-year equipment modernization program. Her initial calculations include a series of depreciation tax savings, which are then discounted. Birdsong is now considering the incorporation of inflation into the NPV analysis. If the depreciation tax savings were based on original equipment cost, which of the following options correctly shows how she should handle the program's cash operating costs and the firm's required rate return, respectively?

Cash Operating Costs

Required Rate of Return

- | | |
|--------------------------------|------------------------------|
| a. Adjust for inflation | Adjust for inflation. |
| b. Adjust for inflation | Do not adjust for inflation. |
| c. Do not adjust for inflation | Adjust for inflation. |
| d. Do not adjust for inflation | Do not adjust for inflation. |
22. Regis Company, which is subject to an effective income tax rate of 30%, is evaluating a proposed capital project. Relevant information for the proposed project is summarized below.

Initial investment	\$500,000
Annual operating cash inflows for the first three years.	
Year 1	185,000
Year 2	175,000
Year 3	152,000

Depreciation will be calculated under the straight-line method using an 8-year estimated service life and a terminal value of \$50,000. In determining the estimated total after-tax cash flow in Year 2 of the project, Regis should consider the after-tax operating cash

- a. inflow only.
 - b. inflow plus annual depreciation expense.
 - c. inflow plus annual depreciation tax shield.
 - d. inflow plus the net impact of the annual depreciation expense and depreciation tax shield.
23. For each of the next six years Atlantic Motors anticipates net income of \$10,000, straight-line tax depreciation of \$20,000, a 40% tax rate, a discount rate of 10%, and cash sales of \$100,000. The depreciable assets are all being acquired at the beginning of Year 1 and will have a salvage value of zero at the end of six years.

The present value of the total depreciation tax savings would be



- a. \$8,000.
- b. \$27, 072.
- c. \$34,840.
- d. \$87,100.

24. Webster Products is performing a capital budgeting analysis on a new product it is considering. Annual sales are expected to be 50,000 units in the first year, 100,000 units in the second year, and 125,000 units the year thereafter. Selling price will be \$80 in the first year and is expected to decrease by 5% per year. Annual costs are forecasted as follows.

Fixed costs	\$300,000 each year
Labor cost per unit	\$20 in year 1, increasing 5% per year,
thereafter	Material cost per unit \$30 in year 1, increasing 10% per year,
thereafter	

The investment of \$2 million will be depreciated on a straight-line basis over 4 years for financial reporting and tax purposes. Webster's effective tax rate is 40%. When calculating net present value (NPV), the net cash flow for year 3 would be

- a. \$558,750.
- b. \$858,750.
- c. \$1,058,750.
- d. \$1,070,000.

25. Skytop Industries is analyzing a capital investment project using discounted cash flow (DCF) analysis. The new equipment will cost \$250,000. Installation and transportation costs aggregating \$25,000 will be capitalized. The appropriate five-year depreciation schedule (20%, 32%, 19%, 14.5%, 14.5%) will be employed with no terminal value factored into the computations. Annual incremental pre-tax cash inflows are estimated at \$75,000. Skytop's effective income tax rate is 40%. Assuming the machine is sold at the end of Year 5 for \$30,000, the after-tax cash flow for Year 5 of the project would amount to

- a. \$63,950.
- b. \$72,950.
- c. \$78,950.
- d. \$86,925.

26. The management of a utility company is considering making a series of investments over the next five years to construct a new energy plant. Rather than commit to the full five-year investment schedule on day one, management wants to retain the flexibility in the timing and amount of each investment in order to take into consideration future business conditions at each stage of construction. Based on this information, which one of the following real options is the **most** appropriate for this situation?



- a. Abandon.
- b. Delay.
- c. Expand.
- d. Scale back.

27. Susan Hines has developed an estimate of the earnings per share for her firm for the next year using the following parameters.

Sales	\$20 million
Cost of goods sold	70% of
sales	
General & administrative expenses	\$300,000
Selling expense	\$100,000 plus 10% of sales
Debt outstanding	\$5 million @ 8% interest rate
Effective tax rate	35%
Common shares outstanding	2 million

She is now interested in the sensitivity of earnings per share to sales forecast changes. A 10% sales increase would increase earnings per share by

- a. 7.0 cents per share.
 - b. 10.4 cents per share.
 - c. 13.0 cents per share.
 - d. 20.0 cents per share.
28. The modeling technique that should be used in a complex situation involving uncertainty is a(n)
- a. expected value analysis.
 - b. program evaluation review technique.
 - c. Monte Carlo simulation.
 - d. Markov process.
29. Janet Jones, an analyst with All Purpose Heater Company, plans to use a Monte Carlo experiment to estimate the simulated daily demand for All Purpose's heaters. The probability distribution for the daily demand for heaters is as follows.

<u>Daily demand for heaters</u>	<u>Probability</u>	<u>Random number intervals</u>
0	.10	00-09
1	.15	10-24
2	.20	25-44



3	.20	45-64
4	.25	
5	.10	

Jones is trying to assign random number intervals for each of the demand levels. She has done so for the first four levels. If a total of 100 two-digit numbers are used in a simulation, what random number intervals should Jones assign to the 4 and 5 heaters demand levels, respectively?

- a. 65-69; 70-88.
 - b. 65-84; 85-99.
 - c. 65-84; 85-99.
 - d. 65-89; 90-99.
30. All of the following are advantages of a simulation model **except** that it
- a. allows what-if type of questions.
 - b. does not interfere with the real-world systems.
 - c. generates optimal solutions to problems.
 - d. allows the study of the interactive effect of variables.
31. The net present value of an investment project represents the
- a. total actual cash inflows minus the total actual cash outflows.
 - b. excess of the discounted cash inflows over the discounted cash outflows.
 - c. total after-tax cash flow including the tax shield from depreciation.
 - d. cumulative accounting profit over the life of the project.
32. Kunkle Products is analyzing whether or not to invest in equipment to manufacture a new product. The equipment will cost \$1 million, is expected to last 10 years, and will be depreciated on a straight-line basis for both financial reporting and tax purposes. Kunkle's effective tax rate is 40%, and its hurdle rate is 14%. Other information concerning the project is as follows.

Sales per year = 10,000
units Selling price = \$100
per unit Variable cost =
\$70 per unit

A 10% reduction in variable costs would result in the net present value increasing by approximately

- a. \$156,000.
- b. \$219,000.



- c. \$365,000.
- d. \$367,000.

33. Allstar Company invests in a project with expected cash inflows of \$9,000 per year for four years. All cash flows occur at year-end. The required return on investment is 9%. If the project generates a net present value (NPV) of \$3,000, what is the amount of the initial investment in the project?

