**Chapter 16 Capital Budgeting Review Problems**

|  |  |  |
| --- | --- | --- |
| **1**. Net present value is the present value of the cash flows subtracted from the initial  investment. | | |
| **A)** | True |
| **B)** | False |
| **2.** Projects with an NPV of zero decrease shareholders' wealth by the cost of the project. | | |
| **A)** | True |
| **B)** | False |
| **3.** Which of the following statements is correct for a project with a positive NPV? | | |
| **A)** | IRR exceeds the cost of capital. |
| **B)** | Accepting the project has an indeterminate effect on  shareholders. |
| **C)** | The discount rate exceeds the cost of capital. |
| **D)** | The profitability index equals one. |
| **4**. What is the NPV of a project that costs $100,000 and returns $45,000 annually for six  years if the opportunity cost of capital is 6%? | | |
| **A)** | $3,397.57 |
| **B)** | $121,279.40 |
| **C)** | $16,100.00 |
| **D)** | $35,000.00 |
| **5.** The decision rule for net present value is to: | | |
| **A)** | accept all projects with cash inflows exceeding initial cost. |
| **B)** | reject all projects with rates of return exceeding the opportunity cost of capital. |
| **C)** | accept all projects with positive net present values. |
| **D)** | reject all projects lasting longer than 10 years. |
| **6.** Which of the following changes will *increase* the NPV of a project? | | |
| **A)** | A decrease in the discount rate |
| **B)** | A decrease in the size of the cash inflows |
| **C)** | An increase in the initial cost of the project |
| **D)** | A decrease in the number of cash inflows |
| **7.** What is the maximum that should be invested in a project at time zero if the inflows are  estimated at $40,000 annually for three years, and the cost of capital is 10%? | | |
| **A)** | $ 99,472.00 |
| **B)** | $109,200.00 |
| **C)** | $103,080.00 |
| **D)** | $130,800.00 |
| **8**. What is the approximate IRR for a project that costs $100,000 and provides cash inflows of  $20,336.36 for 6 years? | | |
| **A)** | 19.9% |
| **B)** | 6.0% |
| **C)** | 32.3% |
| **D)** | 80.0% |
| **9**. If the IRR for a project is 15%, then the project's NPV would be: | | |
| **A)** | negative at a discount rate of 10%. |
| **B)** | positive at a discount rate of 20%. |
| **C)** | negative at a discount rate of 20%. |
| **D)** | positive at a discount rate of 15%. |
| **10**. Evaluate the following project using an IRR criterion, based on an opportunity cost of 10%:  CF0 = -6,000, CF1 = +3,319, CF2 = +3,319. | | |
| **A)** | Accept, since IRR exceeds opportunity cost. |
| **B)** | Reject, since opportunity cost exceeds IRR. |
| **C)** | Accept, since opportunity cost exceeds IRR. |
| **D)** | Reject, since IRR exceeds opportunity cost. |
| **11**. When managers cannot determine whether to invest now or wait until costs decrease later,  the rule should be to: | | |
| **A)** | postpone until costs reach their lowest. |
| **B)** | invest now to maximize the NPV. |
| **C)** | postpone until the opportunity cost reaches its lowest. |
| **D)** | invest at the date that gives the highest NPV today. |
| **12**. If a project has a cost of $50,000 and a profitability index of 0.4, then: | | |
| **A)** | its cash inflows are $70,000. |
| **B)** | the present value of its cash inflows is $30,000. |
| **C)** | its IRR is 20%. |
| **D)** | its NPV is $(30,000). |
| **13**. Which of the following investment criteria does not take the time value of money into  consideration? | | |
| **A)** | Book rate of return |
| **B)** | Net present value |
| **C)** | Profitability index |
| **D)** | Internal rate of return for borrowing projects |
| **14**. If two projects offer the same, positive NPV, then: | | |
| **A)** | they also have the same IRR. |
| **B)** | they have the same payback period. |
| **C)** | they are mutually exclusive projects. |
| **D)** | they add the same amount to the value of the firm. |
| **15**. Which of the following statements is incorrect regarding internal rate of  return of a project?   1. Instead of asking whether a project has a positive NPV, many businesses   prefer to ask whether it offers a higher return than shareholders could expect to get  by investing in the capital market.   1. Return is usually defined as the discount rate that would result in a zero NPV.   This is knownas the internal rate of return, or IRR. The project is attractive if  the IRR exceeds the opportunity cost of capital.   1. There are some pitfalls in using the internal rate of return rule. Be careful about   using the IRR when there is more than one change in the sign of the cash flows or  you need to choose between two mutually exclusive projects.   1. none of the above is incorrect | | |
| **16.** Which of the following statements is **incorrect** regarding the payback period rule?   1. The payback rule may lead to excessive investment in short term projects. 2. It is always takes into account the scale on investment under consideration. 3. The payback rule states that a project is acceptable if you get your   money back within a specified period.   1. The payback rule takes no account of any cash flows that arrive after the payback   period and fails to discount cash flows within the payback period. | | |
|  | | |

