

Long-Term Liabilities

OVERVIEW

What this section does

This section explains transactions, calculations, and financial statement presentation of long-term liabilities, primarily bonds and notes payable.

LEARNING GOALS

BOOK APPENDIX

BOOK APPENDIX 2
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Record and Report Long-Term Liabilities

Part I:
Overview of Long-Term Liabilities
Bonds
Notes Payable
Part II: Straight-Line Amortization
Part III: Effective Interest Amortization
Part IV: Interest Allocations
Located in disk and at worthyjames.com (student info.)

Long-Term Liabilities

Part I

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Part I
Overview of Long-Term Liabilities

What Are They?

Overview

Long-term liabilities are obligations that require payment more than one year from the balance sheet date or after the end of the business operating cycle (page XXX), whichever is longer. In most cases, a long-term liability is a debt that will be paid more than one year from the balance sheet date. The most common long-term liabilities are bonds and notes payable. However, just for reference, some additional types are listed below.

Examples of Long-Term Liabilities

Bond

A *bond* is a formal obligation, issued by a corporation, governmental unit, or school district, usually in minimum denominations of \$1,000 per bond. A bond typically makes semi-annual interest payments and pays the amount borrowed when the bond matures. Bonds are long-term liabilities when issued. Bonds are issued to borrow large amounts of cash from many lenders, who generally view bonds as investments.

Note Payable

A note payable, also called a *promissory note*, is a formal written promise to pay a specified amount at a specified time, usually with a stated interest rate, and usually requiring regular payments. In this respect, a note is similar to a bond. However, notes usually are issued to single lenders. Notes also have a wider variety of payment terms and features, are often issued for shorter periods of time, and are created for a wider variety of transactions (such as asset purchases) than bonds. Notes payable can be either current liabilities or long-term liabilities when issued.

Examples of Long-Term Liabilities, *continued*

Lease

A lease is a rental agreement. However, some kinds of lease agreements are structured in such a way that they act in the same manner as long-term loans that finance the purchase of assets. These kinds of leases are called **capital leases**, and are recorded as long-term liabilities. A second kind of lease, called an **operating lease**, is a true rental agreement. After 2018, an operating lease of more than a year must be recorded as a liability.

Product Warranty

A product warranty is a promise by a seller to repair or replace, within a fixed period of time, what was sold to a buyer at little or no cost to the buyer. Warranty obligations can be less than a year, but most are long term. (See page XXX.)

Deferred Tax Liability

A deferred tax liability occurs when a company applies GAAP accounting rules on its income statement but uses different tax calculation rules in the determination of its tax liability. It represents an obligation for future tax payments. (See page 662 in volume 1 for a basic introduction to the topic.)

Pension Benefits

A pension plan is an obligation by an employer to make payments to retired employees. A pension liability is long term because the obligation to make payments may exist for many years and may not begin until many years into the future. (This is a topic usually covered in intermediate accounting courses.)

Bonds

Basic Features

Bonds are Debt

Of course, the first and most important feature to keep in mind is that bonds are debt. Whoever “buys” a bond is actually a lender to the organization that has issued the bond. This is different than buying stock, which does represent ownership.

Par Value

The amount of obligation of an individual bond is called the **par value** or the **face value** or the **principal** of the bond. This is the liability amount that must be paid when the bond matures (becomes due).

Maturity Date

The date that the par value must be repaid is called the **maturity date** of a bond. A bond that matures at a single date, requiring payment of the entire par value, is called a **term bond**. A bond for which the par value is repaid in installments at sequential dates is called a **serial bond**.

continued ►

Basic Features, *continued*

Interest Payments

In addition to repaying the par value, most bonds require fixed amounts of interest payments to bondholders, usually at six-month intervals. A percentage rate of interest, called the **stated rate** or the **contract rate** is part of a bond agreement, and determines the dollar amount of interest payments. It is a fixed amount and is usually stated as an annual rate. It is also sometimes called a coupon rate.

Registration and Ownership

Bond ownership information is recorded when bonds are issued. When a bond certificate is issued to the owner, the bonds are called **registered bonds**. Most bonds are fully registered as to ownership, which indicates that both principal and interest payments are to be automatically sent to the owner. Generally, physical certificates are infrequently issued; rather, ownership and payment information is recorded only electronically. These are called **book entry bonds**, which have the same rights as registered bonds. The organization that maintains ownership and registration information and supervises the bond issue on behalf of bondholders is called a **trustee** or **registrar**. Unrecorded bonds are called **bearer bonds**, and require physical possession of a bond certificate to show ownership. Owners must send in bond coupons to receive payments. These bonds are now very rare.

Indenture

The legal document that identifies the terms and features of a bond, the obligations of the issuer, and the rights of the owner, is called an **indenture**. The indenture is a contract between the issuer (borrower) and the bond owner (lender).

Other Features

Unsecured and Secured

How does a bond investor know if a bond obligation will be repaid? Payments of interest and par value on unsecured bonds, called **debenture bonds**, depend entirely on the general financial condition of the issuing organization. **Secured bonds** rely on specific assets pledged by the issuer to be used if the issuer fails to make required payments. A bond secured by real estate is called a **mortgage bond**. Some secured bonds require that the issuer make regular deposits into a dedicated cash fund that will accumulate sufficient cash to make the bond principal payment at maturity. This fund is called a **sinking fund**.

Conversion Feature

A **conversion feature** allows a bond to be converted into shares of stock, generally common stock, at a fixed ratio of stock to bonds. Bond owners usually convert the bonds into stock when they think that the stock price will rise substantially.

Other Features, *continued*

Call Feature

Many bonds have a **call feature**, which allows the bond issuer to purchase bonds from an owner at a fixed price after a specific date, prior to maturity. Interest payments will stop on any bonds remaining outstanding after the call date. The issuer usually calls the bonds and retires them when interest rates decline, which allows the issuer to issue new bonds at a lower interest rate. A call provision is an advantage for the issuer and a disadvantage for the bond owner.

Senior and Subordinated

A bond that must be paid *before* other bonds in the case of a payment default or if the issuer enters bankruptcy or is liquidated, is called a **senior bond**. A **subordinated bond** is a bond that, in the same situation, can be paid only after senior bonds' amounts due are fully paid.

Bond Certificate

At one time, each bond owner would receive a bond certificate from the issuer. However, as stated above, most bonds are now book entry bonds; therefore, there is no longer a frequent need to issue certificates to individual bond owners. (A single master certificate for a bond issue may be held by a trustee. Individual ownership is recorded in brokerage accounts. In turn, the broker holds an interest in the master certificate held by the trustee.) However, registered bond certificates are interesting, and an example of a bond certificate is on page 6. Can you identify the key features of the bond? (Stated rate: 8.875%, Issuer: Dow Chemical Company, maturity date: May 1, 2000, par value: \$10,000, secured or unsecured: debenture bond – unsecured.)



The expression “par value” has other different meanings, especially relating to stock (see volume 1). Be sure to keep in mind that the meaning of “par value” when referring to bonds means something different than its other meanings.

Why Corporations Issue Bonds

Four Advantages

If a corporation wants to obtain large amounts of cash, it will consider the choice between issuing more shares of stock or borrowing by issuing bonds. There are four potential advantages to a corporation that chooses to issue bonds:

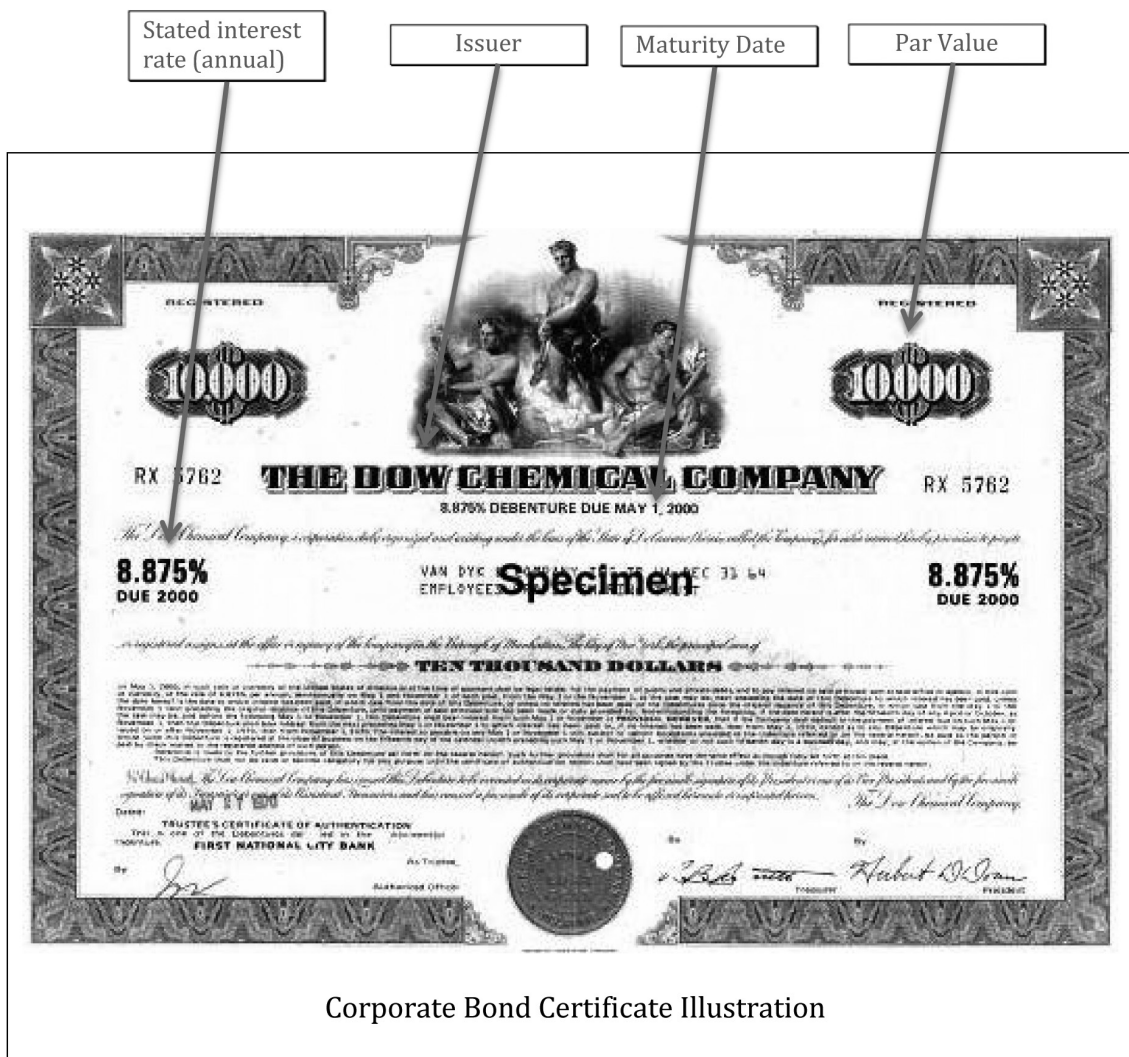
- 1) Ownership and control is not diluted because bondholders do not have voting rights.
 - 2) If many new shares of stock are issued, the stock price will decline because there are more shares outstanding, but a decline is unlikely with bonds.
 - 3) Bond interest is tax deductible, but stock dividends are not.
 - 4) Bond investors are lenders, not owners, and therefore do not share corporate income and do not receive stock. Therefore, earnings per share may be greater when capital is obtained by debt.
-

continued ►

Why Corporations Issue Bonds, *continued*

One (Serious) Disadvantage

Unlike stock dividends, bond interest and principal payments are fixed, required, payments that cannot be removed except by retiring the bonds, which requires large amounts of cash. This increases risk, because if a company should experience a material reduction in its cash flow, bond payments, depending on their size and when they must be paid, could force the issuer into bankruptcy or severely limit the ability of the issuer to operate effectively. Bonds also reduce net income and cash flow.



Corporate Bond Certificate Illustration

Example

The example below compares the issuance of bonds to the issuance of common stock for a profitable company. The company wants to obtain \$10,000,000 in cash. The management believes that it could sell a maximum of 500,000 new shares of stock at an average price of \$20 per share. 350,000 shares are currently outstanding. As an alternative, the company could issue \$10,000,000 of 8% bonds at par value.

Why Corporations Issue Bonds, *continued*

	<u>Issue Stock</u>	<u>Issue Bonds</u>
Income before bond interest and taxes	\$2,000,000	\$2,000,000
Deduct: bond interest expense (\$10,000,000 × .08)	—	800,000
Income before tax	2,000,000	1,200,000
Deduct: income tax at 35%	<u>700,000</u>	<u>420,000</u>
Net income	<u>\$1,300,000</u>	<u>\$780,000</u>
Earnings per share of outstanding stock:		
Issue stock (\$1,300,000 / 850,000 shares)	<u>\$1.53</u>	
Issue bonds (\$780,000 / 350,000 shares)		<u>\$2.23</u>

Note: This same analysis can be performed with notes payable as well as bonds payable. Notes payable would have the same effect. However, notes are usually issued for smaller amounts than bonds.

Analysis

- Even though the bond interest resulted in a lower net income, the earnings per outstanding share is greater than issuing stock because there would be fewer outstanding shares than if new stock were sold. If the stock had been selling at a higher price (requiring fewer shares) and if the bond interest rate had been higher (reducing net income more), then the earnings per share might have been greater with the stock issue.
- If in the future the company were to earn less income or incur losses, and therefore have a lower tax rate, the tax advantage of issuing bonds would diminish in total dollars. A higher tax rate would have the opposite effect.
- Under current conditions, the bond issue will continually reduce operating cash flow by \$520,000 per year (\$800,000 interest expenditure less 35% tax savings).
- There are also risks and rewards that affect percentage return on owner investment when debt is used. See volume 1 discussion on use of leverage.



Bond research companies evaluate the financial reliability of bond issuing organizations and issue bond ratings. The purpose of these ratings is to provide a general guide to the financial condition of the issuer and bond quality, and therefore an indication of the likelihood that a bond investor will be paid. Although market interest rates are the primary influence on bond prices, the financial condition of an issuer is also significant. Well-known bond research firms are *Standard and Poors*, *Moody's*, and *Fitch*. Their reports are often available at local public libraries.

Bond Issuance and Trading

Bond Issuance

Bonds are issued with the approval of the board of directors. State and federal laws authorize the creation of bonds and control the manner in which they are issued.

In a corporation, prior to the bond issuance the board of directors will have authorized a specified amount of bonds with an interest rate, maturity, and other terms and features, effective as of specific date. When the bonds are actually issued depends upon several factors that include the need for cash and prevailing market interest rates. Usually an investment company that specializes in selling bonds is responsible for the sale of bonds to investors.

Bond Trading

After the initial bond issuance, many bonds will be actively traded between investors. As mentioned above, this is somewhat similar to how stocks are traded, and bonds can be bought and sold through brokerage companies and other financial institutions. It is important to remember that **when bonds are traded between investors, these transactions are strictly between the investors, and no journal entries are needed or made by the bond issuer.**

Bond Pricing

Bond Price Quotes

After bonds are initially issued, they are traded as securities, similar to how stocks are traded. The amount for which a bond is issued and is then traded is called the bond price, and is quoted as a percentage of par (face) value. After a bond is issued, its price frequently changes, based on supply and demand. Here are some examples of bond quotes:

Bond is Offered At...	Signifies:
97.25	The bond can be purchased at 97.25% (.9725) of its par, or face, value. Therefore a \$1,000 bond would trade at \$972.50.
102.125	The bond can be purchased at 102.125% (1.02125) of its par, or face, value. Therefore a \$1,000 bond would trade at \$1,021.25.
99.695	The bond can be purchased at 99.695% (.99695) of its par, or face, value. Therefore a \$25,000 bond would trade at \$24,923.75.
100.55	The bond can be purchased at 100.55% (1.0055) of its par, or face, value. Therefore a \$25,000 bond would trade at \$25,137.50.

Bond Pricing, *continued*

Why Do Bond Prices Change?

As indicated, after a bond is issued, its price frequently changes. Bond prices change primarily as the result of market interest rates. A **market rate of interest** is the annual rate of interest that bond investors require at the time they purchase a bond. A market rate of interest is constantly changing based on economic and other factors.

The price that investors are willing to pay for a bond is the price that will result in the bond investment giving investors the market rate of interest existing at the time of the investment, as long as they own the bond.

Example: Bond Sold at Par

Suppose a \$10,000 20-year bond is available to purchase. The bond's stated (contractual) interest rate is 5%, therefore the bond pays the fixed amount of \$500 of interest per year ($\$10,000 \times .05 = \500). You are interested in purchasing a bond, and the market rate of interest is currently 5%, which happens to be the same as the bond stated rate.

Before you buy the bond, you want to make sure that the price you pay to receive \$500 per year will give you a 5% return (the market rate) on your investment. You can do a simple calculation by saying: "\$500 per year is 5% of what amount?"

Answer: $\$500/.05 = \$10,000$. Therefore, you will pay \$10,000 for the bond and receive \$500 per year, which is a 5% annual return on your investment. The bond has sold at exactly the same amount as its par value, \$10,000. The bond quote would be: 100.

Example: Bond Sold at a Discount

Suppose a \$10,000 20-year bond is available to purchase. The bond's stated (contractual) interest rate is 5%, therefore the bond pays the fixed amount of \$500 of interest per year. However, the market rate of interest is now 6%. This means that due to current economic conditions, bond investors require a 6% return on their investments.

We can use the same basic calculation as before: How much should you pay so that the \$500 per year that you receive is a 6% annual return on your investment? In other words, \$500 per year is 6% of what amount?