- a. \$11,253.
- b. \$13,236.
- c. \$26,160.
- d. \$29,160.

34. Smithco is considering the acquisition of scanning equipment to mechanize its procurement process. The equipment will require extensive testing and debugging, as well as user training prior to its operational use. Projected after-tax cash flows are shown below.

Time Period Year	After-Tax Cash Inflow/(Outflow)
0	\$(550,000)
1	\$(500,000)
2	\$450,000
3	\$350,000
4	\$350,000
5	\$350,000

Management anticipates the equipment will be sold at the beginning of year 6 for \$50,000 when its book value is zero. Smithco's internal hurdle and effective tax rates are 14% and 40%, respectively.

The project's net present value would be

- a. \$(1,780).
- b. \$(6,970).
- c. \$(17,350).
- d. \$8,600.

35. An investment decision is acceptable if the

- a. net present value is greater than or equal to \$0.
- b. present value of cash inflows is less than the present value of cash outflows.
- c. present value of cash outflows is greater than or equal to \$0.
- d. present value of cash inflows is greater than or equal to \$0.



36. Verla Industries is trying to decide which one of the following two options to pursue. Either option will take effect on January 1st of the next year.

Option One - Acquire a New Finishing Machine.

The cost of the machine is \$1,000,000 and will have a useful life of five years. Net pre-tax cash flows arising from savings in labor costs will amount to \$100,000 per year for five years. Depreciation expense will be calculated using the straight-line method for both financial and tax reporting purposes. As an incentive to purchase, Verla will receive a trade-in allowance of \$50,000 on their current fully depreciated finishing machine.

Option Two - Outsource the Finishing Work.

Verla can outsource the work to LM Inc. at a cost of \$200,000 per year for five years. If they outsource, Verla will scrap their current fully depreciated finishing machine.

Verla's effective income tax rate is 40%. The weighted-average cost of capital is 10%.

The net present value of outsourcing the finishing work is

- a. \$303,280 net cash outflow.
 - b. \$404,920 net cash outflow.
 - c. \$454,920 net cash outflow.
 - d. \$758,200 net cash outflow.
37. Long Inc. is analyzing a \$1 million investment in new equipment to produce a product with a \$5 per unit margin. The equipment will last 5 years, be depreciated on a straight-line basis for tax purposes, and have no value at the end of its life. A study of unit sales produced the following data.

<u>Annual Unit Sales</u>	<u>Probability</u>
80,000	.10
85,000	.20
90,000	.30
95,000	.20
100,000	.10
110,000	.10

If Long utilizes a 12% hurdle rate and is subject to a 40% effective income tax rate, the expected net present value of the project would be

- a. \$261,750.
- b. \$283,380.
- c. \$297,800.



d. \$427,580.

38. Fred Kratz just completed a capital investment analysis for the acquisition of new material handling equipment. The equipment is expected to cost \$1,000,000 and be used for eight years. Kratz reviewed the net present value (NPV) analysis with Bill Dolan, Vice President of Finance. The analysis shows that the tax shield for this investment has a positive NPV of \$200,000, using the firm's hurdle rate of 20%. Dolan noticed that 8-year straight-line depreciation was used for tax purposes but, since this equipment qualifies for 3-year MACRS treatment, the tax shield analysis should be revised. The company has an effective tax rate of 40%. The MACRS rates for 3-year property are as follows.

<u>Year</u>	<u>Rate</u>
1	33.33%
2	44.45%
3	14.81%
4	7.41%

Accordingly, the revised NPV for the tax shield (rounded to the nearest thousand) should be

- a. \$109,000.
b. \$192,000.
c. \$283,000.
d. \$425,000.
39. Dobson Corp. is analyzing a capital investment requiring a cash outflow at Time 0 of \$2.5 million and net cash inflows of \$800,000 per year for 5 years. The net present value (NPV) was calculated to be \$384,000 at a 12% discount rate. Since several managers felt this was a risky project, three separate scenarios were analyzed, as follows.

- Scenario R - The annual cash inflows were reduced by 10%.
- Scenario S - The discount rate was changed to 18%.
- Scenario T - The cash inflow in year 5 was reduced to zero.

Rank the three individual scenarios in the order of the effect on NPV, from least effect to greatest effect.

- a. R, S, T.
b. R, T, S.
c. S, T, R.
d. T, S, R.
40. Foster Manufacturing is analyzing a capital investment project that is forecasted to produce the following cash flows and net income.



<u>Years</u>	<u>After-Tax Cash Flows</u>	<u>Net Income</u>
0	\$(20,000)	\$ 0
1	6,000	2,000
2	6,000	2,000
3	8,000	2,000
4	8,000	2,000

If Foster's cost of capital is 12%, the net present value for this project is

- a. \$(1,600).
- b. \$924.
- c. \$6,074.
- d. \$6,998.

41. Lunar Inc. is considering the purchase of a machine for \$500,000 which will last 5 years. A financial analysis is being developed using the following information.

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
Unit sales	<u>10,000</u>	<u>10,000</u>	<u>20,000</u>	<u>20,000</u>	<u>20,000</u>
Selling price per unit	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100
Variable cost per unit	65	65	65	65	65
Fixed costs	300,000	300,000	300,000	300,000	300,000
Pre-tax cash flow	50,000	50,000	400,000	400,000	400,000

The machine will be depreciated over 5 years on a straight-line basis for tax purposes and Lunar is subject to a 40% effective income tax rate. Assuming Lunar will have significant taxable income from other lines of business, and using a 20% discount rate, the net present value of the project would be

- a. \$(282,470).
 - b. \$(103,070).
 - c. \$(14,010).
 - d. \$16,530.
42. Parker Industries is analyzing a \$200,000 equipment investment to produce a new product for the next 5 years. A study of expected annual after-tax cash flows from the project produced the following data.



<u>Annual After-Tax Cash Flow</u>	<u>Probability</u>
\$45,000	.10
50,000	.20
55,000	.30
60,000	.20
65,000	.10
70,000	.10

If Parker utilizes a 14% hurdle rate, the probability of achieving a positive net present value is

- a. 20%.
- b. 30%.
- c. 40%.
- d. 60%.

43. Staten Corporation is considering two mutually exclusive projects. Both require an initial outlay of \$150,000 and will operate for five years. The cash flows associated with these projects are as follows.

<u>Year</u>	<u>Project X</u>	<u>Project Y</u>
1	\$ 47,000	\$ 0
2	47,000	0
3	47,000	0
4	47,000	0
5	47,000	280,000
Total	<u>\$235,000</u>	<u>\$280,000</u>

Staten's required rate of return is 10 percent. Using the net present value method, which one of the following actions would you recommend to Staten?

