

SOLUTIONS

Appendix 2

Part I
Multiple Choice

1. a
2. c Accounts payable is a current liability.
3. d A bond is a long-term liability.
4. d Different names are used for the same thing.
5. c The trustee keeps a record of bond owners and other documents.
6. b
7. a
8. c A senior bond will be paid before other bonds in the case of default, bankruptcy, or liquidation. A subordinated bond will be paid after senior bonds – it has lower priority. If a bond cannot be called, the investor can continue to own the bond and earn interest on the bond until maturity, without being forced to sell it a fixed price to the issuer. A registered bond means that if the bond is lost or stolen, the owner will not lose ownership and the bond can be replaced.
9. c
10. d
11. c $\$100,000 \times .965 =$ cash received of $\$96,500$. $\$100,000 - \$96,500 = \$3,500$ discount. Discounts have a debit balance and offset the credit balance of bonds payable.
12. a At maturity the payment obligation is the par value of the bonds.
13. b Carrying value $\$312,000 -$ price paid: $\$300,000 \times 1.015 = \$304,500 = \$7,500$ gain.
14. d There are no gains or losses when bonds are converted. The carrying value is simply moved into stockholders equity as new stock equity.
15. a $\$5,250$ total payment – $\$400$ principal portion = $\$4,850$ interest portion
16. d The long-term liability section will show both note payable of $\$400,000$ and the current portion of the long-term debt of $\$44,400$ subtracted = $\$355,600$. Current liabilities will then show $\$44,400$.
17. a The period-end interest must be accrued. Loan payments are generally made at the end of a period, so the interest expense reflects the time that has already passed since the previous payment.

Part I Discussion Questions and Brief Exercises

1. A long-term liability is an obligation to make a payment (a debt) more than one year from the current balance sheet date or the operating cycle, whichever is longer.
2. The price of bond is determined primarily by a calculation that compares the market rate of interest to the stated (contractual) rate of interest of the bond. If the market rate is higher, the bonds will sell at a discount; if the market rate is lower, the bonds will sell at a premium. In other words, bond prices move inversely to changes in the market rate of interest related to those bonds.
3. This is not really a practical system. For example, investing in bonds at a discount and collecting a greater par value at maturity does not really represent a profit. It is simply the result of the market rate of interest being higher than the bond contractual rate at the time the bonds were bought. In other words, whether or not bonds can be purchased at par, at a discount, or at a premium is just a reflection of the market rate of interest at the time the bonds were purchased, which was acceptable to the investor. That percent rate of return is built into the bond investment, which includes any discount or premium.

SOLUTIONS

Appendix 2, continued

4. A bond discount occurs when the market rate of interest for a type of bond is greater than the stated (contractual) rate for that bond. The effect is to increase the bond's interest expense from the stated rate to the market rate. A bond premium occurs when the market rate of interest for a type of bond is less than the stated (contractual) rate of that bond. The effect is to reduce the bond's interest expense from the stated to the market rate.

5.

Cash paid:	
Par value at maturity	\$1,000,000
Semi-annual interest payments ($\$35,000 \times 20$)	<u>700,000</u>
Total cash payments	1,700,000
Cash received:	
Cash received when bonds issued	<u>1,018,000</u>
Net cost of borrowing	<u>\$682,000</u>

This is the total of: 20 semi-annual interest payments of \$35,000 – premium of \$18,000.

6.

Cash paid:	
Par value at maturity	\$5,000,000
Semi-annual interest payments ($\$200,000 \times 10$)	<u>2,000,000</u>
Total cash payments	7,000,000
Cash received:	
Cash received when bonds issued	<u>4,925,000</u>
Net cost of borrowing	<u>\$2,075,000</u>

This is the total of: 10 semi-annual interest payments of \$200,000 + discount of \$75,000.

7. Advantages of bonds compared to stock: 1) Ownership is not diluted because bondholders do not have voting rights. 2) The stock price will not decline because of new shares being issued. 3) Bond interest is tax-deductible, but stock dividends are not. 4) It is possible that earnings per share may be greater with a bond issue than with a stock issue. Disadvantages of bonds compared to stock: 1) The greatest disadvantage is that bonds increase risk, because they create fixed, required, payments that cannot be removed except by retiring the bonds, and this requires large amounts of cash. 2) Also, bond payments reduce net income and cash flow.
8. a) A feature that allows the issuer to purchase a bond from the bondholder at a fixed price prior to maturity, and that will terminate all interest payments after the call date. b) A serial bond pays the principal (the par value) in installments over the life of the bond. A term bond pays the principal at the end of a bond's term. c) A registered bond ensures that the bond owner's name is recorded by a trustee, so ownership is a matter of record. Bearer bond ownership is not recorded; ownership is determined by physical possession. d) A secured bond means that property has been pledged as collateral by the bond issuer. In the case of non-payment of principal or interest, the pledged property will be sold and the proceeds used to pay the bondholders. A debenture bond is unsecured. e) A senior bond is required to be paid before other bonds in the case of default, bankruptcy, or liquidation of the bond issuer. A subordinated bond is paid only after other senior bonds amounts due are paid.

SOLUTIONS**Appendix 2, continued**

9. A bond sinking fund is a cash fund that is accumulated over the term of a bond for the purpose of ensuring that the principal (par value) of the bond will be paid when it matures.
10. No, after bonds are issued the investor bond transactions are recorded only by the investors, not the issuer of the bonds. An issuer of bonds records these types of transactions: 1) issuing the bonds 2) interest expense and payment 3) redemption before and/or at maturity 4) conversion to stock.
11. The issuer of the bonds is obligated to make periodic interest payments. The issuer is also obligated to pay the principal (par value) of the bonds. Usually the principal payment is a single payment made at maturity; however, some bonds require payment in installments over the term of the bonds.
12. The contractual interest rate (also called the stated rate or face rate) has only one purpose: to determine the amount of interest payments from a bond. This is a fixed rate. The market rate of interest is the rate of interest that investors require in order to invest in a bond. This rate is continually changing as economic and other conditions change. Changes in the market rate of interest is the primary influence for changes in bond prices; however, the financial condition of an issuer will also affect the prices of bonds that it issues.

13.

June 1	Cash	2,487,500	
	Discount on Bonds Payable	12,500	
	Bonds Payable		2,500,000
	(To record bond issue)		

$$\$2,500,000 \times .995 = \$2,487,500$$

14.

Dec. 1	Cash	772,500	
	Premium on Bonds Payable		22,500
	Bonds Payable		750,000
	(To record bond issue)		

$$\$750,000 \times 1.03 = \$772,500$$

15.

May 1	Cash	680,000	
	Bonds Payable		680,000
	(To record bond issue)		

Nov. 1	Cash	25,500	
	Bonds Payable		25,500
	(To record bond interest payment)		

$$\$680,000 \times .075 \times 6/12 = \$25,500$$

SOLUTIONS

Appendix 2, continued

16. At December 31, two months of unpaid interest (from the last payment date of November 1 through December 31 year-end) must accrued.

Nov. 1	Interest Expense	8,500	
	Interest Payable		8,500
	(To accrue unpaid bond interest expense)		

$\$680,000 \times .075 \times 6/12 = \$25,500$ semi-annual interest

$\$25,500 \times 2/6 = \$8,500$ two months of semi-annual interest

17. Carrying value is bond par value minus the balance of the discount or plus the balance of the premium, depending on whether bonds are issued at a premium or discount. In this case, the bonds were issued at a discount, therefore: $\$500,000 - \$11,120 = \$488,880$ bond carrying value.

18.

	<u>Issue Stock</u>	<u>Issue Bonds</u>
Income before bond interest and tax expense	\$845,000	\$845,000
Deduct: bond interest expense ($5,000,000 \times .06$)	-----	300,000
Income before tax	845,000	545,000
Deduct: income tax at 30%	<u>253,500</u>	<u>163,500</u>
Net income	<u>\$591,500</u>	<u>\$381,500</u>
Earnings per share of outstanding stock:		
Issue stock ($\$591,500/600,000 = \0.986)	<u>\$0.986</u>	
Issue bonds ($\$381,500/350,000 = \1.09)		<u>\$1.09</u>

- a) The stock issue results in highest net income.
 b) The bond issue results in the highest earnings per share.
 c) The bond issue creates the greatest risk because of fixed payments.