Answer: $\$500/.06 = \$8,333$ (rounded). The bond will now have to sell at less than its par value so that the fixed \$500 amount provides a 6% return. The difference between \$10,000 par value and the \$8,333 price is \$1,667 and is called a **discount**. The bond quote would be: 83.33

continued ►

Bond Pricing, continued

Example: Bond Sold at a Premium

Suppose a \$10,000 20-year bond is available to purchase. The bond’s stated (contractual) interest rate is 5%, therefore the bond pays the fixed amount of \$500 of interest per year. However, the market rate of interest is now 4%. This means that in current conditions, bond investors require only a 4% return on their investments.

We can use the same basic calculation as before: How much should you pay so that the \$500 per year that you receive is a 4% annual return on your investment? In other words, \$500 per year is 4% of what amount?

Answer: $\$500 / .04 = \$12,500$. Now the bond will sell at more than its par value because only a 4% return is required. The difference between the \$10,000 par value and \$12,500 is \$2,500 and is called a **premium**. The bond quote would be: 125.

A More Precise Calculation

The examples shown above present the basic idea of bond pricing; however, the actual calculation of bond pricing applies this concept in a more precise manner. Part IV of this appendix illustrates the more precise method of calculation used in practice.

Summary

The table below summarizes how bond prices change with changes in market interest rates.

If market interest rates...	then bond prices...
increase	decrease
decrease	increase
AND WHEN	
the market rate is ...	a bond sells at a...
greater than the stated rate	discount
less than the stated rate	premium
the same as the stated rate	par



Be sure that you understand the difference between the stated (contractual) interest rate and the market interest rate. Its important! The stated rate is a fixed interest rate on the bond. The stated interest rate has only one purpose: to determine the dollar amount of the annual bond payments. The market interest rate is a changing rate that represents the rate of return that investors require. Changes in the market rate create changes in the bond price.

The Effect of a Bond Discount

What Does It Mean?

As discussed above, a bond discount occurs when an issuer receives less than the par value of a bond. However, remember that a bond issuer still has to pay the full par value of the bonds when the bonds mature. In the discount example above, the issuer that received the \$8,333 will pay a full \$10,000 par value in 20 years at maturity after the bond was issued. Therefore, the \$1,667 discount represents additional interest cost. This is the additional interest cost that was created because the market rate at 6% was higher than the bond's stated rate at 5% when the bonds were issued.

What Is the Effect?

GAAP requires that the additional interest created by a discount be recorded over the life of a bond until it reaches maturity. The discount is added to the interest expense created by the cash payments. In this way the true interest cost of a bond will be recorded, based on the market interest rate existing when the bonds were sold. (Part II explains the procedure.)

Total Dollar Cost

We can calculate the total dollar interest cost of borrowing by comparing what is paid and what is received:

Cash paid:	
Par value at maturity	\$10,000
Interest payments for 20 years	<u>10,000</u>
Total cash payments	20,000
Cash received:	
Cash received when bonds issued	<u>8,333</u>
Net cost of borrowing	<u><u>\$11,667</u></u>

This is the total of: interest payments of \$10,000 + discount of \$1,667.

The Effect of a Bond Premium

What Does It Mean?

As discussed above, a bond premium occurs when an investor pays more than the par value of a bond. However, the bond issuer still pays the par value of the bonds when the bonds mature. In the premium example above, the issuer that received \$12,500 will pay only the \$10,000 par value in 20 years, at maturity. The issuer of the bond keeps the additional \$2,500 premium. Therefore, the \$2,500 premium represents a reduction in the interest cost. This is the reduced interest cost that was created because the market rate at 4% was lower than the bond's stated rate at 5% when the bonds were issued.

continued ►

The Effect of a Bond Premium, *continued*

What Is the Effect?

GAAP requires that the reduced interest expense created by a premium be recorded over the life of a bond until it reaches maturity. The premium is offset against the interest expense of the cash payments as they are made. In this way the true interest cost of the bonds will be recorded, based on the market interest rate existing when the bonds were sold. (Part II explains the procedure.)

Total Dollar Cost

We can calculate the total dollar interest cost of borrowing by comparing what is paid and what is received:

Cash paid:		
Par value at maturity		\$10,000
Interest payments for 20 years		<u>10,000</u>
Total cash payments		20,000
Cash received:		
Cash received when bonds issued		<u>12,500</u>
Net cost of borrowing		<u><u>\$7,500</u></u>

This is the total of: interest payments of \$10,000 – premium \$2,500.

Check Your Understanding:

Part I: Try to complete the table without referring back to the discussion in this learning goal.

If market interest rates . . .	then bond prices . . .
increase	
decrease	
AND WHEN	
the market rate is . . .	a bond sells at a . . .
greater than the stated rate	
less than the stated rate	
the same as the stated rate	

Part II: Using the information presented below, determine if a bond will sell at a premium or discount.

- A bond with a 5% stated rate is issued when the market rate is 4%
- A bond with a 7.5% stated rate is issued when the market rate is 8%
- A bond with a 5% stated rate is issued when the market rate is 5%

Answers

- The market rate is less than the stated rate, so the bonds will sell at a premium.
- The market rate is more than the stated rate, so the bonds will sell at a discount.
- The market rate is the same as the stated rate, so the bonds will sell at par value.

Overview of Accounting Procedures for Bonds

Overview

A bond issuer will need to make bond-related journal entries in the following common situations:

- Bonds are issued
- Bond interest expense and payment are recorded
- Bonds are redeemed (retired) before maturity
- Bonds are converted to stock
- Bonds are redeemed at maturity

Issuing Bonds at Par and Recording Interest

Bonds Issued at Par

When a bond is issued at par value, the issuer receives the same amount as the par value of the bond. For example, suppose that a \$100,000, 5-year 6% bond is issued on January 1 for \$100,000. The journal entry would be:

Jan. 1	Cash	100,000	
	Bonds Payable		100,000
	(To record sale of bonds at par value)		

Paying Interest

Bonds normally pay interest semi-annually. Therefore, on July 1 the bonds would pay \$3,000 ($\$100,000 \times .06 \times 6/12$). This would be recorded as:

July 1	Interest Expense	3,000	
	Cash		3,000
	(To record payment of bond interest)		

Accruing Interest

The next interest payment date will be on January 1 of the next year. Assume that the current fiscal year-end is December 31. Therefore interest will have to be accrued, because it will not be paid until the next accounting period.

Dec. 31	Interest Expense	3,000	
	Interest Payable		3,000
	(To record accrual of bond interest)		

Issuing Bonds at Par and Recording Interest, *continued*

Paying Accrued Interest

Payment for the accrued interest will be made at the beginning of the next accounting period. The liability is eliminated and cash is paid.

Jan. 1	Interest Payable	3,000	
	Cash		3,000
	(To record payment of accrued bond interest)		

Issuing Bonds at a Discount

Bonds Issued

When a bond is issued at a discount, the issuer receives less than the par value of the bond. For example, suppose that \$100,000 of 5-year, 9% bonds are issued at a discount on January 1 for \$96,149 because the market rate is 10%. The journal entry would be:

Jan. 1	Cash	96,149	
	Discount on Bonds Payable	3,851	
	Bonds Payable		100,000
	(Issued bonds at a discount)		

The Carrying Value

The discount of \$3,851 is not asset, even though it has a debit balance. Discount on Bonds Payable is a contra-liability account; it is an offset to the Bonds Payable account. On the long-term liability section of the balance sheet, Discount on Bonds Payable is subtracted from Bonds Payable. The result is called the carrying value of the bonds: \$100,000 bonds payable – \$3,851 discount on bonds payable = \$96,149.

The **carrying value** of bonds payable is the net liability of bonds at any point in time; carrying value can be thought of as the book value for a bond. For a bond issued at a discount, carrying value increases over time and eventually becomes the same as par value at maturity. Part II provides more discussion of this topic.

XYZ, Inc.			
Balance Sheet (partial)			
January 1, 2017			
Long-term liabilities			
Bonds payable		\$100,000	
Less: discount on bonds payable		<u>3,851</u>	\$96,149

Issuing Bonds at a Premium

Bonds Issued

When a bond is issued at a premium, the issuer receives more than the par value of the bond. For example, suppose that \$100,000 of 5-year, 9% bonds are issued on January 1 for \$104,055 at a premium because the market rate is 8%. The journal entry would be:

Jan. 1	Cash	104,055	
	Premium on Bonds Payable		4,055
	Bonds Payable		100,000
	(Issued bonds at a premium)		

The Carrying Value

The premium on bonds payable is a credit balance account that increases the carrying value of a bond. On the long-term liability section of a balance sheet, Premium on Bonds Payable would be added to Bonds Payable to show the carrying value of the bonds. In this example, the carrying value of the bonds is: \$100,000 bonds payable + \$4,055 bond premium = \$104,055. The **carrying value** of bonds payable is the net liability of bonds at any point in time; carrying value can be thought of as the book value for a bond. For a bond issued at a premium, carrying value decreases over time and eventually becomes the same as par value at maturity. Part II provides more discussion of this topic.

XYZ, Inc.			
Balance Sheet (partial)			
January 1, 2017			
Long-term liabilities			
Bonds payable		\$100,000	
Add: premium on bonds payable		<u>4,055</u>	\$104,055

The details concerning the terms of a bond would appear in the notes to the financial statements.

Check Your Understanding:

Part I: The Mackenzie Corporation issued \$250,000 of 10-year bonds at a price of 98.6.

- Prepare a journal entry to record the bond issue.
- Show how the bonds would be reported on the company balance sheet at date of issue.

Part II: The Saginaw Company issued \$500,000 of 20-year bonds at a price of 102.35.

- Prepare a journal entry to record the bond issue.
- Show how the bonds would be reported on the company balance sheet at date of issue.

Answers are on the next page.

Answers:

Long-term liabilities	
Bonds payable	\$500,000
Add: Premium on bonds payable	11,750
	\$511,750

XXXX
Balance Sheet (partial)
Saginaw Company

b)

Cash	511,750
Premium on Bonds Payable	11,750
Bonds Payable	500,000

(Issued bonds at a premium)

a)

Part II:

Long-term liabilities	
Bonds payable	\$250,000
Less: discount on bonds payable	3,500
	\$246,500

XXXX
Balance Sheet (partial)
Mackenzie Corporation

b)

Cash	246,500
Discount on Bonds Payable	3,500
Bonds Payable	250,000

(Issued bonds at a discount)

a)

Part I:

Bond Redemption

Overview

A bond **redemption** means that a bond liability is being removed by a payment. This can happen in two possible ways:

- The bond par value is paid at maturity.
- Bonds are purchased prior to maturity by the bond issuer. This may be done by exercising a call provision or purchasing bonds in the open market.

Bond Redeemed at Maturity

Suppose that XYZ company redeems \$100,000 par value of bonds at maturity. All interest has been paid. At maturity there would be no balance of premium or discount because it would have been fully adjusted into interest expense by the maturity date. The company would record the transaction as follows:

Nov. 9	Bonds Payable Cash (\$100,000 par value bonds redeemed at maturity.)	100,000	100,000
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Bond Redemption Prior to Maturity

A company might wish to retire bonds before maturity by either purchasing the bonds in the market or by exercising a call feature to pay the current bondholders. This often happens when interest rates become significantly lower and new bonds can be issued at a lower interest cost, or when a company simply wants to strengthen its balance sheet by reducing total debt.

When bonds are retired early, cash is credited and the carrying value of the bonds is removed. As you recall, carrying value is par value of the bonds minus the discount or plus the premium. **The difference between the cash paid and the carrying value is a gain or loss.** Any unpaid interest owed to investors is also paid.

Example: Redemption With Discount

Suppose that the \$100,000, 5-year, 9% bonds of XYZ Company are selling at 98.25. The bonds were sold at a discount, and the current amount of the discount is \$2,150. Before the bonds mature, XYZ decides to purchase and retire the bonds. XYZ can make the following calculation prior to the purchase:

Carrying value: \$100,000 – \$2,150	\$97,850
Less: Purchase price: \$100,000 × .9825	<u>98,250</u>
Loss on bond redemption	<u>\$400</u>

Bond Redemption, *continued*

Example: Redemption With Discount (continued)

The company would record the transaction as follows:

April 3	Bonds Payable	100,000	
	Loss on Bond Redemption	400	
	Discount on Bonds Payable		2,150
	Cash		98,250
	(Bonds purchased prior to maturity)		

Example: Redemption With Premium

Suppose that the \$100,000, 5-year, 9% bonds of XYZ Company are selling at 101.5. The bonds were sold at a premium, and the current amount of premium is \$1,880. Before the bonds mature, XYZ decides to purchase and retire the bonds. XYZ can make the following calculation prior to the purchase:

Carrying value: \$100,000 + \$1,880	\$101,880
Less: Purchase price: \$100,000 x 101.5	<u>101,500</u>
Gain on bond redemption	<u>\$380</u>

The company would record the transaction as follows:

April 3	Bonds Payable	100,000	
	Premium on Bonds Payable	1,880	
	Gain on Bond Redemption		380
	Cash		101,500
	(Bonds purchased prior to maturity)		

Note: Gain or loss on retirement of bonds is reported on the income statement. Proper disclosure would be as an individual line item in the “other” section, and explained in footnotes.

Convertible Bonds

Overview

Sometimes bonds are issued with a conversion feature, which investors usually find attractive. The conversion feature gives bond holders the right to convert the bonds into common stock. The bond holders usually exercise the conversion right when they see the common stock increasing in value. (Note: see volume 1 for a detailed discussion of corporate stock.)

continued ►

Convertible Bonds, *continued*

Rule for Recording Conversion

When bonds are converted into common stock, remove the *carrying value* of the converted bonds from liabilities and add it to paid-in capital. Market values of both the bonds and stock are ignored. **There is no gain or loss on bond conversions.**

Example of Bond Conversion Into No-Par Stock

Suppose that \$100,000 par value of bonds with a discount of \$4,000 is converted into 1,000 shares of no-par common stock. The bonds are priced at 99.85 and the stock is selling at \$120 per share. The company would record the transaction as follows:

Nov. 9	Bonds Payable	100,000	
	Discount on Bonds Payable		4,000
	Common Stock		96,000
	(Bonds converted to common stock.)		

Notice the following: 1) Stock and bond prices are ignored for accounting purposes, although it is the basis of the investors' decision. 2) Debt carrying value of $\$100,000 - \$4,000 = \$96,000$ is removed from liabilities and becomes stockholders' equity.

Example of Bond Conversion Into Par Value Stock

Suppose that \$100,000 par value of bonds with a discount of \$4,000 is converted into 1,000 shares of \$.10 par value common stock. The bonds are priced at 99.85 and the stock is selling at \$120 per share. The company would record the transaction as follows:

Nov. 9	Bonds Payable	100,000	
	Discount on Bonds Payable		4,000
	Common Stock		100
	Paid-in Capital in Excess of Par, Common		95,900
	(Bonds converted to common stock.)		

Notes Payable

Overview

Qualities and Comparison to Bonds

Long-term notes payable are a form of borrowing that in many respects are similar to bonds. Both involve written promises to repay a loan. However, bonds are usually issued for larger amounts and involve many investors. The amount to be repaid on a note is often referred to as the *principal* of

Overview, continued**Qualities and Comparison to Bonds continued**

the loan. Notes have a wider variety of terms, conditions, and features, and involve a wider variety of transactions, including asset purchases.

Notes are often secured by a borrower's assets that are pledged to the lender in the case that the borrower does not repay a loan. One common example is called a mortgage note payable, frequently involved in real estate transactions. A **mortgage** is a separate security document that accompanies a note payable, and gives a lender title to a buyer's property if the note is not repaid. In some states, this is called a **deed of trust**.

The interest rates on notes payable can be either fixed or variable; generally, fixed rates are more common. A **fixed rate note** is a note payable for which the interest rate is constant over the full term of the note. A **variable rate note** has an interest rate that is periodically adjusted up or down, depending on changes in the market rate of interest.

Notes are often repaid in installments, such as equal monthly payments. The amount of the payment includes a payment of some of the principal of the loan, plus interest paid on the outstanding (unpaid) balance of the loan. A loan with installment terms that fully pay the loan by the end of the loan term is called a **fully-amortizing loan**. The loan payments can be calculated using compound interest formulas, and are often presented in the form of a loan amortization table such as you see below.

Loan Amortization**Example**

Suppose that on September 1, 2017 Milwaukee Company borrows \$500,000 cash and signs a note payable for 8% fixed annual interest, fully amortizing, payable over 10 years in equal monthly installments. A typical loan amortization table for the first six months would be:

continued ►

Loan Amortization, *continued*

Example (continued)

	(A)	(B)	(C)	(D)
Pmt. #	Payment (formula)	Principal (A – C)	Interest (.08 x D)/12	Principal Balance
				\$500,000.00
1	\$6,066.38	2,733.05	3,333.33	497,266.95
2	\$6,066.38	2,751.27	3,315.11	494,515.68
3	\$6,066.38	2,769.61	3,296.77	491,746.07
4	\$6,066.38	2,788.07	3,278.31	488,958.00
5	\$6,066.38	2,806.66	3,259.72	486,151.34
6	\$6,066.38	2,825.37	3,241.01	483,325.97

and at the end of the loan period, the final three months would be:

118	\$6,066.38	5,946.65	119.73	12,012.40
119	\$6,066.38	5,986.30	80.08	6,026.10
120	\$6,066.38	*6,026.10	40.17	-0-

*rounded

Analysis

- The loan payments of \$6,066.38 are constant over the life of the loan. The payment amount can be calculated using a compound interest formula, tables, or an advanced calculator.
- The principal amount is the difference between column A and C.
- The interest amount is .08 multiplied by the outstanding loan balance in column D, then divided by 12 to obtain a monthly amount.
- Notice that the interest becomes progressively smaller, especially near the end of the loan. This is because the loan balance is decreasing as payments are made.
- As the interest becomes smaller, the principal amount becomes larger, so more of the balance is being paid with each payment.



If you do an Internet search you will be able to find various sites that provide loan calculations and amortization schedules. You only have to enter the terms of the loan. However, do not use sites that ask for personal information.