- a. Accept Project X, and reject Project Y.
 - b. Accept Project Y, and reject Project X.
 - c. Accept Projects X and Y.
 - d. Reject Projects X and Y.
44. Stennet Company is considering two mutually exclusive projects. The company's cost of capital is 10%. The net present value (NPV) profiles of the two projects are as follows.

<u>Discount Rate</u>	<u>Net Present Value \$(000)</u>	
<u>(percent)</u>	<u>Project A</u>	<u>Project B</u>



0	\$2,220	\$1,240
10	681	507
12	495	411
14	335	327
16	197	252
18	77	186
20	(26)	128
22	(115)	76
24	(193)	30
26	(260)	(11)
28	(318)	(47)

The company president is of the view that Project B should be accepted because it has the higher internal rate of return (IRR). The president requested John Mack, the CFO, to make a recommendation. Which one of the following options should Mack recommend to the president?

- a. Agree with the president.
 - b. Accept Project A because it has an IRR higher than that of Project B.
 - c. Accept both Projects A and B as the IRR for each project is greater than cost of capital.
 - d. Accept Project A because at a 10% discount rate it has an NPV that is greater than that of Project B.
45. Winston Corporation is subject to a 30% effective income tax rate and uses the net present value method to evaluate capital budgeting proposals. Harry Ralston, the capital budget manager, desires to improve the appeal of a marginally attractive proposal. To accomplish his goal, which one of the following actions should be recommended to Ralston?
- a. Postpone a fully-deductible major overhaul from year 4 to year 5.
 - b. Decrease the project's estimated terminal salvage value.
 - c. Immediately pay the proposal's marketing program in its entirety rather than pay in five equal installments.
 - d. Adjust the project's discount rate to reflect movement of the project from a "low risk" category to an "average risk" category.
46. The management of a company will rent office space if the present value of the lease payment is less than ¥1,500,000. The company uses a discount rate of 10% and all payments are due on December 31 of each year. The facilities manager for the company has found the following potential office spaces to rent.

<u>Location</u>	<u>Annual rent</u>	<u>Rental period</u>
Building X	¥ 450,000	4 years
Building Y	¥ 650,000	2 years
Building Z	¥ 615,000	3 years



Based on the management's selection criteria, which lease(s) should the company accept?

- a. Building X only.
- b. Building Y only.
- c. Building X and Building Z only.
- d. Building X and Building Y only.

47. A company is analyzing a capital investment project with a 10-year useful life utilizing the following estimates.

Annual units sold	5,000
Selling price	\$1,000
Variable cost	\$500
Investment	\$10,000,000
Straight-line depreciation	10 years
Income tax rate	25%
Hurdle rate	12%

If estimated sales units sold increase by 10%, the net present value will increase by approximately how much?

- a. \$1,059,000.
- b. \$1,278,000.
- c. \$1,413,000.
- d. \$2,119,000.

48. A company is evaluating a project using net present value and internal rate of return (IRR). Information about the project proposal is shown below.

Initial	investment
	\$250,
000 Annual operating cost savings	
	\$70,0
00 Estimated useful life	6
years	

The project is depreciated using the straight-line method with no salvage value. The company's cost of capital is 10% and the effective income tax rate is 30%. If the effective income tax rate increases to 40%, the company should

- a. reject the project since IRR decreases.
- b. reject the project since the annual after-tax cash flows are reduced.



- c. accept the project since the depreciation deduction after taxes increases.
- d. accept the project since the after-tax discounted cash inflows exceed the cash outflows.

49. An entity is evaluating the following four independent projects as possible investments.

	<u>Internal Rate of Return</u>
Project A	8%
Project B	5%
Project C	6%
Project D	4%

If the entity has a 6% cost of capital and no limitations on investment capital, under the internal rate of return method, which one of the following is the **most** valid conclusion?

- a. The entity should pursue Project A only.
 - b. The entity should pursue Project A and Project C, only.
 - c. The entity should pursue Project B and Project C, only.
 - d. The entity should pursue Project D only.
50. The management of a company is considering how to invest \$15 million. Possible internal investment choices are the following projects with similar risks.

<u>Project</u>	<u>Investment</u>	<u>Internal rate of return</u>
A	\$1,000,000	7%
B	\$10,000,000	12%
C	\$5,000,000	5%
D	\$2,000,000	11%

The company can also invest up to \$15 million into an external project in equivalent risk to the internal projects and earn 10%. How should the management of the company invest this \$15 million in order to maximize value for the company?

- a. \$1 million in Project A, \$5 million in Project C, and \$9 million in an external investment.
 - b. \$10 million in Project B and \$5 million in Project C.
 - c. \$10 million in Project B, \$2 million in Project D, and \$3 million in an external investment.
 - d. \$10 million in Project B and \$5 million in an external investment.
51. Which of the following is **not** a shortcoming of the Internal Rate of Return (IRR) method?
- a. IRR assumes that funds generated from a project will be reinvested at an interest rate equal to



the project's IRR.

- b. IRR does not take into account the difference in the scale of investment alternatives.
- c. IRR is easier to visualize and interpret than net present value (NPV).
- d. Sign changes in the cash flow stream can generate more than one IRR.

52. A company is in the process of evaluating a major product line expansion. Using a 14% discount rate, the firm has calculated the present value of both the project's cash inflows and cash outflows to be \$15.8 million. The company will likely evaluate this project further by
- a. taking a closer look at the expansion's contribution margin.
 - b. comparing the internal rate of return versus the accounting rate of return.
 - c. comparing the internal rate of return versus the company's cost of capital.
 - d. comparing the internal rate of return versus the company's cost of capital and hurdle rate.

53. Hobart Corporation evaluates capital projects using a variety of performance screens; including a hurdle rate of 16%, payback period of 3 years or less, and an accounting rate of return of 20% or more. Management is completing review of a project on the basis of the following projections.

• Capital investment	\$200,000
• Annual cash flows	\$74,000
• Straight-line depreciation	5 years
• Terminal value	\$20,000

The projected internal rate of return is 20%. Which one of the following alternatives reflects the appropriate conclusions for the indicated evaluative measures?

	<u>Internal Rate of Return</u>	<u>Payback</u>
a.	Accept	Reject.
b.	Reject	Reject.
c.	Accept	Accept.
d.	Reject	Accept.

54. Diane Harper, Vice President of Finance for BGN Industries, is reviewing material prepared by her staff prior to the board of directors meeting at which she must recommend one of four mutually exclusive options for a new product line. The summary information below indicates the initial investment required, the present value of cash inflows (excluding the initial investment) at BGN's hurdle rate of 16%, and the internal rate of return (IRR) for each of the four options.