19.

Carrying value: $\$1,000,000 - \$41,200$	\$958,800
Less: Purchase price: $\$1,000,000 \times 1.035$	<u>\$1,035,000</u>
Loss on bond redemption	<u>\$76,200</u>

-----	Bonds Payable	1,000,000	
	Loss on Bond Redemption	76,200	
	Discount on Bonds Payable		41,200
	Bonds Payable		1,035,000
	(To record bond retirement)		

SOLUTIONS**Appendix 2, continued****20.**

-----	Bonds Payable	500,000	
	Premium on Bonds Payable	26,600	
	Common Stock		526,600
	(To record bond conversion into common Shares)		

Notice that there is no gain or loss when bonds are converted into stock, and the price of the stock is not relevant to how the transaction is recorded.

21.

	(A)	(B)	(C)	(D)
Pmt. #	Payment (formula)	Principal (A – C)	Interest (.08 × D)/4	Principal Balance
				\$250,000
1	\$9,139	\$4,139	\$5,000	245,861
2	9,139	4,222	4,917	241,639
3	9,139	4,306	4,833	237,333
4	9,139	4,392	4,747	232,941

22.

June 1	Cash	750,000	
	Notes Payable		750,000
	(To record new loan)		

Aug. 1	Interest Expense	4,063	
	Notes Payable	1,529	
	Cash		5,592
	(To record loan payment)		

Interest expense for first payment is $\$750,000 \times .065/12 = \$4,063$

SOLUTIONS

Appendix 2, continued

23.

Littleton Company			
Balance Sheet (partial)			
June 30, 20XX			
Current liabilities:			
Current portion of long-term debt	\$11,778		
Accounts payable	<u>8,500</u>		
Total current liabilities		\$20,278	
Long-term liabilities			
Notes payable	145,320		
Less: current portion of long-term debt	<u>11,778</u>	133,542	
Bonds payable	220,000		
Add: premium on bonds payable	<u>11,000</u>	<u>231,000</u>	
Total long-term liabilities		<u>364,542</u>	
Total Liabilities		<u>\$384,820</u>	

To determine the current portion of the note payable, it is necessary to set up a partial amortization table. The principal portion of the next two semi-annual payments are a current liability: $\$5,787.80 + \$5,990.37 = \$11,778.17$

(A)	(B)	(C)	(D)
Payment (formula)	Principal (A – C)	Interest (.07 × D)/2	Principal Balance
			\$145,320.00
\$10,874	5,787.80	5,086.20	139,532.20
\$10,874	5,990.37	4,883.62	133,541.83

Reinforcement Problems

A 2-1.

a.

	<u>Issue Stock</u>	<u>Issue Bonds</u>
Income before bond interest and tax expense	\$12,800,000	\$12,800,000
Deduct: bond interest expense ($\$75,000,000 \times .075$)	-----	5,625,000
Income before tax	12,800,000	7,175,000
Deduct: income tax at 35%	<u>4,480,000</u>	<u>2,511,250</u>
Net income	<u>\$8,320,000</u>	<u>\$4,663,750</u>
Earnings per share of outstanding stock:		
Issue stock ($\$8,320,000/1,400,000 = \5.943)	<u>\$5.94</u>	
Issue bonds ($\$4,663,750/800,000 = \5.830)		<u>\$5.83</u>

SOLUTIONS**Appendix 2, continued****A 2-1, continued**

- b. The bond issue results in substantially lower net income. In this circumstance the stock issue results in a higher earnings per share than the bond issue. Furthermore, the bond issue creates more risk, because the bond payments are fixed and required, while stock dividends are not. Furthermore, the bond issue will reduce cash flow.

Future changes in tax rates will also affect the tax advantage of the bond issue. If tax rates increase, the bond issue results in a greater tax savings; if tax rates decrease the bond issue will have less tax benefits.

The bond issue will not affect ownership and possible control of the company as would a stock issue. Furthermore, a bond issue will not dilute the price of the stock. Issuing 600,000 new shares will upset current stockholders because the large increase in number of shares will reduce the price per share as well as earnings per share. (Notice that current earnings per share is $\$8,320,000/800,000 = \10.40 per share.)

(Note: also see volume 1 for discussion on the advantages and disadvantages of the use of leverage on stockholder return on investment.)

A 2-2.

a.

Mar. 1	Cash	1,000,000	
	Premium on Bonds Payable		21,000
	Bonds Payable		600,000
	(To record bond issue)		

$$\$600,000 \times 1.035 = \$621,000$$

b.

Mar. 1	Cash	583,500	
	Discount on Bonds Payable	16,500	
	Bonds Payable		600,000
	(To record bond issue)		

$$\$600,000 \times .9725 = \$583,500$$

c.

Mar. 1	Cash	600,000	
	Bonds Payable		600,000
	(To record bond issue)		
Sept. 1	Interest Expense	22,500	
	Cash		22,500
	(To record semi-annual bond interest payment)		

$$\$600,000 \times .075 \times 6/12 = \$22,500$$

SOLUTIONS

Appendix 2, continued

A 2-3.

a.

Apr. 1	Cash	1,000,000	
	Bonds Payable		1,000,000
	(To record bond issue)		

b.

Oct. 1	Interest Expense	40,000	
	Cash		40,000
	(To record semi-annual bond interest payment)		

$$\$1,000,000 \times .08 \times 6/12 = \$40,000$$

c.

Dec. 31	Interest Expense	20,000	
	Interest Payable		20,000
	(To accrue 3 months' bond interest expense)		

$$1,000,000 \times .08 \times 6/12 = \$40,000$$

$$\$40,000 \times 3/6 = \$20,000$$

A 2-4.

a. 2017

June 1	Cash	900,000	
	Bonds Payable		900,000
	(To record bond issue)		

b.

Dec. 1	Interest Expense	27,000	
	Cash		27,000
	(To record semi-annual bond interest payment)		

$$\$900,000 \times .06 \times 6/12 = \$27,000$$

c.

Dec. 31	Interest Expense	4,500	
	Interest Payable		4,500
	(To accrue 1 month bond interest expense)		

$$900,000 \times .06 \times 6/12 = \$27,000$$

$$\$27,000 \times 1/6 = \$4,500$$

SOLUTIONS**Appendix 2, continued****A 2-4, continued**

d. 2018

June 1	Interest Expense	22,500	
	Interest Payable	4,500	
	Cash		27,000
	(To record 5 months' bond interest expense and semi-annual payment)		

$$\begin{aligned} \$900,000 \times .06 \times 6/12 &= \$27,000 \\ \$27,000 \times 5/6 &= \$22,500 \quad (\text{or } \$900,000 \times .06 \times 5/12) \end{aligned}$$

Because the bonds were issued on June 1, the interest expense for each second semi-annual payment will always have to be apportioned as 1 month and 5 months between years.

A 2-5.

a.

Sept. 1	Bonds Payable	400,000	
	Premium on Bonds Payable	12,300	
	Cash		386,000
	Gain on Bond Redemption		26,300
	(To record early bond redemption)		

$$\begin{aligned} \text{Carrying value: } \$400,000 + \$12,300 & \$412,300 \\ \text{Less: Purchase price: } \$400,000 \times .965 & \underline{\$386,000} \\ \text{Gain on bond redemption} & \underline{\underline{\$26,300}} \end{aligned}$$

b.

Apr. 2	Bonds Payable	500,000	
	Loss on Bond Redemption	23,000	
	Cash		515,000
	Discount on Bonds Payable		8,000
	(To record early bond redemption)		

$$\begin{aligned} \text{Carrying value: } \$500,000 - \$8,000 & \$492,000 \\ \text{Less: Purchase price: } \$500,000 \times 1.03 & \underline{\$515,000} \\ \text{Loss on bond redemption} & \underline{\underline{\$(23,000)}} \end{aligned}$$

SOLUTIONS

Appendix 2, continued

A 2-5, continued

c.