Recording Notes Payable

Recording the Loan

Using the same information above for Milwaukee Company, the loan transaction occurring on September 1 and payments are made on the first day of the month are shown below. If the loan was for cash, the journal entry is:

Sept. 1	Cash	500,000	
	Notes Payable		500,000
	(To record loan)		

If the borrower had been a buyer of an asset, such as equipment, the borrower's journal entry would be:

Sept. 1	Equipment	500,000	
	Notes Payable		500,000
	(To record equipment purchase)		

Recording a payment

Using the amortization table, the journal entry for the first monthly payment would be:

Oct. 1	Notes Payable	2,733.05	
	Interest Expense	3,333.33	
	Cash		6,066.38
	(To record monthly loan payment)		

Each payment will follow a similar pattern, using the amounts from the amortization table.

Recording an Accrual

Assume that the company uses a calendar year fiscal period. At year end 2017, the company will have to accrue interest expense for the fourth payment.

Dec. 31	Interest Expense	3,278.31	
	Interest Payable		3,278.31
	(To accrue loan interest payable on January 1)		

Note: If an accrual period is shorter than an interest payment period, then interest is accrued only for the shorter period. For example, if a semi-annual note payment was last made on November 1, at December 31 year-end only 2/6 of the applicable interest would be accrued.

Check Your Understanding:

Shreveport, Inc. borrowed \$500,000 and signed a 20-year, 9% note payable. The terms of the note require the company to make quarterly payments of \$13,532.

- a) Prepare a journal entry to record issuance of the note.
- b) Prepare a journal entry to record the first quarterly payment.

Answers

Interest calculation: $\$500,000 \times .09 \times 3/12 = \$11,250$
 Principal calculation: $\$13,532 - \$11,250 = \$2,282$

(To record quarterly loan payment)	
Cash	13,532
Interest Expense	11,250
Notes Payable	2,282

b)

(To record issuing a note payable)	
Cash	500,000
Notes Payable	500,000

a)

Financial Statement Presentation of Long-term Notes Payable

Procedure

Long-term notes payable are reported in the long-term liability section of the balance sheet. However, when a portion of the note principal is payable within a year, that amount is subtracted from the total note liability and reported as a current liability. A common example is a loan with installment payments as you see above.

Example

The Milwaukee Company loan balance at December 31 is \$491,746.07. A full amortization table would show the next 12 principal payments in column B as a total of \$34,711.30. Therefore, the long-term note payable balance would be $(\$491,746.07 - \$34,711.30) = \$457,034.77$. The balance sheet would report the note payable as follows:

Milwaukee Company Balance Sheet (partial) December 31, 2017			
Current liabilities:			
Accounts payable	\$	XXX	
Interest payable		3,728	
Current portion of long-term debt		<u>34,711</u>	
Total current liabilities			\$ XXX
Long-term liabilities			
Notes payable		491,746	
Less current portion of long-term debt		<u>34,711</u>	457,035

Note: It would be acceptable to round balance sheet amounts to the nearest dollar.

The details concerning the terms of the loan would appear in the notes to the financial statements.



The current portion of any long-term debt must be reported as a current liability. For example, the amount of bonds maturing within a year would also be reported as a current liability.

Part I QUICK REVIEW

- Common types of long-term liabilities are bonds, notes payable, capital leases, product warranties, deferred tax liabilities, and pensions.
- Basic features of a bond to understand are: 1) bonds are debt 2) par value 3) maturity date 4) interest payments 5) registration 6) indenture.
- Other bond features can include: 1) secured or unsecured 2) conversion 3) call 4) subordination or seniority
- A bond issue or sales price depends on the market rate of interest, which can cause a bond to sell at a premium or a discount to its par value. The price of a bond varies inversely to the market interest rate.
- A bond discount represents the higher rate of market interest above a bond stated rate at the time a bond is sold, and that will increase a bond's interest expense over its term. A bond premium represents the lesser amount of market rate below the stated rate, that will reduce bond interest expense over its term.
- Journal entries related to bond transactions in this appendix are: 1) Recording the issuance of bonds 2) Periodic interest payments 3) Accruing bond interest at the end of an accounting period 4) Bond redemptions 5) Bond conversions
- Bonds are reported in the long-term liability section of a balance sheet at carrying value, unless the bonds are payable within a year, in which case they are reported as current liabilities.
- Bonds can be redeemed (retired) in two possible ways: 1) payment at maturity 2) purchase prior to maturity. Gain or loss is recorded when bonds are redeemed prior to maturity
- Convertible bonds allow investors to convert bonds into stock. The carrying value of the bonds is transferred to paid-in capital in stockholders' equity. There is never a gain or loss when bonds are converted to stock.
- Journal entries for notes payable in this appendix are: 1) note issuance 2) periodic payments 3) interest accrual at the end of a financial period.
- A loan amortization table is frequently used when referring to notes payable (or receivable).
- The portion of a long-term note principal payable that will not be paid within a year is reported in the long-term section of a balance sheet. The portion of the note principal that will be paid within a year is reported as a current liability.

VOCABULARY

Bearer bond (pg. 6) A bond that is not registered and ownership is determined by physical possession.

Bond (pg. 4) is a formal long-term obligation, issued by a corporation, governmental unit, or school district to raise large sums of cash, usually in minimum amounts of \$1,000 per bond from many lenders.

Call feature (pg. 7) A feature that allows a bond to be repurchased by the issuer at a fixed

price prior to maturity, after which the interest payments will not be made.

Capital lease (pg. 5) A certain type of lease agreement that which is essentially a means of financing the purchase of an asset.

Carrying value (pg. 17) The net liability of bonds at a point time: par value minus discount or par value plus premium

Contract rate (pg. 6) The percentage interest rate in a bond agreement that determines the

VOCABULARY

amount of interest payments. Also called face rate.

Conversion feature (pg. 6) A feature that allows a bond to be converted into stock.

Debenture (pg. 6) An unsecured bond.

Discount (pg. 11) The difference between the par value of a bond and the cash received when the bond is issued, when the cash received is less than par value.

Face value (pg. 5) The amount of the bond obligation that must be paid when the bond matures. Also called par value or principal.

Fixed rate note (pg. 23) A note that has a constant interest rate over the full term of the note.

Fully-amortizing loan (pg. 23) A loan with installment payments that will result in a zero balance due at the completion of the note term.

Indenture (pg. 6) The legal contract that identifies the terms and obligations of a bond, and the rights and obligations of the borrower and lender.

Long-term liability (pg. 4) An obligation that requires payment more than one year from the current balance sheet date.

Market rate (pg. 11) The rate of interest that investors require when purchasing a bond.

Maturity date (pg. 5) The date that the par value of bond must be paid.

Mortgage (pg. 23) The document that pledges real estate as security for a loan, and that is signed when the loan is signed. Also called a deed of trust in some states

Mortgage bond (pg. 6) A bond secured by real estate.

Operating Lease (pg. 5) A rental agreement in which only the right to use property is transferred, and the property must be returned to the owner at the end of the lease term.

Par value (pg. 5) The amount of the bond obligation that must be paid when the bond matures. Also called face value or principal.

Premium (pg. 12) The difference between the par value of a bond and the cash received when the bond is issued, when the cash received is more than par value.

Principal (pg. 22) The amount of the bond obligation that must be paid when the bond matures. Also called par value or face value.

Promissory note (pg. 4) A formal written promise to pay a specified amount at specified time, usually with interest.

Redemption (pg. 20) Removal of bond liability by paying the amount owed. Also called retirement of bonds.

Registered bond (pg. 6) A bond with a recorded owner.

Secured bond (pg. 6) A bond that can rely on specific assets pledged by the issuer if required payments are not made.

Senior bond (pg. 7) A bond with higher priority for payment than other bonds, in the case of issuer default, bankruptcy, or liquidation.

Serial bond (pg. 5) A bond that pays that pays the par value in installments.

Sinking fund (bond) (pg. 6) A dedicated cash fund that accumulates cash adequate to make a bond principal payment at maturity.

Stated rate (pg. 6) The percentage interest rate in a bond agreement that determines the amount of interest payments. Also called contract rate.

Subordinated bond (pg. 7) A bond that will be paid only after other bonds are paid in the case of default, issuer bankruptcy or liquidation

Term bond (pg. 5) A bond that matures on a single date.

Trustee (pg. 6) An organization that maintains registration and other bond documentation

Variable rate note (pg. 23) A note that has the interest rate periodically adjusted, depending on current market rates.

Part I PRACTICE Appendix 2

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Multiple Choice

Select the best answer.

1. The rule to classify a liability as long-term is:
 - a. More than a year or the operating cycle, whichever is longer
 - b. At least a year or the operating cycle, whichever is longer
 - c. More than a year or the operating cycle, whichever is shorter
 - d. None of the above
2. Which of the following would not represent long-term liabilities?
 - a. Bond, 5-year note payable, product warranty
 - b. Capital lease, pension benefits, deferred tax liability
 - c. Bond, accounts payable, 5-year note payable
 - d. Product warranty, capital lease, 2-year note payable
3. A bond is a(n)
 - a. asset.
 - b. part of stockholders' equity.
 - c. part of preferred stockholders' equity.
 - d. liability.
4. The amount that must be paid when a bond matures is called the
 - a. face value.
 - b. par value.
 - c. principal.
 - d. all the above.
5. Bonds that are recorded by a trustee who directs the payment of interest and principal are called
 - a. bearer bonds.
 - b. trustee bonds.
 - c. registered bonds.
 - d. debenture bonds.
6. The contract between a bond lender (investor) and the borrower is called a(n)
 - a. mortgage.
 - b. indenture.
 - c. debenture.
 - d. subordination agreement.
7. The feature that allows an issuer to purchase bonds from investors at a fixed price before maturity is called a(n)
 - a. call feature.
 - b. subordination feature.
 - c. conversion feature
 - d. par feature.
8. Among the choices below, which bond would you consider to be the safest and most profitable bond?
 - a. A subordinated, callable, bearer bond
 - b. A senior, bearer, callable bond.
 - c. A senior, non-callable, registered bond
 - d. A senior, callable, registered bond
9. If bonds are issued at a premium, this means that
 - a. the contractual rate was less than the market rate.
 - b. the contractual rate was the same as the market rate.
 - c. the contractual rate was greater than the market rate.
 - d. the market rate was not used to determine the bond price.

Part I PRACTICE Appendix 2, continued

Solutions are in the disk at the back of the book and at: www.worthyjames.com

10. Bond carrying value is
 - a. the bond liability at any point in time.
 - b. par value plus the premium or minus the discount.
 - c. par value minus the premium or plus the discount.
 - d. both a and b.
11. \$100,000 of bonds par value are issued at a price of 96.5
 - a. The journal entry to record the issuance will include a debit to cash of \$100,000.
 - b. The journal will to record the issuance include a credit to bonds payable of \$96,500.
 - c. The journal entry to record the issuance will include a debit to discount of \$3,500.
 - d. The journal entry to record the issuance will include a credit to premium of \$3,500.
12. \$500,000 face value of bonds originally issued at 101.4 are retired at maturity.
 - a. The journal entry will include a credit to cash of \$500,000.
 - b. The journal entry will include a credit to cash of \$501,400.
 - c. The journal entry will include a credit to cash of \$507,000.
 - d. The journal entry will include a credit to cash of \$493,000.
13. \$300,000 par value of bonds with a premium balance of \$12,000 are redeemed early at 101.5.
 - a. The issuer will record a loss of \$1,500.
 - b. The issuer will record a gain of \$7,500.
 - c. The issuer will record a gain of \$1,500.
 - d. The issuer will not record a gain or loss.
14. Bond investors converted \$750,000 par value of bonds with a discount balance of \$45,000 into 10,000 shares of common stock selling at \$85 per share.
 - a. The issuer will record a loss of \$45,000.
 - b. The issuer will record a gain of \$45,000.
 - c. The issuer will record a gain of \$145,000.
 - d. The issuer will not record a gain or loss.
15. An amortization table for a note payable shows a \$5,250 payment and a decrease in note principal balance of \$400. The amount of interest expense is
 - a. \$4,850.
 - b. \$400.
 - c. \$5,250.
 - d. None of the above.
16. A 10-year note payable in the amount of \$400,000 with monthly payments will require payments in the next year consisting of \$44,400 principal and \$31,000 interest for a total of \$75,400. The liability section of the balance sheet at current year-end would include the following balances for the note:
 - a. \$75,400 current liability and \$355,600 long-term liability.
 - b. \$75,400 current liability and \$400,000 long-term liability.
 - c. \$31,000 current liability and \$400,000 long-term liability.
 - d. \$44,400 current liability and \$355,600 net long-term liability.
17. An amortization table shows the next payment as \$2,855 with principal of \$700 and interest of \$2,155. The payment is due on January 3 of next year. A journal entry at December 31 current year end will show a:
 - a. debit to interest expense and credit to interest payable of \$2,155.
 - b. debit to notes payable and credit to cash of \$2,855.
 - c. debit to notes payable and credit to interest payable of \$2,155.
 - d. No journal entry is required until the payment date of January 5.

Part I PRACTICE Appendix 2, continued

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Part I Discussion Questions and Brief Exercises

1. State and explain the definition of long-term liability. Give three examples of long-term liabilities.

2. Explain how the market price of a bond is determined and the primary cause of price changes.

3. Bob, a bond investor, says that he will never purchase a bond that includes a premium. He only wants to purchase a bond at par value or at a discount, so that he will receive at least the same amount or more than he invested when the bond matures. What do you think of this system?

4. Why does a bond discount occur? What is the effect of a discount over the term of a bond? Why does a bond premium occur? What is the effect of a premium over the term of a bond?

5. Boston Enterprises issued \$1,000,000 of 7%, 10-year bonds at 101.8. What is the total dollar cost of borrowing over the life of the bonds?

6. Springfield Inc., issued \$5,000,000 of 8%, 5-year bonds at 98.5. What is the total dollar cost of borrowing over the life of the bonds?

7. When a corporation is considering obtaining large amounts of financing, what are: a) the advantages of bonds over stock? b) the disadvantages of issuing bonds?

8. Explain the meanings of each of the following as they relate to bonds: a) call feature b) serial and term c) registered and bearer d) secured and debenture e) senior and subordinated

9. What is a bond sinking fund?

10. After bonds are issued and begin to trade between investors, does the issuing company record the investor transactions? If so, how? What types of transactions does a bond issuer record?

11. After bonds are issued, what are the two types of payments the issuing company must make? When do they occur?

12. What is the difference between the contractual interest rate and the market rate? How do they affect bonds?

Part I PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Part I Discussion Questions and Brief Exercises, continued

13. On June 1, the authorization date, Scotia Enterprises issued \$2,500,000 of 8%, 10-year bonds at 99.5. Prepare the journal entry to record the bond issue.
-
14. On December 1, the authorization date, Arcata Inc., issued \$750,000 of 6%, 10-year bonds at 103. Prepare the journal entry to record the bond issue.
-
15. On May 1, the authorization date, Knoxville Company issued \$680,000 of 7.5%, 10-year bonds at par value. Record the journal entry to issue the bonds and the entry to record the first semi-annual payment.
-
16. On May 1, the authorization date, Knoxville Company issued \$680,000 of 7.5%, 10-year bonds at par. Record the journal entry at December 31, year-end.
-
17. Flushing Enterprises, Inc. issued \$500,000 of 10%, 5-year bonds. The Discount on Bonds Payable account shows a balance of \$11,120. What is the carrying value of the bonds?
-
18. Charleston Company is deciding on whether to issue bonds or stock in order to obtain \$5,000,000 of financing for an expansion of its facilities. The company currently has 350,000 shares of common stock outstanding. The company could sell 250,000 additional shares of common stock or issue 6%, 10-year bonds at par value. Complete the table below to compare annual income.

	<u>Issue Stock</u>	<u>Issue Bonds</u>
Annual income before interest and tax expense	\$845,000	\$845,000
Deduct: bond interest expense	_____	_____
Income before tax	_____	_____
Deduct: income tax at 30%	_____	_____
Net income	_____	_____
Earnings per share of outstanding stock:		
Issue stock	_____	
Issue bonds		_____

- a) Which choice results in the highest net income?
 b) Which choice results in the highest earnings per share?
 c) Which choice results in the most risk?
-

Part I PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Part I Discussion Questions and Brief Exercises, continued

19. McKeesport Company redeemed \$1,000,000 par value of 8%, 10-year bonds prior to maturity. On the date that the company redeemed the bonds, the Discount on Bonds Payable account had a balance of \$41,200. The company paid a bond price of 103.5 to retire the bonds. Prepare the journal entry to record the retirement of the bonds.
-
20. Bond investors of Decatur Enterprises converted \$500,000 par value of convertible bonds into 5,000 shares of no-par common stock, which was selling at \$115 per share. At the time, the Premium on Bonds Payable account had a balance of \$26,600. Prepare the journal entry to record the conversion of the bonds.
-
21. On May 1, Orlando Company borrowed \$250,000 and signed an 8%, 10-year note payable with quarterly payments of \$9,139 beginning on August 1. Complete the amortization below for the first four quarters. (Round calculations to the nearest dollar.)

	(A)	(B)	(C)	(D)
Pmt. #	Payment	Principal (A – C)	Interest	Principal Balance
				\$250,000
1				
2				
3				
4				

22. Rahway Enterprises issued a \$750,000 6.5%, 20-year note payable on June 1. Monthly payments are \$5,592. Prepare journal entries to record the issuance of the note and the first note payment. (Round amounts to the nearest dollar.)
-
23. At June 30 year-end, Littleton Company accounts showed the following balances: Accounts Payable: \$8,500, Notes Payable \$145,320, Bonds Payable \$220,000, and Premium on Bonds Payable, \$11,000. The note has an interest rate of 7% and is fully amortizing, payable in semi-annual installments of \$10,874 payable on June 30 and December 31. Prepare the liability section of the balance sheet at year-end.