<u>Option</u>	<u>Investment</u>	<u>Present Value of Cash Inflows at 16%</u>	<u>IRR</u>
X	\$3,950,000	\$3,800,000	15.5%



Y	3,000,000	3,750,000	19.0%
Z	2,000,000	2,825,000	17.5%
W	800,000	1,100,000	18.0%

If there are no capital budgeting constraints, which option should Harper recommend?

- a. Option X.
- b. Option Y.
- c. Option Z.
- d. Option W.

55. If the present value of expected cash inflows from a project equals the present value of expected cash outflows, the discount rate is the

- a. payback rate.
- b. internal rate of return.
- c. accounting rate of return.
- d. net present value rate.

56. The net present value profiles of projects A and B are as follows.

<u>Discount Rate</u> <u>(percent)</u>	<u>Net Present Value \$(000)</u>	
	<u>Project A</u>	<u>Project B</u>
0	\$2,220	\$1,240
10	681	507
12	495	411
14	335	327
16	197	252
18	77	186
20	(26)	128
22	(115)	76
24	(193)	30
26	(260)	(11)
28	(318)	(47)

The approximate internal rates of return for Projects A and B, respectively, are

- a. 0% and 0%.
- b. 19.0% and 21.5%.
- c. 19.5% and 25.5%.
- d. 20.5% and 26.5%.



57. Two mutually exclusive capital expenditure projects have the following characteristics.

		<u>Project A</u>	<u>Project B</u>
Investment		\$100,000	\$150,000
Net cash inflow -	Year 1	40,000	80,000
	Year 2	50,000	70,000
	Year 3	60,000	60,000

All cash flows are received at the end of the year. Based on this information, which one of the following statements is **not** correct?

- a. The net present value of Project A at a cost of capital of 10% is \$22,720.
 - b. The net present value of Project B at a cost of capital of 12% is \$19,950.
 - c. The internal rate of return of Project B is greater than the internal rate of return of Project A.
 - d. The payback years for Project A is greater than the payback years for Project B.
58. Jenson Copying Company is planning to buy a copying machine costing \$25,310. The net present values (NPV) of this investment, at various discount rates, are as follows.

<u>Discount Rate</u>	<u>NPV</u>
4%	\$2,440
6%	\$1,420
8%	\$ 460
10%	(\$ 440)

Jenson's approximate internal rate of return on this investment is

- a. 6%.
 - b. 8%.
 - c. 9%.
 - d. 10%.
59. Ben Manufacturing is analyzing a capital investment project that is forecasted to produce the following cash flows and net income.

<u>Year</u>	<u>After Tax Cash-Flows</u>	<u>Net Income</u>
0	\$(20,000)	\$ 0
1	6,000	2,000
2	6,000	2,000
3	8,000	2,000
4	8,000	2,000



The internal rate of return (rounded to the nearest whole percentage) is

- a. 5%.
- b. 12%.
- c. 14%.
- d. 40%.

60.

<u>Year</u>	<u>CashSavings</u>	<u>Year</u>	<u>CashSavings</u>
0	-	5	\$24,000
1	\$35,000	6	20,000
2	32,000	7	15,000
3	28,000	8	10,000
4	26,000		

The payback period is closest to

- a. 4.0 years.
- b. 3.2 years.
- c. 3.4 years.
- d. 3.0 years.

61.

A company requires that capital budgeting proposals meet the acceptability criteria of both the payback method and the net present value (NPV) method. The company uses a cutoff payback period of four years. Which one of the following projects would produce conflicting results when applying the payback method and the NPV method?

<u>Project</u>	<u>Payback</u>	<u>Net Present Value</u>
A	5 years	\$800,000
B	3 years	100,000
C	5 years	(300,000)
D	3 years	50,000

- a. Project A.
- b. Project B.
- c. Project C.
- d. Project D.

62. :A company with a 10% required rate of return is evaluating a \$35,000 capital budgeting proposal. The anticipated



cash inflows from this project are shown below.

Year 1	\$10,000
Year 2	20,000
Year 3	30,000

The discounted payback period for this project is

- a. 2.42 years.
- b. 2.31 years.
- c. 2.28 years.
- d. 2.17 years.

63. The following methods are used to evaluate capital investment projects.

- Internal rate of return
- Average rate of return
- Payback
- Net present value

Which one of the following correctly identifies the methods that utilize discounted cash-flow (DCF) techniques?

	<u>Internal Rate of Return</u>	<u>Average Rate of Return</u>	<u>Payback</u>	<u>Net Present Value</u>
a.	Yes	Yes	No	No.
b.	No	No	Yes	Yes.
c.	Yes	No	Yes	No.
d.	Yes	No	No	Yes.

64. Molar Inc. is evaluating three independent projects for the expansion of different product lines. The Finance Department has performed an extensive analysis of each project and the chief financial officer has indicated that there is no capital budgeting constraints in effect. Which of the following statements are correct?

- I. Reject any project with a payback period which is shorter than the company standard.
- II. The project with the highest internal rate of return (IRR) exceeding the hurdle rate should be selected and the others rejected.
- III. All projects with positive net present values should be selected.
- IV. Molar should reject any projects with negative IRRs.

- a. I, II and IV only.



- b. I, II, III and IV.
- c. II and III only.
- d. III and IV only.

65. Jones & Company is considering the acquisition of scanning equipment to mechanize its procurement process. The equipment will require extensive testing and debugging as well as user training prior to its operational use. Projected after-tax cash flows are as follows.

<u>Time Period</u> <u>Year</u>	<u>After-Tax Cash</u> <u>Inflow/(Outflow)</u>
0	\$(600,000)
1	(500,000)
2	450,000
3	450,000
4	350,000
5	250,000

Management anticipates the equipment will be sold at the beginning of Year 6 for \$50,000 and its book value will be zero. Jones' internal hurdle and effective income tax rates are 14% and 40%, respectively. Based on this information, a negative net present value was computed for the project.

Accordingly, it can be concluded that

- a. the project has an internal rate of return (IRR) less than 14% since IRR is the interest rate at which net present value is equal to zero.
 - b. Jones should examine the determinants of its hurdle rate further before analyzing any other potential projects.
 - c. Jones should calculate the project payback to determine if it is consistent with the net present value calculation.
 - d. the project has an IRR greater than 14% since IRR is the interest rate at which net present value is equal to zero.
66. Foggy Products is evaluating two mutually exclusive projects, one requiring a \$4 million initial outlay and the other a \$6 million outlay. The Finance Department has performed an extensive analysis of each project. The chief financial officer has indicated that there is no capital budgeting constraints in effect. Which of the following statements are correct?
- I. Both projects should be rejected if their payback periods are longer than the company standard.
 - II. The project with the highest Internal Rate of Return (IRR) should be selected (assuming both IRRs exceed the hurdle rate).
 - III. The project with the highest positive net present value should be selected.