July 1	Interest Expense	50,000	
	Cash		50,000
	(To record semi-annual interest payment)		
	Bonds Payable	1,000,000	
	Loss on Bond Redemption	13,000	
	Cash		1,013,000
	(To record early bond redemption)		

Carrying value:	\$1,000,000
Less: Purchase price: $\$1,000,000 \times 1.013$	<u>\$1,013,000</u>
Loss on bond redemption	<u><u>\$(13,000)</u></u>

d.

May 1	Bonds Payable	300,000	
	Common Stock		300,000
	(To record bond conversion to stock)		

A 2-6.

a.

Feb. 1	Cash	450,000	
	Notes Payable		450,000
	(To record issuing note to borrow cash)		

Pmt #	(A)	(B)	(C)	(D)
	Payment (formula)	Principal (A – C)	Interest $(.09 \times D)/2$	Principal Balance
				\$450,000.00
1	\$27,626.	\$7,376.00	\$20,250.00	442,624.00
2	27,626.	7,707.92	19,918.08	434,916.08
3	27,626.	8,054.78	19,571.22	426,861.30

b.

Aug. 1	Interest Expense	20,250	
	Notes Payable	7,376	
	Cash		27,626
	(To record semi-annual interest payment)		

SOLUTIONS**Appendix 2, continued****A 2-6, continued**

c.

Dec. 31	Interest Expense	16,598	
	Interest Payable		16,598
	(To accrue 5 months' interest on note)		

Accrued interest: $\$19,918.08 \times 5/6 = \$16,598.40$

d.

Feb. 1	Interest Expense	3,320	
	Interest Payable	16,598	
	Notes Payable	7,708	
	Cash		27,626
	(To record semi-annual interest payment)		

e.

Portland Company Balance Sheet (partial) December 31, 2017		
Current liabilities:		
Note interest payable		\$16,598
Current portion of long-term debt		15,763
Long-term liabilities		
Notes payable	\$42,624	
Less: current portion of long-term debt	<u>15,763</u>	<u>426,861</u>
Total Liabilities		<u>\$459,222</u>

Current portion of long-term note: $\$7,707.92 + \$8,054.78 = \$15,762.70$
(see amortization schedule)**A 2-7.**

a.

Mar. 1	Cash	500,000	
	Bonds Payable		500,000
	(To record bond issue)		

May 31	Equipment	250,000	
	Notes Payable		250,000
	(To record equipment purchase)		

SOLUTIONS

Appendix 2, continued

A 2-7, continued

Sept. 1	Interest Expense	15,000	
	Cash		15,000
	(To record semi-annual bond interest payment)		

$\$500,000 \times .06 \times 6/12 = \$15,000$ semi-annual bond interest expense.

Nov. 30	Interest Expense	10,625	
	Notes Payable	20,583	
	Cash		31,208
	(To record note interest payment)		

Pmt #	(A)	(B)	(C)	(D)
	Payment (formula)	Principal (A – C)	Interest (.085 × D)/2	Principal Balance
				\$250,000.00
1	\$31,208.00	\$20,583.00	\$10,625.00	229,417.00
2	31,208.00	21,457.78	9,750.22	207,959.22
3	31,208.00	22,369.73	8,838.27	185,589.49
4	31,208.00	23,320.45	7,887.55	162,269.04

Dec. 18	Bonds Payable	200,000	
	Loss on Bond Redemption	6,000	
	Discount on Bonds Payable		10,000
	Cash		196,000
	(To record bond redemption prior to maturity)		

Carrying value: \$200,000 – \$10,000	\$190,000
Less: Purchase price: \$200,000 × .98	<u>\$196,000</u>
Loss on bond redemption	<u>\$(6,000)</u>

Dec. 31	Interest Expense	11,625	
	Interest Payable		11,625
	(To accrue interest on bond and note payable)		

Accrued bond interest: $\$15,000 \times 4/6 = \$10,000$. (or $\$500,000 \times .06 \times 4/12$)

Accrued note interest: $\$9,750.22 \times 1/6 = 1,625.04$

SOLUTIONS

Appendix 2, continued

A 2-7, continued

b.

Greensboro, Inc.		
Balance Sheet (partial)		
December 31, 20XX		
Current liabilities:		
Interest payable	\$11,635	
Current portion of long-term debt	43,828	
Accounts payable	<u>15,300</u>	
Total current liabilities		\$ 70,753
Long-term liabilities		
Notes payable	229,417	
Less: current portion of long-term debt	<u>43,828</u>	185,589
Bonds payable		<u>500,000</u>
Total long-term liabilities		<u>685,589</u>
Total Liabilities		<u>\$756,342</u>

Current portion of long-term note: $\$21,457.78 + \$22,369.73 = \$43,827.51$
 (see amortization schedule)

SOLUTIONS

Appendix 2, continued

Part II
Multiple Choice

1. c The total interest expense over the life of a bond consists of the cash payments made combined with the discount or premium of the bond. Amortizing a discount increases interest expense above the amount of the cash payment and amortizing a premium reduces interest expense below the amount of the cash payment.
2. a
3. d
4. b See the journal entry example in the appendix.
5. c See the journal entry example in the appendix.
6. c The sale of the bonds at 98 results in a 2% discount $(1 - .98) \times \$500,000 = \$10,000$. This discount will be amortized over 20 semi-annual periods: $\$10,000/20 = \500 . Therefore, the interest expense for each semi-annual period is $\$500 + (\$500,000 \times .05 \times 6/12) = \$13,000$.
7. d. Unpaid bond interest expense should be accrued at the end of an accounting period. The accrual will include both interest expense from the unpaid payment as well as from the amortization of a discount or premium.
8. b The sale of the bonds at 102 results in a 2% premium of $\$1,000,000 \times .02 = \$20,000$. This premium will be amortized over 20 semi-annual periods: $\$20,000/20 = \$1,000$. Therefore, the interest expense for each semi-annual period is $(\$1,000,000 \times .06 \times 6/12) - \$1,000 = \$29,000$.
9. b The semi-annual discount amortization is $\$10,000/10 = \$1,000$. The semi-annual interest payment is $\$1,000,000 \times .06 \times 6/12 = \$30,000$. Therefore, the semi-annual interest is $\$31,000$. If bonds are issued on August 1, the first semi-annual payment will be on February 1. At December 31, 5 months of interest would be accrued: $\$31,000 \times 5/6 = \$25,833$.
10. d

Discussion Questions and Brief Exercises

1. Accruing interest expense means to record interest that is owed because time has passed (interest accrues with the passage of time), but has not yet been paid. Yes, what applies to interest expense also applies to interest revenue that has been earned.
2. A bond discount represents additional interest expense above the amount of the semi-annual interest payments. The discount is adjusted into interest expense over the full term of bonds because this is the period for which the issuer has the use of the money. (Interest is the “rental charge” for use of money.) It would be incorrect to record this interest all in a single period. The same logic applies to amortization of a premium, which results in a decrease in interest expense below the amount of the total cash payments over the full term of bonds.
- 3.

June 30	Interest Expense	12,167	
	Discount on Bonds Payable		500
	Interest Payable		11,667
	(To accrue interest expense.)		

$\$35,000 \times 2/6 = \$11,667$ interest expense for two months (May and June).

$\$1,500 \times 2/6 = \500 amortization for two months (May and June).

