

**Multiple Choice Questions**

1. The capital budgeting decision depends in part on the
  - a) Availability of funds.
  - b) Relationships among proposed projects.
  - c) Risk associated with a particular project.
  - d) All of these.
  
2. Which of the following is *not* a typical cash flow related to equipment purchase and replacement decisions?
  - a) Increased operating costs
  - b) Overhaul of equipment
  - c) Salvage value of equipment when project is complete
  - d) Depreciation expense
  
3. An asset costs \$210,000 with a \$30,000 salvage value at the end of its ten-year life. If annual cash inflows are \$30,000, the cash payback period is
  - a) 8 years.
  - b) 7 years.
  - c) 6 years.
  - d) 5 years.
  
4. B Company is considering the purchase of a piece of equipment that costs \$23,000. Projected net annual cash flows over the project's life are:

<u>Year</u>	<u>Net Annual Cash Flow</u>
1	\$3,000
2	8,000
3	15,000
4	9,000

The cash payback period is:

- a) 2.63 years.
  - b) 2.80 years.
  - c) 2.37 years.
  - d) 2.20 years.
  
5. If a company's required rate of return is 10% and, in using the net present value method, a project's net present value is zero, this indicates that the
  - a) Project's rate of return exceeds 10%.
  - b) Project's rate of return is less than the minimum rate required.
  - c) Project earns a rate of return of 10%.
  - d) Project earns a rate of return of 0%.
  
6. When a capital budgeting project generates a positive net present value, this

means that the project earns a return higher than the

- a) Internal rate of return.
- b) Annual rate of return.
- c) Required rate of return.
- d) Present value index

7. S Company recently invested in a project with a 3-year life span. The initial investment was \$15,060 and annual cash inflows were \$7,000 for year 1; \$8,000 for year 2; and \$9,000 for year 3. The company expects a 15% required rate of return, information related to that is presented below. What is the net present value for the project?

<u>Year</u>	<u>Present Value</u>	<u>Present Value of an Annuity</u>
1	.870	.870
2	.756	1.626
3	.658	2.283

- a) \$15,264.
  - b) \$3,000.
  - c) \$9,744.
  - d) \$12,000.
8. The formula to calculate the internal rate of return factor is
- a) Capital investment/ annual rate of return
  - b) Capital investment/ average investment.
  - c) Capital investment/ net annual cash flows.
  - d) Capital investment/ net annual income.
9. The present value index is computed by dividing the
- a) Total cash flows by the initial investment.
  - b) Present value of cash flows by the initial investment.
  - c) Initial investment by the total cash flows.
  - d) Initial investment by the present value of cash flows.
10. J Company has an 8% required rate of return. It's considering a project that would provide annual cost savings of \$20,000 for 5 years. The most that Johnson would be willing to spend on this project is

<u>Year</u>	<u>Present Value</u>	<u>Present Value</u>
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		<u>of an Annuity</u>
	1	.926
	2	.857
	3	.794
	4	.736
	5	.681
a)	\$50,364.	.926
b)	\$66,240.	1.783
c)	\$79,860.	2.577
d)	\$13,620.	3.312
		3.993

**Practice Problems****Practice Problem #1:**

L Company is considering two new machines that should produce considerable cost savings in its assembly operations. The cost of each machine is \$14,000 and neither is expected to have a salvage value at the end of a 4-year useful life. L Company's required rate of return is 12% and the company prefers that a project return its initial outlay within the first half of the project's life. The annual after-tax cash savings for each machine are provided in the following table:

<u>Year</u>	<u>Machine A</u>	<u>Machine B</u>
1	\$5,000	\$8,000
2	5,000	6,000
3	5,000	4,000
4	<u>5,000</u>	<u>2,000</u>
Total	\$20,000	\$20,000

- Required:
- a) Compute the payback period for each machine
  - b) Compute the net present value for each machine.
  - c) Which machine should be purchased?

**Practice Problem #2:**

B Company is considering purchasing equipment that costs \$235,000. The equipment has an estimated useful life of 5 years and no salvage value. B Company believes that the annual cash inflows from using the equipment will be \$65,000.

- Required:
- a) Calculate the net present value of the equipment assuming that B Company's cost of capital is 12%. Is the equipment an acceptable investment?
  - b) Calculate the net present value of the equipment assuming that B Company's cost of capital is 10%. Is the equipment an acceptable investment?