**17**. A profitability index of .85 for a project means that:

1. the present value of benefits is 85% greater than the project's costs.
2. the project's NPV is greater than zero.
3. the project returns 85 cents in present value for each current dollar invested.
4. the payback period is less than one year.

**18.** BackInTime, Inc., has estimated that a proposed project's 10-year annual net cash benefit, received each year end, will be $2,500 with an additional terminal benefit of $5,000 at the end of the tenth year. Assuming that these cash inflows satisfy exactly BackInTime’s required rate of return of 8 percent, calculate the initial cash outlay.

1. $16,775.25
2. $19,091.25
3. $25,000.00
4. $30,000.00

**19.** WeatherTech Solutions Company is considering a project that calls for an initial cash outlay of $50,000. The expected net cash inflows from the project are $7,791 for each of 10 years. What is the IRR of the project?

1. 6 percent
2. 7 percent
3. 8 percent

d. 9 percent

**20**. Which of the following statements is correct?

1. If the NPV of a project is greater than 0, its PI will equal 0.
2. If the IRR of a project is 0%, its NPV, using a discount rate, k, greater than 0, will be 0.
3. If the PI of a project is less than 1, its NPV should be less than 0.
4. If the IRR of a project is greater than the discount rate, k, its PI will be less than 1 and

     its NPV will be greater than 0.

**21**. Assume that a firm has accurately calculated the net cash flows relating to an investment proposal. If the net present value of this proposal is greater than zero and the firm is not under the constraint of capital rationing, then the firm should:

1. calculate the IRR of this investment to be certain that the IRR is greater than the cost of capital.
2. compare the profitability index of the investment to those of other possible investments.
3. calculate the payback period to make certain that the initial cash outlay can be recovered within an appropriate period of time.
4. accept the proposal, since the acceptance of value-creating investments should increase shareholder wealth.

**22.** A project's Profitability Index is equal to the ratio of the          of a project's future cash flows to the project's         .

1. present value; initial cash outlay
2. net present value; initial cash outlay
3. present value; depreciable basis
4. net present value; depreciable basis

**23.** The preferred technique for evaluating most capital investments is

a. payback period

b. discount payback period

c. internal rate of return

d. net present value

**24.** Sanyo Technonics is considering the purchase of testing equipment that will cost $500,000 to replace old equipment. Assume the new machine will generate after-tax savings of $250,000 per year over the next four years.

What’s the payback period for the investment?

1. 1.8 years
2. 2.0 years
3. 2.5 years
4. 2.8 years

**25.** Sanyo Technonics is considering the purchase of testing equipment that will cost $500,000 to replace old equipment. Assume the new machine will generate after-tax savings of $250,000 per year over the next four years.

If Sanyo Technonics has a 15% cost of capital, what’s the NPV of the investment?

a. $213,750

b. $185,865

c. $713,750

d. $500,000

**26**. Sanyo Technonics is considering the purchase of testing equipment that will cost $580,000 to replace old equipment. Assume the new machine will generate after-tax savings of $250,000 per year over the next **three** years.

If Sanyo Technonics has a 15% cost of capital, what’s the IRR of the investment?

a. 23.4%

b. 15.0%

c. 14%

d. 43.1%

**27**. Sanyo Technonics is considering the purchase of testing equipment that will cost $500,000 to replace old equipment. Assume the new machine will generate after-tax savings of $250,000 per year over the next four years.

If Sanyo Technonics has a 15% cost of capital, what’s the profitability index of the investment?

a. 1.4275

b. 0.4

c. 2.0

d. 1.0

**28**. The cash flows associated with an investment project are as follows:

Cash Flows Initial Outflow -$70,000

Year 1 $20,000

Year 2 $30,000

Year 3 $30,000

What’s the payback period of the project? If a firm’s cutoff payback period is 3 years, should it accept the project?

1. 2.7 years; reject the project
2. 2.7 years; accept the project
3. 3.6 years; reject the project
4. 3.6 years; accept the project

**29**. A piece of equipment costs $1.2m. The equipment has a useful life of 4 years. In each of the four years, the investment generates a cash inflow of $0.5m.