SOLUTIONS**Appendix 2, continued**

4. Without amortization of a discount, interest expense would be overstated in the period that a bond matures, and understated in all other periods of the bond's term. This is because the full amount of discount would have to be recorded as interest expense in a single period at maturity. Without amortization of a premium, interest expense would be understated in the period that a bond matures, and overstated in all other periods of the bond's term. This is because the full amount of premium would have to be removed in a single period.
5. Straight-line means an equal amount is recorded in each equal period.
6. An amortization table provides several benefits: 1) It reduces errors by calculating all elements together, including changing balances, in one table. 2) It provides a source of data for journal entries. 3) It provides a convenient and understandable summary of all the accounting effects of a bond issue.
7. When a discount is amortized, the carrying value of a bond increases as the bond approaches maturity. This happens because the discount, which is subtracted from bonds payable, is being reduced. When a premium is amortized, the carrying value of a bond decreases as the bond approaches maturity. This happens because the premium, which is added to bonds payable, is being reduced.
8.
 - a. The premium is being amortized over 10 semi-annual periods, so the bond has a 5-year term. The annual interest rate is 8%.
 - b. Unamortized premium, which is added to the \$100,000 of bonds payable to obtain carrying value, is decreasing, therefore decreasing the carrying value.
 - c.

June 30	Interest Expense	3,490	
	Premium on Bonds Payable	510	
	Cash		4,000
	(To record semi-annual interest payment.)		

9.
 - a. The discount is being amortized over 10 semi-annual periods, so the bond has a 5-year term. The annual interest rate is 8%.
 - b. Unamortized discount, which is subtracted from the \$100,000 of bonds payable to obtain carrying value, is decreasing, therefore increasing the carrying value.
 - c.

June 30	Interest Expense	4,350	
	Discount on Bonds Payable		350
	Cash		4,000
	(To record semi-annual interest payment.)		

10. A bond interest payment was made, and includes discount amortization.
11. Bond interest expense was accrued, and includes discount amortization.
12. A bond interest payment was made, and includes premium amortization.

SOLUTIONS

Appendix 2, continued

A 2-8.

a.

Jan. 1	Cash	960,000	
	Discount on Bonds Payable	40,000	
	Bonds Payable		1,000,000
	(To record bond issue)		

$$\$1,000,000 \times .96 = \$960,000$$

b.

July 1	Interest Expense	34,000	
	Discount on Bonds Payable		4,000
	Cash		30,000
	(To record semi-annual interest payment)		

$$\$1,000,000 \times .06 \times 6/12 = \$30,000 \text{ payment}$$

$$\$40,000/10 = \$4,000 \text{ discount amortization}$$

c.

Dec. 31	Interest Expense	34,000	
	Discount on Bonds Payable		4,000
	Interest Payable		30,000
	(To accrue semi-annual interest expense)		

$$\$1,000,000 \times .06 \times 6/12 = \$30,000 \text{ payment}$$

$$\$20,000/10 = \$2,000 \text{ discount amortization}$$

A 2-9.

a.

Jan. 1	Cash	2,150,000	
	Premium on Bonds Payable		150,000
	Bonds Payable		2,000,000
	(To record bond issue)		

$$\$2,000,000 \times 1.075 = \$2,150,000$$

b.

July 1	Interest Expense	62,500	
	Premium on Bonds Payable	7,500	
	Cash		70,000
	(To record semi-annual interest payment)		

$$\$2,000,000 \times .07 \times 6/12 = \$70,000 \text{ payment}$$

$$\$150,000/20 = \$7,500 \text{ premium amortization}$$

SOLUTIONS

Appendix 2, continued

A 2-9, continued

c.

Dec. 31	Interest Expense	62,500	
	Premium on Bonds Payable	7,500	
	Interest Payable		70,000
	(To accrue semi-annual interest expense)		

$$\$2,000,000 \times .07 \times 6/12 = \$70,000 \text{ payment}$$

$$\$150,000/20 = \$7,500 \text{ premium amortization}$$

A 2-10.

a.

Semi-annual Period	A	B	C	D	E
	Interest Expense (B - C)	Cash Payment (\$800,000 × .08 × 6/12)	Premium Amortization (\$58,400/20)	Unamortized Premium (D - C)	Bond Carrying Value (\$800,000 + D)
				\$58,400	\$858,400
1	\$29,080	\$32,000	\$2,920	55,480	855,480
2	29,080	32,000	2,920	52,560	852,560
3	29,080	32,000	2,920	49,640	849,640
4	29,080	32,000	2,920	46,720	846,720

b.

Jan. 1	Cash	858,400	
	Premium on Bonds Payable		58,400
	Bonds Payable		800,000
	(To record bond issue)		

$$\$800,000 \times 1.073 = \$858,400$$

July 1	Interest Expense	29,080	
	Premium on Bonds Payable	2,920	
	Cash		32,000
	(To record semi-annual interest payment)		

$$\$800,000 \times .08 \times 6/12 = \$32,000 \text{ payment}$$

$$\$58,400/20 = \$2,920 \text{ premium amortization}$$

SOLUTIONS

Appendix 2, continued

A 2-10, continued

c.

Dec. 31	Interest Expense	29,080	
	Premium on Bonds Payable	2,920	
	Interest Payable		32,000
	(To accrue semi-annual interest expense)		

$$\$800,000 \times .08 \times 6/12 = \$32,000 \text{ payment}$$

$$\$58,400/20 = \$2,920 \text{ premium amortization}$$

d.

Jan. 1	Interest Payable	32,000	
	Cash		32,000
	(To record semi-annual interest payment)		

A 2-11.

a.

Semi-annual Period	A	B	C	D	E
	Interest Expense (B - C)	Cash Payment (\$1,000,000 × .075 × 6/12)	Premium Amortization (\$200,000/20)	Unamortized Premium (D - C)	Bond Carrying Value (\$1,000,000 + D)
				\$200,000	\$1,200,000
1	\$27,500	\$37,500	\$10,000	190,000	1,190,000
2	27,500	37,500	10,000	180,000	1,180,000
3	27,500	37,500	10,000	170,000	1,170,000
4	27,500	37,500	10,000	160,000	1,160,000

b.

Jan. 1	Cash	1,200,000	
	Premium on Bonds Payable		200,000
	Bonds Payable		1,000,000
	(To record bond issue)		

$$\$1,000,000 \times 1.20 = 1,200,000 \text{ cash received.}$$

July 1	Interest Expense	27,500	
	Premium on Bonds Payable	10,000	
	Cash		37,500
	(To record semi-annual interest payment)		

Use amortization table for journal entry.

SOLUTIONS

Appendix 2, continued

A 2-11, continued

Dec. 31	Interest Expense	27,500	
	Premium on Bonds Payable	10,000	
	Interest Payable		37,500
	(To record accrual of semi-annual interest)		

Use amortization table for journal entry.

c.

Las Vegas Company Balance Sheet (partial) December 31, 2017		
Current liabilities		
Interest payable		\$37,500
Long-term liabilities		
Bonds payable	\$1,000,000	
Add: premium on bonds payable	<u>180,000</u>	1,180,000

A 2-12.

a.

Semi-annual Period	A	B	C	D	E
	Interest Expense (B – C)	Cash Payment (\$1,000,000 × .04 × 6/12)	Discount Amortization (\$43,000/10)	Unamortized Discount (D – C)	Bond Carrying Value (\$1,000,000 – D)
				\$43,000	\$957,000
1	\$24,300	\$20,000	\$4,300	38,700	961,300
2	24,300	20,000	4,300	34,400	965,600
3	24,300	20,000	4,300	30,100	969,900
4	24,300	20,000	4,300	25,800	974,200

b.

July 1	Cash	957,000	
	Discount on Bonds Payable	43,000	
	Bonds Payable		1,000,000
	(To record bond issue)		

Proceeds: $\$1,000,000 \times .957 = \$957,000$

Jan. 1	Interest Expense	24,300	
	Discount on Bonds Payable		4,300
	Cash		20,000
	(To record semi-annual interest payment)		

Use amortization table for journal entry.

SOLUTIONS

Appendix 2, continued

A 2-12, *continued*

June 30	Interest Expense	24,300	
	Discount on Bonds Payable		4,300
	Interest Payable		20,000
	(To record semi-annual interest accrual)		

Use amortization table for journal entry.

c.

