

CHAPTER 10

DISCUSSION QUESTIONS

1. Present values are less when discount rates are high as compared to when they are low. This is because the interest owed or the discount reported is proportionate to the interest rate. That is, a company cannot borrow as much money on high-interest-paying loans as on low-interest-paying loans and yet could be required to pay the same periodic amount to satisfy the terms of the loan.
2. An annuity is a series of cash flows of equal amounts at equal time intervals. These cash flows can either be paid or received.
3. The stated amount of a liability equals its present value when the market rate of interest is equal to the stated rate of interest associated with the liability. For example, if a bank issues a two-year, \$1,000, 8% note to a company when the market rate of interest is 8%, then the present value computations will result in a present value of \$1,000—the same as the face amount of the note.
4. A note payable is an obligation to pay a specified sum of money on or before some future date, whereas a mortgage payable is a liability that is usually paid in periodic (monthly) installments. Also, a mortgage payable is usually secured by the asset that was purchased with the borrowed money.
5. For each mortgage payment, a portion is interest, and the remainder is applied to reduce the principal. To compute that amount attributable to principal, the outstanding loan balance is multiplied by the monthly interest rate. The result is the interest portion of the payment. Subtracting this amount from the total payment gives the amount applied to reduce the principal.
6. Companies usually sell bonds through underwriters to individuals, other companies, pension funds, insurance companies, universities, or other institutions that perceive bonds to be an attractive investment. Because bonds are usually sold in small denominations, almost anyone can buy them.
7. Two important factors in determining the issuance price of a bond are (1) the market rate of interest and (2) the length of time until the maturity of the bonds. The market rate of interest determines the effective cost of borrowing per period. The period until the maturity of the bonds determines the length of time over which the face value and the interest payments are discounted in arriving at the bond issuance price.
8. Bonds can mature or be eliminated as follows:
 - a. Term bonds mature in one single sum on a specified future date.
 - b. Serial bonds mature in a series of installments.
 - c. Callable bonds are term or serial bonds that the issuer can redeem or call at any time at a specified price.
 - d. Convertible bonds are term or serial bonds that can be converted to other securities, such as stocks, after a specified time at the option of the bondholder.
9. If a bond's stated interest rate is below the market interest rate, it will usually sell at a discount. The lower issuance price would increase the bond's yield rate to the market rate of interest.
10. If you thought the market rate of interest was going to drop in the near future, it would probably be wise to invest in bonds because, as the market rate of interest drops, bonds usually increase in price. Everyone wants a higher-paying interest investment.
11. Bonds will sell at or near face value in at least two instances: (1) when the stated rate of interest on the bonds is equal to the market rate of interest, and investment in the firm is no more or less risky than it is in other bond issuers; and (2) when the bond nears maturity, because on the maturity date the face value of the bond will be paid to bondholders.
12. The retirement of bonds before maturity may result in a gain or a loss because the price paid to retire the bonds is greater (loss) or less (gain) than the carrying amount of the bonds on that date. The price paid to retire the bonds may be different from the carrying amount of the bonds because the effective rate of interest for current investments and the stated rate of interest on the bonds may

- be in a different relationship to each other than when the bonds were issued.
13. The debt ratio is calculated by dividing total liabilities by total assets. It measures the percentage of total assets in an organization that were financed by debt or by borrowing money.
14. From the standpoint of a lender, a high times interest earned ratio is more attractive than a low times interest earned ratio. The magnitude of the times interest earned ratio indicates how much cushion a company has in making its interest payments; the higher the ratio, the less likely the company will be unable to make its interest payments.

PRACTICE EXERCISES

PE 10–1 (LO1) Present Value of a Single Amount

| | |
|---|-------------------------|
| Amount of payment..... | \$ 50,000 |
| Present value factor of \$1 to be paid in 5 periods at 8% interest (from Table I, Appendix D)..... | <u>× 0.6806</u> |
| Present value of payment | <u><u>\$ 34,030</u></u> |

PE 10–2 (LO1) Future Value of a Single Amount

| | |
|---|------------------------------------|
| Present value in savings account..... | \$ 75,000 |
| Future value factor of \$1 to be paid in 10 periods at 10% interest (Table III, Appendix D)..... | <u>× 2.5937</u> |
| Future value | <u><u>\$ 194,528</u></u> (rounded) |

PE 10–3 (LO1) Interest Rate per Compounding Period

$$\text{Interest rate per compounding period} = \frac{\text{Yearly interest rate}}{\text{Compounding periods per year}} = \frac{16\%}{4} = 4\%$$

PE 10–4 (LO1) Number of Interest Periods

$$\text{Number of interest periods} = \text{Compounding periods per year} = \text{Number of years} = 12 \times 7 = 84 \text{ periods}$$

PE 10–5 (LO1) Future Value of Single Amount Compounded Monthly

| | |
|--|----------------------------------|
| Present value in savings account..... | \$ 16,000 |
| Future value factor of \$1 to be paid in 60 periods at 1% interest (Table III, Appendix D)..... | <u>× 1.8167</u> |
| Future value | <u><u>\$29,067</u></u> (rounded) |

PE 10–6 (LO1) Computing the Present Value of an Annuity

| | |
|---|-----------------------------------|
| Amount of semiannual payment | \$ 1,600 |
| Present value factor of an annuity of \$1 discounted for 16 payments at 5% (Table II, Appendix D)..... | <u>× 10.8378</u> |
| Present value of payments | <u><u>\$ 17,340</u></u> (rounded) |

PE 10–7 (LO1) Computing Periodic Payment Amount

| | Payment |
|---|------------------|
| Amount of monthly payment..... | |
| Present value factor of an annuity of \$1 discounted for 60 payments at 1% (Table II, Appendix D)..... | $\times 44.9550$ |
| Present value of payments | <u>\$ 80,000</u> |

In equation format, this can be written as follows:

$$\begin{aligned} \$80,000 &= \text{Payment} \times 44.9550 \\ \text{Payment} &= \$80,000 / 44.9550 \\ \text{Payment} &= \$1,779.56 \text{ (rounded)} \end{aligned}$$

PE 10–8 (LO2) Interest-Bearing Notes

| | |
|--|--------|
| 1. Cash..... | 30,000 |
| Notes Payable..... | |
| <i>Borrowed \$30,000 at 8% interest for seven years.</i> | 30,000 |
| 2. Interest Expense..... | 2,400 |
| Cash | |
| <i>Made first annual interest payment on note (\$30,000 × 0.08).</i> | 2,400 |

PE 10–9 (LO2) Mortgages Payable Issuance and First Payment

| | |
|---|-----------|
| 1. Building | 1,000,000 |
| Mortgage Payable | |
| <i>Borrowed \$1,000,000 to purchase building.</i> | 1,000,000 |
| 2. Mortgage Payable (\$8,776 – \$8,333.33)..... | 442.67 |
| Interest Expense [(\$1,000,000 × 0.10)/12] | 8,333.33 |
| Cash | |
| <i>Made first month's mortgage payment.</i> | 8,776 |

Chapter 10
PE 10–10 (LO2) Mortgages Payable Second Payment

| | |
|--|----------|
| Feb. 28 Mortgage Payable (\$8,776 – \$8,329.64)..... | 446.36 |
| Interest Expense | |
| $\{[(\$1,000,000 - \$442.67) \times 0.10]/12\}.....$ | 8,329.64 |
| Cash | 8,776.00 |
| <i>Made second month's mortgage payment.</i> | |

PE 10–11 (LO3) Types of Bonds

The correct answer is B. Serial bonds mature in a series of installments, whereas term bonds mature in one single sum on a specified future date.

PE 10–12 (LO3) Bonds Issued at Face Value

| | |
|--|-------------------|
| Quarterly interest payments | \$ 2,000 |
| Present value of an annuity of 60 payments of \$1 at 2% (Table II, Appendix D)..... | <u>× 34.7609</u> |
| Present value of interest payments | \$ 69,522 |
| Maturity value of bonds | \$ 100,000 |
| Present value of \$1 received 60 periods in the future discounted at 2% (Table I, Appendix D) | <u>× 0.3048</u> |
| Present value of principal amount..... | 30,480 |
| Issuance price of bonds (total present value)..... | <u>\$100,002*</u> |

*Difference is due to the rounding of the present value factor.