Assume the equipment is depreciated on a straight-line basis over 4 years, what is the average contribution to **net income** across all four years?

1. $0.2m
2. $0.5m
3. $0.3m
4. $0.8m

**30**. Suppose a particular investment project will generate an immediate cash inflow of $1,000,000 followed by cash outflows of $381,054 in each of the next three years. What is the project’s IRR? Suppose a company’s hurdle rate is 10%, should it accept the project?

a. 23%; reject the project

b. 23%; accept the project

c. 7%; reject the project

d. 7%; accept the project

**31**. Suppose a particular investment project will require an initial cash outlay of $1,000,000 and will generate a cash inflow of $147,022 in each of the next nine years. What is the project’s IRR? Suppose a company’s hurdle rate is 5%, should it accept the project?

a. 6%; reject the project

b. 6%; accept the project

c. 10%; reject the project

1. 10%; accept the project

**32**. Halliburton, Inc. is evaluating a new Boring tool. The equipment costs $1,000,000 and will generate after-tax cash inflows of $400,000 per year for six years. Assume the firm has a 15% cost of capital. What’s the NPV of the investment?

a. $513,800

b. $450,000

c. $1,513,800

d. $1,400,000

**33**. Should a firm invest in projects with NPV = $0?

1. Yes
2. No
3. It is complicated because it depends on the discount factor chosen
4. The firm should look at the PI and IRR of the projects

**34**. A firm has 10 million shares outstanding with a current market price of $20 per share. There is one investment project available to the firm. The initial investment of the project is $20 million, and the NPV of the project is $10 million. What will be the firm’s stock price if capital markets fully reflect the value of undertaking the project?

a. $19

b. $20

c. $21

d. $22

**35**. Diffusion Pharmaceuticals has 200 million shares outstanding with a current market price of $30 per share. Its stock rose to $32 on the news that Diffusion Pharmaceuticals’ long waited new drug Trans Sodium Crocetinate (TSC) is to hit the market next month. What’s the market’s consensus of the NPV that the new drug will generate for Diffusion Pharmaceuticals?

a.$400 million

b.-$6,400 million

c. $6,000 million

d. None of the above

**36**  Merck Industries has 100 million shares of common stock outstanding with a current market price of $50. The firm is contemplating to take an investment project which requires an initial cash outflow of $100 million. The IRR of the project is equal to the firm’s weighted average cost of capital. What will be the firm’s stock price if capital markets fully reflect the value of undertaking the project?

a. $50

b. $49

c. $51

d. Cannot tell from the given information

**37**. The IRR method assumes that the reinvestment rate of cash flows is

1. the cost of capital
2. the IRR
3. essentially arbitrary
4. zero

**38**. The profitability index is most useful

1. when the NPV method and the IRR method give conflicting signals on mutually exclusive projects
2. in capital rationing situations
3. when the cash flow pattern is unusual
4. when project scales are of concern

**39**. The main virtue of the payback method is its:

a.simplicity.

b. complexity.

c. completeness.

d. thoroughness.

**40.**  The payback method:

1. fails to explicitly consider the time value of money.
2. is the amount of time it takes for a project to recoup its profits.
3. is the best method for evaluating complex projects.
4. is never used by businesses today.

**41**. When the IRR is equal to the discount rate, the NPV is:

1. positive.
2. equal to zero.
3. negative.
4. cannot be determined without knowing the discount rate.

**42**. The hurdle rate used in IRR analysis should be:

a. the risk-free rate.

b. the current corporate bond rate.

c. the prime rate.

d. the discount rate used in NPV analysis.

**43**. Two mutually exclusive investment proposals have "scale differences" (i.e., the cost of the projects differ). Ranking these projects on the basis of IRR, NPV, and PI methods          give contradictory results.

* 1. will never
  2. will always
  3. may

d. will generally

**44**. If capital is to be rationed *for only the current period,* a firm should probably first consider selecting projects by descending order of         .

1. net present value
2. payback period
3. internal rate of return
4. profitability index

**45**. The          method provides correct rankings of mutually exclusive projects, when the firm is not subject to capital rationing.

1. net present value
2. internal rate of return
3. payback period
4. profitability index

**46**. The estimated benefits from a project are expressed as cash flows instead of income flows because:

1. it is simpler to calculate cash flows than income flows.
2. it is cash, not accounting income, that is central to the firm's capital budgeting decision.
3. this is required by the Internal Revenue Service.
4. this is required by the Securities and Exchange Commission.