Medford Company Balance Sheet (partial) June 30, 2018		
Current liabilities		
Interest payable		\$ 20,000
Long-term liabilities		
Bonds payable	\$1,000,000	
Less: discount on bonds payable	<u>34,400</u>	965,600

SOLUTIONS**Appendix 2, continued****Part III
Multiple Choice**

1. c
2. a GAAP requires that interest expense (the cost of borrowing) during the life of bonds be the result of applying the market rate of interest at the time the bonds were issued, which determined what the bonds were sold for. Doing this results in a calculation that first determines interest expense based on this rate, and then calculates amortization as a residual amount. This is different than the straight-line method, which calculates amortization first, and then interest expense is a residual.
3. a
4. b
5. b Carrying value: $\$1,000,000 \times 1.01 = \$1,010,000$. $\$1,010,000 \times .07 \times 6/12 = \$35,350$ total interest expense.
6. a Carrying value: $\$1,000,000 \times .98 = \$980,000$. $\$980,000 \times .095 \times 6/12 = \$46,550$.

Discussion Questions and Brief Exercises

1. GAAP requires that the effective-interest method be used to record interest expense unless the straight-line method calculation gives results that are not materially different. The reason that GAAP requires the use of effective-interest is because it represents the true cost of borrowing. The true cost of borrowing is the interest rate that determined the proceeds of the borrowing (the cash received from the bond issue) as applied to whatever amount is still owed to the creditors (the carrying value). That is the reason that the market rate of interest at the time of borrowing is multiplied by the carrying value of the bond to determine interest expense.
2. Interest expense is calculated first. The objective of the effective-interest method is to report the most accurate interest expense, so interest expense is calculated first, and does not depend on how amortization is calculated. Conversely, the straight-line method calculates amortization first, and interest expense is the difference between the amortization amount and the cash payment.
- 3.

Step	Effective-Interest: Compute...	Straight-line: Compute...
1	Interest expense = (carrying value \times mkt. interest rate)	Amortization expense = (Premium or discount/ periods)
2	Cash payment (par value \times contract rate)	Cash payment (par value \times contract rate)
3	Amortization (payment - interest expense)	Interest expense (payment - amort. expense)
4	New carrying value	New carrying value

Notice the difference between steps 1 and 3.

4. Interest expense: $\$1,000,000 \times 1.02 = \$1,020,000$ initial carrying value $\times .07 \times 6/12 = \$35,700$
Premium amortization: $\$1,000,000 \times .09 \times 6/12 = \$45,000$ cash payment - $\$35,700 = \$9,300$.
5. Interest expense: $\$500,000 \times .95 = \$475,000$ initial carrying value $\times .06 \times 6/12 = \$14,250$
Premium amortization: $\$500,000 \times .04 \times 6/12 = \$10,000$ cash payment. $\$14,250 - \$10,000 = \$4,250$
6. Bond interest, including discount amortization, is being accrued at the end of an accounting period.
7. A bond interest payment is being made, including premium amortization.

SOLUTIONS

Appendix 2, continued

Part III Discussion Questions and Brief Exercises, *continued*

8. Referring to page XXX, the effective-interest table, interest expense begins at \$4,807 the first period and increases progressively to \$4,961 at the last period. This is because a constant effective interest rate of 5% is being applied to an increasing carrying value of the debt. Referring to page XXX for the straight-line method, we see that the interest rate is constant each period at \$4,885. This is because the interest expense is the sum of a fixed payment amount plus a fixed amount of a discount amortization each period. In both cases, the total interest expense over the full term of the bonds is the same: \$48,851.
9. Referring to page XXX, the effective-interest table, interest expense begins at \$4,162 the first period and decreases progressively to \$4,018 at the last period. This is because a constant effective interest rate of 4% is being applied to a decreasing carrying value of the debt. Referring to page XXX for the straight-line method, we see that the interest rate is constant each period at \$4,094. This is because the interest expense is the sum of a fixed payment amount minus fixed amount of a premium amortization each period. In both cases, the total interest expense over the full term of the bonds is the same: \$40,945.

Reinforcement Problems

A 2-13.

a.

Jan. 1	Cash	960,000	
	Discount on Bonds Payable	40,000	
	Bonds Payable		1,000,000
	(To record new bond issue)		

b.

July 1	Interest Expense	33,600	
	Discount on Bonds Payable		3,360
	Cash		30,000
	(To record interest payment and discount amortization)		

Interest expense: $\$960,000 \text{ initial carrying value} \times .07 \times 6/12 = \$33,600$.

Discount amortization: $\$33,600 - \$30,000 \text{ cash payment} = \$3,360$.

c.

Dec. 31	Interest Expense	33,718	
	Discount on Bonds Payable		3,718
	Interest Payable		30,000
	(To record accrual of bond interest and premium amortization)		

Carrying value: $\$960,000 + \$3,360 = \$963,360$.

Interest expense: $\$963,360 \text{ carrying value} \times .07 \times 6/12 = \$33,718$

Discount amortization: $\$33,718 - \$30,000 \text{ cash payment} = \$3,718$.

SOLUTIONS**Appendix 2, continued****A 2-13, continued**

- d. The interest expense is different with the effective-interest method. Specifically, it is a more accurate number and is based on the effective interest rate applied to the increasing carrying value of the debt. In the case of a discount using the effective-interest method, initially the interest expense is less than straight-line because the interest calculation is based on a discounted carrying value. (In problem A2-8 interest expense for the July 1 payment was \$34,000.) This effect reverses as the loan approaches maturity and carrying value increases.

A 2-14.

a.

Jan. 1	Cash	2,150,000	
	Premium on Bonds Payable		150,000
	Bonds Payable		2,000,000
	(To record new bond issue)		

$$\$2,000,000 \times 1.075 = \$2,150,000$$

b.

July 1	Interest Expense	64,500	
	Premium on Bonds Payable	5,500	
	Cash		70,000
	(To record interest payment and discount amortization)		

Interest expense: $\$2,150,000$ initial carrying value $\times .06 \times 6/12 = \$64,500$.

Premium amortization: $\$70,000$ cash payment $- \$64,500 = \$5,500$.

c.

Dec. 31	Interest Expense	64,335	
	Discount on Bonds Payable	5,665	
	Interest Payable		70,000
	(To record accrual of bond interest and premium amortization)		

Carrying value: $\$2,150,000 - \$5,500 = \$2,144,500$.

Interest expense: $\$2,144,500 \times .06 \times 6/12 = \$64,335$

Premium amortization: $\$70,000 - \$64,335 = \$5,665$.

- d. The interest expense is different with the effective-interest method. Specifically, it is a more accurate number and is based on the effective interest rate applied to the carrying value of the debt. In the case of a premium using the effective interest method, initially the interest expense is more than straight-line because the interest calculation is based on a high carrying value. This effect reverses as the loan approaches maturity and carrying value decreases.

SOLUTIONS

Appendix 2, continued

A 2-15.

a.

Bond Premium Amortization Table Effective-Interest Method: 20 semi-annual periods 7% annual, 3.5% semi-annual effective rate					
Semi-annual Period	A	B	C	D	E
	Interest Expense (Prior row E × .035)	Cash Payment (\$800,000 × .08 × 6/12)	Premium Amortization (B – A)	Unamortized Premium (D – C)	Bond Carrying Value (\$800,000 + D)
Issue				\$58,400.00	\$858,400.00
1	\$30,044.00	\$32,000	\$1,956.00	56,444.00	856,444.00
2	29,975.54	32,000	2,024.46	54,419.54	854,419.54
3	29,904.68	32,000	2,095.32	52,324.22	852,324.22
4	29,831.35	32,000	2,168.65	50,155.57	850,155.57

b.

Jan. 1	Cash	858,400	
	Premium on Bonds Payable		58,400
	Bonds Payable		800,000
	(To record bond issue)		

$$\$800,000 \times 1.073 = \$858,400$$

July 1	Interest Expense	30,044	
	Premium on Bonds Payable	1,956	
	Cash		32,000
	(To record semi-annual interest payment)		

Use amortization table for journal entry.

c.

Dec. 31	Interest Expense	29,976	
	Premium on Bonds Payable	2,024	
	Interest Payable		32,000
	(To accrue semi-annual interest expense)		

Use amortization table for journal entry.

d.