PE 10–13 (LO3) Bonds Issued at a Discount

| | |
|---|-----------------|
| Semiannual interest payments | \$ 1,000 |
| Present value of an annuity of 10 payments of \$1 at 6% (Table II, Appendix D) | <u>× 7.3601</u> |
| Present value of interest payments | \$ 7,360 |
| Maturity value of bonds | \$ 25,000 |
| Present value of \$1 received 10 periods in the future discounted at 6% (Table I, Appendix D)... | <u>× 0.5584</u> |
| Present value of principal amount..... | 13,960 |
| Issuance price of bonds (total present value)..... | <u>\$21,320</u> |

PE 10–14 (LO3) Bonds Issued at a Premium

| | |
|---|-------------------------|
| Semiannual interest payments..... | \$ 4,000 |
| Present value of an annuity of 14 payments of \$1 at 3% (Table II, Appendix D) | <u>× 11.2961</u> |
| Present value of interest payments | \$ 45,184 |
| Maturity value of bonds | \$ 100,000 |
| Present value of \$1 received 14 periods in the future discounted at 3% (Table I, Appendix D)... | <u>× 0.6611</u> |
| Present value of principal amount..... | <u>66,110</u> |
| Issuance price of bonds (total present value)..... | <u><u>\$111,294</u></u> |

PE 10–15 (LO3) Accounting for Bonds Payable Issued at Face Value

| | |
|--|---------|
| 1. Cash..... | 800,000 |
| Bonds Payable | 800,000 |
| <i>Issued \$800,000, 9%, 20-year bonds at face value.</i> | |
| 2. Bond Interest Expense..... | 36,000 |
| Cash | 36,000 |
| <i>Paid semiannual interest on the \$800,000, 9%, 20-year bonds (\$800,000 × 0.09 × ½ year).</i> | |

PE 10–16 (LO3) Accounting for Retirement of Bonds Payable Issued at Face Value

| | |
|--|---------|
| Bonds Payable..... | 800,000 |
| Cash | 800,000 |
| <i>Retired the \$800,000, 9%, 20-year bonds.</i> | |

PE 10–17 (LO3) Bond Retirements before Maturity

| | |
|---|---------|
| Bonds Payable..... | 300,000 |
| Loss on Bond Retirement..... | 18,000 |
| Cash..... | 318,000 |
| <i>To retire \$300,000 of bonds at a call price of 106.</i> | |

PE 10–18 (LO4) Debt Ratio

$$\text{Debt ratio} = \frac{\text{Total liabilities}}{\text{Total assets}} = \frac{\$350,000}{\$850,000} = 41.18\%$$

PE 10-19 (LO4) Debt-to-Equity Ratio

$$\text{Debt-to-equity ratio} = \frac{\text{Total liabilities}}{\text{Total equity}} = \frac{\$350,000}{\$500,000^*} = 0.7$$

*Total equity = Total assets – Total liabilities (\$850,000 – \$350,000 = \$500,000).

PE 10-20 (LO4) Times Interest Earned Ratio

$$\text{Times interest earned ratio} = \frac{\text{Income before interest and taxes}}{\text{Annual interest expense}} = \frac{\$80,000}{\$7,500} = 10.67 \text{ times}$$

EXERCISES

E 10–1 (LO1) Computing the Present Value of a Single Sum

All present value factors are from Table I, Appendix D.

1. \$ 60,000 × 0.7921 = \$47,526 (6% for 4 periods)
2. \$ 15,000 × 0.7730 = \$11,595 (2% for 13 periods)
3. \$ 76,000 × 0.4564 = \$34,686 (4% for 20 periods)
4. \$ 85,000 × 0.0872 = \$ 7,412 (5% for 50 periods)

E 10–2 (LO1) Computing the Future Value of a Single Sum

All future value factors are from Table III, Appendix D.

1. \$15,842 × 1.2625 = \$20,001 (6% for 4 periods)
2. \$30,920 × 1.2936 = \$39,998 (2% for 13 periods)
3. \$ 6,846 × 2.1911 = \$15,000 (4% for 20 periods)
4. \$ 959 × 11.467 = \$10,997 (5% for 50 periods)

E 10–3 (LO1) Computing the Present Value of an Annuity

Present value factors are from Table II, Appendix D.

1. \$50,000 × 3.9927 = \$199,635 (8% for 5 payments)
2. \$50,000 × 3.7908 = \$189,540 (10% for 5 payments)

E 10–4 (LO1) Computing the Amount of Periodic Payments

1. PV_{ANN} = Payment [PV_{ANN} Factor (Table II, Appendix D): $n = ?$, $i = ?$]
\$250,000 = Payment [PV_{ANN} Factor (Table II, Appendix D): $n = 4$, $i = 8\%$]
\$250,000 = Payment [3.3121]
Payment = $\$250,000 / 3.3121$
Payment = \$75,481
2. PV_{ANN} = Payment [PV_{ANN} Factor (Table II, Appendix D): $n = ?$, $i = ?$]
\$250,000 = Payment [PV_{ANN} Factor (Table II, Appendix D): $n = 8$, $i = 7\%$]
\$250,000 = Payment [5.9713]
Payment = $\$250,000 / 5.9713$
Payment = \$41,867

Chapter 10

E 10-5 (LO1)

Evaluation of Statements about Bonds.

1. False. When seeking long-term financing, an advantage of issuing bonds over issuing ordinary shares is that tax savings result.
2. True.
3. True.
4. True.

E 10-6 (LO2)

Accounting for Long-Term Note Payable

2017

| | | | |
|--|--------------------|--------|--------|
| Oct. 1 | Cash..... | 60,000 | |
| | Notes Payable..... | | 60,000 |
| <i>Borrowed \$60,000 on a two-year, 8% note.</i> | | | |

| | | | |
|---|-----------------------|-------|-------|
| Dec. 31 | Interest Expense..... | 1,200 | |
| | Interest Payable..... | | 1,200 |
| <i>To record three months' interest expense on note (\$60,000 × 0.08 × 3/12 = \$1,200).</i> | | | |

2018

| | | | |
|---|------------------------|-------|-------|
| Oct. 1 | Interest Expense..... | 3,600 | |
| | Interest Payable | 1,200 | |
| | Cash | | 4,800 |
| <i>To record nine months' interest expense on note (\$60,000 × 0.08 × 9/12 = \$3,600) and payment of interest for one year.</i> | | | |

| | | | |
|--|-----------------------|-------|-------|
| Dec. 31 | Interest Expense..... | 1,200 | |
| | Interest Payable..... | | 1,200 |
| <i>To record three months' interest expense on note.</i> | | | |

2019

| | | | |
|---|------------------------|--------|--------|
| Oct. 1 | Interest Expense..... | 3,600 | |
| | Interest Payable | 1,200 | |
| | Notes Payable | 60,000 | |
| | Cash | | 64,800 |
| <i>To record nine months' interest expense and payment of face amount of note at maturity plus interest for one year.</i> | | | |

E 10–7 (LO2) Accounting for Long-Term Note Payable
2017

July 1 Cash..... **500,000**
 Notes Payable..... **500,000**
*Borrowed \$500,000 from First National Bank
and issued a note.*

Dec. 31 Interest Expense..... **25,000**
 Cash
*To record payment of interest on the note
(\$500,000 × 0.10 × 6/12).*

2018

June 30 Interest Expense..... **25,000**
 Cash
*To record payment of interest on the note
(\$500,000 × 0.10 × 6/12).*

Dec. 31 Interest Expense..... **25,000**
 Cash
*To record payment of interest on the note
(\$500,000 × 0.10 × 6/12).*

2019

June 30 Interest Expense..... **25,000**
 Cash
*To record payment of interest on the note
(\$500,000 × 0.10 × 6/12).*

Dec. 31 Interest Expense..... **25,000**
 Cash
*To record payment of interest on the note
(\$500,000 × 0.10 × 6/12).*

2020

June 30 Interest Expense..... **25,000**
 Cash
*To record payment of interest on the note
(\$500,000 × 0.10 × 6/12).*

30 Notes Payable..... **500,000**
 Cash
To record payment of note in full.

Chapter 10
E 10–8 (LO2)
Accounting for a Mortgage

| <u>Month</u> | <u>Monthly Payment</u> | <u>Principal Paid</u> | <u>Interest Paid</u> | <u>Outstanding Balance</u> |
|--------------|------------------------|-----------------------|-----------------------|----------------------------|
| | | | | \$50,000 |
| June | \$ 525 | \$ 192 | \$ 333 | 49,808 |
| July | 525 | 193 | 332 | 49,615 |
| August | 525 | 194 | 331 | 49,421 |
| September | 525 | 196 | 329 | 49,225 |
| October | 525 | 197 | 328 | 49,028 |
| November | 525 | 198 | 327 | 48,830 |
| December | <u>525</u> | <u>199</u> | <u>326</u> | <u>48,631</u> |
| Totals | <u>\$3,675</u> | <u>\$1,369</u> | <u>\$2,306</u> | |

Note: For simplicity in calculation, the monthly payment in this example is set at \$525. In actuality, with a loan amount of \$50,000, with 144 payments (12 years × 12 months), and an interest rate of 8% compounded monthly, the actual payment would be \$541.

2. Interest of \$2,306 will be paid during the last seven months of 2017.
3. By the end of 2017, the balance of the mortgage will have been reduced by \$1,369.