**Answers**

1.False PVCF – IO

2. False, unaffected

3. A.

4.B PVCF – IO=NPV

Annuity (PV Annuity Factor, 6%, 6years) – Initial Outlay =

45,000(4.91732) – 100,000 = 121,279.40

5. C

6. A

7. A. PVof Annuity = Annuity (PV Annuity Factor,10%, 3 years )= 40,000(2.4868) = $99,472

8. A. 6% 100,000= 20,336.36 (PVAF 6 years ); 4.9173 = PVAF , 6%,6 years

9. C. negative at a discount rate of 20%. When the IRR (15%) < Discount rate(20%), you have a negative NPV. If the Discount Rate > IRR, you have a negative NPV. Another way of saying this is..when the project return (IRR) is less than the discount rate (let’s assume WACC) then it is losing money…negative NPV

10. B Reject 6,000= 3,319 (PV AF, ?%, 2 periods); 1.8078 = factor at 2 period line IRR is 7%, which is less than opportunity cost

11. D

12. D. PI = PVCF /IO ;

PVCF/50,000= 4

PVCF = 20,000;

NPV = PVCF – IO = 20,000 -50,000 = (30,000)

13. A

14. D

15. D

16 .B

17. C

18. B. PV of Cashflows – Initial Outlay =0

PV of Cashflows = Initial Outlay

($2,500)(PVAnnuity at 8% for 10 periods) +

($5,000)(PVof $1 at 8% for 10 periods) =

($2,500)(6.7101) + ($5,000)(.4632) =

$19,091.25

19. 0=PVCF – IO

$7,791(PVAnnuity at i% for 10 periods) - $50,000 = $50,000/$7,791 = 6.4177

From the PV Annuitytable in Table 4, 6.4177 is the PV Annuity factor is at the 9% column

20. C. If the PI of a project is less than 1, its NPV should be less than 0.

21. D. accept the proposal, since the acceptance of value-creating investments should increase shareholder wealth.

22 A. present value; initial cash outlay

23. D. NPV

24. B 500,000/250,000 = 2

25. A. NPV = PVCF- IO = 250,000(2.8550) – 500,000 = 713,750 – 500,000 =213,750

26. C. 250,000(PVAF , 3 periods) – 580,000 = 0; factor = 2.320 at 3 period line interest rate = 14%

27. A PI = PVCF/IO = 713,750 /500,000 = 1.4275

28. B. 2.7 years accept

29. A. 12M/4=>3; NI = .5 - .3 = .2M This problem is an example of reverse engineering. Usually we have net income and add depreciation to arrive at an estimation of cash flow.

30. C Because this is a reverse scenario—the project has an immediate benefit and then cash outflows

1,000,000 – 381,054 (factor) = 0; factor = 2.6243; 7%, 3 periods

**IRR = 7% < Hurdle Rate 10%, Reject**

31.B Annuity (PV Annuity , ?%, 9 years) = 0

147,022 x Factor = 1,000,000

factor= 6.8017===at nine year row >> **6%, IRR greater than hurdle rate of 5%, accept**

32. A NPV= PV of Cashflows – Initial Outlay

NPV = Annuity (PV of Annuity, 15%, 6 years) – IO

= 400,000 (3.7845) – 1,000,000 = 513,800

33. C. It is complicated. When the NPV = 0, the discount factor = IRR of the project. If the discount rate is the desired of return on invested capital, the project should be accepted; it has met your hurdle rate. However, if the discount rate is the WACC, then you are treading water and the project adds no value but is breaking even. If you have no other projects with positive NPV to allocate investment funds to, choosing this one has the intangible benefit of, at least, keeping your employees working without losing ground.

34. C will increase by NPV of Project/ Number of Common Shares outstanding=

$10M/10M shares=$1 per share

Current Share Price + increase = 20 + 1 = 21

35. A The stock price increased by $2 per share. NPV = $2/share \* 200m shares = $400m

36. A $ 50. The NPV of the project is zero since the project’s IRR equals the cost of capital. So there is no change in stock price because there is no increase in value of company.

37. B

38. B

39. A

40. A. It is the time for the cash inflows of the project to recoup the cash outflows, usually expressed in years.

41 B NPV=O when IRR = Discount Rate

42. D

43. C may

44. D. profitability index bcause the PI reflects the measure of investment efficiency. It is used to rank projects because it allows you to calculate the amount of value created per dollar of investment. If the corporation **has limited funds for investment**, The PI Index allows the company to invest in those projects which create value most value **per dollar invested**. The pool of investment dollars acts as a constrained resource

45. A.. net present value

46. B. it is cash, not accounting income, that is central to the firm's capital budgeting decision**. Cash is King!!!**