Jan. 1	Interest Payable	32,000	
	Cash		32,000
	(To record semi-annual interest payment)		

- e. The interest expense is different with the effective-interest method. Specifically, it is a more accurate number and is based on the effective interest rate applied to the carrying value of the debt. In the case of a premium, initially the interest expense is more than straight-line because the interest calculation is based on a high carrying value. This effect reverses as the loan approaches maturity and carrying value decreases.

SOLUTIONS

Appendix 2, continued

A 2-16.

a.

Bond Premium Amortization Table Effective-Interest Method: 20 semi-annual periods 5% annual, 2.5% semi-annual effective rate					
Semi-annual Period	A	B	C	D	E
	Interest Expense (Prior row E × .025)	Cash Payment (\$1,000,000 × .075 × 6/12)	Premium Amortization (B – A)	Unamortized Premium (D – C)	Bond Carrying Value (\$1,000,000 + D)
Issue				\$200,000.00	\$1,200,000.00
1	\$30,000.00	\$37,500	\$7,500.00	192,500.00	1,192,500.00
2	29,812.50	37,500	7,687.50	184,812.50	1,184,812.50
3	29,620.31	37,500	7,879.69	176,932.81	1,176,932.81
4	29,423.32	37,500	8,076.68	168,856.13	1,168,856.13

b.

Jan. 1	Cash	1,200,000	
	Premium on Bonds Payable		200,000
	Bonds Payable		1,000,000
	(To record bond issue)		

\$1,000,000 × 1.20 = \$1,200,000 proceeds

July 1	Interest Expense	30,000	
	Premium on Bonds Payable	7,500	
	Cash		37,500
	(To record semi-annual interest payment)		

Use amortization table for journal entry.

Dec. 31	Interest Expense	29,812	
	Premium on Bonds Payable	7,688	
	Interest Payable		37,500
	(To accrue semi-annual interest expense)		

Use amortization table for journal entry.

c.

Las Vegas Company Balance Sheet (partial) December 31, 2017		
Current liabilities		
Interest payable		\$ 37,500
Long-term liabilities		
Bonds payable	\$1,000,000	
Add: premium on bonds payable	<u>184,812</u>	1,184,812

SOLUTIONS

Appendix 2, continued

A 2-16, continued

- d. The interest expense is different with the effective-interest method. Specifically, it is a more accurate number and is based on the effective interest rate applied to the carrying value of the debt. In the case of a premium, initially the interest expense is more than straight-line because the interest calculation is based on a high carrying value. This effect reverses as the loan approaches maturity and carrying value decreases. Liabilities are also affected.

A 2-17.

a.

Bond Discount Amortization Table Effective-Interest Method: 10 semi-annual periods 5% annual, 2.5% semi-annual effective rate					
Semi-annual Period	A Interest Expense (Prior row E × .025)	B Cash Payment (\$1,000,000 × .04 × 6/12)	C Discount Amortization (A – B)	D Unamortized Discount (D – C)	E Bond Carrying Value (\$1,000,000 – D)
Issue				\$43,000.00	\$957,000.00
1	\$23,925.00	\$20,000	\$3,925.00	39,075.00	960,925.00
2	24,023.12	20,000	4,023.12	35,051.86	964,948.12
3	24,123.70	20,000	4,123.70	30,928.16	969,071.82
4	24,226.80	20,000	4,226.80	26,701.36	973,298.62

b. 2017

July 1	Cash	957,000	
	Discount on Bonds Payable	43,000	
	Bonds Payable		1,000,000
	(To record bond issue)		

Proceeds: $\$1,000,000 \times .957 = \$957,000$

2018

Jan. 1	Interest Expense	23,925	
	Discount on Bonds Payable		3,925
	Cash		20,000
	(To record semi-annual interest payment)		

Use amortization table for journal entry.

June 30	Interest Expense	24,023	
	Discount on Bonds Payable		4,023
	Interest Payable		20,000
	(To record semi-annual interest accrual)		

SOLUTIONS**Appendix 2, continued**

Use amortization table for journal entry.

A 2-17, continued

c.

Medford Company		
Balance Sheet (partial)		
June 30, 2018		
Current liabilities		
Interest payable		\$20,000
Long-term liabilities		
Bonds payable	\$1,000,000	
Less: discount on bonds payable	<u>35,052</u>	964,948

- d. The interest expense is different with the effective-interest method. Specifically, it is a more accurate number and is based on the effective interest rate applied to the increasing carrying value of the debt. In the case of a discount, initially the interest expense is less than straight-line because the interest calculation is based on a discounted carrying value. This effect reverses as the loan approaches maturity and carrying value increases. Liabilities are also affected.

SOLUTIONS

Appendix 2, continued

Part IV

Multiple Choice

1. c \$1 today can be invested and provide profits during the time period that passes until the future \$1 becomes available.
2. d
3. d
4. a This was discussed earlier in the appendix. The interest rate at the time bonds are issued determines the price of the bonds, because this is the rate of return that investors expect to receive as long as they hold the bonds.
5. b
6. c The interest rate in a table is the interest per time period. A time period can be any length of time. The length of the time period used depends upon each situation or problem presented. Typically, the most common periods are annual, semi-annual, quarterly, and monthly.

Discussion Questions

1. Money can be invested in many ways. As time passes, the investments return more money.
2. A bond provides cash flow from the payment of the par value at maturity and from the regular (usually semi-annual) interest payments.
3. 20 periods. A typical bond has semi-annual interest payments, therefore semi-annual periods must be used to match the payment intervals. To be consistent, semi-annual periods are also used for the calculation of the present value of the future par value redemption.
4. The amounts in an annuity table are the sum of present values of a series of \$1 payments, while a single sum table shows values for only a single \$1 amount. (Notice that for one payment in an annuity table the values are the same as a single sum table.)
5. The amounts become smaller. Moving from left to right, the interest rates increase, therefore the present values decrease. This can be interpreted in two equally valid ways: 1) The higher the interest rate, the less needs to be invested today to earn the same \$1. Or, 2) The higher the interest rate, the less the future \$1 is worth to you today, because you could have otherwise invested your money at the higher interest rate.
6. Smaller. As the number of periods increases, the present value becomes smaller. This can be interpreted in two equally valid ways: 1) The greater the number of periods, the more time is available to earn money, so the less needs to be invested today to earn the same \$1. Or, 2) The greater the number of periods, the less the future \$1 is worth to you today, because you have to wait longer to receive it.
7. The same principles apply in an annuity table. As interest rates increase, the present value of any given number of payments (any row) decreases. In a column, the amounts become greater because additional payments are added, but each payment is worth a little less because it is further away, so the amount of increase gets smaller and smaller.
8. Approximately .822
9. Approximately $.822 \times \$750 = \616.50
10. Five years is ten semi-annual periods. As well, since the periods are semi-annual, the interest rate is 2% per semi-annual period. (Bond interest rates, as with most interest rates, are stated as annual rates.) Therefore, 10 periods at 2% per period shows a present value of 1 as approximately .820.
11. Approximately 8.983
12. Approximately $8.983 \times \$500 = \$4,491.50$
13. Step #1: Calculate the present value of the par redemption payment. Step #2: Calculate the present value of the interest payments. Step #3: Add the results of step #1 and step #2.

SOLUTIONS**Appendix 2, continued****Reinforcement Problems****A 2-19.**

Step	Action
1	Present value of the par redemption payment. (Using market rate as the discount rate.) $.820 \times \$1,000,000 = \$820,000$
2	Present value of the interest payments. $8.983 \times \$25,000 = \$224,575$
3	Bond price: $\$820,000 + \$224,575 = \$1,044,575$.

A 2-20.

Step	Action
1	Present value of the par redemption payment. (Using market rate as the discount rate.) $.70892 \times \$5,000,000 = \$3,544,600$
2	Present value of the interest payments. $8.31661 \times \$150,000 = \$1,247,491.50$
3	Bond price: $\$3,544,600 + \$1,247,491.50 = \$4,792,091.50$.