E 10–9 (LO2) Accounting for a Mortgage

1. Using (Table II, Appendix D) the present value of an annuity factor for 60 payments at an interest rate of 1% is 44.9550. Dividing this factor into \$250,000 results in a monthly payment of \$5,561 (rounded).

| <u>Month</u> | <u>Monthly Payment</u> | <u>Principal Paid</u> | <u>Interest Paid</u> | <u>Outstanding Balance</u> |
|--------------|------------------------|------------------------|------------------------|----------------------------|
| | | | | \$250,000 |
| January | \$ 5,561 | \$ 3,061 | \$ 2,500 | 246,939 |
| February | 5,561 | 3,092 | 2,469 | 243,847 |
| March | 5,561 | 3,123 | 2,438 | 240,724 |
| April | 5,561 | 3,154 | 2,407 | 237,570 |
| May | 5,561 | 3,185 | 2,376 | 234,385 |
| June | 5,561 | 3,217 | 2,344 | 231,168 |
| July | 5,561 | 3,249 | 2,312 | 227,919 |
| August | 5,561 | 3,282 | 2,279 | 224,637 |
| September | 5,561 | 3,315 | 2,246 | 221,322 |
| October | 5,561 | 3,348 | 2,213 | 217,974 |
| November | 5,561 | 3,381 | 2,180 | 214,593 |
| December | <u>5,561</u> | <u>3,415</u> | <u>2,146</u> | <u>211,178</u> |
| Totals | <u>\$66,732</u> | <u>\$38,822</u> | <u>\$27,910</u> | |

E 10-9 (LO2) (Continued)

3. 2017

| | | |
|---------|------------------------|-------|
| Jan. 31 | Mortgage Payable | 3,061 |
| | Interest Expense | 2,500 |
| | Cash..... | 5,561 |

To record payment of first mortgage payment.

4. For each subsequent journal entry, the accounts will be the same; only the amounts will differ. The table prepared in part (2) provides the amount of interest and principal for each successive payment.

E 10-10 (LO2) Accounting for Interest-Bearing Notes.

2017

July 1

| | |
|---------------------|--------|
| Cash | 50,000 |
| Notes Payable | 50,000 |

Nov. 1

| | |
|---------------------|--------|
| Cash | 42,000 |
| Notes Payable | 42,000 |

Dec. 31

| | |
|-----------------------------|-------|
| Interest Expense | |
| (\$50,000 X 8% X 6/12)..... | 2,000 |
| Interest Payable | 2,000 |
| Interest Expense | |
| (\$42,000 X 7% X 2/12)..... | 490 |
| Interest Payable | 490 |

2018

Feb. 1

| | |
|------------------------|--------|
| Notes Payable | 42,000 |
| Interest Payable | 490 |
| Interest Expense | 245 |
| Cash..... | 42,735 |

Apr. 1

| | |
|------------------------|--------|
| Notes Payable | 50,000 |
| Interest Payable | 2,000 |
| Interest Expense | 1,000 |
| Cash..... | 53,000 |

Chapter 10

E 10-11 (LO3) Issuance Price of Bonds

The issuance price is determined as follows:

| | | |
|---|-----------------|-------------------------|
| Maturity value of the bonds | \$ 160,000 | |
| PV discounted at 4% for 12 periods (Table I, Appendix D) | <u>× 0.6246</u> | \$ 99,936 |
| Interest payments ($\$160,000 \times 0.05$)..... | \$ 8,000 | |
| PV of interest payments discounted at 4% for 12 payments (Table II, Appendix D)..... | <u>× 9.3851</u> | <u>75,081</u> |
| Total issuance price | | <u>\$175,017</u> |

E 10-12 (LO3) Issuance Price of Bonds

The issuance price is determined as follows:

| | | |
|---|-----------------|------------------------|
| Maturity value of the bonds | \$100,000 | |
| PV discounted at 5% for 14 periods (Table I, Appendix D) | <u>× 0.5051</u> | \$50,510 |
| Interest payments ($\$100,000 \times 0.035$)..... | \$ 3,500 | |
| PV of interest payments discounted at 5% for 14 payments (Table II, Appendix D)..... | <u>× 9.8986</u> | <u>34,645</u> |
| Total issuance price | | <u>\$85,155</u> |

E 10–13 (LO3) Accounting for Bonds Issued at Face Value

| | | | | |
|----|----------|---|---------|---------|
| 1. | 2017 | | | |
| | July 1 | Cash..... | 500,000 | |
| | | Bonds Payable..... | | 500,000 |
| | | <i>To record the issuance of \$500,000, five-year, 10% bonds at face value.</i> | | |
| 2. | 2017 | | | |
| | Dec. 31 | Bond Interest Expense..... | 25,000 | |
| | | Cash..... | | 25,000 |
| | | <i>To record bond interest expense (\$500,000 $\times 0.10 \times 6/12 = \\$25,000$) for six months.</i> | | |
| 3. | 2018 | | | |
| | Sept. 30 | Bond Interest Expense | 12,500 | |
| | | Cash..... | | 12,500 |
| | | <i>To pay bond interest expense from July 1 to date of retirement (\$500,000 $\times 0.10 \times 3/12 = \\$12,500$).</i> | | |
| | | Bonds Payable | 500,000 | |
| | | Cash..... | | 486,000 |
| | | Gain on Bond Retirement | | 14,000 |
| | | <i>To retire bonds early when market price was \$486,000.</i> | | |
| 4. | | Romulus could retire the bonds with a book value of \$500,000 for only \$486,000. Thus the company was able to take a liability off its books at less than the face amount. | | |

E 10–14 (LO3) Accounting for Bonds Issued at Face Value

| | | | | |
|----|---------|--|---------|---------|
| 1. | 2017 | | | |
| | Sept. 1 | Cash..... | 280,000 | |
| | | Bonds Payable..... | | 280,000 |
| | | <i>Issued \$280,000, 9%, 10-year bonds at face value.</i> | | |
| 2. | 2017 | | | |
| | Dec. 31 | Bond Interest Expense | 8,400 | |
| | | Bond Interest Payable..... | | 8,400 |
| | | <i>To recognize bond interest expense (\$280,000 $\times 0.09 \times 4/12 = \\$8,400$).</i> | | |

E 10–14 (LO3) (Continued)**3. 2018**

| | | |
|---|-----------------------------|--------|
| Mar. 1 | Bond Interest Expense | 4,200 |
| | Bond Interest Payable | 8,400 |
| | Cash..... | 12,600 |
| <i>To recognize bond interest expense and eliminate interest payable. Cash paid for interest is \$12,600 ($\\$280,000 \times 0.09 \times 6/12$).</i> | | |

| | | |
|--|-----------------------------|--------|
| Sept. 1 | Bond Interest Expense | 12,600 |
| | Cash..... | 12,600 |
| <i>To recognize bond interest expense ($\\$280,000 \times 0.09 \times 6/12 = \\$12,600$).</i> | | |

| | | |
|---|-----------------------------|-------|
| Dec. 31 | Bond Interest Expense | 8,400 |
| | Bond Interest Payable | 8,400 |
| <i>To recognize bond interest expense ($\\$280,000 \times 0.09 \times 4/12 = \\$8,400$).</i> | | |

4. 2019

| | | |
|--|-----------------------------|--------|
| Feb. 20 | Bond Interest Payable | 8,400 |
| | Bond Interest Expense | 3,500 |
| | Cash..... | 11,900 |
| <i>To pay bond interest from Sept. 1 to Feb. 20 (date of retirement). Bond interest expense from Jan. 1 is ($\\$280,000 \times 0.09 \times 5/3 \text{ months} \times 1/12 = \\$3,500$).</i> | | |
| Bonds Payable 280,000 Loss on Bond Retirement 20,000 Cash..... 300,000 | | |
| <i>To retire bonds early paying \$300,000 and record loss on retirement of \$20,000.</i> | | |

5. Elric Alphonse must have had excess cash and was willing to pay slightly more than the book value of the debt in order to retire the debt earlier. By retiring the bonds earlier, Elric Alphonse is able to avoid future interest payments and also is able to remove the debt from its financial statements.

E 10-15 (LO4) Computation of Debt-Related Financial Ratios

1. **Debt ratio:** (Total liabilities/Total assets) = $\$90,000/\$150,000 = 60\%$
2. **Debt-to-equity:** (Total liabilities/Total equity) = $\$90,000/\$60,000 = 1.5$
3. **Times interest earned:** (Operating income/Interest expense) = $\$25,000/\$18,000 = 1.39 \text{ times}$

E 10-16 (LO4) Discussing the Impact of Unrecorded Obligations on Liquidity and Solvency

1. (1). **Working capital** = NT\$3,500 – NT\$3,000 = NT\$500
(2). **Current ratio** = NT\$3,500 ÷ NT\$3,000 = 1.1667:1
(3). **Debt to assets ratio** = NT\$16,000 ÷ NT\$30,000 = 53.33%
(4). **Times interest earned** = (NT\$4,500 + NT\$1,950 + NT\$475) ÷ NT\$475 = 14.58 times

A current ratio that is less than 1.30 indicates lower liquidity. The debt to assets ratio indicates that NT\$.53 of each dollar of assets have been financed by creditors. The times interest earned of over 14 times indicates that Swarlie Ltd. income is large enough to make required interest payments as they come due.