IV. Select the project with the smaller initial investment, regardless of which evaluation method is used.

- a. I, II, and IV only.
- b. I, II and III only.
- c. I and III only.
- d. II and III only.

67.

payback period continues to be a popular method to evaluate investments because, in part, it

- a. provides some insight into the risk associated with a project.
- b. ignores the time value of money.
- c. focuses on income rather than cash flow.
- d. furnishes information about an investment's lifetime performance.

68. Which one of the following is **not** a shortcoming of the payback method?

- a. It offers no consideration of cash flows beyond the expiration of the payback period.
- b. It ignores the time value of money.
- c. It offers no indication of a project's liquidity.
- d. It encourages establishing a short payback period.

69.

Quint Company uses the payback method as part of its analysis of capital investments. One of its projects requires a \$140,000 investment and has the following projected before-tax cash flows.

Year 1	\$60,000
Year 2	60,000
Year 3	60,000
Year 4	80,000
Year 5	80,000

Quint has an effective 40% tax rate. Based on these data, the after-tax payback period is

- a. 1.5.
- b. 2.3.
- c. 3.4.
- d. 3.7.

70. A company is analyzing a capital investment project that is forecasted to produce the following cash flows



and net income.

<u>Year</u>	<u>After-Tax Cash flow</u>
0	(\$50,000)
1	15,000
2	18,000
3	25,000
4	36,000

The payback period of this project will be

- a. 2.16 years.
- b. 2.34 years.
- c. 2.68 years.
- d. 3.33 years.

71. Smithco is considering the acquisition of scanning equipment to mechanize its procurement process. The equipment will require extensive testing and debugging, as well as user training prior to its operational use. Projected after-tax cash flows are shown below.

<u>Time Period Year</u>	<u>After-Tax Cash Inflow/(Outflow)</u>
0	\$(550,000)
1	\$(500,000)
2	\$450,000
3	\$350,000
4	\$250,000
5	\$150,000

Management anticipates the equipment will be sold at the beginning of year 6 for \$50,000 when its book value is zero. Smithco's internal hurdle and effective tax rates are 14% and 40%, respectively.

The project's payback period will be

- a. 2.3 years.
- b. 3.0 years.
- c. 3.5 years.
- d. 4.0 years.



Answer for Section E: Investment Decisions

(Đáp án cho phần E: Quyết định đầu tư vốn)

1. Correct answer d. Capital investments generally provide benefits into the future and, therefore, the expenditure is allocated over a period of time (depreciation). Refinancing existing working capital agreements supports current operations and is not generally treated as capital investment project.
2. Correct answer a. The net present value of the equipment being replaced is least likely to impact the investment decision. This is a sunk cost and does not affect future decisions.
3. Correct answer a. The financing aspect of the project is considered in setting the appropriate discount factor. However, the financing cash flows are not included anymore in the determination of the relevant cash flows. An example of a financing cash flow is proceeds from financing.
4. Correct answer c. The controller should recommend option c as the present value of this option is the highest as shown below.

Option c:	$(\$20,000 \times 6.710) + \$5,000$	=	\$139,200
Option a:			\$135,000
Option b:	$\$40,000 \times 3.312$	=	\$132,480
Option d:	$(\$5,000 \times 6.247) + (\$200,000 \times .463) + \$5,000$	=	\$128,835

5. Correct answer b. Olson's net cash flow for period 3 is \$860,000 calculated as follows.

Cash inflow after tax:	$(\$1,200,000 - \$300,000) \times .6$	=	\$540,000
Tax shield Building:	$(\$2,000,000 \div 10) \times .4$	=	80,000
Tax shield Equipment	$(\$3,000,000 \div 5) \times .4$	=	<u>240,000</u>
			<u>\$860,000</u>

6. Correct answer c. The first-year operating cash flow for Skyline's project is \$67,000 as shown below.

Incremental cash inflows	$\$175,000 \times .6$	=	\$105,000
Depreciation tax shield	$(\$375,000 \times .2) \times .4$	=	<u>30,000</u>
		=	<u>\$135,000</u>

7. Correct answer d. Colvern's cash flow is \$22,800 as shown below.

After-tax cash savings:	$\$28,400 \times .6$	=	\$17,040
Depreciation tax shield:	$\$16,000 \times .4$	=	6,400
Loss of depreciation tax shield:	$\$1,600 \times .4$	=	<u>640</u>
			<u>\$22,800</u>



8. Correct answer d. Bell's initial investment is \$2,200,000 as shown below.

Equipment	\$1,600,000
Installation	200,000
Working capital	<u>400,000</u>
Initial investment	<u>\$2,200,000</u>

9. Correct answer d. Year 0 cash outflows for Skytop total \$202,000 as shown below.

Sale of old equipment	\$ 80,000	
New equipment and installation	-275,000	
Additional A/R and inventory	- 30,000	
Additional accounts payable	+ 15,000	
Tax shield/loss on old equipment	<u>+ 8,000</u>	(\$100K - \$80K) x .4
Cash outflow	<u>\$202,000</u>	

10. Correct answer c. The overall impact of Mintz's working capital investment is a net outflow of \$17,040 as shown below.

Working capital outflow at Time 0	\$40,000	
Working capital inflow at Time 5	<u>22,680</u>	(\$40,000 x .567)
Net outflow	<u>\$17,040</u>	

11. Correct answer b. A discounted cash flow analysis should not include sunk costs as they will not change and are not relevant. Changes in working capital and inflation affect future costs and should be included.