Part I PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Reinforcement Problems

A 2-1. Financing decision Portsmouth, Inc. needs to obtain \$75,000,000 of financing in order to develop a new product line. The company currently has 800,000 shares of common stock outstanding. The company feels that it can sell a maximum of 600,000 additional shares of common stock at average price of \$125 per share, or issue 7.5%, 20-year bonds at par value to obtain the financing. The company's current annual income before tax and bond interest expense is \$12,800,000. The income tax rate is 35%.

Instructions:

- Complete an analysis to compare the current annual net income and earnings per share for each alternative.
- Evaluate the advantages and disadvantages of each alternative.

A 2-2. Record bond issue and interest payment On March 1, the authorization date, Bakersfield Company, Inc. issued \$600,000 of 7.5%, 10-year bonds.

Instructions:

- Prepare a journal entry to record the issue of the bonds at 103.5.
- Prepare a journal entry to record the issue of the bonds at 97.25.
- Assume the bonds were sold at par. Prepare journal entries to record the bond issue and the first semi-annual interest payment.

A 2-3. Record first-year bond transactions On April 1, 2017, the authorization date, Oklahoma City Company, Inc. issued \$1,000,000 of 8%, 10-year bonds at par value, with semi-annual interest payments.

Instructions: Record the necessary 2017 entries related to the bond issue.

A 2-4. Record first and second-year bond transactions On June 1, 2017, the authorization date, Austin Enterprises issued \$900,000 of 6%, 20-year bonds at par value with semi-annual interest payments. The company reports on a calendar-year basis.

Instructions:

- Prepare a journal entry to record the bond issue.
- Prepare a journal entry to record the first interest payment.
- Prepare a journal entry to record the year-end accrual.
- Prepare a journal entry to record the second interest payment.

A 2-5. Record early redemption and convertible bond transactions Following are four separate events:

- On September 1, immediately after the last interest payment had been made and recorded, Sioux Falls, Inc. retired \$400,000 of 9.5%, 10-year bonds at a price of 96.5. At that time, the balance in the Premium on Bonds Payable account was \$12,300.

Part I PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

A 2-5, continued

- b. On April 2, immediately after the last interest payment had been made and recorded, Ogden Company retired \$500,000 of 11%, 20-year bonds at a price of 103. At that time, the balance in the Discount on Bonds Payable account was \$8,000.
- c. On July 1, Detroit Corporation retired \$1,000,000 of 10%, 20-year bonds at a price of 101.3. The bonds had been issued at par value. The bonds were retired on the same date as the semi-annual interest payment, which had not yet been paid.
- d. On May 1, immediately after the last interest payment had been made and recorded, bond investors of Teton Company converted \$300,000 of 4.5% 20-year convertible bonds into 5,000 shares of no-par common stock. The bonds were issued at par. Each share of stock is currently selling at \$72.00 per share.

Instructions: Prepare separate journal entries to record each of the four independent events.

A 2-6. Record note transactions, show note presentation on balance sheet Portland Company borrowed cash and issued a \$450,000 9% 15- year note on February 1, 2017. The note is fully amortizing, with semi-annual installment payments of principal and interest of \$27,626. Portland Company prepares annual financial statements for a December 31 year-end.

Instructions:

- a. Prepare the journal entry to record the issuance of the note.
- b. Prepare the journal entry to record the semi-annual note payment in 2017.
- c. Prepare the journal entry to record the year-end interest accrual.
- d. Prepare the journal entry to record the first semi-annual note payment in 2018.
- e. Prepare the liability section of the December 31, 2017 balance sheet.

A 2-7. Record various bond and note transactions; prepare liability section of balance sheet

During the current year, Greensboro, Inc. had the transactions that you see below. Greensboro does its financial reporting on a calendar year basis. At year-end \$15,300 of accounts payable were outstanding.

Mar. 1	Issued \$500,000 of 6%, 20-year bonds on authorization date. Bonds were issued at par and pay interest semi-annually.
May 31	Purchased \$250,000 of new equipment and signed an 8.5%, 5-year note payable for financing provided by the seller. The note is fully amortizing with semi-annual payments of \$31,208.
Dec. 18	Redeemed all bonds of a \$200,000 previous bond issue prior to maturity. The bonds were 8%, 10-year bonds with a Discount on Bonds Payable balance of \$10,000. The company retired the bonds at a price of 98. All the interest was fully paid prior to retirement.

Instructions:

- a. Make all necessary journal entries related to the above events for the current year.
- b. Prepare the liability section of the year-end balance sheet.

Part I PRACTICE Appendix 2, continued

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Instructor-Assigned Problems

If you are using this book in a class, these review problems may be assigned by your instructor for homework, group assignments, class work, or other activities. Only your instructor has the solutions.

IAA 2-1. Financing decision Wilmington, Inc. needs to obtain \$90,000,000 of financing in order to expand operations. The company currently has 1,000,000 shares of common stock outstanding. The company feels that it can sell a maximum of 1,000,000 additional shares of common stock at average price of \$90 per share, or issue 6.5%, 15-year bonds at par value to obtain the financing. The company's current annual income before tax and bond interest expense is \$15,000,000. The income tax rate is 35%.

Instructions:

- Complete an analysis to compare the current annual net income and earnings per share for each alternative.
- Evaluate the advantages and disadvantages of each alternative.

IAA 2-2. Record first and second-year bond transactions On May 1, 2017, the authorization date, South Bend, Inc. issued \$1,500,000 of 7.5%, 20-year bonds at par value with semi-annual interest payments. The company reports on a calendar-year basis.

Instructions:

- Prepare a journal entry to record the bond issue.
- Prepare a journal entry to record the first interest payment.
- Prepare a journal entry to record the year-end accrual.
- Prepare a journal entry to record the second interest payment.

IAA 2-3. Record early redemption and convertible bond transactions Four separate events are shown below.

- On July 2, immediately after the last interest payment had been made and recorded, Roswell Enterprises retired \$5,000,000 of 10%, 10-year bonds at a price of 102.75. At that time, the balance in the Discount on Bonds Payable account was \$111,600.
- On October 1, immediately after the last interest payment had been made and recorded, Atlanta Company retired \$850,000 of 12.5%, 15-year bonds at a price of 93. At that time, the balance in the Premium on Bonds Payable account was \$9,100.
- On November 1, Anchorage Company retired \$900,000 of 12.5%, 30-year bonds at a price of 102.5. The bonds had been issued at par value. The bonds were retired on the same date as the semi-annual interest payment, which had not yet been paid.
- On October 1, immediately after the last interest payment had been made and recorded, bond investors of Honolulu Enterprises converted \$1,500,000 of 3.5% 15-year convertible bonds into \$1 par common stock. The discount on bonds payable balance was \$14,000. The bonds are convertible into 50 shares of common stock for each \$1,000 of par value. The bonds were issued at par, and each share of stock is currently selling at \$28.00 per share.

Instructions: Prepare separate journal entries to record each of the four independent events.

Part I PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

IAA 2-4. Record note transactions, show note presentation on balance sheet Santa Cruz

Enterprises borrowed cash and issued a \$750,000 8% 20-year note on August 1, 2017. The note is fully amortizing, with quarterly installment payments of principal and interest of \$18,871. Santa Cruz Enterprises prepares annual financial statements with a December 31 year-end.

Instructions:

- Prepare the journal entry to record the issuance of the note.
- Prepare the journal entry to record the quarterly note payment in 2017.
- Prepare the journal entry to record the year-end interest accrual.
- Prepare the journal entry to record the first quarterly note payment in 2018.
- Prepare liability section on the December 31, 2017 balance sheet.

IAA 2-5. Record various bond and note transactions; prepare liability section of balance sheet

During the current year, Mansfield, Inc. had the transactions that you see below. Mansfield does its financial reporting on a calendar year basis. At year-end \$21,250 of accounts payable were outstanding.

May 1	Purchased \$200,000 land and a \$400,000 new building and signed a 6.5 %, 20-year note and mortgage. The note is fully amortizing with semi-annual payments of \$28,096.
June 1	Issued \$1,000,000 of 6.5%, 30-year bonds on authorization date. Bonds were issued at par and pay interest semi-annually.
Dec. 11	Redeemed all bonds of a \$770,000 previous bond issue prior to maturity. The bonds were 9%, 15-year bonds with a Premium on Bonds Payable balance of \$82,000. The company retired the bonds at a price of 104.75 All the interest was fully paid prior to retirement.

Instructions:

- Make all necessary journal entries related to the above events for the current year.
- Prepare the liability section of the year-end balance sheet.

Part II Straight-Line Amortization

Recording Interest for Bonds Issued at a Discount

Bonds Issued

When a bond is issued at a discount, the issuer receives less than the par value of the bond. For example, we can return to an earlier example of \$100,000 of 5-year, 9% bonds that are issued on January 1 for \$96,149 at a discount because the market rate is 10%. The bonds pay interest semi-annually on January 1 and July 1. The journal entry to issue the bonds would be:

Jan. 1	Cash	96,149	
	Discount on Bonds Payable	3,851	
	Bonds Payable		100,000
	(Issued bonds at a discount)		

As we discussed in Part I of the appendix, a discount on bonds payable represents an additional interest cost of borrowing over the term of a bond, until maturity. In this example, the additional cost over the 5-year life of the bonds is \$3,851. We need to record this over the life of the bonds. This is accomplished by adding an equal part of the discount to interest expense each time interest is recorded.

In this example the equal part would be: $\$3,851/10 = \385 (rounded) for each semi-annual period. This is called the **straight-line amortization** method.

Paying Interest

On July 1 the first interest payment is recorded as shown below. Note that the interest expense includes the cash payment of $\$100,000 \times .09 \times 6/12 = \$4,500$ plus the discount amortization of \$385 for a total of \$4,885.

Jan. 1	Interest Expense	4,885	
	Discount on Bonds Payable		385
	Cash		4,500
	(To record interest payment and discount amortization.)		

Accruing Interest

The next interest payment date will be on January 1 of the next year. Assume that the current fiscal year-end is December 31. At year-end, the \$4,500 interest payment for the semi-annual payment will have to be accrued. As well, six months of interest will have to be recorded for the discount amortization.

continued ►

Recording Interest for Bonds Issued at a Discount, *continued***Accruing Interest**
continued

Dec. 31	Interest Expense	4,885	
	Discount on Bonds Payable		385
	Interest Payable		4,500
	(To record accrual of bond interest and discount amortization)		

Pay Accrued Interest

Payment for the accrued interest will be made at the beginning of the next accounting period. The liability is eliminated and cash is paid.

Jan. 1	Interest Payable	4,500	
	Cash		4,500
	(To record payment of accrued bond interest)		

Bond Amortization Table

A straight-line bond discount amortization table can be prepared that summarizes the cash payments, the interest expense, the discount amortization, and the bond carrying value as you see below.

Bond Discount Amortization Table					
Straight-Line Method: 10 semi-annual periods					
	A	B	C	D	E
Semi-annual Period	Interest Expense (B + C)	Cash Payment (\$100,000 x .09 x 6/12)	Discount Amortization (\$3,851/10)	Unamortized Discount (D-C)	Bond Carrying Value (\$100,000 - D)
Issue				\$3,851	\$96,149
1	\$4,885	\$4,500	\$385	3,466	96,534
2	4,885	4,500	385	3,081	96,919
3	4,885	4,500	385	2,696	97,304
4	4,885	4,500	385	2,311	97,689
5	4,885	4,500	385	1,926	98,074
6	4,885	4,500	385	1,541	98,459
7	4,885	4,500	385	1,156	98,844
8	4,885	4,500	385	771	99,229
9	4,885	4,500	385	386	99,614
10	4,886*	4,500	386*	-0-	*100,000
Total	<u>\$48,851</u>	<u>\$45,000</u>	<u>\$3,851</u>		

* Adjusted for rounding differences

Recording Interest for Bonds Issued at a Discount, *continued*

Key Points

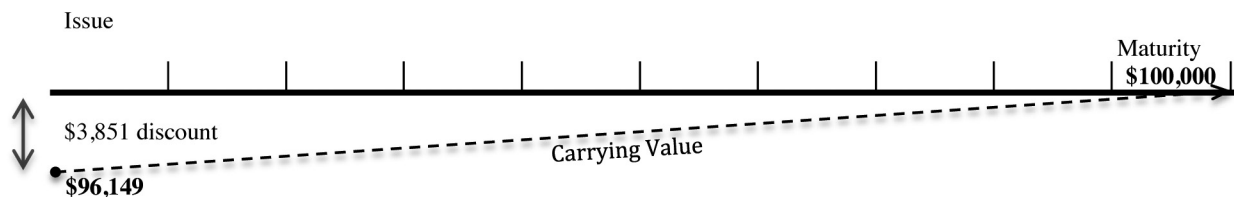
- The cash payment is constant at \$4,500 each semi-annual period.
- The discount amortization is constant at \$385 each semi-annual period.
- Interest expense is constant at \$4,885 each semi-annual period (columns B+C).
- The unamortized discount decreases by the same amount, \$385, each period and the carrying value increases by \$385. At the end of last period, the unamortized discount is gone, and the carrying value of the bond is \$100,000, the payoff amount of the bond when it matures.

Carrying Value and Discount

The increase in carrying value signifies that two things are occurring simultaneously. 1) The amount of the liability is increasing as the bond gets closer to maturity, at which point the issuer will be required to pay \$100,000. 2) The increasing balance of the liability means that the issuer will have to use up more resources (cash) to pay the increased obligation at maturity. Because this happens as a result of borrowing, the additional use of the resources is classified as interest expense.

Illustration

The illustration below provides a graphic view of the concepts we are discussing. The initial carrying value of Bonds Payable is \$96,149 as a result of the \$3,851 discount at the time of the bond issue. The dashed line shows the increase in carrying value (bond liability) over the ten semi-annual periods as the bond approaches maturity. At maturity carrying value reaches par value of \$100,000.



Bond Maturity

At the date the bond matures, the final interest payment will be made and the bond par value will be paid.

Jan. 1	Interest Payable	4,500	
	Bonds Payable	100,000	
	Cash		104,500
	(To record payment of interest and redemption of bonds at maturity)		

Discounted Loans

Overview

Occasionally a bank or other lender will structure a loan in a way that reduces the amount of funds loaned to the borrower by subtracting interest from the loan proceeds. These are called discounted loans or zero interest-bearing loans. They are often shorter-term loans, even less than a year.

Example

ABC Company borrows \$100,000 from a bank and signs a 1 year note payable. The stated interest rate is 6%. However, instead of structuring the loan with installment payments, the bank subtracts a year of interest, or \$6,000, from the loan proceeds. Therefore, the borrower receives only \$94,000. The principal of \$100,000 will be paid in a single payment at maturity.

Journal Entry

The journal entry to record the transaction is illustrated below.

Oct. 1	Cash	94,000	
	Discount on Notes Payable	6,000	
	Notes Payable		100,000
	(To record new loan)		

Analysis

- The Discount on Notes Payable will be amortized over the life of loan by debiting interest expense and crediting the discount, just like a discount on bonds payable.
- The cost of borrowing is greater than 6% because the borrower did not receive the full proceeds. $\$6,000 / \$94,000 = 6.38\%$

Compensating Balances

Overview

A compensating balance has the same effect as a discounted loan. For example, if the bank loaned \$100,000 but also required the borrower to maintain a minimum balance of \$6,000 in a checking or savings account with the bank, the borrower still has only \$94,000 of funds available for use. Interest earned, if any, is usually trivial.

Recording Interest for Bonds Issued at a Premium

Bonds Issued

When a bond is issued at a premium, the issuer receives more than the par value of the bond. For example, we can return to the earlier example of \$100,000 of 5-year, 9% bonds that are issued on January 1 for \$104,055. The bonds pay interest semi-annually on January 1 and July 1. The journal entry to issue the bonds would be:

Jan. 1	Cash	104,055	
	Premium on Bonds Payable		4,055
	Bonds Payable		100,000
	(Issued bonds at a discount)		

As we discussed earlier in the learning goal, a premium on bonds payable represents a reduction in interest cost over the term of a bond, until maturity. In this example, the reduction in cost over the 5-year life of the bond is \$4,055. We need to record this over the life of the bond. This is accomplished by reducing interest expense by an equal part of the premium each period.

In this example the equal part would be: $\$4,055/10 = \406 (rounded) for each semi-annual period. This is called the *straight-line amortization* method.

Paying Interest

On July 1 the first interest payment is recorded as shown below. Note that the interest expense includes the cash payment of $\$100,000 \times .09 \times 6/12 = \$4,500$ minus the premium amortization of \$406 for a total of \$4,094.

Jan. 1	Interest Expense	4,094	
	Premium on Bonds Payable	406	
	Cash		4,500
	(to record interest payment and premium amortization)		

Accruing Interest

The next interest payment date will be on January 1 of the next year. Assume that the current fiscal year-end is December 31. The \$4,500 interest payment for the semi-annual payment will have been accrued. As well, six months of interest reduction will have to be recorded for the premium amortization.

Dec. 31	Interest Expense	4,094	
	Premium on Bonds Payable	406	
	Interest Payable		4,500
	(To record accrual of bond interest and premium amortization)		

continued ►

Recording Interest for Bonds Issued at a Premium, *continued***Pay Accrued Interest**

Payment for the accrued interest will be made at the beginning of the next accounting period. The liability is eliminated and cash is paid.

Jan. 1	Interest Payable	4,500	
	Cash		4,500
	(To record payment of accrued bond interest)		

Bond Amortization Table

A straight-line bond premium amortization table can be prepared that summarizes the cash payments, the interest expense, the premium amortization, and the bond carrying value as you see below.