2. Debt to assets ratio, adjusted for off-balance-sheet lease obligations.

$$\frac{\$16,000 + \$7,500}{\$30,000 + \$7,500} = 63\%$$

By including these off-balance-sheet obligations the debt to assets ratio increases from 53% to 63%, suggesting that Swarlie Ltd. is not as solvent as it first appears.

PROBLEMS

P 10–1 (LO1) Present and Future Value Computations

1. a. Principal:

$$\$15,000 \times 0.6730 \text{ (Table I)} = \$10,095 \text{ (20 periods, 2%)}$$

Interest payments:

$$\$15,000 \times 0.08 \times 1/4 = \$300$$

$$\begin{array}{rcl} \$300 \times 16.3514 \text{ (Table II)} & = & \underline{\quad 4,905 \quad} \text{ (20 payments, 2\%)} \\ & & \underline{\$15,000} \end{array}$$

- b. Principal:

$$\$12,000 \times 0.4970 \text{ (Table I)} = \$5,964 \text{ (12 periods, 6\%)}$$

Interest payments:

$$\$12,000 \times 0.12 \times 1/2 = \$720$$

$$\begin{array}{rcl} \$720 \times 8.3838 \text{ (Table II)} & = & \underline{\quad 6,036 \quad} \text{ (12 payments, 6\%)} \\ & & \underline{\$12,000} \end{array}$$

- c. $\$7,000 \times 11.2551 \text{ (Table II)} = \$78,786 \text{ (12 payments, 1\%)}$

2. a. $\$20,000 \times 1.3686 \text{ (Table III)} = \$27,372 \text{ (8 periods, 4\%)}$

- b. $\$60,000 \times 5.8916 \text{ (Table III)} = \$353,496 \text{ (60 periods, 3\%)}$

P 10–2 (LO1) Present and Future Value Computations

1. a. $\$30,000 \times 0.6209 \text{ (Table I)} = \$18,627 \text{ (5 periods, 10\%)}$

- b. $\$6,000 \times 3.7908 \text{ (Table II)} = \$22,745 \text{ (5 payments, 10\%)}$

- c. Principal: $\$25,000 \times 0.6209 \text{ (Table I)} = \$15,523 \text{ (5 periods, 10\%)}$

$$\begin{array}{rcl} \text{Interest: } \$2,500 \times 3.7908 \text{ (Table II)} & = & \underline{\quad 9,477 \quad} \text{ (5 payments, 10\%)} \\ \text{Total present value} & & \underline{\$25,000} \end{array}$$

2. a. $\$20,000 \times 1.6105 \text{ (Table III)} = \$32,210 \text{ (5 periods, 10\%)}$

- b. $\$8,000 \times 3.2810 \text{ (Table III)} = \$26,248 \text{ (60 periods, 2\%)}$

P 10–3 (LO1) Computing the Amount of Periodic Payments

1. PV_{ANN} = Payment [PV_{ANN} Factor (Table II): $n = ?$, $i = ?$]
 $\$20,000$ = Payment [PV_{ANN} Factor (Table II): $n = 30$, $i = 1\%$]
 $\$20,000$ = Payment [25.8077]
 Payment = $\$20,000 / 25.8077$
 Payment = \$774.96

2. PV_{ANN} = Payment [PV_{ANN} Factor (Table II): $n = ?$, $i = ?$]
 $\$20,000$ = Payment [PV_{ANN} Factor (Table II): $n = 60$, $i = 1\%$]
 $\$20,000$ = Payment [44.9550]
 Payment = $\$20,000 / 44.9550$
 Payment = \$444.89

3. PV_{ANN} = Payment [PV_{ANN} Factor (Table II): $n = ?$, $i = ?$]
 PV_{ANN} = \$444.89 [PV_{ANN} Factor (Table II): $n = 30$, $i = 1\%$]
 PV_{ANN} = \$444.89 [25.8077]
 PV_{ANN} = $\$444.89 \times 25.8077$
 PV_{ANN} = \$11,481.59

After making the 30th payment, the balance on the loan is \$11,481.59. Note that even though half the payments have been made, more than half the loan balance remains. This is because the initial payments include lots of interest and not as much principal. As the balance of the loan amount is reduced, each succeeding payment includes less interest and more principal.

P 10–4 (LO2) Accounting for Notes Payable

2017

| | | | |
|---------|---|--|-------|
| Jan. 1 | Cash..... | | 8,000 |
| | Note Payable..... | | 8,000 |
| | <i>Borrowed \$8,000 from Peterson Bank, issuing a 2-year, 10% note.</i> | | |
| 1 | Cash..... | | 4,500 |
| | Note Payable..... | | 4,500 |
| | <i>Borrowed \$4,500 from Laurence National Bank, issuing a 3-year, 11% note.</i> | | |
| Dec. 31 | Interest Expense..... | | 1,295 |
| | Interest Payable..... | | 1,295 |
| | <i>To recognize interest expense on 2-year note of \$800 (\$8,000 × 0.10) and on 3-year note of \$495 (\$4,500 × 0.11).</i> | | |

2018

Jan. 1 Interest Payable 1,295
 Cash 1,295
To record payment of interest on notes payable.

Dec. 31 Interest Expense 1,295
 Interest Payable 1,295
To recognize interest expense on 2-year note of \$800 ($\$8,000 \times 0.10$) and on 3-year note of \$495 ($\$4,500 \times 0.11$).

2019

Jan. 1 Interest Payable 1,295
 Cash 1,295
To record payment of interest on notes payable.

1 Note Payable 8,000
 Cash 8,000
To record payment of 2-year note from Peterson Bank.

Dec. 31 Interest Expense 495
 Interest Payable 495
To recognize interest expense on 3-year note of \$495 ($\$4,500 \times 0.11$).

2020

Jan. 1 Interest Payable 495
 Cash 495
To record payment of interest on note payable.

1 Note Payable 4,500
 Cash 4,500
To record payment of 3-year note from Laurence National Bank.

P 10–5 (LO2) Accounting for Notes Payable
1. 2017

| | | |
|-------|--|---------|
| May 1 | Machine | 600,000 |
| | Note Payable..... | 600,000 |
| | <i>Purchased a machine by issuing a 3-year, 7% note.</i> | |

| | | |
|--------|---|--------|
| July 1 | Cash..... | 25,000 |
| | Note Payable..... | 25,000 |
| | <i>Issued a 2-year, 6% note to South-Central National Bank.</i> | |

2. 2017

| | | |
|---------|--|--------|
| Dec. 31 | Interest Expense | 750 |
| | Cash..... | 750 |
| | <i>To record payment of interest on South-Central National Bank note ($\\$25,000 \times 0.06 \times 6/12$).</i> | |
| 31 | Interest Expense | 28,000 |
| | Interest Payable..... | 28,000 |
| | <i>To record interest on Kuma Corporation note payable ($\\$600,000 \times 0.07 \times 8/12$).</i> | |

3. 2018

| | | |
|---------|---|--------|
| May 1 | Interest Expense | 14,000 |
| | Interest Payable | 28,000 |
| | Cash..... | 42,000 |
| | <i>To record annual interest payment of \$42,000 ($\\$600,000 \times 0.07$) and to record interest expense for the first three months of the year.</i> | |
| June 30 | Interest Expense | 750 |
| | Cash..... | 750 |
| | <i>To record payment of interest on South-Central National Bank note ($\\$25,000 \times 0.06 \times 6/12$).</i> | |
| Dec. 31 | Interest Expense | 750 |
| | Cash..... | 750 |
| | <i>To record payment of interest on South-Central National Bank note ($\\$25,000 \times 0.06 \times 6/12$).</i> | |
| 31 | Interest Expense | 28,000 |
| | Interest Payable..... | 28,000 |
| | <i>To record interest on Corporation note payable ($\\$600,000 \times 0.07 \times 8/12$).</i> | |

Chapter 10
 P 10-6 (LO2)

Accounting for a Mortgage

1. **2018**
 Nov. 1 Land 75,000
 Building 325,000
 Mortgage Payable 400,000
Purchased land and building on a 30-year, 12% mortgage.
2. **2018**
 Nov. 30 Interest Expense 4,000
 Mortgage Payable 114
 Cash 4,114
Made monthly mortgage payment (\$400,000 × 0.01 = \$4,000 interest).
- Dec. 31 Interest Expense 3,999
 Mortgage Payable 115
 Cash 4,114
Made monthly payment (\$400,000 – \$114 = \$399,886; \$399,886 × 0.01 = \$3,999).
3. The total mortgage balance of \$399,771 (\$400,000 – \$114 – \$115 = \$399,771) would be reported in the liabilities section of the December 31, 2017, balance sheet. The amount of principal that will be paid during 2018 would be reported as a current liability (current portion of long-term debt); the remaining balance as a long-term liability.