12. Correct answer b. AGC's initial investment is \$92,800 as shown below.

Sale of old equipment	\$ 3,000	
New equipment	-95,000	
Increase in accounts receivable	- 2,000	
Increase in accounts payable	+ 400	
Tax shield/Loss on sale	<u>+ 800</u>	(\$50,000 - \$45,000 - \$3,000) x .4
Cash outflow	<u>\$92,800</u>	

13. Correct answer c. Calvin's initial cash outflow is \$79,000 as shown below.

Sale of old equipment	\$ 25,000	
Purchase new equipment	-100,000	
Tax on gain from sale	<u>- 4,000</u>	(\$25,000 - \$15,000*) x .4
Cash outflow	<u>\$ 79,000</u>	



*Accumulated depreciation $(\$50,000 \div 10) \times 7 =$
 $\$35,000$ Book value $\$50,000 - \$35,000 = \$15,000$

14. Correct answer c.

Revenue	\$ 1,500,000
Cash exp.	-300,000
Depreciation	<u>- 800,000</u>
Pretax Income	<u>\$ 400,000</u>
Tax at 40%	-160,000
Add back depreciation	<u>800,000</u>
	<u>1,040,000</u>
Sell land	700,000
Tax on gain /land	-80,000
Sell building	800,000
Tax on loss/building	80,000
Sell equipment	120,000
Tax on on gain /equipment	<u>-48,000</u>
	<u>2,612,000</u>

15. Correct answer d. All of these items should be included in the initial investment as they all impact the cash flow of the project.
16. Correct answer d. Bison's second year incremental cash flow is \$42,000 as shown below.

After-tax cash savings	$\$50,000 \times .6$	=
	$\$30,000$ Tax shield/new equipment	
	$(\$180,000 + 25,000 + 9,000 - 14,000) \div 5 \times .4 =$	
	16,000	
- Loss of old tax shield	$-(\$100,000 \div 10) \times .4$	=
<u>4,000</u> Incremental Cash flow		<u>\$42,000</u>

17. Correct answer d. Kell's 3rd year cash flows are \$800,000 as shown below.

After tax cash inflows	$(\$8,000,000 - \$6,500,000 - \$500,000) \times .6$	\$600,000
Depreciation tax shield	$(\$1,500,000 \div 3) \times .4$	<u>200,000</u>
Cash inflow		<u>\$800,000</u>

18. Correct answer c.
 $1,000,000 - 200,000 - 300,000 = 500,000$ taxable
 $500,000 - 125,000$ (taxes @ .25) = $375,000 + 300,000 = \mathbf{675,000}$ (add back depreciation)
19. Correct answer b.



Option b is correct. A decrease in the marginal tax rate will lead to a decrease in the present value of the tax-deductible amount due to depreciation. Recall that the tax shield amount is calculated as depreciation x tax rate.

20. Correct answer c.

$$500,000 - (500,000 - 400,000) \times .35 = 465,000$$

21. Correct answer a. Both the operating costs and the required rate of return should be adjusted for inflation as inflation will affect both in the future.

22. Correct answer c. Regis would include the operating cash inflows plus the tax shield provided by the depreciation expense. The depreciation expense does not represent a cash transaction and, therefore, is not included.

23. Correct answer c. Atlantic would include the present value of the depreciation tax shield totaling \$34,840 as shown below.

Annual tax shield	$20,000 \times .4$	\$8,000	
Present value @10%	$8,000 \times 4.355$		<u>\$34,840</u>

24. Correct answer c. Webster's net cash flow for Year 3 totals \$1,058,750 as shown below.

Unit price: $\$80 \times .95 = \$76 \times .95 = \$72.20$

Labor cost: $\$20 \times 1.05 = \$21 \times 1.05 = \$22.05$

Material cost: $\$30 \times 1.1 = \$33 \times 1.1 = \$36.30$

Cash inflow: $[125,000 \times (\$72.20 - \$22.05 - \$36.30) - \$300,000] \times .6$ \$ 858,750

Depreciation tax shield: $(\$2,000,000 \div 4) \times .4$ 200,000

Net cash flow for Year 3 \$1,058,750

25. Correct answer c. Skytop's after-tax cash flow for Year 5 is \$78,950 as shown below.

Cash inflow after tax	$\$75,000 \times .6$	\$45,000
Depreciation tax shield	$(\$275,000 \times .145) \times .4$	15,950
Sale of equipment		30,000
Less tax on \$30,000 gain @ 40%		<u>12,000</u>
Net cash flow		<u>\$78,950</u>

26. Correct answer b. A delay would be the most appropriate in this situation as it is the option to wait and learn before investing (some refer to this as an investment-timing option). A delay option allows the staging of investments as a series of outlays (i.e. the construction stages of the new energy plant) creating the option to abandon the project in midstream if new information is unfavorable. Each investment stage (for instance, for the energy plant the stages might be demolition, excavation, construction and fit-out) can be viewed as an option on the value of



subsequent stages and valued as a compound option.

27. Correct answer c. Earnings per share would increase \$.13 per share as shown below.

Sales	\$20,000,000	\$22,000,000	(increase 10%)
Contribution (30%)	6,000,000	6,600,000	
Less administrative	300,000	300,000	
Less commission (10%)	<u>2,000,000</u>	<u>2,200,000</u>	
Operating profit	3,600,000	4,000,000	
Interest expense	<u>400,000</u>	<u>400,000</u>	
Profit before tax	3,200,000	3,600,000	
Tax @35%	<u>1,120,000</u>	<u>1,260,000</u>	
Net income	<u>\$ 2,080,000</u>	<u>\$ 2,340,000</u>	
Earnings per share	<u>\$1.04</u>	<u>\$1.17</u>	(NI ÷ 2,000,000)

28. Correct answer c. Monte Carlo simulation is a quantitative technique that accounts for risk in decision making by generating a range of outcomes and associated probabilities.
29. Correct answer d. Start with the next available #; 25 multiples for demand of 4 and 10 multiples for demand of 5.
30. Correct answer c. The purpose of the simulation is not to generate an optimal solution. Rather it allows the analyst to model the behavior of a system and generates a range of different outcomes.
31. Correct answer b. The net present value method calculates the expected monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time.
32. Correct answer b. The net present value of Kunkle's project will increase approximately \$219,000 as shown below.

$$\begin{aligned}\text{Present value of current cash flow} &= 10,000 \times (\$100 - \$70) \times .6 \\ &= \$180,000 \times 5.216 \\ &= \$938,880 \\ \text{Present value of reduced cash flow} &= 10,000 \times (\$100 - \$63) \times .6 \\ &= \$222,000 \times 5.216 \\ &= \$1,157,952 \\ \text{Increase in net present value} &= \$1,157,952 - \$938,880 \\ &= \$219,072\end{aligned}$$

33. Correct answer c. Allstar's initial investment is \$26,160 as shown below.

$$\text{Present value of cash inflows} \quad \$9,000 \times 3.24 \quad = \quad \$29,160$$



Initial investment $\$29,160 - \$3,000 = \underline{\underline{\$26,160}}$

34. Correct answer a. Smithco's project has a net present value of \$(1,780) as shown below.

Year 0		\$(550,000)
Year 1	$\$(500,000) \times .877$	(438,500)
Year 2	$\$450,000 \times .769$	346,050
Year 3	$\$350,000 \times .675$	236,250
Year 4	$\$350,000 \times .592$	207,200
Year 5	$\$380,000^* \times .519$	<u>197,220</u>
	Net present value	<u>\$ (1,780)</u>

*Includes \$30,000 from sale of old equipment
 $\$50,000 - (\$50,000 \times .4) = \$30,000$

35. Correct answer a. An investment decision is acceptable if the net present value is equal to or greater than zero because the return from the decision is equal to or exceeds the cost of capital.
36. Correct answer c. If Verla outsources the work, the net present value of the cash outflows is \$454,920 $[(\$200,000 \times .6) \times 3.791 = \$454,920]$.
37. Correct answer b. The net present value of Long's project is \$283,380 as shown below.