Bond Premium Amortization Table					
Straight-Line Method: 10 semi-annual periods					
	A	B	C	D	E
Semi-annual Period	Interest Expense (B – C)	Cash Payment (\$100,000 × .09 × 6/12)	Premium Amortization (\$4,055/10)	Unamortized Premium (D – C)	Bond Carrying Value (\$100,000 + D)
				\$4,055	\$104,055
1	\$4,094	\$4,500	\$406	3,649	103,649
2	4,094	4,500	406	3,243	103,243
3	4,094	4,500	406	2,837	102,837
4	4,094	4,500	406	2,431	102,431
5	4,094	4,500	406	2,025	102,025
6	4,094	4,500	406	1,619	101,619
7	4,094	4,500	406	1,213	101,213
8	4,094	4,500	406	807	100,807
9	4,094	4,500	406	401	100,401
10	<u>4,099*</u>	<u>4,500</u>	<u>401*</u>	-0-	*100,000
Total	<u>\$40,945</u>	<u>\$45,000</u>	<u>\$4,055</u>		

*Adjusted for rounding differences

Key Points

- The cash payment is constant at \$4,500 each semi-annual period.
- The premium amortization is constant at \$406 each semi-annual period.
- Interest expense is constant at \$4,094 each semi-annual period (columns B – C).

continued ►

Recording Interest for Bonds Issued at a Premium, *continued*

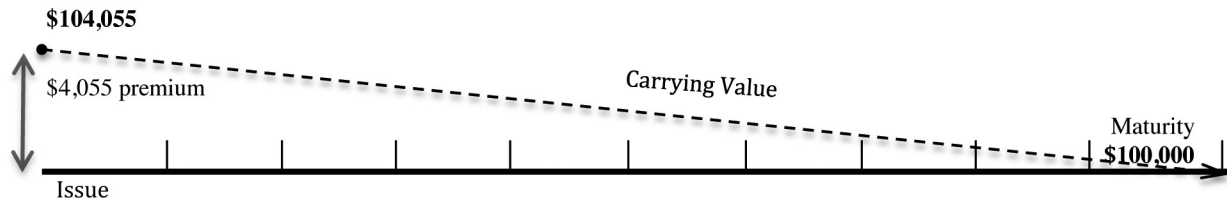
- The unamortized premium decreases by the same amount, \$406, each period and the carrying value decreases by \$406. At the end of last period, the unamortized premium is gone, and the carrying value of the bond is \$100,000, the payoff amount of the bond when it matures.

Carrying Value and Premium

The decrease in carrying value signifies that two things are occurring simultaneously. 1) The amount of the liability is decreasing as the bond gets closer to maturity, at which point the issuer will be required to pay \$100,000. 2) The decreasing balance of the liability means that the issuer will have to use up less resources (cash) at maturity to pay the decreased obligation. Because this happens as a result of borrowing, the savings in resources is classified as an interest expense reduction.

Illustration

The illustration below provides a graphic view of the concepts we are discussing. The initial carrying value of Bonds Payable is \$104,055 as a result of the \$4,055 premium at the time of the bond issue. The dashed line shows the decrease in the carrying value (bond liability) over the ten semi-annual periods as the bond approaches maturity. At maturity carrying value reaches par value of \$100,000.



Bond Maturity

At the date the bond matures, the final interest payment will be made and the bond par value will be paid.

Jan. 1	Interest Payable	4,500	
	Bonds Payable	100,000	
	Cash		104,500
	(To record payment of interest and redemption of bond at maturity)		

Coming Up

In Part III of the appendix we will examine another amortization method. This method is the method required by GAAP, unless the results are not materially different from the straight-line method, which we have just discussed.

Part II QUICK REVIEW

- When a bond is issued at a discount, the discount amount must be allocated as an addition to interest expense over the term of the bonds. Similarly, when a bond is issued at a premium, the amount of the premium must be allocated over the life of the bonds as a reduction of interest expense.
- The **straight-line amortization** method allocates an equal amount of discount or premium into each payment period. Straight-line amortization results in a constant dollar amount of interest expense and amortization each period.
- When a discount is amortized the bond carrying value (the bond liability) increases as the bond approaches maturity, and reaches par value at maturity. When a premium is amortized the bond carrying value (the bond liability) decreases as the bond approaches maturity, and reaches par value at maturity.
- A bond amortization table is a commonly-used and useful tool to identify the correct amortization amounts and bond account balances.
- At the end of an accounting period, unpaid bond interest must be accrued. This is the amount owed since the last payment date, but will not be paid until the next payment date.

Part II PRACTICE**Appendix 2**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Multiple Choice

Select the best answer.

1. Amortization of a bond discount or premium is necessary because:
 - a. Without amortization, interest expense would be too low.
 - b. Without amortization, interest expense would be too high.
 - c. Total interest expense during the term of a bond includes the amount of discount or premium.
 - d. The amount of bond payment at maturity depends on discount or premium amortization.
2. Which of the following is correct?
 - a. Discount amortization increases interest expense and premium amortization decreases interest expense.
 - b. Discount amortization decreases interest expense and premium amortization increases interest expense.
 - c. Discount and premium amortization can both increase and decrease interest expense.
 - d. All of the above.
3. When a bond discount or premium is amortized using the straight-line method:
 - a. The amount of amortization each period remains the same.
 - b. The bond carrying value changes each time the amortization is recorded.
 - c. The amount of total interest expense each period never changes.
 - d. All of the above are correct.
4. When a bond discount is amortized:
 - a. The bond interest expense will be the same as the semi-annual cash payment.
 - b. The bond interest expense will be greater than the semi-annual cash payment.
 - c. The bond interest expense will be less than the semi-annual cash payment.
 - d. The bond interest expense will change so that it can be greater or less than the cash payment.
5. When a bond premium is amortized:
 - a. The bond interest expense will be the same as the semi-annual cash payment.
 - b. The bond interest expense will be greater than the semi-annual cash payment.
 - c. The bond interest expense will be less than the semi-annual cash payment.
 - d. The bond interest expense will change so that it can be greater or less than the cash payment.
6. Little Rock Company, Inc. issued \$500,000 of 5%, 10-year bonds at a price of 98. The journal entry to record the full semi-annual payment and interest expense will include which of the following?
 - a. Debit to bond interest expense of \$12,500
 - b. Debit to bond interest expense of \$13,500
 - c. Debit to bond interest expense of \$13,000
 - d. Credit to bond interest expense of \$12,500
7. If a bond is issued at a premium or discount and the next semi-annual interest payment is not due until after the end of the current accounting period, then
 - a. no interest expense would be recorded at the end of the current period because payment will not be made until the next period
 - b. a portion of the payment due should be accrued at the end of the current period, but not the discount or premium.
 - c. a reduced cash payment should be made at the end of the current period.
 - d. a portion of the premium or discount should be amortized at the end of the current period.
8. Milwaukee, Inc. issued \$1,000,000 of 6%, 10-year bonds at a price of 102. The journal entry to record the full semi-annual payment and interest expense will include which of the following?
 - a. Debit to bond interest expense of \$60,000
 - b. Debit to bond interest expense of \$29,000
 - c. Debit to bond interest expense of \$30,000
 - d. Credit to bond interest expense of \$30,000

Part II PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

9. On August 1, Boise Enterprises issued \$1,000,000 of 6%, 5-year bonds at a price that included a \$10,000 discount. The company has a December 31 year-end. Before the semi-annual interest is paid in January, the company at year-end should
 - a. not record interest expense because payment will not be made until the next period
 - b. debit bond interest expense \$25,833
 - c. debit bond interest expense \$31,000
 - d. credit bond interest expense \$25,833
10. When a bond premium or discount is amortized,
 - a. carrying value will increase.
 - b. carrying value will decrease.
 - c. carrying value is not affected.
 - d. carrying value will increase or decrease, depending on whether a discount or a premium is being amortized.

Discussion Questions and Brief Exercises

1. Explain what it means to accrue interest expense. Could this also apply to interest revenue?
2. Why is a bond discount amortized? Why is a bond premium amortized?
3. A bond pays semi-annual interest of \$35,000 each November 1 and May 1. Also, at each date a bond discount is amortized in the amount of \$1,500. What journal entry would be necessary at June 30, the issuing company's fiscal year-end?
4. What would be the result if amortization of discount or premium was not done?
5. What is the meaning of straight-line amortization?
6. What is the purpose of a bond amortization table? How is it used?
7. What happens to bond carrying value when a discount is amortized? Why? When a premium is amortized? Why?

Part II PRACTICE

Appendix 2, continued

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Discussion Questions and Brief Exercises, continued

8. A bond amortization table is presented below.

	A	B	C	D	E
Semi-annual Period	Interest Expense (B – C)	Cash Payment (\$100,000 × .08 × 6/12)	Premium Amortization (\$5,100/10)	Unamortized Premium (D – C)	Bond Carrying Value (\$100,000 + D)
				\$5,100	\$105,100
1	\$3,490	\$4,000	\$510	4,590	104,590
2	3,490	4,000	510	4,080	104,080
3	3,490	4,000	510	3,570	103,570

- What is the term of the bond? What is the interest rate?
- Why is the bond carrying value decreasing?
- Prepare the journal entry for the first payment.

9. A bond amortization table is presented below.

	A	B	C	D	E
Semi-annual Period	Interest Expense (B + C)	Cash Payment (\$100,000 × .08 × 6/12)	Discount Amortization (\$3,500/10)	Unamortized Discount (D – C)	Bond Carrying Value (\$100,000 – D)
Issue				\$3,500	\$96,500
1	\$4,350	\$4,000	\$350	3,150	96,850
2	4,350	4,000	350	2,800	97,200
3	4,350	4,000	350	2,450	97,550

- What is the term of the bond? What is the interest rate?
- Why is the bond carrying value increasing?
- Prepare the journal entry for the first payment.

10. Using the journal entry below, explain the transaction that is recorded.

Interest Expense	3,500	
Discount on Bonds Payable		500
Cash		3,000

Part II PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Discussion Questions and Brief Exercises, continued

11. Using the journal entry below, explain the transaction that is recorded.

Interest Expense	1,000	
Discount on Bonds Payable		300
Interest Payable		700

12. Using the journal entry below, explain the transaction that is recorded.

Interest Expense	7,150	
Premium on Bonds Payable	350	
Cash		7,500

Part II PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Reinforcement Problems

A 2-8. Record first-year bond transactions On January 1, 2017, the authorization date, Manhattan Enterprises issued \$1,000,000 of 6%, 5-year bonds at 96, with semi-annual interest payments.

Instructions:

- Prepare journal entries to record the bond issue
- Prepare journal entries for the first interest payment date.
- Prepare year-end journal entries.

A 2-9. Record first-year bond transactions On January 1, 2017, the authorization date, Arlington Company issued \$2,000,000 of 7%, 10-year bonds at 107.5 with semi-annual interest payments.

Instructions:

- Prepare journal entries to record the bond issue
- Prepare journal entries for the first interest payment date.
- Prepare year-end journal entries.

A 2-10. Record first and second-year bond transactions On January 1, 2017, the authorization date, Boise Enterprises issued \$800,00,000 of 8%, 10-year bonds at 107.3 with semi-annual interest payments. The company reports on a calendar-year basis.

Instructions:

- Prepare a bond amortization table.
- Prepare journal entries to record the bond issue and the first interest payment.
- Prepare a journal entry to record the year-end accrual.
- Prepare a journal entry to record the second interest payment.

A 2-11. Prepare amortization table, record bond transactions On January 1, 2017, the authorization date, Las Vegas Company issued \$1,000,00,000 of 7.5%, 10-year bonds at 120 with semi-annual interest payments. The company reports on a calendar-year basis.

Instructions:

- Prepare a bond amortization table for the first four semi-annual payments
- Prepare the necessary bond journal entries for 2017.
- Prepare the liability section of the December 31, 2017 balance sheet.

A 2-12. Prepare amortization table, record bond transactions On July 1, 2017, the authorization date, Medford Company issued \$1,000,00,000 of 4%, 5-year bonds at 95.7 with semi-annual interest payments. The company reports on a June 30 year-end.

Instructions:

- Prepare a bond amortization table for the first four semi-annual payments
- Prepare the necessary bond journal entries for 2017 and 2018.
- Prepare the liability section of the June 30, 2018 balance sheet.

Part II PRACTICE**Appendix 2, continued****Instructor-Assigned Problems**

If you are using this book in a class, these review problems may be assigned by your instructor for homework, group assignments, class work, or other activities. Only your instructor has the solutions.

IAA 2-6. Record first and second-year bond transactions On January 1, 2017, the authorization date, Cody Company issued \$2,500,000 of 6%, 10-year bonds at 99 with semi-annual interest payments. The company reports on a calendar-year basis.

Instructions:

- Prepare journal entries to record the bond issue and the first interest payment.
- Prepare a journal entry to record the year-end accrual.
- Prepare a journal entry to record the second interest payment.

IAA 2-7. Prepare amortization table, record bond transactions On July 1, 2017, the authorization date, Gila Bend, Inc. issued \$740,000 of 8%, 5-year bonds at 103 with semi-annual interest payments. The company has a June 30 year-end.

Instructions:

- Prepare a bond amortization table for the first four semi-annual payments.
- Prepare the necessary bond journal entries for the fiscal year beginning July 1.
- Prepare the liability section of the June 30, 2018 balance sheet.

IAA 2-8. Prepare amortization table, record bond transactions On January 1, 2017, the authorization date, Pawtucket Enterprises, Inc. issued \$3,000,000,000 of 4.5%, 10-year bonds at 96 with semi-annual interest payments. The company reports on a calendar-year basis.

Instructions:

- Prepare a bond amortization table for the first four semi-annual payments.
- Prepare the necessary bond journal entries for 2017.
- Prepare the liability section of the December 31, 2017 balance sheet.

IAA 2-9. Prepare amortization table, record bond transactions On January 1, 2017, the authorization date, Providence Company issued \$5,000,000,000 of 7.5%, 10-year bonds at 97 with semi-annual interest payments. The company reports on a calendar-year basis.

Instructions:

- Prepare a bond amortization table for the first four semi-annual payments.
- Prepare the necessary bond journal entries for 2017.
- Prepare the long-term liability section of the December 31, 2017 balance sheet.

Part III Effective-Interest Amortization

Overview of the Effective-Interest Method

Overview

GAAP requires that the amount of bond interest expense recorded each period results in an interest rate that is the same as the market rate of interest that determined the price of the bonds, at the time the bonds were issued. The market rate of interest is also referred to as the *effective rate*.

For example, if the effective rate of interest at the time bonds are issued is an annual 10% rate, then GAAP requires that the dollar amount of interest recorded each period also be a 10% annual rate of the carrying value of the bonds for the period. This is required because the price of the bonds is determined by the effective (market) rate of interest, and the true cost of borrowing is really that rate.

The exception to this requirement is that if the straight-line method does not result in a material difference, then the straight-line rate can be used. What is a “material difference”? There is no clear guideline. The answer probably depends on each organization’s own interpretation of what would make a difference to a user of their financial statements.

Effective-Interest Method for Bonds Issued at a Discount

How to Apply the Effective-Interest Method

The table below shows the steps to apply the *effective-interest method* for a bond issued at a discount. The example is for \$100,000 of 5-year, 9% bonds issued on January 1 for \$96,149 as a result of a \$3,851 discount. Interest payments are semi-annual on January 1 and July 1. The market (effective) rate of interest at the time of the bond issue was 10%.

Step	Action	Example for First Period
A	Compute bond interest expense by multiplying the bond carrying value by the effective rate for the semi-annual period.	The semi-annual effective rate is: $.10/2 = .05$ $\$96,149 \times .05 = \$4,807$ interest expense (rounded amount)
B	Compute the bond cash payment	$\$100,000 \times .09 \times 6/12 = \$4,500$ payment each period.
C	Compute the discount amortized by subtracting the payment from the interest expense to obtain a residual amount.	$\$4,807 - \$4,500 = \$307$ residual
D/E	Calculate the new unamortized discount and carrying value. (They both change by the amount of amortization.)	<ul style="list-style-type: none"> ■ $\\$3,851 - \\$307 = \\$3,544$ discount balance ■ $\\$100,000 - \\$3,544 = \\$96,456$ carrying value
	Repeat steps 1–4 each period.	See table below

continued ►

Effective-Interest Method for Bonds Issued at a Discount, *continued*

Bond Amortization Table

An effective-interest discount amortization table can be prepared that summarizes the cash payments, the interest expense, the discount amortization, and the bond carrying value as you see below.

Bond Discount Amortization Table					
Effective-Interest Method: 10 semi-annual periods					
10% annual, 5% semi-annual effective rate					
	A	B	C	D	E
Semi-annual Period	Interest Expense (Prior row E × .05)	Cash Payment (\$100,000 × .09 × 6/12)	Discount Amortization (A – B)	Unamortized Discount (D – C)	Bond Carrying Value (\$100,000 – D)
Issue				\$3,851	\$96,149
1	\$4,807	\$4,500	\$307	3,544	96,456
2	4,823	4,500	323	3,221	96,779
3	4,839	4,500	339	2,882	97,118
4	4,856	4,500	356	2,526	97,474
5	4,874	4,500	374	2,152	97,848
6	4,892	4,500	392	1,760	98,240
7	4,912	4,500	412	1,348	98,652
8	4,933	4,500	433	915	99,085
9	4,954	4,500	454	461	99,539
10	<u>4,961*</u>	<u>4,500</u>	<u>461*</u>	-0-	*100,000
Total	<u>\$48,851</u>	<u>\$45,000</u>	<u>\$3,851</u>		

*Adjusted for rounding differences

Journal Entries

Columns A, B, and C are the sources of the journal entries to record the interest, amortization, and cash payment each semi-annual period after the bonds are issued.

Paying Interest

On July 1 the first interest payment is recorded as shown below. Note that the interest expense includes the cash payment of $\$100,000 \times .09 \times 6/12 = \$4,500$ plus the discount amortization of \$307 for a total of \$4,807. Refer to table, line 1.