P 10-7 (LO3) Issuance Price of Bonds
June 30 Bonds

| | |
|--|--------------------|
| Maturity value of the bonds | \$ 750,000 |
| PV discounted @ 2% for 60 periods (Table I)..... | <u>× 0.3048</u> |
| | \$ 228,600 |
| Interest payments (\$750,000 × 0.03)..... | \$ 22,500 |
| PV discounted @ 2% for 60 payments (Table II)..... | <u>× 34.7609</u> |
| | <u>782,120</u> |
| Issuance price of bonds..... | <u>\$1,010,720</u> |

August 31 Bonds

| | |
|--|-----------------|
| Maturity value of the bonds | \$ 556,000 |
| PV discounted @ 4% for 40 periods (Table I)..... | <u>× 0.2083</u> |
| | \$ 115,815 |

P 10–7 (LO3) (Continued)

| | |
|---|------------------------------------|
| Interest payments ($\$556,000 \times 0.025$)..... | \$ 13,900 |
| PV discounted @ 4% for 40 payments (Table II) | <u>$\times 19.7928$</u> |
| | <u>275,120</u> |
| Issuance price of bonds..... | <u>\$ 390,935</u> |

P 10–8 (LO3) Accounting for Bonds

| | | |
|----|---|-------------------|
| 1. | Present value of an annuity of \$20,000 for 60 payments at 4% interest ($\$20,000 \times 22.6235$) (Table II) ... | \$452,470 |
| | Present value of a single payment of \$500,000 for 60 periods at 4% interest ($\$500,000 \times 0.0951$) (Table I) | <u>47,550</u> |
| | Present value of bond | <u>\$500,000*</u> |
| | *Rounded | |
| 2. | 2017 | |
| | July 1 Cash..... | 500,000 |
| | Bonds Payable..... | 500,000 |
| | <i>To record issuance of \$500,000, 30-year, 8% bonds at face value.</i> | |
| 3. | 2017 | |
| | Dec. 31 Bond Interest Expense..... | 20,000 |
| | Bond Interest Payable..... | 20,000 |
| | <i>To record bond interest expense ($\\$500,000$ $\times 0.08 \times 6/12$).</i> | |
| 4. | 2020 | |
| | Oct. 1 Bond Interest Expense..... | 10,000 |
| | Cash..... | 10,000 |
| | <i>Paid interest for three months, July 1–Oct. 1 (\$500,000 $\times 0.08 \times 3/12$ = \$10,000).</i> | |
| | Bonds Payable | 500,000 |
| | Cash..... | 495,000 |
| | Gain on Bond Retirement | 5,000 |
| | <i>To retire bonds with a carrying amount of \$500,000 by paying \$495,000.</i> | |

P 10–9 (LO3) Accounting for Bonds**1. 2017**

| | | |
|--|--------------------|-----------|
| Nov. 1 | Cash..... | 1,500,000 |
| | Bonds Payable..... | 1,500,000 |
| <i>To record issuance of \$1,500,000, 20-year, 9% bonds at face value.</i> | | |

2. 2017

| | | |
|---|----------------------------|--------|
| Dec. 31 | Bond Interest Expense..... | 22,500 |
| | Bond Interest Payable..... | 22,500 |
| <i>To record bond interest expense (\$1,500,000 × 0.09 × 2/12).</i> | | |

3. 2018

| | | |
|---|---|--------|
| May 1 | Bond Interest Expense..... | 45,000 |
| | Bond Interest Payable | 22,500 |
| | Cash..... | 67,500 |
| <i>To record semiannual interest payment of \$67,500 (\$1,500,000 × 0.09 × 6/12) and to record bond interest expense for the first four months of the year.</i> | | |
| Nov. 1 | Bond Interest Expense..... | 67,500 |
| | Cash..... | 67,500 |
| | <i>To record semiannual bond interest payment.</i> | |
| Dec. 31 | Bond Interest Expense..... | 22,500 |
| | Bond Interest Payable..... | 22,500 |
| | <i>To record bond interest expense (\$1,500,000 × 0.09 × 2/12).</i> | |

P 10-10 (LO4) Accounting for Bond Interest Payments, Premium Amortization, and Redemption.
1. 2018

| | | |
|--------|-------------------------------|------------------|
| Jan. 1 | <i>Interest Payable</i> | 280,000** |
| | <i>Cash</i> | 280,000 |

2. Dec. 31

| | | |
|--|---|------------------|
| | <i>Interest Expense</i> | 304,000** |
| | <i>Bonds Payable (\$240,000 ÷ 10)</i> | 24,000 |
| | <i>Interest Payable</i> | 280,000 |

3. 2019

| | | |
|-------|--|--------------------|
| Jan 1 | <i>Bonds Payable</i> | 1,200,000** |
| | <i>Bonds Payable</i> | 64,800** |
| | <i>Gain on Bond Redemption</i> | |
| | $(\$1,272,000 - \$1,212,000)$ | 52,800 |
| | <i>Cash (\$1,200,000 X 101%)</i> | 1,212,000 |

$$*(\$240,000 - \$24,000) \times 0.30 = \$64,800$$

4. Dec. 31

| | | |
|--|----------------------------------|------------------|
| | <i>Interest Expense</i> | 212,800** |
| | <i>Bonds Payable</i> | 16,800** |
| | <i>Interest Payable</i> | |
| | $(\$2,800,000 \times 7\%)$ | 196,000 |

$$**\$240,000 - \$24,000 - \$64,800 = \$151,200 \quad \$151,200 / 9 = \$16,800 \text{ or } \$24,000 \times 0.70.$$

P 10–11 (LO4) Reporting Liabilities on the Balance Sheet**Liabilities****Current liabilities:**

| | |
|---|--------------|
| Accounts payable..... | \$48,000 |
| Notes payable..... | 24,000 |
| Income taxes payable | 18,000 |
| Unearned sales revenue | 32,000 |
| Mortgage payable (current portion)..... | 12,300 |
| Property taxes payable..... | 8,700 |
| Salaries and wages payable..... | 15,200 |
| Sales tax payable | <u>2,500</u> |
| Total current liabilities..... | \$160,700 |

Long-term liabilities:

| | |
|-----------------------------------|------------------|
| Notes payable | \$40,000 |
| Mortgage payable..... | <u>93,000</u> |
| Total long-term liabilities | 133,000 |
| Total liabilities..... | <u>\$293,700</u> |

P 10–12 (LO4) Computation of Debt-Related Financial Ratios

1. **Debt ratio:** (Total liabilities/Total assets) = \$540,000/\$1,020,000 = 52.9%

2. **Debt-to-equity:** (Total liabilities/Total equity) = \$540,000/\$480,000 = 1.125

3. **Times interest earned:** (Earnings before interest and taxes/Interest)
 $\$128,000/\$78,000 = 1.64 \text{ times}$

Earnings before interest and taxes is computed as earnings before income taxes plus interest expense.

4. Of the three ratios presented, the times interest earned ratio is probably the single most useful value in this case. This ratio shows that Walker Company is currently generating just enough operating profit to be able to pay existing interest expense, with a small cushion. This low ratio value means that there is a real chance that operating profit in future years might not be enough to cover interest expense. The other ratio values in this case can really be interpreted meaningfully only by seeing values for similar companies in the same industry.

ANALYTICAL ASSIGNMENTS

AA 10–1 *You Decide:* If a young company has a negative “times interest earned” ratio, should the company be refused or given a loan by lenders?

Judgment Call

Issues to be discussed with this question are:

1. Whether or not the company will have (or really is near to having) a product that will generate significant revenue.
2. It could be that with this last \$100,000, the company will be highly profitable. On the other hand, the financial institution must decide if by making the loan it would be throwing good money after bad money.
3. The loans that have already been made and the money that has already been spent should be considered sunk costs (a topic for discussion in the managerial portion of this book), and the decision of whether or not to make the loan should be based on whether there will be revenues to repay the loan given the other obligations the company has as well.
4. Certainly, you would want additional information (such as possible collateral, etc.) before you made the final decision.

AA 10–2 Carrefour

Real Company Analysis

1. Carrefour's long-term debt decreased by €153 million (€6,662 – €6,815), and its total assets actually decreased by €694 million (€45,095 – €45,789). However, the main reason for this decrease in total assets is clearly a decrease in non-current liabilities, which are €2,549 million lower than at the end of the previous year (€12,106 – €12,508).
2. Debt ratio:
2014: $(\text{€}12,508 + \text{€}23,053) / \text{€}45,789 = 77.7\%$
2015: $(\text{€}12,106 + \text{€}22,317) / \text{€}45,095 = 76.3\%$

Carrefour's debt ratio (Total liabilities/Total assets) decreased from 77.7% in 2014 to 76.3% in 2015. The primary reason for the decrease was the decrease in long-term borrowings.