A 2-21.

a.

Step	Action
1	Present value of the par redemption payment. (Using market rate as the discount rate.) $.742 \times \$5,000,000 = \$3,710,000$
2	Present value of the interest payments. $17.169 \times \$112,500 = \$1,931,512.50$
3	Bond price: $\$3,710,000 + \$1,931,512.50 = \$5,641,512.50$

b.

Jan. 1	Cash	5,641,512.50	
	Premium on Bonds Payable		641,512.50
	Bonds Payable		5,000,000.00
	(To record bond issue)		

SOLUTIONS

Appendix 2, continued

A 2-22.

a.

Step	Action
1	Present value of the par redemption payment. (Using market rate as the discount rate.) $.554 \times \$8,000,000 = \$4,432,000$
2	Present value of the interest payments. $14.877 \times \$220,000 = \$3,272,940$
3	Bond price: $\$4,432,000 + \$3,272,940 = \$7,704,940$

b.

Jan. 1	Cash	7,704,940	
	Discount on Bonds Payable	295,060	
	Bonds Payable		8,000,000
	(To record bond issue)		

A 2-23.

a.

Step	Action
1	Present value of the par redemption payment. (Using market rate as the discount rate.) $.744 \times \$100,000 = \$74,400$
2	Present value of the interest payments. $8.530 \times \$2,500 = \$21,325$
3	Bond price: $\$74,400 + \$21,325 = \$95,725$

b.

Step	Action
1	Present value of the par redemption payment. (Using market rate as the discount rate.) $.676 \times \$100,000 = \$67,600$
2	Present value of the interest payments. $8.111 \times \$2,500 = \$20,277$
3	Bond price: $\$67,600 + \$20,277 = \$87,877$

c.

Step	Action
1	Present value of the par redemption payment. (Using market rate as the discount rate.) $.554 \times \$100,000 = \$55,400$
2	Present value of the interest payments. $14.877 \times \$2,500 = \$37,193$
3	Bond price: $\$55,400 + \$37,193 = \$92,593$

SOLUTIONS

Appendix 2, continued

A 2-23, continued

d.

Step	Action
1	Present value of the par redemption payment. (Using market rate as the discount rate.) $.456 \times \$100,000 = \$45,600$
2	Present value of the interest payments. $13.590 \times \$2,500 = \$33,975$
3	Bond price: $\$45,600 + \$33,975 = \$79,575$

- e. The longer the term of a bond, the more it will be affected by a change in interest rates. For example, the market interest rate in both cases changed from 6% to 8%. You lost $\$95,725 - \$87,877 = \$7,848$ in value on your investment in 5-year bonds. However, you lost $\$92,593 - \$79,575 = \$13,018$ in value on the 10-year bonds, even though the interest rate increased the same 2%. Alternatively, if the rate had declined by 2%, the longer-term bonds would have gained more in value. As an investor, the longer the term of the bond, the greater the risk, and the greater the reward when rates change. The market rate changes will have no effect on the issuer of the bonds, because the payments remain the same.

SOLUTIONS

Appendix 2, continued

Part V
Multiple Choice

1. b Accrued interest in the context of a bond issue refers to the amount of interest that would have been incurred between the last payment date and the date the bonds are purchased, if the bonds had actually been outstanding. Because bonds pay a full six months' of interest at each payment date, the bond investor who purchases bonds between payment dates pays the issuing company the accrued interest at the date the bonds are purchased. The investor later receives a full six months of interest, thereby receiving the correct net amount of interest for the period the bonds were owned.
2. a (see #1 above)
3. c
4. b
5. b 10 years = 120 months. February 1 to April 1 = 2 months passed since authorization. Therefore, $120 - 2 = 118$ remaining months for amortization until maturity. $\$50,000/118 = \423.73 amortization per month. August 1 (the last payment date when interest was recorded) to December 31 = 5 months. Therefore, $\$423.73 \times 5 = \$2,118.65$ premium amortization.

Discussion Questions and Brief Exercises

1. First, the remaining number of months until maturity is reduced. This means that a premium or discount will have to be amortized over a reduced number of months. Second, accrued interest since the previous interest payment date (or the authorization date, if this is the first time the bonds are issued) must be calculated and added to the proceeds received from the bond investor.
2. September 1, 2017 to March 1, 2021 is 42 months. For 2017 total amortization is: $(\$3,000/42) \times 4 = \285.71 , rounded to \$286. (Bonds were outstanding for 4 months in 2017.)
3. 5 years = 60 months. December 1, 2016 to March 1, 2017 = 3 months. Remaining months until maturity: $60 - 3 = 57$. $\$6,000/57 = \105.26 per month premium amortization. $\$105.26 \times 10$ months outstanding in 2017 = \$1,052.60, rounded to \$1,053.
4. August 1, 2018 to November 30, 2027 is 112 months. $\$8,000/112 = \71.43 per month. At December 31, 2018 five months have elapsed since the last payment date recorded amortization on August 1. Therefore, $\$71.43 \times 5 = \357.15 discount amortization on December 31.
5. 10 years = 120 months. July 1, 2016 to May 1, 2017 = 10 months. Remaining months until maturity: $120 - 10 = 110$. $\$12,000/110 = \109.09 per month. At December 31, 2017 six months have elapsed since the last payment date recorded amortization on July 1. $\$109.09 \times 6 = \654.54 premium amortization on December 31.
6. Semi-annual interest is $\$1,000,000 \times .05 \times 6/12 = \$25,000$. June 1 to August 1 = 2 months. Accrued interest is $\$25,000 \times 2/6 = \$8,333$.
7. Semi-annual interest is $\$3,000,000 \times .06 \times 6/12 = \$90,000$. May 1 to September 1 = 4 months. Accrued interest is $\$90,000 \times 4/6 = \$60,000$.

SOLUTIONS**Appendix 2, continued****Part V Discussion Questions and Brief Exercises, continued**

8. If a bond is issued at par value between interest payment dates, steps 1–4 would be applied. If a discount or premium exists, step 5 would be completed.

Step	Action
1	Calculate the correct amount of payment interest expense for the time bonds are outstanding within the period.
2	From the bond issue: <i>collect</i> the “accrued interest” from the investor.
3	Bonds <i>pay</i> the full six months of interest on the next payment date.
4	Verify the net amount paid with Step 1, payments interest expense.
5	Calculate discount or premium amortization. Combine amount with results from steps 1–4.

9. Cash payment:

Step 1: $\$2,000,000 \times .07 \times 2/12 = \$23,333$ interest expense for September—October.

Step 2: $\$2,000,000 \times .07 \times 4/12 = \$46,667$ accrued interest

Step 3: $\$2,000,000 \times .07 \times 6/12 = \$70,000$

Step 4: $\$70,000 - \$46,667 = \$23,333$

Total interest expense: Discount amortization: $\$40,000/50$ months to maturity = $\$800$ per month. $\$800 \times 2 = \$1,600$. Total interest: $\$23,333 + \$1,600 = \$24,933$.

10. Cash payment:

Step 1: $\$1,000,000 \times .06 \times 4/12 = \$20,000$ interest expense for April—July

Step 2: $\$1,000,000 \times .06 \times 2/12 = \$10,000$ accrued interest

Step 3: $\$1,000,000 \times .06 \times 6/12 = \$30,000$

Step 4: $\$30,000 - \$10,000 = \$20,000$

Total interest expense:

Premium amortization: $\$25,000/118$ months to maturity = $\$211.86$ per month.

$\$211.86 \times 4 = \847.44 . Total interest: $\$20,000 - \$847 = \$19,153$.

- 11.

Dec. 31	Interest Expense	25,000	
	Interest Payable		25,000
	(To record year-end accrual: $\$5,000,000 \times .06 \times 1/12$)		
June 1	Interest Payable	25,000	
	Interest Expense	125,000	
	Cash		150,000
	(To record semi-annual interest payment: $\$5,000,000 \times .06 \times 6/12$)		

- 12.