July 1	Interest Expense	4,807	
	Discount on Bonds Payable		307
	Cash		4,500
	(To record interest payment and discount amortization)		

Effective-Interest Method for Bonds Issued at a Discount, *continued*

Accruing Interest

The next interest payment date will be on January 1 of the next year. Assume that the current fiscal year-end is December 31. At year-end, the \$4,500 interest payment for the semi-annual payment will have to be accrued. As well, six months of interest will have to be recorded for the discount amortization. Refer to table, line 2.

Dec. 31	Interest Expense	4,823	
	Discount on Bonds Payable		323
	Interest Payable		4,500
	(To record accrual of bond and discount amortization)		

Pay Accrued Interest

Payment for the accrued interest will be made at the beginning of the next accounting period. The liability is eliminated and cash is paid.

Jan. 1	Interest Payable	4,500	
	Cash		4,500
	(To record payment of accrued bond interest)		

Effective-Interest Method for Bonds Issued at a Premium

How to Apply the Effective-Interest Method

The table below shows the steps to follow to apply the effect-interest method for a bond issued at a premium. The example is for \$100,000 of 5-year, 9% bonds issued January 1 for \$104,055 as a result of a \$4,055 premium. Interest payments are semi-annual on January 1 and July 1. The market (effective) rate of interest at the time of the bond issue was 8%.

Step	Action	Example for First Period
A	Compute bond interest expense by multiplying the bond carrying value by the effective rate for the semi-annual period.	The semi-annual effective rate is: $.08/2 = .04$ $\$104,055 \times .04 = \$4,162$ interest expense (rounded)
B	Compute the bond cash payment	$\$100,000 \times .09 \times 6/12 = \$4,500$ payment each period.
C	Compute the premium amortized by subtracting the interest expense from the payment to obtain a residual amount.	$\$4,500 - \$4,162 = \$338$ residual
D/E	Calculate the new unamortized premium and carrying value. (They both change by the amount of amortization.)	<ul style="list-style-type: none"> ■ $\\$4,055 - \\$338 = \\$3,717$ premium balance ■ $\\$100,000 + \\$3,717 = \\$103,717$ carrying value
	Repeat steps 1–4 each semi-annual period.	See table below

continued ►

Effective-Interest Method for Bonds Issued at a Premium, *continued*

Bond Amortization Table

An effective-interest premium amortization table can be prepared that summarizes the cash payments, the interest expense, the premium amortization, and the bond carrying value as you see below.

Bond Premium Amortization Table					
Effective-Interest Method: 10 semi-annual periods					
8% annual, 4% semi-annual effective rate					
	A	B	C	D	E
Semi-annual Period	Interest Expense (Prior row E × .04)	Cash Payment (\$100,000 × .09 × 6/12)	Premium Amortization (B – A)	Unamortized Premium (D – C)	Bond Carrying Value (\$100,000 + D)
Issue				\$4,055	\$104,055
1	\$4,162	\$4,500	\$338	3,717	103,717
2	4,149	4,500	351	3,366	103,366
3	4,135	4,500	365	3,001	103,001
4	4,120	4,500	380	2,621	102,621
5	4,105	4,500	395	2,226	102,226
6	4,089	4,500	411	1,815	101,815
7	4,073	4,500	427	1,388	101,388
8	4,056	4,500	444	944	100,944
9	4,038	4,500	462	482	100,482
10	<u>4,018*</u>	<u>4,500</u>	<u>482*</u>	-0-	*100,000
Total	<u>\$40,945</u>	<u>\$45,000</u>	<u>\$4,055</u>		

*Adjusted for rounding differences

Journal Entries

Columns A, B, and C are the sources of the journal entries to record the interest, amortization, and cash payment each semi-annual period after the bonds are issued.

Paying Interest

On July 1 the first interest payment is recorded as shown below. Note that the interest expense is the cash payment of $\$100,000 \times .09 \times 6/12 = \$4,500$ minus the premium amortization of \$338 for a net amount of \$4,162. Refer to table, line 1.

July 1	Interest Expense	4,162	
	Premium on Bonds Payable	338	
	Cash		4,500
	(To record interest payment and premium amortization)		

Effective-Interest Method for Bonds Issued at a Premium, *continued*

Accruing Interest

The next interest payment date will be on January 1 of the next year. Assume that the current fiscal year-end is December 31. At year-end, the \$4,500 interest payment for the semi-annual payment will have been accrued. As well, six months of interest offset will have to be recorded for the premium amortization. Refer to table, line 2.

Dec. 31	Interest Expense	4,149	
	Premium on Bonds Payable	351	
	Interest Payable		4,500
	(To record accrual of bond interest and premium amortization)		

Jan. 1	Interest Payable	4,500	
	Cash		4,500
	(To record payment of accrued bond interest)		

Summary for Effective-Interest Method

- Interest expense results from a constant *rate* of interest on the carrying value of the debt throughout the term of a bond.
- The *rate* of interest is the market discount rate that was used to price a bond at the time the bond was issued.
- At each payment date, interest expense is calculated first; discount or premium amortization is the residual difference between interest expense and the cash payment.



TIP

Keep in mind that the total amount of bond interest expense over the life of a bond is the same regardless of whether the effective-interest method or straight line method is used. However, the effective-interest method allocates interest expense to each period in a more accurate way.

Part III QUICK REVIEW

- GAAP requires that the amount of bond interest expense recorded each period results in an interest rate that is the same as or not materially different than the market rate of interest, which is also called the **effective rate**. It is the market rate (effective rate) that determined the price of the bonds at the time they were issued. The requirement is accomplished by using the **effective-interest method** to calculate interest expense.
- When the effective-interest method is used, the effective interest rate at the time of bond issuance is used to determine interest expense each period. Do this by multiplying the effective rate times the bond carrying value each period.
- When the effective-interest method is used, interest expense is calculated first. The difference between the bond payment and the interest expense is the amount of discount or premium amortization.
- An effective-interest bond amortization table is a necessary tool when using the effective-interest method.

Part III PRACTICE**Appendix 2**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Multiple Choice

Select the best answer.

1. The effective interest rate means:
 - a. The semi-annual cash rate of return paid by bonds.
 - b. The rate that would be earned if bonds are retired prior to maturity.
 - c. The market rate of interest required by investors at the time bonds are sold.
 - d. The amount earned by a sinking fund for a bond issue.
2. The effective-interest method
 - a. is a GAAP requirement.
 - b. maintains a constant rate of interest throughout the term of a bond.
 - c. calculates amortization differently than the straight-line method.
 - d. All of the above.
3. Using an effective-interest amortization table for bonds issued at a discount
 - a. will result in an increasing carrying value, which is also true for a straight-line method table.
 - b. will result in a decreasing carrying value, which is also true for a straight-line method table.
 - c. will result in a constant amount of discount amortization.
 - d. requires the use of the contract interest rate to determine interest expense.
4. Using an effective-interest amortization table for bonds issued at a premium
 - a. will result in an increasing carrying value, which is also true for a straight-line method table.
 - b. will result in a decreasing carrying value, which is also true for a straight-line method table.
 - c. will result in a constant amount of discount amortization.
 - d. requires the use of the contract interest rate to determine interest expense.
5. Jamestown, Inc. issued \$1,000,000 of 8%, 10-year bonds at a price of 101, resulting from a 7% market rate at time of issue. The journal entry to record the first semi-annual payment and interest expense using the effective-interest method will include which of the following?
 - a. Debit to bond interest expense of \$34,500
 - b. Debit to bond interest expense of \$35,350
 - c. Credit to bond interest expense of \$39,500
 - d. Debit to bond interest expense of \$35,000
6. Nashville Enterprises issued \$1,000,000 of 7.5%, 10-year bonds at a price of 98, resulting from a 9.5% market rate at time of issue. The journal entry to record the first semi-annual payment and interest expense using the effective-interest method will include which of the following?
 - a. Debit to bond interest expense of \$46,550
 - b. Debit to bond interest expense of \$37,500
 - c. Credit to bond interest expense of \$41,000
 - d. Debit to bond interest expense of \$48,500

Discussion Questions and Brief Exercises

1. What is the GAAP position regarding the use of the effective-interest method compared to the use of the straight-line method? Why?
2. When the effective-interest method is used, which amount is calculated first: interest expense or the amortization of premium or discount? Why?

Part III PRACTICE Appendix 2, continued*Solutions are in the disk at the back of the book and at: www.worthyjames.com***Discussion Questions and Brief Exercises, continued**

3. Explain the differences in the calculation procedures between the effective-interest method and the straight-line method.
-
4. Topeka Enterprises issued \$1,000,000 of 9%, 10-year bonds at a price of 102, resulting from a 7% market rate at time of issue. What is the amount of interest expense and premium amortization for the first semi-annual period using the effective-interest method?
-
5. Whittier, Inc. issued \$500,000 of 4%, 10-year bonds at a price of 95, resulting from a 6% market rate at time of issue. What is the amount of interest expense and premium amortization for the first semi-annual period using the effective-interest method?
-
6. Using the journal entry below, explain the transaction that is recorded.

Interest Expense	3,400	
Discount on Bonds Payable		700
Interest Payable		2,700

7. Using the journal entry below, explain the transaction that is recorded.

Interest Expense	6,200	
Premium on Bonds Payable	500	
Cash		6,700

8. On page XXX, refer to the effective-interest method table for bonds issued at a discount. Compare this to the straight-line method table on page XXX for the same bond issue. What is the difference in interest expense? How does it change? What is the total interest expense for each table?
-
9. Make the same comparisons between the effective-interest method table for bonds issued at a premium and the straight-line method table for the same bond issue. Refer to pages XXX and XXX.

Part III PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Reinforcement Problems

A 2-13. Record first-year bond transactions On January 1, 2017, the authorization date, Manhattan Enterprises issued \$1,000,000 of 6%, 5-year bonds at 96, with semi-annual interest payments using the effective-interest method. Market rate at time of issue was 7%.

Instructions:

- Prepare journal entries to record the bond issue.
- Prepare journal entries for the first interest payment date.
- Prepare year-end journal entries.
- If you completed problem A2-8, compare your results to that problem and evaluate the difference.

A 2-14. Record first-year bond transactions On January 1, 2017, the authorization date, Arlington Company issued \$2,000,000 of 7%, 10-year bonds at 107.5 with semi-annual interest payments using the effective-interest method. Market rate at time of issue was 6%.

Instructions:

- Prepare journal entries to record the bond issue.
- Prepare journal entries for the first interest payment date.
- Prepare year-end journal entries.
- If you completed problem A2-9, compare your results to that problem and evaluate the difference.

A 2-15. Record first and second-year bond transactions On January 1, 2017, the authorization date, Boise Enterprises issued \$800,000,000 of 8%, 10-year bonds at 107.3 with semi-annual interest payments using the effective-interest method. Market rate at time of issue was 7%. The company reports on a calendar-year basis.

Instructions:

- Prepare a bond amortization table for the first four semi-annual payments.
- Prepare a journal entries to record the bond issue and the first interest payment.
- Prepare a journal entry to record the year-end accrual.
- Prepare a journal entry to record the second interest payment.
- If you completed problem A2-10, compare your results to that problem and evaluate the difference.

A 2-16. Prepare amortization table, record bond transactions On January 1, 2017, the authorization date, Las Vegas Company issued \$1,000,000,000 of 7.5%, 10-year bonds at 120 with semi-annual interest payments using the effective-interest method. Market rate at time of issue was 5%. The company reports on a calendar-year basis

Instructions:

- Prepare a bond amortization table for the first four semi-annual payments.
- Prepare the necessary bond journal entries for 2017.
- Prepare the long-term liability section of the December 31, 2017 balance sheet.
- If you completed problem A2-11, compare your results to that problem and evaluate the difference.

Part III PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Reinforcement Problems, continued

A 2-17. Prepare amortization table, record bond transactions On July 1, 2017, the authorization date, Medford Company issued \$1,000,000 of 4%, 5-year bonds at 95.7 with semi-annual interest payments using the effective-interest method. Market rate at time of issue was 5%. The company reports on a June 30 year-end.

Instructions:

- a. Prepare a bond amortization table for the first four semi-annual payments.
 - b. Prepare the necessary bond journal entries for 2017 and 2018.
 - c. Prepare the long-term liability section of the June 30, 2018 balance sheet.
 - d. If you completed problem A2-12, compare your results to that problem and evaluate the difference.
-

Part III PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Instructor-Assigned Problems

If you are using this book in a class, these review problems may be assigned by your instructor for homework, group assignments, class work, or other activities. Only your instructor has the solutions.

IAA 2-10. Record first and second-year bond transactions On January 1, 2017, the authorization date, Yakima, Inc. issued \$1,000,000 of 8%, 10-year bonds at 87.5 with semi-annual interest payments using the effective-interest method. Market rate at time of issue was 10%. The company reports on a calendar-year basis

Instructions:

- Prepare a bond amortization table.
- Prepare journal entries to record the bond issue and the first interest payment.
- Prepare a journal entry to record the year-end accrual.
- Prepare a journal entry to record the second interest payment.

IAA 2-11. Prepare amortization table, record bond transactions On January 1, 2017, the authorization date, Grand Rapids Enterprises issued \$3,000,000,000 of 7%, 10-year bonds at 107.5 with semi-annual interest payments using the effective-interest method. Market rate at time of issue was 6%. The company reports on a calendar-year basis.

Instructions:

- Prepare a bond amortization table for the first four semi-annual payments.
- Prepare the necessary bond journal entries for 2017.
- Prepare the liability section of the December 31, 2017 balance sheet.

IAA 2-12. Prepare amortization table, record bond transactions On July 1, 2017, the authorization date, Cincinnati, Inc. issued \$2,000,000 of 7.5%, 8-year bonds at 97 with semi-annual interest payments using the effective-interest method. Market rate at time of issue was 8%. The company reports on a June 30 year-end.

Instructions:

- Prepare a bond amortization table for the first four semi-annual payments.
- Prepare the necessary bond journal entries for 2017 to fiscal year-end 2018.
- Prepare the liability section of the June 30, 2018 balance sheet.

IAA 2-13. Prepare amortization table, record bond transactions On January 1, 2017, the authorization date, Providence Enterprises issued \$5,000,000,000 of 7.5%, 10-year bonds at 97 with semi-annual interest payments using the effective-interest method. The market interest rate at time of issue was 8%. The company reports on a calendar-year basis.

Instructions:

- Prepare a bond amortization table for the first four semi-annual payments.
- Prepare the necessary bond journal entries for 2017.
- Prepare the long-term liability section of the December 31, 2017 balance sheet.

Part IV

Calculating a Bond Price

Overview of Bond Pricing

Overview

Money has a time value. Money made available in the future is not worth as much as the same money made available today, because money today can be invested. Therefore, present value and compound interest procedures must be applied in bond pricing, because bond payments occur over time into the future after a bond is issued.

Here, we will illustrate and use present value tables based on compound interest to help explain calculations and concepts. However, if you are unfamiliar with the time value of money, compound interest, and present value, a more complete review of these concepts could benefit your understanding of bond pricing. One good online source is the Khan Academy at the following link: <https://www.khanacademy.org/economics-finance-domain/core-finance/interest-tutorial/present-value/v/introduction-to-present-value>.

Two Future Cash Flows

From an investor viewpoint, a bond consists of two future flows of cash. The first is a single lump-sum payoff when the bond is redeemed at maturity. The second is the regular (usually semi-annual) interest payments received over the life of the bond. The value of a bond consists of the value of those two future cash flows at the date the bond is sold.

Bond Pricing Calculation (Bond Sold at Discount)

Pricing the Par Value

For example, let's take a look at \$100,000 of 5-year, 9% bonds. Interest payments are semi-annual. The market (effective) rate of interest at the time of the bond issue is 10%. This means that investors would pay a price for the bonds such that they will receive a 10% return on their investment, over the life of the bonds.

The first source of cash the investors can expect to receive from the bond is payment of the par value (principal) when the bond is redeemed. This is a single lump-sum payment that will occur five years from the date of issue. We need to determine the value of this future payment as of the date of issue. To do this, we can use a table called the present value of a single sum. A sample table is presented below.

Bond Pricing Calculation (Bond Sold at Discount), *continued*

Present Value of a Single Sum of \$1 Table (partial)

	0.5%	1%	1.5%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.995	0.990	0.985	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	0.990	0.980	0.971	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826
3	0.985	0.971	0.956	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751
4	0.980	0.961	0.942	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683
5	0.975	0.951	0.928	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621
6	0.971	0.942	0.915	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564
7	0.966	0.933	0.901	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513
8	0.961	0.923	0.888	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467
9	0.956	0.914	0.875	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424
10	0.951	0.905	0.862	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386
11	0.947	0.896	0.849	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350
12	0.942	0.887	0.836	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319
13	0.937	0.879	0.824	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290
14	0.933	0.870	0.812	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263
15	0.928	0.861	0.800	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239
16	0.923	0.853	0.788	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218
17	0.919	0.844	0.776	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198
18	0.914	0.836	0.765	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180
19	0.910	0.828	0.754	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164
20	0.905	0.820	0.742	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149

Table Features

- The table is calculated in terms of \$1. This is useful, because whatever amounts we obtain from the table can be used as a multiple of the actual dollars we are working with.
- There are two variables in the table to apply. First, if you look across the top of the table you will see percentages. These are the percentages of interest per period. When calculating present values, this interest rate is called the **discount rate**. The percentages can be adjusted to apply to whatever time periods we are working with (annual, semi-annual, monthly, etc.). The vertical column along the left side is the number of periods for which we are applying an interest rate.

continued ►

Bond Pricing Calculation (Bond Sold at Discount), *continued*

Examples

- The value today of \$1 received 6 periods in the future at an interest rate of 4% during all of those 6 periods is \$.790. Or, you could say that if we invested \$.79 today at 4% per period for 6 periods we would receive exactly \$1. What if the future amount was \$1,000 and the time periods were years? The value today of \$1,000 received in 6 years would be $.79 \times \$1,000 = \790 .
- Suppose that the stated interest rate is an annual rate, but the calculation periods are semi-annual? For example, what is the present value today of \$1,000 received 6 years from now at a 4% annual interest rate, but interest is compounded semi-annually? We adjust the table variables: 6 years \times 2 periods per year = 12 semi-annual periods. 4% annual interest $/ 2 = 2\%$ interest semi-annually. To calculate the answer, we look at 12 periods at 2% interest, which is a table factor of .788. Therefore the value today would be $.788 \times \$1,000 = \788 .