AA 10-3 IBM

Real Company Analysis

1. A debenture is an unsecured bond. Recall that a bond is a piece of paper issued by a company (such as IBM) in which the company promises to pay a certain maturity amount (usually \$1,000) at a specified date in the future, plus interest every year between now and then. In exchange for this promise to pay, IBM receives financing from investors who buy the bonds. So, a bond is simply a way for IBM to borrow money. The fact that a debenture is an unsecured bond means that the only assurance that investors have that IBM will pay the money promised in the bond contract is IBM's good word. There is no specific collateral attached to the debentures.
2. IBM's 7.13% debentures are unusual because they do not mature until the year 2096. It looks as if these bonds had an initial maturity period of 100 years—very long-term bonds indeed.
3. IBM gets some of its loans denominated in foreign currencies for a variety of reasons. First, some countries are reluctant to allow large multinational corporations such as IBM to do business in their countries without using local financing. Using local financial institutions as much as possible helps IBM establish good local relations. Also, some of IBM's foreign subsidiaries are relatively self-contained, meaning that almost all operating, investing, and financing activities are handled locally. Sometimes IBM gets foreign currency financing because the interest rate is low. (Look at the 0.6% average rate on the Japanese yen loans.)

Finally, foreign currency financing is a way for IBM to hedge, or protect itself, against fluctuations in the value of foreign currencies. For example, if IBM has assets denominated in Thai baht, and the baht decreases in value, then IBM will have lost money. However, if IBM has an equal amount of loans denominated in Thai baht, the loss from the decrease in the value of the Thai baht assets will be offset by the gain from the decrease in value of the Thai baht liabilities. This is called a hedge and results in IBM being immune from the effects of exchange rate changes, up or down.

4. Two key reasons for the large difference in interest rates on loans denominated in different currencies are the expected stability of the currencies and the expected inflation rates in the home countries. If you were to get a loan in Indonesian rupiah, you would have to pay a much higher rate because the lender runs the risk that the rupiah will become worthless between now and the time you repay the loan. In addition, expected inflation rates affect the interest rates on loans. Because the lender wants the interest received to reimburse him or her for the lost purchasing power caused by inflation, higher expected inflation means higher interest rates. The primary reason that interest rates in the United States were much lower in the 1990s than in the early 1980s is that expected inflation was lower.

EXPANDED MATERIAL

DISCUSSION QUESTIONS

15. Discount on Bonds Payable is a contra-liability account that is deducted from Bonds Payable on the balance sheet.
16. The discount on bonds payable account is a contra-liability account that is offset against the bonds payable account to arrive at the book value of the bonds payable. The discount (with its debit balance) serves to reduce the book value of the bonds (with their credit balance). As the discount is reduced, the amount offset against the bonds becomes smaller, thereby increasing the book value of the bonds.
17. The effective-interest amortization method is more theoretically appropriate than the straight-line method because it takes into consideration the time value of money. The effective-interest amortization amount is equal to the effective interest rate times the amount of money actually borrowed at any point in time. The straight-line method provides only an approximation of true interest. Also, with effective-interest amortization, the bond balance is always equal to the present value of the future bond payments.
18. The carrying amount of a bond is the face amount of the bond plus any premium or less any discount. The discount or premium is amortized over the life of the bond, resulting in the book value and the face amount eventually being equal on the day the bond matures.
19. Under the effective-interest method, the carrying amount of the bond influences the amount of bond interest expense for a period. The amount of interest each period in turn affects the carrying amount for the next period. To compute bond interest expense using the effective-interest method, the carrying amount of the bond is multiplied by the effective rate of interest. The difference between the amount of cash paid and the bond interest expense serves to reduce the discount or premium account. Thus, the carrying amount for the next period is changed by the amount of the premium or discount amortized in the current period.
20. When the effective interest rate on bonds is higher than the stated rate, the bonds will sell at a discount because investors are asking for a higher return on their investment than what they will receive in cash payments. Therefore, the bond interest expense for each period will be higher than the cash paid since the bond interest expense for the period will be equal to the cash paid plus the bond discount amortization. A sample journal entry showing the relative amount of bond interest expense in relation to cash paid is:

| | |
|-----------------------------|-------|
| Bond Interest Expense | 2,304 |
| Cash | 2,000 |
| Discount on Bonds Payable | 304 |

EXERCISES

E 10–17 (LO3, LO5) Accounting for Bonds Issued at a Discount

2017

| | | |
|--|--------------------------------|---------|
| June 30 | Cash | 490,000 |
| | Discount on Bonds Payable..... | 10,000 |
| | Bonds Payable | 500,000 |
| <i>Issued \$500,000, 10%, five-year bonds at 98.</i> | | |

Dec. 31 Bond Interest Expense 26,000

 Discount on Bonds Payable 1,000

 Cash 25,000

Paid semiannual interest on the bonds

($\$500,000 \times 0.10 \times 1/2 \text{ year} = \$25,000$).

Amortization: $\$10,000/60 \text{ months} = \166.67

per month \times 6 months = \$1,000.

2018

Jan. 31 Bond Interest Expense 4,333

 Discount on Bonds Payable 167

 Bond Interest Payable 4,166

To recognize bond interest expense for

one month ($\$500,000 \times 0.10 \times 1/12 \text{ year} =$

\$4,166) and amortize bond discount for

one month at \$166.

2018

June 30 Bond Interest Payable 4,166

 Bond Interest Expense 21,667

 Discount on Bonds Payable 833

 Cash 25,000

Paid semiannual interest on bonds; discount

amortization = $\$166.67 \times 5 \text{ months} = \833 .

2022

June 30 Bonds Payable 500,000

 Cash 500,000

To retire \$500,000, 10%, five-year bonds at maturity.

E 10–18 (LO3, LO5) Accounting for Bonds Issued at a Premium
1. Journal entries
a. 2018

| | | | |
|--|---|--------------------------------|---------|
| Apr. | 1 | Cash..... | 102,000 |
| | | Premium on Bonds Payable | 2,000 |
| | | Bonds Payable..... | 100,000 |
| <i>Issued \$100,000 face value of 10%, 10-year bonds at a price of 102 (\$100,000 × 1.02 = \$102,000).</i> | | | |

b. 2018

| | | | |
|---|---|--------------------------------|-------|
| Oct. | 1 | Bond Interest Expense | 4,900 |
| | | Premium on Bonds Payable | 100 |
| | | Cash..... | 5,000 |
| <i>To record semiannual payment at 5% on \$100,000 face value bonds and amortize 1/20 of a \$2,000 premium.</i> | | | |

c. 2018

| | | | |
|---|----|--------------------------------|-------|
| Dec. | 31 | Bond Interest Expense | 2,450 |
| | | Premium on Bonds Payable | 50 |
| | | Bond Interest Payable..... | 2,500 |
| <i>To record bond interest for three months and amortize bond premium (\$100/2 = \$50).</i> | | | |

2. Balance sheet presentation at December 31, 2018

| | |
|-------------------------------------|-------------------------------|
| Bonds payable..... | \$100,000 |
| Plus: Premium on bonds payable..... | <u>1,850</u> <u>\$101,850</u> |

There would also be a bond interest payable at \$2,500 on the balance sheet.

E 10–19 (LO5) Effective-Interest Calculation

The discount equals \$13,500, which will be amortized at $\$13,500/3 \text{ years} = \$4,500$ a year. Total annual interest expense = $\$4,500 + (\$675,000 \times 0.09) = \$65,250$. The effective interest rate is equal to annual interest expense ÷ amount of cash received at issuance ($\$65,250/\$661,500$), or approximately 9.86%.

Chapter 10
E 10–20 (LO5) Bond Amortization Schedule

- (1) $\$373^* + \$2,627 = \$3,000$
- (2) $\$52,537 - \$52,164 = \$373$
- (3) $\$3,000 - \$392 = \$2,608$
- (4) $\$52,164 - \$392 = \$51,772$
- (5) $\$3,000$ (same as other periods or $\$50,000 \times 0.06$)
- (6) $\$51,772 \times (10\% \times 1/2 \text{ year})^{**} = \$2,589$
- (7) $\$3,000 - \$2,589 = \$411$
- (8) $\$51,772 - \$411 = \$51,361$

*From item (2)

**Interest expense ÷ Carrying value = 0.05, or 1/2 of 0.10

E 10–21 (LO3, LO5) Accounting for Bonds
1. 2017

| | | | |
|--|---|--------------------------------|---------|
| May | 1 | Cash..... | 679,000 |
| | | Discount on Bonds Payable..... | 21,000 |
| | | Bonds Payable | 700,000 |
| <i>Issued 15-year, 11% bonds at 97 (\$700,000 × 0.97 = \$679,000).</i> | | | |

2. 2017

| | | | |
|---|---|--------------------------------|--------|
| Nov. | 1 | Bond Interest Expense..... | 39,200 |
| | | Discount on Bonds Payable..... | 700 |
| | | Cash | 38,500 |
| <i>Paid semiannual interest on 15-year, 11% bonds (\$700,000 × 0.11 × 1/2 = \$38,500) and amortized bond discount for six months (\$21,000/180 months = \$116.67 per month; \$116.67 × 6 = \$700, rounded to the nearest dollar).</i> | | | |