Sept. 1	Cash	2,033,333	
	Bonds Payable		2,000,000
	Interest Payable		33,333

$\$2,000,000 \times .05 \times 4/12 = \$33,333$ accrued interest May 1 – September 1

SOLUTIONS

Appendix 2, continued

Part V Discussion Questions and Brief Exercises, continued

13. On December 31 of the current year, unpaid interest must be accrued from September 1 issue date for 4 months and the \$30,000 discount also must be amortized for 4 months. Accrued (unpaid) interest is: $\$1,000,000 \times .06 \times 4/12 = \$20,000$. Discount amortization is: $5 \text{ yrs.} \times 12 = 60$ month bond term – 7 months since authorization = 53 remaining months. $\$30,000/53 = \$566.04/\text{month}$. $\$566.04 \times 4 = \$2,264.16$. Therefore interest expense to record on December 31 for the bond issue is: $\$20,000 + \$2,264 = \$22,264$. (Note that in this problem the “accrued interest” refers to an accrual of unpaid interest expense at year-end, and not the use of the term referring to recording interest for a bond issued between interest payment dates, since that has already occurred and been recorded. Carefully distinguish between the uses of the term “accrued interest”.)

Reinforcement Problems

A 2-24.

a.

May 1	Cash	2,518,750	
	Bonds Payable		2,500,000
	Interest Payable		18,750
	(To record bond issue)		

$\$2,500,000 \times .09 \times 1/12 = \$18,750$ accrued interest for April

b. Cash payment:

Step 1: $\$2,500,000 \times .09 \times 5/12 = \$93,750$ interest expense for May—September

Step 2: $\$2,500,000 \times .09 \times 1/12 = \$18,750$ accrued interest received

Step 3: $\$2,500,000 \times .09 \times 6/12 = \$112,500$ semi-annual payment

Step 4: $\$112,500 - \$18,750 = \$93,750$ net cash paid

c.

Oct. 1	Interest Payable	18,750	
	Interest Expense	93,750	
	Cash		112,500
	(To record semi-annual interest payment)		

A 2-25.

a. Cash payment:

Step 1: $\$7,000,000 \times .0725 \times 3/12 = \$126,875$ interest expense for August—October

Step 2: $\$7,000,000 \times .0725 \times 3/12 = \$126,875$ accrued interest received

Step 3: $\$7,000,000 \times .0725 \times 6/12 = \$253,750$ semi-annual payment

Step 4: $\$253,750 - \$126,875 = \$126,875$ net cash payment

SOLUTIONS**Appendix 2, continued****A 2-25, continued**

b. and c.

Nov. 1	Interest Payable	126,875	
	Interest Expense	126,875	
	Cash		253,750
	(To record semi-annual interest payment)		
Dec. 31	Interest Expense	84,583	
	Interest Payable		84,583
	(To record year-end accrual: $\$7,000,000 \times .0725 \times 2/12$)		

A 2-26.

a.

June 1	Cash	4,339,417	
	Bonds Payable		4,300,000
	Interest Payable		39,417
	(To record bond issue)		

 $\$4,300,000 \times .055 \times 2/12 = \$39,417$ accrued interest for April—May

b.

June 30	Interest Expense	19,708	
	Interest Payable		19,708
	(To record year-end accrual)		

 Accrued payment interest for June: $\$4,300,000 \times .055 \times 1/12 = \$19,708.33$

c. Cash payment:

Step 1: $\$4,300,000 \times .055 \times 4/12 = \$78,833$ interest expense for June—SeptemberStep 2: $\$4,300,000 \times .055 \times 2/12 = \$39,417$ accrued interest receivedStep 3: $\$4,300,000 \times .055 \times 6/12 = \$118,250$ semi-annual paymentStep 4: $\$118,250 - \$39,417 = \$78,833$ net cash paid

d.

Oct. 1	Interest Payable	59,125	
	Interest Expense	59,125	
	Cash		118,250
	(To record semi-annual interest payment)		

 Check: interest expense for July—September = $\$4,300,000 \times .055 \times 3/12 = \$59,125$.

Note: This is a tricky problem because a year-end occurs before the first interest payment, so you have to calculate two kinds of accrued interest before payment! First, there is the accrued interest related to the bond issue. Second, there is now an interest payment accrual at year-end on June 30. The total interest expense for June – September is \$78,833, but \$19,708 of this amount is recorded at June 30 year-end, leaving $\$78,833 - \$19,708 = \$59,125$ to be recorded on October 1.

SOLUTIONS

Appendix 2, continued

A 2-27.

a.

Feb. 1	Cash	1,989,667	
	Discount on Bonds Payable	32,000	
	Bonds Payable		2,000,000
	Interest Payable		21,667
	(To record bond issue)		

$\$2,000,000 \times .984 = \$1,968,000$ bond proceeds

$\$2,000,000 \times .065 \times 2/12 = \$21,667$ accrued interest for December—January

$\$2,000,000 - \$1,968,000 = \$32,000$ discount

b. Cash payment:

Step 1: $\$2,000,000 \times .065 \times 4/12 = \$43,333$ interest expense for February—May

Step 2: $\$2,000,000 \times .065 \times 2/12 = \$21,667$ accrued interest received

Step 3: $\$2,000,000 \times .065 \times 6/12 = \$65,000$ semi-annual payment

Step 4: $\$65,000 - \$21,667 = \$43,333$ net cash payment

c.

Discount amortization: February 1, 2017 – November 1, 2021 = 57 months.

$\$32,000/57 = \561.40 per month. $\$561.40 \times 4$ months = $\$2,245.60$, rounded to $\$2,246$.

June 1	Interest Payable	21,667	
	Interest Expense	45,579	
	Discount on Bonds Payable		2,246
	Cash		65,000
	(To record semi-annual interest payment and discount amortization)		

Check: interest expense = $\$43,333$ four months interest payment + $\$2,246$ four months discount amortization.

d.

Dec. 31	Interest Expense	11,394	
	Discount on Bonds Payable		561
	Interest Payable		10,833
	(To record year-end accrual and discount amortization)		

Accrued payment interest: $\$2,000,000 \times .065 \times 1/12 = \$10,833$ (December)

Discount amortization: $\$561.40 \times 1$ month = $\$561.40$

SOLUTIONS**Appendix 2, continued****A 2-28.**

a.

May 31	Cash	5,233,333	
	Premium on Bonds Payable		100,000
	Bonds Payable		5,000,000
	Interest Payable		133,333
	(To record bond issue)		

$\$5,000,000 \times 1.02 = \$5,100,000$ bond proceeds

$\$5,000,000 \times .08 \times 4/12 = \$133,333$ accrued interest for February—May

$\$5,100,000 - \$5,000,000 = \$100,000$ premium

b. Cash payment:

Step 1: $\$5,000,000 \times .08 \times 2/12 = \$66,667$ interest expense for June—July

Step 2: $\$5,000,000 \times .08 \times 4/12 = \$133,333$ accrued interest received

Step 3: $\$5,000,000 \times .08 \times 6/12 = \$200,000$ semi-annual payment

Step 4: $\$200,000 - \$133,333 = \$66,667$ net cash payment

c. Premium amortization: February 1, 2017 – May 31, 2017 = 4 months. $120 - 4 = 116$ months until maturity. $\$100,000/116 = \862.07 per month. $\$862.07 \times 2$ months = $\$1,724.14$, rounded to $\$1,724$.

Aug. 1	Interest Payable	133,333	
	Interest Expense	64,943	
	Premium on Bonds Payable	1,724	
	Cash		200,000
	(To record semi-annual interest payment and premium amortization)		

Check: interest expense = $\$66,667$ two months interest payment – $\$1,724$ two months premium amortization.

d.

Dec. 31	Interest Expense	162,357	
	Premium on Bonds Payable	4,310	
	Interest Payable		166,667
	(To record year-end accrual and discount amortization)		

Accrued payment interest: $\$5,000,000 \times .08 \times 5/12 = \$166,667$ (August—December)

Premium amortization: $\$862.07 \times 5$ months = $\$4,310.35$