Summary

The table below shows a summary of the steps to calculate a bond price.

Summary of Bond Price Calculation Procedure

Step	Action
1	Calculate the present value of the par redemption payment. (Using market rate as the discount rate.)
2	Calculate the present value of the interest payments. (Using market rate as the discount rate.)
3	Add the present values.

Step 1: Calculate Present Value of the Par Value

- Number of periods: We use semi-annual periods because payments are made semi-annually. Therefore, our 5-year bonds will have 10 periods.
- Discount rate: The market interest rate is 10%, but this is always given as annual rate. Therefore the semi-annual rate is $10\% / 2 = 5\%$.
- Calculation : 10 periods discounted at 5% per period is a table factor of .614. Therefore the present value of the \$100,00 par value bond redemption is $.614 \times \$100,00 = \$61,400$.

Pricing the Semi-Annual Payments

We can also calculate the present value of the semi-annual payments. A series of equal payments made at equal intervals is called an **annuity**. The table that we will use is called the present value of an ordinary annuity of \$1. An example of this table is shown below.

Bond Pricing Calculation (Bond Sold at Discount), *continued*

Present Value of an Ordinary Annuity of \$1 Table (partial)

	0.5%	1%	1.5%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.995	0.990	0.985	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	1.985	1.970	1.956	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736
3	2.970	2.941	2.912	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487
4	3.950	3.902	3.854	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170
5	4.926	4.853	4.783	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791
6	5.896	5.795	5.697	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355
7	6.862	6.728	6.598	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868
8	7.823	7.652	7.486	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335
9	8.779	8.566	8.361	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759
10	9.730	9.471	9.222	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145
11	10.677	10.368	10.071	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495
12	11.619	11.255	10.908	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814
13	12.556	12.134	11.732	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103
14	13.489	13.004	12.543	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367
15	14.417	13.865	13.343	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606
16	15.340	14.718	14.131	13.578	12.561	11.652	10.838	10.106	9.447	8.851	8.313	7.824
17	16.259	15.562	14.908	14.292	13.166	12.166	11.274	10.477	9.763	9.122	8.544	8.022
18	17.173	16.398	15.673	14.992	13.754	12.659	11.690	10.828	10.059	9.372	8.756	8.201
19	18.082	17.226	16.426	15.678	14.324	13.134	12.085	11.158	10.336	9.604	8.950	8.365
20	18.987	18.046	17.169	16.351	14.877	13.590	12.462	11.470	10.594	9.818	9.129	8.514

Table Features

- There are two variables in the table to apply. First, if you look across the top of the table you will see percentages. These are the percentages of interest (the discount rates) per period. The vertical column along the left side shows the number of payments for which we are applying the interest rate.

Examples

- The value today of six future \$1 payments at an interest rate of 4% between each of the payments is 5.242. Or, you could say that if we invested \$5.242 today earning 4%, we could receive exactly six payments of \$1. What if the payments were \$1,000 instead of \$1? $5.242 \times \$1,000 = \$5,242$ present value of six \$1,000 payments.

continued ►

Bond Pricing Calculation (Bond Sold at Discount), *continued*

**Examples
Continued**

- Suppose that the interest rate is an annual rate, but payments are semi-annual? For example, what is the present value today of \$500 payments received semi-annually for six years? We adjust the table variables: 6 years \times 2 semi-annual payments per year = 12 payments. 4% annual interest / 2 = 2% interest semi-annually. To calculate the answer, we look at 12 payments discounted at 2% interest, which is a table factor of 10.575. The value today would be $10.575 \times \$500 = \$5,287.50$ present value.

**Step 2: Present Value
of the Bond Payments**

- Number of payments: 10 semi-annual payments.
- Discount rate: The market interest rate is 10%, but this is always given as an annual rate. Therefore the semi-annual rate is $10\% / 2 = 5\%$.
- Calculation: 10 payments at 5% between payments is a table factor of 7.722. Therefore the present value of the \$4,500 semi-annual payments is $7.722 \times \$4,500 = \$34,749$.

**Step 3: Complete the
Calculation**

To complete the calculation all that is necessary is to add the two present value amounts together.

Market Price of \$100,000 of 5-year, 9% Bonds at a 10% Market (Discount) Rate	
This element ...	has a present value of ...
Present value of the bond redemption of \$100,000 in 10 periods, discounted at 5% per period. (.614)	\$61,400
Present value of 10 interest payments of \$4,500, discounted at 5%. (7.722)	<u>34,749</u>
Bond market price	<u>\$96,149</u>

Bond Pricing Calculation (Bond Sold at Premium)

Procedure

The procedure remains the same. It makes no difference if the bond is sold at a discount (present value less than par value) or at a premium (present value greater than par value).

- Calculate the present value of the par value redemption.
- Calculate the present value of the semi-annual payments.
- Add the present values.

Bond Pricing Calculation (Bond Sold at Premium), *continued*

Example

We will use the same \$100,000, 5-year, 9% bond issue. However, in this case the market interest rate is 8%. Also in this example, for practice we will use present value tables that are accurate to a greater number of decimal places. Here we calculate to five decimal places.

Present Value of Single Sum of \$1 Table (partial)				
	3.0%	3.5%	4.0%	4.5%
1	\$0.970874	\$0.966184	\$0.961538	\$0.956938
2	\$0.942596	\$0.933511	\$0.924556	\$0.915730
3	\$0.915142	\$0.901943	\$0.888996	\$0.876297
4	\$0.888487	\$0.871442	\$0.854804	\$0.838561
5	\$0.862609	\$0.841973	\$0.821927	\$0.802451
6	\$0.837484	\$0.813501	\$0.790315	\$0.767896
7	\$0.813092	\$0.785991	\$0.759918	\$0.734828
8	\$0.789409	\$0.759412	\$0.730690	\$0.703185
9	\$0.766417	\$0.733731	\$0.702587	\$0.672904
10	\$0.744094	\$0.708919	\$0.675564	\$0.643928
11	\$0.722421	\$0.684946	\$0.649581	\$0.616199
12	\$0.701380	\$0.661783	\$0.624597	\$0.589664
13	\$0.680951	\$0.639404	\$0.600574	\$0.564272
14	\$0.661118	\$0.617782	\$0.577475	\$0.539973
15	\$0.641862	\$0.596891	\$0.555265	\$0.516720

Present Value of Ordinary Annuity of \$1 Table (partial)				
	3%	3.5%	4%	4.5%
1	\$0.970874	\$0.966184	\$0.961538	\$0.956938
2	\$1.913470	\$1.899694	\$1.886095	\$1.872668
3	\$2.828611	\$2.801637	\$2.775091	\$2.748964
4	\$3.717098	\$3.673079	\$3.629895	\$3.587526
5	\$4.579707	\$4.515052	\$4.451822	\$4.389977
6	\$5.417191	\$5.328553	\$5.242137	\$5.157872
7	\$6.230283	\$6.114544	\$6.002055	\$5.892701
8	\$7.019692	\$6.873956	\$6.732745	\$6.595886
9	\$7.786109	\$7.607687	\$7.435332	\$7.268790
10	\$8.530203	\$8.316605	\$8.110896	\$7.912718
11	\$9.252624	\$9.001551	\$8.760477	\$8.528917
12	\$9.954004	\$9.663334	\$9.385074	\$9.118581
13	\$10.634955	\$10.302738	\$9.985648	\$9.682852
14	\$11.296073	\$10.920520	\$10.563123	\$10.222825
15	\$11.937935	\$11.517411	\$11.118387	\$10.739546

Market Price of \$100,000 5-year, 9% Bonds at an 8% Market (Discount) Rate

This element ...	has a present value of ...
Present value of the bond redemption of \$100,000 in 10 periods, discounted at 4% per period. (.67556)	\$67,556
Present value of 10 interest payments of \$4,500, discounted at 4%. (8.11090)	<u>36,499</u>
Bond market price	<u>\$104,055</u>

Part IV QUICK REVIEW

- Money has a time value. The time value can be calculated by formulas and shown in compound interest tables. The tables that apply to bonds are called present value tables.
- When using present value tables, the interest rate is often referred to as the *discount rate*.
- The price of a bond is calculated by adding the present value of the bond maturity payment and the present value of the interest payments over the life of the bond, both discounted at the effective (market) rate of interest from the bond issue date.
- A series of equal payments made at equal intervals is called an *annuity*. Semi-annual bond payments are an example of an annuity.

Part IV PRACTICE**Appendix 2**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Multiple Choice

Select the best answer

1. The value of \$1 in the future:
 - a. is worth more than the value of \$1 today.
 - b. is worth the same as the value of \$1 today.
 - c. is worth less than the value of \$1 today.
 - d. can be worth more or less than \$1 today, depending on market interest rates.
2. A present value of a single sum table:
 - a. will show the value today of a single future amount of \$1.
 - b. shows values that depend on the number of periods that interest is compounded.
 - c. shows values that depend on a fixed interest rate per period.
 - d. all of the above.
3. A present value of an annuity table:
 - a. will show the value today of a series of equal payments made at equal intervals.
 - b. shows values that depend on the number of payments being made.
 - c. shows values that depend on a fixed interest rate for the periods between each payment.
 - d. all of the above.
4. When selecting an interest rate to use for a present value table to determine a bond price,
 - a. use the market rate of interest on the date the bonds are issued.
 - b. use the contract rate of interest for the bonds.
 - c. use the market rate of interest as it changes with each bond payment over the life of the bonds.
 - d. none of the above.
5. The interest rate that is used in the calculation of a present value is often referred to as a
 - a. market rate.
 - b. discount rate.
 - c. contract rate.
 - d. present value rate.
6. The interest rate that is displayed in a present value table is a(n)
 - a. annual interest rate.
 - b. semi-annual interest rate.
 - c. interest rate per some period of time.
 - d. none of the above.

Discussion Questions and Brief Exercises

1. What does it mean to say that “money has a time value”?
2. What are the two cash flows provided by a bond?
3. A bond has a 10-year term. How many periods and payments should you use in the present value tables if this is a typical bond? Why?
4. Why does the present value of an annuity table show larger amounts than the single-sum table?

Part IV PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Discussion Questions and Brief Exercises, continued

5. Select any row on the present value of a single sum table. If you look from left to right, do the amounts become larger or smaller? Why?

6. Select any column on the present value of a single sum table. If you look from top to bottom, do the amounts become larger or smaller? Why?

7. Answer the same questions as #5 and #6 for an annuity table.

8. What is the present value of \$1 received 5 periods from today discounted at 4% per period?

9. What is the present value of \$750 received 5 periods from today discounted at 4% per period?

10. What is the present value of \$1 received 5 years from today, discounted at 4% per period, compounded semi-annually?

11. What is the present value of an annuity of 10 \$1 payments discounted at 2% per payment period?

12. What is the present value of an annuity of 10 \$500 payments discounted at 2% per payment period?

13. What are the three steps in the calculation of the price of a bond?

Part IV PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Reinforcement Problems

A 2-19. Calculate bond price Springfield, Inc. issued \$1,000,000 of 5%, 5-year bonds at a time when the market interest rate was 4%.

Instructions: Calculate the price of the bonds and show your calculations.

A 2-20. Calculate bond price Markleeville, Inc. issued \$5,000,000 of 6%, 5-year bonds at a time when the market interest rate was 7%.

Instructions: Calculate the price of the bonds and show your calculations (Round to 5 places).

A 2-21. Calculate bond price, record the issue On January 1, 2017, the authorization date, Stamford Company issued \$5,000,000 of 4.5%, 10-year bonds at a time when the market interest rate was 3%.

Instructions:

- Calculate the price of the bonds and show your calculations.
 - Record the bond issue in a general journal entry.
-

A 2-22. Calculate bond price, record the issue Irving, Inc. issued \$8,000,000 of 5.5%, 10-year bonds at a time when the market interest rate was 6%.

Instructions:

- Calculate the price of the bond and show your calculations.
 - Record the bond issue in a general journal entry.
-

A 2-23. Calculate bond prices for different terms, determine effect on investment A company issued of \$10,000,000 of 5%, 5-year bonds at a time when the market interest rate was 6%. You purchased \$100,000 of these bonds. (Round amounts to the nearest dollar.)

Instructions:

- Calculate the price of the bond and show your calculations.
 - Assume that after you purchased the 5-year bonds the market rate of interest later changed to 8%. What is the value of your investment now?
 - Assume that the bonds are 5%, 10-year bonds, instead of 5-year bonds. The market rate is the same 6%. Calculate how much you would have paid for the bonds.
 - Assume that after you purchased the 10-year bonds the market rate of interest later changed to 8%. What is the value of your investment now?
 - Which investment changed the most in value? What does this tell you about bond investment risk related to the length of a bond term?
-

Part IV PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Instructor-Assigned Problems

If you are using this book in a class, these review problems may be assigned by your instructor for homework, group assignments, class work, or other activities. Only your instructor has the solutions.

IAA 2-14. Calculate bond price Raleigh, Inc. issued \$4,000,000 of 8%, 5-year bonds at a time when the market interest rate was 7%.

Instructions: Calculate the price of the bonds and show your calculations (Round calculations to 5 places and round answer to the nearest dollar.)

IAA 2-15. Calculate bond price Muncie, Inc. issued \$5,000,000 of 6%, 5-year bonds at a time when the market interest rate was 6%.

Instructions: Calculate the price of the bonds and show your calculations (Round calculations to 6 places and round answer to the nearest dollar.)

IAA 2-16. Calculate bond price, record the issue On January 1, 2017, the authorization date, Duluth Enterprises, Inc. issued \$1,000,000 of 7%, 10-year bonds at a time when the market interest rate was 6%.

Instructions:

- a. Calculate the price of the bonds and show your calculations.
 - b. Record the bond issue in a general journal entry.
-

Part V Interest Allocations

Two Additional Issues

Overview

In all the examples presented to this point, we have made two assumptions in order to simplify the examples. We assumed that: 1) bonds are sold exactly at the beginning of a six-month payment interval. In other words, there always will be exactly six months until the first interest payment date is made, after the bond sale. 2) bonds with a premium or discount have interest payment dates that correspond to financial period end dates. For example, payment dates of January 1 and July 1 correspond to quarter-end and year-end periods of calendar year financial periods. Changes in these two assumptions do not change any of the concepts or procedures that we have discussed. However, they do require additional calculations.

Bonds Issued Between Payment Dates

Checklist

When a bond is issued between interest payment dates, the following items must always be checked:

- *Periods remaining to maturity:* When bonds are authorized, the bond indenture states a fixed maturity date. If a bond is sold between interest payment dates, this is an indicator that some time has passed since authorization and fewer periods remain until maturity. Example: 10-year bonds are authorized as of January 1, 2017. The first interest payment will be in six months, on July 1. If the bonds had been sold on January 1, there would be 120 months until maturity. However, if the bonds are sold on May 1, only 116 months remain until maturity.
- *Interest expense with the first interest payment.* In the example above, the bond investor will be entitled to receive only two months' of interest on the next payment date, for the months of May and June.

Example #1, Accrued Interest

Let's assume that \$100,000 of 9%, 5-year, bonds were first issued and sold at par (no discount or premium) on May 1. The bonds pay interest on January 1 and July 1, therefore the bonds have been issued between the interest payment dates. The bonds were authorized as of January 1. Result:

- Remaining months to maturity: $60 - 4$ (January 1 to May 1) = 56.
- Interest expense that should be recorded on the next payment date of July 1 is for only two months: May and June. However, bonds always pay a full amount of six months' interest on the interest payment date to whoever owns the bonds. So how do we ensure that only two months of interest expense is recorded? This is done by collecting "accrued interest" when the bonds are issued.

continued ►

Bonds Issued Between Payment Dates, *continued*

Example #1, Accrued Interest (continued)

Accrued interest as used in the context of a bond issue means the amount of interest that would have been owed by the issuer since the last payment date (or authorization date, if bonds are issued before the first payment date) if the bonds had been outstanding. In other words, accrued interest is interest for the time that the bonds were *not* outstanding between two payment dates.

The table below illustrates how to calculate (step 1) and verify (steps 2-4) the interest expense in the period in which bonds are issued/sold between interest payment dates. Step 5 completes the total interest expense calculation if there is a discount or premium.

Step	Action	Example
1	Calculate the correct amount of payment interest expense for the time the bonds are outstanding within the period.	$\$100,000 \times .09 \times 2/12 = \$1,500$ Bonds are outstanding 2 months: May and June
2	From the bond issue: <i>collect</i> the "accrued interest" from the investor.	January, February, March, April = 4 months bonds not outstanding: $\$100,000 \times .09 \times 4/12 = \$3,000$
3	Bonds <i>pay</i> the full six months of interest on the next payment date.	$\$100,000 \times .09 \times 6/12 = \$4,500$ Paid on July 1
4	Verify the net amount paid with Step 1, payments interest expense.	Paid: \$(4,500) Collected: <u>\$ 3,000</u> Net paid: \$(1,500)
5	Calculate discount or premium amortization. Combine result with interest expense, steps 1-4.	See next page

First Period Only

This is required only for a period in which bonds are issued/sold between interest payment dates, because the bonds are not outstanding for the entire period.

Issuing the Bonds

On May 1 the bond sale is recorded. Note that the cash received includes the bond issue price of \$100,000 plus the \$3,000 accrued interest collected.

May 1	Cash	103,000	
	Bonds Payable		100,000
	Interest Payable		3,000
	(To record sale of bonds and collection of 4 months' accrued interest.)		