3. 2017

| | | | |
|---|----|--------------------------------|--------|
| Dec. | 31 | Bond Interest Expense..... | 13,067 |
| | | Discount on Bonds Payable..... | 233 |
| | | Bond Interest Payable | 12,834 |
| <i>To record two months' bond interest (\$38,500 × 2/6 = \$12,833) and bond discount amortization for two months (\$116.67 × 2 = \$233, rounded to the nearest dollar).</i> | | | |

E 10–21 (LO4, LO5) (Continued)**4. 2018**

| | | |
|-------|--|--------|
| May 1 | Bond Interest Expense..... | 26,133 |
| | Bond Interest Payable..... | 12,834 |
| | Discount on Bonds | 467 |
| | Cash | 38,500 |
| | <i>Paid semiannual interest on 15-year, 11% bonds and amortized bond discount for four months ($\\$116.67 \times 4 = \\467, rounded to the nearest dollar).</i> | |

PROBLEMS

P 10–13 (LO3, LO5) Accounting for Bonds

| | | | | |
|----|----|---|--------|---------------------------------------|
| 1. | a. | Cash | 87,300 | |
| | | Discount on Bonds Payable..... | 2,700 | |
| | | Bonds Payable | | 90,000 |
| | | <i>Issued \$90,000 of bonds at 97.</i> | | |
| b. | | Cash | 90,000 | |
| | | Bonds Payable | | 90,000 |
| | | <i>Issued \$90,000 of bonds at face value.</i> | | |
| c. | | Cash | 94,500 | |
| | | Premium on Bonds Payable | | 4,500 |
| | | Bonds Payable | | 90,000 |
| | | <i>Issued \$90,000 of bonds at 105.</i> | | |
| 2. | a. | Bond Interest Expense | 6,885 | |
| | | Discount on Bonds Payable | | 135 |
| | | Bond Interest Payable | | 6,750 |
| | | <i>To recognize bond interest expense (discount amortization = \$2,700/180 months = \$15/month; \$15 × 9 months = \$135; interest = \$90,000 × 0.10 × 3/4 year = \$6,750).</i> | | |
| b. | | Bond Interest Expense | 6,750 | |
| | | Bond Interest Payable | | 6,750 |
| | | <i>To recognize bond interest expense (\$90,000 × 0.10 × 3/4 year = \$6,750).</i> | | |
| c. | | Bond Interest Expense | 6,525 | |
| | | Premium on Bonds Payable..... | 225 | |
| | | Bond Interest Payable | | 6,750 |
| | | <i>To recognize bond interest expense (premium amortization = \$4,500/180 months = \$25 per month; \$25 × 9 months = \$225; interest = \$90,000 × 0.10 × 3/4 year = \$6,750).</i> | | |
| 3. | | Presentation of bond liabilities on the December 31, 2018, balance sheet | | |
| | a. | When bonds were sold at 97 | b. | When bonds were sold at face value |
| | | Current liabilities: | | Current liabilities: |
| | | Bond interest payable <u>\$ 6,750</u> | | Bond interest payable <u>\$ 6,750</u> |
| | | Long-term liabilities: | | Long-term liabilities: |
| | | Bonds payable \$90,000 | | Bonds payable <u>\$90,000</u> |
| | | Less: Discount on bonds payable <u>(2,565)</u> | | |

Bond carrying amount \$87,435

c. When bonds were sold at 105

Current liabilities:

Bond interest payable \$ 6,750

Long-term liabilities:

Bonds payable \$90,000

Plus: Premium on

bonds payable 4,275

Bond carrying amount \$94,275

4. Bonds will sell at 97, which is less than face value, when investors are asking for a higher rate of interest on their investment than the 10% rate stated in the bond contract. Bonds will sell at 105, which is at a higher price than face value, when investors are willing to accept a lower rate of return on their investment than the 10% rate stated in the bond contract.

P 10–14 (LO3, LO5) Accounting for Bonds Issued at a Premium

1. 2017

| | | |
|--|-------------------------------|---------|
| Mar. 1 | Cash..... | 189,000 |
| | Bonds Payable | 180,000 |
| | Premium on Bonds Payable..... | 9,000 |
| <i>Issued \$180,000, 12%, 5-year bonds at 105.</i> | | |

2. 2017

| | | |
|--|--------------------------------|--------|
| Sept. 1 | Bond Interest Expense..... | 9,900 |
| | Premium on Bonds Payable | 900 |
| | Cash | 10,800 |
| <i>Paid semiannual interest on bonds (premium amortization = \$9,000/60 months = \$150; \$150 × 6 months = \$900). Cash paid = \$180,000 × 12% × 1/2 = \$10,800.</i> | | |

3. 2017

| | | |
|--|--------------------------------|-------|
| Dec. 31 | Bond Interest Expense..... | 6,600 |
| | Premium on Bonds Payable | 600 |
| | Bond Interest Payable | 7,200 |
| <i>To recognize bond interest expense and premium amortization for four months (\$150 × 4 months = \$600). Bond interest payable = \$180,000 × 12% × 4/12 = \$7,200.</i> | | |

Chapter 10

P 10–14 (LO3, LO5) (Continued)

4. 2022

| | | |
|--------|--|---------|
| Mar. 1 | Bond Interest Payable..... | 7,200 |
| | Bond Interest Expense..... | 3,300 |
| | Premium on Bonds..... | 300 |
| | Cash | |
| | | 10,800 |
| | <i>Paid final semiannual interest payment and recorded premium amortization for two months at \$150 per month.</i> | |
| | Bonds Payable..... | 180,000 |
| | Cash | 180,000 |
| | <i>Retired \$180,000 of 12%, 5-year bonds at maturity.</i> | |

P 10–15 (LO3, LO5) Straight-Line versus Effective-Interest Amortization

| | | |
|----|---|------------------|
| 1. | \$150,000 × 0.5584 (Table I—6%, 10 periods)..... | \$ 83,760 |
| | \$7,500 × 7.3601 (Table II—6%, 10 payments) | 55,201 |
| | Issuance price of bonds | <u>\$138,961</u> |

2.

| Date | Cash Interest Payment | Interest Expense | Discount Amortization | Bond Carrying Value |
|-----------------------|-----------------------------|---------------------|--------------------------|---------------------------|
| January 1, 2017 | | | | \$138,961 |
| July 1, 2017 | \$ 7,500 | \$ 8,338 | \$ 838 | 139,799 |
| January 1, 2018 | 7,500 | 8,388 | 888 | 140,687 |
| July 1, 2018 | 7,500 | 8,441 | 941 | 141,628 |
| January 1, 2019 | 7,500 | 8,498 | 998 | 142,626 |
| July 1, 2019 | 7,500 | 8,558 | 1,058 | 143,684 |
| January 1, 2020 | 7,500 | 8,621 | 1,121 | 144,805 |
| July 1, 2020 | 7,500 | 8,688 | 1,188 | 145,993 |
| January 1, 2021 | 7,500 | 8,760 | 1,260 | 147,253 |
| July 1, 2021 | 7,500 | 8,835 | 1,335 | 148,588 |
| January 1, 2022 | 7,500 | 8,912** | 1,412** | 150,000 |
| Totals | <u>\$75,000</u> | <u>\$86,039</u> | <u>\$11,039</u> | |

**Rounded

| Year | Interest Expense | |
|--------|------------------|--------------------|
| | Straight-Line | Effective-Interest |
| 2017 | \$17,208 | \$16,726 |
| 2018 | 17,208 | 16,939 |
| 2019 | 17,208 | 17,179 |
| 2020 | 17,208 | 17,448 |
| 2021 | 17,207** | 17,747 |
| Totals | <u>\$86,039</u> | <u>\$86,039</u> |

**Rounded

P 10–15 (LO3, LO5) (Continued)

| | | | |
|----|---------|---|---------|
| 4. | 2021 | | |
| a. | Dec. 31 | Interest Expense | 8,912 |
| | | Discount on Bonds Payable | 1,412 |
| | | Bond Interest Payable | 7,500 |
| | | <i>Accrued final interest obligation at maturity of bonds.</i> | |
| | 2022 | | |
| b. | Jan. 1 | Bond Interest Payable | 7,500 |
| | | Cash | 7,500 |
| | | <i>Paid final interest payment at maturity of bonds.</i> | |
| 5. | 2022 | | |
| | Jan. 1 | Bonds Payable..... | 150,000 |
| | | Cash | 150,000 |
| | | <i>Retired 10%, 5-year bonds.</i> | |
| 6. | | If the difference between the two methods has a material effect on income in any year, then the effective-interest method is required. In this case, since the difference does not exceed \$540 in any one year, it is not likely to have a significant impact on net income. Either method would probably be acceptable. In practice, the auditing firm that expresses an opinion on the financial statements must make a judgment as to whether the difference has a material effect on net income. The difference would be considered material if its effect on net income would alter the decision of a prudent reader of the financial statements after considering the numbers influenced by the method used. There are no hard-and-fast rules or guidelines for what constitutes materiality in any given situation. | |