Expected annual sales: $(80,000 \times .1) + (85,000 \times .2) + (90,000 \times .3) + (95,000 \times .2) +$
 $(100,000 \times .1) + (110,000 \times .1) = 92,000$

Annual after-tax cash flow: $(92,000 \times \$5) \times .6 = \$276,000$

Annual depreciation tax shield: $(\$1,000,000 \div 5) \times .4 =$
\$80,000

Net present value: = $[(\$276,000 + \$80,000) \times 3.605] - \$1,000,000$
 = $\$1,283,380 - \$1,000,000$
 = \$283,380

38. Correct answer c. The revised net present value for the tax shield is \$283,000 as shown below.

Year 1: $[(\$1,000,000 \times .3333) \times .4] \times .833$	\$111,056
Year 2: $[(\$1,000,000 \times .4445) \times .4] \times .694$	123,379
Year 3: $[(\$1,000,000 \times .1481) \times .4] \times .579$	34,300
Year 4: $[(\$1,000,000 \times .0741) \times .4] \times .482$	14,286
Net present value (to nearest thousand)	<u>\$283,000</u>

39. Correct answer a. The ranking of the scenarios from least effect on the net present value to the greatest effect is R, S, and T as shown below.

R: $[(\$800,000 \times .9) \times 3.605] - \$2,500,000$ \$95,000



$$\begin{array}{ll} \text{S: } (\$800,000 \times 3.127) - \$2,500,000 & \$1,600 \\ \text{T: } (\$800,000 \times 3.037) - \$2,500,000 & \$ (70,400) \end{array}$$

40. Correct answer b. The net present value of Foster's project is \$924 as shown below.

$$\begin{array}{l} \text{Discounted cash flow} = (\$6,000 \times .893) + (\$6,000 \times .797) + (\$8,000 \times .712) + (\$8,000 \times .636) \\ \quad = \$20,924 \\ \text{Less investment} \quad \quad \quad \underline{20,000} \\ \quad \quad \quad \underline{\$ \quad 924} \end{array}$$

41. Correct answer d. The net present value of Lunar's project is \$16,600 as shown below.

After-tax cash flow (x .6)	\$30,000	\$30,000	\$240,000	\$240,000	\$240,000
Tax shield (\$500,000 ÷ 5) x .4	<u>40,000</u>	<u>40,000</u>	<u>40,000</u>	<u>40,000</u>	<u>40,000</u>
	\$70,000	\$70,000	\$280,000	\$280,000	\$280,000

$$\begin{array}{l} \text{Net present value} = (\$70,000 \times 1.528) + [\$280,000 \times (2.991 - 1.528)] - \$500,000 \\ \quad = \$106,960 + \$409,640 - \$500,000 \\ \quad = \underline{\$16,600} \approx \underline{\$16,530} \end{array}$$

42. Correct answer c. Using a 14% hurdle rate, Parker's project will not have a positive net present value until the annual cash flows are \$60,000 or higher ($\$60,000 \times 3.433 = \$205,980 - \$200,000 = \$5,980$). As shown, the probability of the cash flows reaching \$60,000 or higher is 40%.
43. Correct answer a. Since the projects are mutually exclusive, Staten should accept Project X (higher net present value) and reject Project Y.

$$\begin{array}{ll} \text{Net present value Project X} & = (\$47,000 \times 3.791) - \$150,000 \\ & = \$28,177 \\ \text{Net present value Project Y} & = (\$280,000 \times .621) - \$150,000 \\ & = \$23,880 \end{array}$$

44. Correct answer d. Since Stennet's cost of capital is 10% and Project A has a higher net present value at a discount rate of 10%, Mack should recommend Project A. Since the projects are mutually exclusive, only one can be accepted.
45. Correct answer a. Delaying the cash outflow for a major overhaul from Year 4 to Year 5 will decrease its present value and result in an increase in the net present value of the project. All of the other options would result in a decrease the net present value.



46. Correct answer d.

<u>Building X</u>			
<u>Year</u>	<u>Annual rent</u>	<u>Discount factor</u>	<u>Present value</u>
1	¥450,000	0.909	409,050
2	450,000	0.826	371,700
3	450,000	0.751	337,950
4	450,000	0.683	307,350
Total PV of annual rent Building X			<u><u>1,426,050</u></u>

<u>Building Y</u>			
<u>Year</u>	<u>Annual rent</u>	<u>Discount factor</u>	<u>Present value</u>
1	650,000	0.909	590,850
2	650,000	0.826	536,900
Total PV of annual rent Building Y			<u><u>1,127,750</u></u>

<u>Building Z</u>			
<u>Year</u>	<u>Annual rent</u>	<u>Discount factor</u>	<u>Present value</u>
1	615,000	0.909	559,035
2	615,000	0.826	507,990
3	615,000	0.751	461,865
Total PV of annual rent Building Z			<u><u>1,528,890</u></u>

47. Correct answer a.

The sensitivity of NPV to a 10% increase in sales volume is computed as follows

Incremental Units	500
Selling Price	1,000
Variable Cost	500
Margin / unit	500
Additional. Margin	250,000
Margin after tax	187,500
PV Factor	5.6502
Increase in NPV	<u>1,059,413</u>