Bonds Issued Between Payment Dates, *continued*

Paying the Interest

On the interest payment date the bonds pay the full amount of interest. Instead of recording the full amount of the payment as interest expense, \$3,000 of the payment is to eliminate interest payable. The investor has paid \$3,000 and received \$4,500, with a net correct amount of \$1,500 bond interest. (Time value of money is ignored.)

July 1	Interest Expense	1,500	
	Interest Payable	3,000	
	Cash		4,500
	(To record bond interest payment)		

Example #2, Accrued Interest and Amortization

Now let's assume that the same \$100,000 of 5-year, 9% bonds were sold on May 1 for \$97,200, at a \$2,800 discount. The same amount of accrued interest is collected. However, now we also have to amortize the discount over the remaining 56 months until the bonds mature: $\$2,800 / 56 = \50 per month using straight-line amortization. On the interest payment date, the journal entry would include the discount amortization for two months ($\$50/\text{month} \times 2 = \100) amortization.

Recording the Payment and Amortization

On the interest payment date the bonds pay the full amount of interest. The journal entry is a combination of the interest payment plus discount amortization. Interest expense is $\$1,500 + \$100 = \$1,600$.

July 1	Interest Expense	1,600	
	Interest Payable	3,000	
	Cash		4,500
	Discount on Bonds Payable		100
	(To record bond interest payment and discount amortization)		

Alternatively, two separate entries could also be made:

July 1	Interest Expense	1,500	
	Interest Payable	3,000	
	Cash		4,500
	Interest Expense	100	
	Discount on Bonds Payable		100
	(To record bond interest payment and discount amortization)		

continued ►

Bonds Issued Between Payment Dates, *continued*

Recording the Payment and Amortization (continued)



The full amount of authorized bonds is not always issued at one time. For example, a company may have twenty million dollars of bonds authorized, but only issue an initial ten million. Later, portions of the remaining authorized amount of the bonds are issued as the company decides when it is appropriate or necessary.

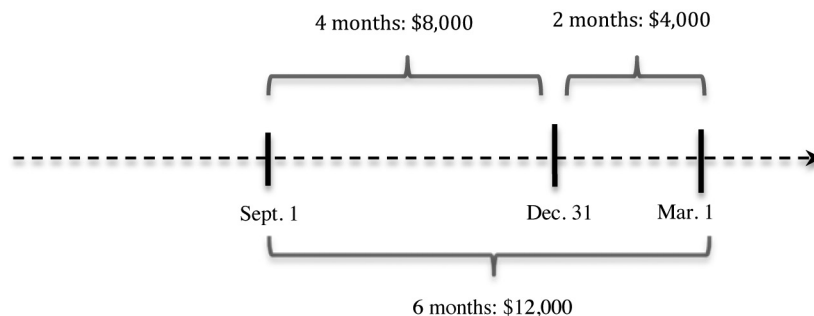
Difference Between Payment Dates and Financial Periods

Overview

Bond interest payment dates do not always correspond to financial period end dates. For example, a calendar-year reporting company might issue bonds with September 1 and March 1 bond interest payment dates. The result is that bond interest expense, including any amortization, will have to be apportioned between financial reporting periods.

Example and Illustration (No amortization)

For example, if a calendar-year company issued a bond at par that pays \$12,000 interest each September 1 and March 1, the company will have to apportion the interest between fiscal years each December 31. Count the number of months from the last interest payment date to December 31. September 1 to December 31 is four months, therefore: $4/6 \times \$12,000 = \$8,000$ of interest is recorded at year-end. The remaining two months of the six-month period is: $2/6 \times \$12,000 = \$4,000$ recorded on March 1 of the following year.



The September 1 journal entry would be:

	Sept. 1	Interest Expense	12,000
		Cash	12,000
		(To record semi-annual bond interest payment)	

The December 31 journal entry would be:

	Dec. 31	Interest Expense	8,000
		Interest Payable	8,000
		(To accrue bond interest for four months)	

Difference Between Payment Dates and Financial Periods, *continued*

Example and Illustration (continued)

The March 1, next year, journal entry would be:

Mar. 1	Interest Payable	8,000	
	Interest Expense	4,000	
	Cash		12,000
	(To record semi-annual bond interest payment)		

Example With Amortization

Following the example, now assume that \$1,500 of discount is being amortized every semi-annual payment period (straight-line method). The journal entries below illustrate how bond interest and payments would be recorded.

The September 1 journal entry now includes 6 months of discount amortization:

Sept. 1	Interest Expense	13,500	
	Discount on Bonds Payable		1,500
	Cash		12,000
	(To record semi-annual bond interest payment and discount amortization for 6 months)		

The December 31 journal entry now includes 4 months (September 1 – December 31) of discount amortization: ($\$1,500 \times 4/6 = \$1,000$)

Dec. 31	Interest Expense	9,000	
	Discount on Bonds Payable		1,000
	Interest Payable		8,000
	(To record 4 months of bond interest accrual and discount amortization)		

The March 1 journal entry now includes 2 months of discount amortization: ($\$1,500 \times 2/6 = \500). Interest expense is: ($\$12,000 - \$8,000$) + $\$500 = \$4,500$. The interest payable is removed.

Mar. 1	Interest Payable	8,000	
	Interest Expense	4,500	
	Discount on Bonds Payable		500
	Cash		12,000
	(To record semi-annual bond interest payment and discount amortization for 2 months)		

continued ►

Difference Between Payment Dates and Financial Periods, *continued*

Example With Amortization (*continued*)



Reminder: If a bond is issued after the beginning of the bond term (after the authorization date) the number of months to use for amortization is decreased. Depending on the information given, calculate the amortization over the reduced number of periods.

Example #1: 10-year bonds due on June 1, 2025 are issued at a discount on October 1, 2017. October 1, 2017 to June 1, 2025 is 92 months. Therefore, the discount should be amortized over 92 remaining months.

Example #2: 10-year bonds authorized as of June 1, 2015 are issued on October 1, 2017. 10 years = 120 months. However, 28 months have already passed from June 1, 2015 to October 1, 2017. Therefore $120 - 28 = 92$ remaining months to amortize the discount.

Premium Amortization

A premium amortization would follow exactly the same pattern, using the premium amortization procedures previously discussed. For example, suppose there had been \$1,500 of premium amortization instead of a \$1,500 discount amortization. The journal entry sequence would be:

Sept. 1	Interest Expense	10,500	
	Premium on Bonds Payable	1,500	
	Cash		12,000
	(To record semi-annual bond interest payment and premium amortization for 6 months)		

The December 31 journal entry now includes 4 months (September 1 – December 31) of premium amortization: $(\$1,500 \times 4/6 = \$1,000)$

Dec. 31	Interest Expense	7,000	
	Premium on Bonds Payable	1,000	
	Interest Payable		8,000
	(To record 4 months of bond interest accrual and premium amortization)		

Mar. 1	Interest Payable	8,000	
	Interest Expense	3,500	
	Premium on Bonds Payable	500	
	Cash		12,000
	(To record semi-annual bond interest payment and premium amortization for 2 months)		

Part V QUICK REVIEW

- When a bond is sold between interest payment dates, you must be careful to check: 1) the remaining periods to maturity 2) the correct interest expense in the first payment period.
- The interest expense in the first payment period should be recorded for only the period of time the bonds were outstanding in that period.
- To correctly allocate interest in the first period, the bond investor is required to pay an additional amount for the time that has elapsed between the last payment date (or authorization date if issued before the first payment) and the date of the purchase. This is done in order to correctly allocate interest in a period in which the investor did not own the bonds for the full period. This additional amount is referred to as *accrued interest*. The bond then pays the interest for the full period on the next payment date, resulting in the correct allocation of interest for the period of time the bonds were actually outstanding. (Note that the term “accrued interest” has a different meaning in this context than for other situations, such as for year-end accruals.)
- When bond interest payment dates do not always correspond exactly to the end of financial periods, bond interest must be allocated between financial periods. This includes interest for both the bond payment and amortization of discount or premium.

Part V PRACTICE**Appendix 2**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Note: All amortization is calculated using the straight-line method.

Multiple Choice

Select the best answer

1. The term “accrued interest” when used in the context of a bond issue, means
 - a. the application of the matching principle to record interest incurred but not yet paid.
 - b. an amount received by the issuing organization for interest not actually incurred.
 - c. the present value of closest interest payment.
 - d. an amount paid in advance by the bond issuer.
2. When a bond is issued between interest payment dates
 - a. the bond investor will pay an additional amount for the time period since the last payment date that the bonds were not owned.
 - b. the investor receives a reduced payment on the next interest payment date.
 - c. no interest is paid on the next interest payment date.
 - d. a bond will automatically adjust for the reduced time the bonds are outstanding.
3. When a bond is issued between interest payment dates
 - a. amortization of discount or premium is calculated for a shorter period on the first payment date.
 - b. total months of amortization is reduced.
 - c. both a and b are correct.
 - d. bond amortization will not be recorded on the next payment date.
4. When a bond is issued between interest payment dates
 - a. accrued year-end interest is often more than the full amount of a semi-annual payment.
 - b. accrued year-end interest is often less than the full amount of a semi-annual payment.
 - c. accrued year-end interest is always the full amount of semi-annual interest.
 - d. accrued year-end interest payments should be deferred until maturity.
5. A calendar-year company issued 10 –year bonds at a \$50,000 premium. The bonds were authorized as of February 1 of the current year, and were issued on April 1. The bonds pay interest on February 1 and August 1. The December 31 year-end journal entry includes
 - a. \$423 bond premium amortization.
 - b. \$2,119 bond premium amortization.
 - c. \$2,083 of interest expense.
 - d. \$2,083 bond premium amortization.

Discussion Questions and Brief Exercises

1. What two additional issues are created when bonds are issued between maturity dates?

2. 5-year bonds due on March 1, 2021 are issued at a \$3,000 discount on September 1, 2017. What is the discount amortization in 2017?

3. 5-year bonds authorized as of December 1, 2016 are first issued on March 1, 2017 at a \$6,000 premium. What is the premium amortization in 2017?

Part V PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Discussion Questions and Brief Exercises, continued

4. 10-year bonds due on November 30, 2027 are issued at an \$8,000 discount on August 1, 2018 by a calendar-year company. Interest payment dates are May 31 and November 30. What is the discount amortization at December 31, 2018?

5. 10-year bonds authorized as of July 1, 2016 are first issued on May 1, 2017 at a \$12,000 premium by a calendar-year company. Interest payment dates are July 1 and January 1. What is the premium amortization at December 31, 2017?

6. \$1,000,000 of 5%, 8-year bonds are issued at par on June 1. Interest payment dates are February 1 and August 1. Calculate the amount of accrued interest for the next interest payment date.

7. \$3,000,000 of 6%, 10-year bonds are issued at par on September 1. Interest payment dates are May 1 and November 1. Calculate the amount of accrued interest for the issue between payment dates.

8. What are the steps to calculate interest expense for a bond issued at par value between interest payment dates? What changes if a bond is issued at a premium or discount?

9. \$2,000,000 of 7%, 5-year bonds are first issued at 98 on September 1, 2017. The bonds mature on November 1, 2021. Interest payment dates are May 1 and November 1. Calculate the amount of cash paid and the amount of interest expense on the next interest payment date after the issue.

10. \$1,000,000 of 6%, 10-year bonds are first issued at 102.5 on April 1, 2017. The bonds were authorized as of February 1, 2017 and pay interest on February 1 and August 1. Calculate the amount of cash paid and the amount of interest expense on the next interest payment date after the issue.

11. \$5,000,000 of 6%, 20-year bonds are issued at par value on May 1, 2017. Interest payment dates are June 1 and December 1. Prepare the December 31, 2017 and June 1, 2018 bond journal entries.

12. \$2,000,000 of 5%, 10-year bonds are issued at par value on September 1 of the current year. Interest payment dates are November 1 and May 1. Prepare the September 1 journal entry to record the bond issue.

Part V PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Discussion Questions and Brief Exercises, continued

13. A calendar-year company issued \$1,000,000 of 6%, 5-year bonds on September 1 for \$970,000. The bonds pay interest on August 1 and February 1 and were authorized as of February 1 in the current year. At December 31, what is the amount of interest expense to record?
-

Reinforcement Problems

- A 2-24. Record bond issue at par between payment dates and semi-annual interest** Penobscot, Inc. issued \$2,500,000 of 9%, 10-year bonds at par on May 1 of the current year. The company reports on a calendar-year basis. Bond interest payment dates are April 1 and October 1.

Instructions:

- Prepare a journal entry to record the bond issue on May 1.
 - Calculate the net amount of cash paid as of April 1, the next semi-annual payment date.
 - Prepare a journal entry to record the October 1 transaction.
-

- A 2-25. Record semi-annual payment and year-end entry; bond issued at par between payment dates** Myrtle Beach Company issued \$7,000,000 of 7.25%, 10-year bonds at par on August 1 of the current year. The company reports on a calendar-year basis. Bond interest payment dates are November 1 and May 1.

Instructions:

- Calculate the net amount of cash paid as of November 1, the next semi-annual payment date.
 - Prepare a journal entry to record the November 1 transaction.
 - Prepare a journal entry for December 31, year-end.
-

- A 2-26. Record semi-annual payment and year-end entry; bond issued at par between payment dates** New Bedford, Inc. issued \$4,300,000 of 5.5%, 20-year bonds at par on June 1, 2017. The company reports on a June 30 year-end. Bond interest payment dates are April 1 and October 1.

Instructions:

- Prepare a journal entry to record the bond issue.
 - Prepare a journal entry for June 30, 2017 year-end.
 - Calculate the net amount of cash paid as of October 1, the next semi-annual payment date.
 - Prepare a journal entry to record the October 1 transaction.
-

Part V PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Reinforcement Problems, Continued

A 2-27. Record bond issue at discount between payment dates and year-end entry; record semi-annual payment Elko Enterprises, Inc. issued \$2,000,000 of 6.5%, 5-year bonds at 98.4 on February 1, 2017. The bonds mature on November 1, 2021. The company reports on a calendar-year basis. Bond interest payment dates are June 1 and December 1.

Instructions:

- a. Prepare a journal entry to record the bond issue on February 1.
 - b. Calculate the net amount of cash paid as of June 1, the next semi-annual payment date.
 - c. Prepare a journal entry to record the June 1 transaction.
 - d. Prepare a journal entry for December 31 year-end.
-

A 2-28. Record bond issue at premium between payment dates and year-end entry; record semi-annual payment Albuquerque Company issued \$5,000,000 of 8%, 10-year bonds at 102 on May 31, 2017 as its first bond issue. The bonds were authorized as of February 1, 2017. The company reports on a calendar-year basis. Bond interest payment dates are August 1 and February 1.

Instructions:

- a. Prepare a journal entry to record the bond issue.
 - b. Calculate the net amount of cash paid as of the first semi-annual payment date.
 - c. Prepare a journal entry for the first interest payment date.
 - d. Prepare a journal entry for December 31 year-end.
-

Part V PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

Instructor-Assigned Problems

If you are using this book in a class, these review problems may be assigned by your instructor for homework, group assignments, class work, or other activities. Only your instructor has the solutions.

IA A2-17. Record bond issue at par between payment dates and semi-annual interest

Honolulu, Inc. issued \$3,800,000 of 7.5%, 10-year bonds at par on February 1 of the current year. The company reports on a calendar-year basis. Bond interest payment dates are June 1 and December 1.

Instructions:

- Prepare a journal entry to record the bond issue on October 1.
- Calculate the net amount of cash paid as of June 1, the next semi-annual payment date.
- Prepare a journal entry to record the June 1 transaction.

IAA 2-18. Record semi-annual payment and year-end entry; bond issued at par between payment dates

Nashua, Inc. issued \$2,500,000 of 6%, 25-year bonds at par on September 1 of the current year. The company reports on a calendar-year basis. Interest payment dates are November 1 and May 1.

Instructions:

- Calculate the net amount of cash paid as of November 1, the next semi-annual payment date.
- Prepare a journal entry to record the November 1 transaction.
- Prepare a journal entry for December 31, year-end.

IAA 2-19. Record semi-annual payment and year-end entry; bond issued at par between payment dates

Biloxi Enterprises issued \$6,000,000 of 5%, 10-year bonds at par on June 1, 2017. The company reports on a September 30 year-end. Bond interest payment dates are May 1 and November 1.

Instructions:

- Prepare a journal entry to record the bond issue on June 1.
- Prepare a journal entry for September 30, 2017 year-end.
- Calculate the net amount of cash paid as of November 1, the next semi-annual payment date.
- Prepare a journal entry to record the November 1 transaction.

IAA 2-20. Record bond issue at discount between payment dates and year-end entry; record semi-annual payment

Tulsa Company issued \$9,000,000 of 8.25%, 5-year bonds at 99 on March 1, 2017. The bonds mature on September 1, 2021. The company reports on a calendar-year basis. Bond interest payment dates are April 1 and October 1.

Instructions:

- Prepare a journal entry to record the bond issue on March 1.
- Calculate the net amount of cash paid as of April 1, the next semi-annual payment date.
- Prepare a journal entry to record the April 1 transaction.
- Prepare a journal entry for December 31 year-end.

Part V PRACTICE**Appendix 2, continued**

Solutions are in the disk at the back of the book and at: www.worthyjames.com

IAA 2-21. Record bond issue at premium between payment dates and year-end entry; record semi-annual payment San Francisco, Inc. issued \$3,000,000 of 8%, 15-year bonds at 102.5 on April 1, 2017 as its first bond issue. The bonds were authorized as of December 1, 2016. The company reports on a calendar-year basis. Bond interest payment dates are June 1 and December 1.

Instructions:

- a. Prepare a journal entry to record the bond issue.
 - b. Calculate the net amount of cash paid as of the first semi-annual payment date.
 - c. Prepare a journal entry for the first interest payment date.
 - d. Prepare a journal entry for December 31 year-end.
-