**Practice Problem #3**

C Company is investigating four different opportunities. Information on the four projects under study is as follows:

	Project 1	Project 2	Project 3	Project 4
Investment required	\$480,000	\$360,000	\$270,000	\$450,000
Present value of cash inflows	567,270	433,400	336,140	522,970
Net present value	\$87,270	\$73,400	\$66,140	\$72,970
Life of project	6 years	12 years	6 years	3 years

The company's required rate of return is 10%; therefore a 10% discount rate has been used in the present value computations above. Limited funds are available for investment, so the company cannot accept all of the available projects.

- Required:
- a) Compute the profitability index for each investment project.
  - b) Rank the four projects according to preference, in terms of:
    - Net present value
    - Present value index

**Practice Problem #4**

S Company is considering the purchase of a new piece of equipment for laying sod. Relevant information concerning the equipment follows:

Cost of the equipment	\$180,000
Annual cost savings from new equipment	\$37,500
Life of the new equipment	12 years
Expected Annual Net Income	\$15,000

- Required:
- a) Compute the payback period for the equipment. If the company requires a payback period of four years or less, would the equipment be purchased?
  - b) Compute the annual rate of return on the equipment. Would the equipment be purchased if the company's required rate of return is 14%?

**Practice Problem #5**

P Company is considering a 5-year project. It plans to invest \$62,000 now and it forecasts cash flows for each year of \$16,200. The company requires a minimum rate of 12%.

- Required: Calculate the internal rate of return to determine whether it should accept this project.

### Solutions

- |     |   |
|-----|---|
| 1.  | D |
| 2.  | D |
| 3.  | B |
| 4.  | B |
| 5.  | C |
| 6.  | C |
| 7.  | B |
| 8.  | C |
| 9.  | B |
| 10. | D |

#### Practice Problem #1

- a) Machine A:  $\$14,000/\$5,000 = 2.8$  years  
 Machine B:  $\$8,000 + \$6,000 = \$14,000$ .
- b) Net present value:

Year	<u>Machine A</u>			<u>Machine B</u>		
	<u>Cash flow</u>	<u>PV factor</u>	<u>PV</u>	<u>Cash flow</u>	<u>PV factor</u>	<u>PV</u>
0	(\$14,000)	1.0000	(\$14,000)	(\$14,000)	1.0000	(\$14,000)
1	\$5,000	.8929	\$4,465	\$8,000	.8929	\$7,143
2	5,000	.7972	3,986	6,000	.7972	4,783
3	5,000	.7118	3,559	4,000	.7118	2,847
4	5,000	.6355	3,177	2,000	.6355	1,271
			\$1,187			\$2,044

- c) Machine B is preferred. It has a higher net present value and a shorter payback period.

**Practice Problem #2**

a)	Present value	\$65,000	3.6048	\$234,310
	less: Investment			<u>(235,000)</u>
	NPV			(\$690)

Because net present value is negative, the equipment is not an acceptable investment at a required rate of return of 12%.

b)	Present value	\$65,000	3.7901	\$246,401
	less: Investment			<u>(235,000)</u>
	NPV			\$11,401

Because net present value is positive, the equipment is an acceptable investment at a required rate of return of 10%.

**Practice Problem #3**

a)		<u>Net Present Value</u>	<u>Net Investment</u>	<u>Profitability index</u>
	Project 1	\$87,270	\$480,000	.18
	Project 2	\$73,400	\$360,000	.20
	Project 3	\$66,140	\$270,000	.24
	Project 4	\$72,970	\$450,000	.16

b)		<u>Net Present Value</u>	<u>Profitability index</u>
	1 <sup>st</sup> Preference	Project 1	Project 3
	2 <sup>nd</sup> Preference	Project 2	Project 2
	3 <sup>rd</sup> Preference	Project 3	Project 1
	4 <sup>th</sup> Preference	Project 4	Project 4

Profitability index method is preferred because it properly considers the amount of investment. For example, the present value index method ranks project #3 first as it is has the highest cash inflow generated for each dollar of investment fourth yet the NPV method ranks this project last because of it low net present value.

**Practice Problem #4**

a)

$$\frac{\text{Net investment required}}{\text{Annual cash flow}} = \frac{\$180,000}{\$37,500} = 4.8 \text{ years}$$

The equipment would not be purchased, since the 4.8 year payback period exceeds the company's maximum 4 year payback period.

b)

Annual net income	\$15,000
Divided by Average investment (180,000+0)/2	<u>90,000</u>
Annual Rate of Return	16.6%

The equipment would be purchased since its 16.6% rate of return is greater than the company's 14% required rate of return.

**Practice Problem #5**

Investment	\$62,000
Annual cash flows	\$16,200
IRR Factor	3.827

In the present value of an annuity of \$1 table 5 period column, the factor of 3.827 is between the factors for 9% and 10%. Therefore the project should be rejected as the minimum rate of return is not met.