Chapter 10

P 10–16 (LO3, LO5)
Effective-Interest Amortization

| 1. | \$350,000 × 0.7462 (Table I—5%, 6 periods)..... | 6 | peri- | \$261,17 |
|-----------------------|---|---------------------|-------------------------|---------------------------|
| 0 | | | | |
| | \$21,000 × 5.0757 (Table II—5%, 6 payments) | | | <u>106,590</u> |
| | Present value (price of bonds)..... | | | <u>\$367,760</u> |
| 2. | | | | |
| Period | Cash Interest Payment | Interest Expense | Premium Amortization | Bond Carrying Value |
| January 1, 2017 | | | | \$367,760 |
| July 1, 2017 | \$ 21,000 | \$ 18,388 | \$ 2,612 | 365,148 |
| January 1, 2018 | 21,000 | 18,257 | 2,743 | 362,405 |
| July 1, 2018 | 21,000 | 18,120 | 2,880 | 359,525 |
| January 1, 2019 | 21,000 | 17,976 | 3,024 | 356,501 |
| July 1, 2019 | 21,000 | 17,825 | 3,175 | 353,326 |
| January 1, 2020 | 21,000 | 17,674** | 3,326** | 350,000** |
| Totals | <u>\$126,000</u> | <u>\$108,240</u> | <u>\$17,760</u> | |
| | | | | <u>\$126,000</u> |

**Rounded

3. 2019

| | |
|-----------------------------------|--------|
| July 1 Bond Interest Expense..... | 17,825 |
| Premium on Bonds Payable | 3,175 |
| Cash | 21,000 |

Paid semiannual interest and amortized the bond premium for six months.

4. The bonds were sold for more than face value because the company promised to pay a higher rate of interest (12%) than the investors were expecting (10%) at the time the bonds were issued.

P 10–17 (LO3, LO5)
Straight-Line versus Effective-Interest Amortization

| | |
|---|------------------|
| 1. \$180,000 × 0.7050 (Table I—6%, 6 periods) | \$126,900 |
| \$9,000 × 4.9173 (Table II—6%, 6 payments) | <u>44,256</u> |
| Issuance price of bonds | <u>\$171,156</u> |

P 10–18 (LO3, LO5) Unifying Concepts: Accounting for Bonds Payable

| | | |
|----|--|------------------------|
| 1. | \$100,000 × 0.7307 (Table I—4%, 8 periods) | \$73,070 |
| | \$3,500 × 6.7327 (Table II—4%, 8 payments) | 23,564 |
| | Issuance price of bonds | <u>\$96,634</u> |

| 2. | Date | Cash Interest Payment | Interest Expense | Discount Amortization | Bond Carrying Value |
|----|--------------------------|-----------------------------|------------------------|--------------------------|---------------------------|
| | May 1, 2017 | | | | \$ 96,634 |
| | November 1, 2017..... | \$ 3,500 | \$ 3,865 | \$ 365 | 96,999 |
| | May 1, 2018 | 3,500 | 3,880 | 380 | 97,379 |
| | November 1, 2018..... | 3,500 | 3,895 | 395 | 97,774 |
| | May 1, 2019 | 3,500 | 3,911 | 411 | 98,185 |
| | November 1, 2019..... | 3,500 | 3,927 | 427 | 98,612 |
| | May 1, 2020 | 3,500 | 3,944 | 444 | 99,056 |
| | November 1, 2020..... | 3,500 | 3,962 | 462 | 99,518 |
| | May 1, 2021 | <u>3,500</u> | <u>3,982**</u> | <u>482**</u> | 100,000** |
| | Totals | <u>\$28,000</u> | <u>\$31,366</u> | <u>\$3,366</u> | |

**Rounded

| | | |
|--|--|-------|
| 3. a. 2017 | Dec. 31 Bond Interest Expense | 1,294 |
| | Discount on Bonds Payable | 127 |
| | Bond Interest Payable | 1,167 |
| <i>To record bond interest for two months (\$3,500 × 2/6 = \$1,167) and amortize bond discount for two months (\$380 × 2/6 = \$127).</i> | | |
| b. 2018 | | |
| | May 1 Bond Interest Expense | 2,586 |
| | Bond Interest Payable | 1,167 |
| | Discount on Bonds Payable (\$380 – \$127) .. | 253 |
| | Cash | 3,500 |
| <i>To pay semiannual bond interest and amortize bond discount for four months.</i> | | |
| c. 2018 | | |
| | Nov. 1 Bond Interest Expense | 3,895 |
| | Discount on Bonds Payable | 395 |
| | Cash | 3,500 |
| <i>To pay semiannual bond interest and amortize bond discount for six months.</i> | | |

| | | |
|---------|--|-----------------|
| d. 2018 | | |
| Dec. 31 | Bond Interest Expense | 1,304 |
| | Discount on Bonds Payable | 137 |
| | Bond Interest Payable | 1,167 |
| | <i>To record bond interest for two months (\$3,500 × 2/6 = \$1,167) and amortize bond discount for two months (\$411 × 2/6 = \$137).</i> | |
| 4. | Interest expense for 2018 | |
| | Computed May 1, 2018 | \$2,586 |
| | Computed November 1, 2018..... | 3,895 |
| | Computed December 31, 2018..... | 1,304 |
| | Bond interest expense for 2018..... | <u>\$7,785</u> |
| 5. | Carrying value of bonds at December 31, 2018 | |
| | Carrying value at November 1, 2018 (per amortization schedule) . | \$97,774 |
| | Add bond discount amortized November to December 31, 2018 .. | 137 |
| | Carrying value at December 31, 2018..... | <u>\$97,911</u> |
| 6. | The issuance price of a bond is based on the relationship of the effective rate of interest to the stated rate of interest quoted on the bond as well as relative risks. If two companies issued bonds with the same face value and the same stated rate of interest on the same day, the effective rate of interest could be different because investors assess the risk inherent in the bonds of one company to be different from the risk inherent in the other company. This difference in assessment could be related to the quality of management, the financial status of the firm, and/or expectations of differences in performance in the future. These could be related to labor problems, differences in product quality, ability to compete in a global economy, and so on. | |

Chapter 10
P 10-19(LO 3, LO 5) Accounting for Bonds Issued at a Discount

2017

| | | |
|--------|---------------------|-----------|
| Jan. 1 | Cash | 4,219,600 |
| | Bonds Payable | 4,219,600 |

2.

Edward Elric Ltd.
Bond Discount Amortization Table
Effective-Interest Method—Annual Interest Payments
9% Bonds Issued at 10%

| Annual Interest Periods | (A) Interest to Be Paid | (B) Interest Expense to Be Recorded | (C) Discount Amor- tization (B) – (A) | (D) Bond Carrying Value |
|-------------------------------|----------------------------------|---|---|----------------------------------|
| Jan 1, 2017 | | | | \$3,508,434 |
| Dec 31, 2017 | \$320,000 | \$350,843 | \$30,843 | 3,539,277 |
| Dec 31, 2018 | 320,000 | 353,928 | 33,928 | 3,573,205 |

3. Dec. 31 Interest Expense

| | |
|--|---------|
| (\$3,508,434 X 10%) | 350,843 |
| Bonds Payable | 30,843 |
| Interest Payable (\$4,000,000 X 8%) | 320,000 |

4. 2018

| | | |
|--------|-----------------------|---------|
| Jan. 1 | Interest Payable..... | 320,000 |
| | Cash | 320,000 |

5. Dec. 31 Interest Expense

| | |
|---------------------------|---------|
| [\$3,539,277 X 10%] | 353,928 |
| Bonds Payable | 33,928 |
| Interest Payable..... | 320,000 |

SOLUTIONS TO “STOP & THINK”

Stop & Think (p. 418): Without referencing the present value tables, answer these questions: As interest rates increase, would you expect the present value factors to increase or decrease? Why?

If you can invest at a higher interest rate, you would expect to be able to invest a smaller sum of money now and yet still receive the same amount in the future. Why? Your investment can be smaller because the interest you earn will be larger. As a result, you would expect the present value factors to get smaller as interest rates rise. This can be confirmed by looking at the present value of a single amount table.

Stop & Think (p. 427): If the market rate of interest is higher than the rate of interest stated on the bonds, will the bonds sell at a price higher or lower than the face value? Is the higher rate more attractive to investors, and if it is, what would investors do as a result?

It is important for students to understand the intuition behind the relationship between bond prices and interest rates. This question is answered in the paragraphs that follow this box in the chapter. If an issuer is offering a bond that pays a higher rate of interest than other bonds of the same risk, investors will bid the price of the bond up.