48. Correct answer d.
At 30%, after tax cash inflow $70,000 \times 70\% = 49,000$
Depreciation deduction $250,000/6 = 41,667 \times 30\% = 12,500$ Total after tax cash inflow 61,500
 $61,500 \times 4.355^* = 267,832.50$ discounted cash inflows
(250,000) cash
outflow NPV = 17,832.50 project is acceptable
At 40% tax rate, after tax cash inflow $70,000 \times 60\% = 42,000$
Depreciation deduction $250,000/6 = 41,667 \times 40\% = 16,667$ Total after tax cash inflow 58,667
 $58,667 \times 4.355^* = 255,494$
(250,000) cash
outflow NPV = 5494 project is acceptable
*PV annuity table, 10% 6 years
49. Correct answer b. The internal rate of return method generally indicates that a project whose internal rate of return is greater than or equal to the firm's cost of capital should be accepted, whereas a project whose internal rate of return is less than the firm's cost of capital should be rejected. Accordingly, as the entity has not limit on its investment capital and it's cost of capital is 6% both Project A with an internal rate of return of 8% and Project C with an internal rate of return of 6% should be accepted.
50. Correct answer c. The internal rate of return method evaluates investments by comparing the internal rate of return to the criterion rate of return from the best alternative investment. For this company the best alternative investment is a 10% external investment. The company should accept all projects over the 10% threshold, Project B for \$10 million and Project D for \$2 million, and invest the cash balance of \$3 million, which equals \$15 million less \$10 million for Project B and less \$2 million for Project D, in the external investment as no other internal project can earn higher than 10%.
51. Correct answer c. The internal rate of return method is easier to understand (interpret) than the net present value method. All of the other options are disadvantages of the internal rate of return method.
52. Correct answer d. Since the company has already evaluated the cash flows (net present value) of the project using a hurdle rate of 14%, the next logical step would be to compare the internal rate of return to the hurdle and the cost of capital.
53. Correct answer c. Hobart would accept the project under both the internal rate of return of 20% which exceeds the hurdle rate of 15% and the payback period of 2.7 years ($\$200,000 \div \$74,000$) which is less than the company's 3-year benchmark.



54. Correct answer c. BGN Industries should select Option Z as it has the highest net present value (\$2,825,000 - \$2,000,000) and the internal rate of return is greater than the hurdle rate.
55. Correct answer b. The internal rate of return is the discount rate that equates the present value of future net cash flows from an investment project with project's initial cash outflow.
56. Correct answer c. The approximate internal rates of return are 19.5% and 25.5% as shown.

Project A: $77 + 26 = 103$; $77 \div 103 = .75\%$; $.75\% \times 2 = 1.5\%$; $18\% + 1.5\% = 19.5\%$

Project B: $30 + 11 = 41$; $30 \div 41 = .73\%$; $.73\% \times 2 = 1.5\%$; $24\% + 1.5\% = 25.5\%$

57. Correct answer c. Options a, b, and d are correct as shown below.

NPV Project A: $\$100,000 - (\$40,000 \times .909) + (\$50,000 \times .826) + (\$60,000 \times .751) =$

$\$22,720$ NPV Project B: $\$150,000 - (\$80,000 \times .893) + (\$70,000 \times .797) + (\$40,000 \times .712) =$

$\$19,950$ Payback Project A: $\$100,000 - \$40,000 - \$50,000 = \$10,000 \div \$65,000 = .167$

$.167 \text{ years} + 2 \text{ years} \approx 2.2$

years Payback Project B: $\$150,000 - \$80,000 -$

$\$70,000 = 0$

Payback = 2 years

58. Correct answer c. The approximate internal rate of return is 9%. A net present value of zero is approximately half way between \$460 and (\$440) and 9% is half way between 8% and 10%.
59. Correct answer c. An internal rate of return equates Ben's cash flows to the initial investment as shown below.

$(\$6,000 \times .877) + (\$6,000 \times .769) + (\$8,000 \times .675) + (\$8,000 \times .592) = \$20,012$

Initial cash outflow of \$20,000 $\approx$ \$20,012

60. Correct answer b.

Cash savings

**Cumulative
Savings**

**Initial Investment
Recovered at end of year**



Year 0	-	-	\$100,000
Year 1	\$35,000	\$ 35,000	65,000
Year 2	32,000	67,000	33,000
Year 3	28,000	95,000	5,000
Year 4	26,000	121,000	-
Year 5	24,000	145,000	-
Year 6	20,000	165,000	-
Year 7	15,000	180,000	-
Year 8	10,000	190,000	-

Straight- line interpolation after 3 years reveals that the final \$ 5,000 needed to recover the \$ 100,000 (5 numbers @ \$20,000) investment will be achieved halfway through year 4. Payback period = 3 years + \$5,000.
\$26,000.
 = 3.192 Rounded to 3.2 years.

61. Correct answer a.
 Accept projects with payback less than 4, reject if greater than 4. Accept projects with NPV greater than 0 and reject if less than 0.
 A is reject/accept, B is accept/accept, C is reject/reject, D is accept/accept, so A.
62. Correct answer a.
 $10,000 \times .9091 = \$9,091$; $20,000 \times .8264 = \$16,528$; $30,000 \times .7513 = \$22,539$; $35,000 - 9,091$
 $(\text{one year}) - 16,528 (\text{two years}) = 9,381$; $9,381/22,539 = .42$
63. Correct answer d. Both the internal rate of return method and the net present value method utilize discounted flow techniques taking into consideration the time value of money. Payback and average rate of return do not consider the time value of money.
64. Correct answer d. Statements III and IV are correct. Since the company has no capital budgeting constraints, all projects with positive net present values will enhance the value of Molar. Projects with negative internal rates of return will cost more than they will return to the company and should be rejected.
65. Correct answer a. Since the net present value of the project is negative using a discount rate of 14%, it can be concluded that the internal rate of return is something less than 14%.
66. Correct answer c. Since the projects are mutually exclusive, Foggy Products can select only one, and the one selected should have the highest net present value. If both projects



exceed the company's benchmark for payback period, they should both be rejected.

67. Correct answer a. The payback period does provide some insight into the risk of a project – the longer the payback period, the riskier the project. The other options are either incorrect or disadvantages of the payback method.
68. Correct answer c. Because the payback method calculates the time to return the project's initial investment, it does evaluate the project's liquidity. The other options are all drawbacks of the payback method.
69. Correct answer d. Quant's payback period is 3.7 years as shown below.

	<u>After-tax cash flow</u>	<u>Investment less cash flow</u>
Year 1	$\$60,000 \times .6 = \$36,000$	\$104,000
Year 2	$\$60,000 \times .6 = \$36,000$	68,000
Year 3	$\$60,000 \times .6 = \$36,000$	32,000
Year 4	$\$80,000 \times .6 = \$48,000$	$\$32,000 \div \$48,000 = .667$
	Payback period = 3.7 years	

70. Correct answer c. The payback period is 2.68 years.
 $\$50,000 - \$15,000 - \$18,000 = \$17,000$
 $\$17,000 / 25,000 = 0.68$
71. Correct answer d. Smithco's payback period is 4.0 years ($\$550,000 + \$500,000 - \$450,000 - \$350,000 - \$250,000 = 0$).