

# QUESTIONS FOR REVIEW OF KEY TOPICS

## Chapter 11 Property, Plant, and Equipment and Intangible Assets: Utilization and Disposition

---

### Question 11–1

The terms depreciation, depletion, and amortization all refer to the process of allocating the cost of property, plant, and equipment and finite-life intangible assets to periods of use. The only difference between the terms is that they refer to different types of these long-lived assets; depreciation for plant and equipment, depletion for natural resources, and amortization for intangibles.

### Question 11–2

The term depreciation often is confused with a decline in value or worth of an asset. Depreciation is not measured as a decline in value from one period to the next. Instead, it involves the distribution of the cost of an asset, less any anticipated residual value, over the asset's estimated service life in a systematic and rational manner that attempts to match revenues with the use of the asset.

### Question 11–3

The process of cost allocation for plant and equipment and finite-life intangible assets requires that three factors be established at the time the asset is put into use. These factors are:

1. Service (useful) life—The estimated use that the company expects to receive from the asset.
2. Allocation base—The cost of the asset expected to be consumed during its service life.
3. Allocation method—The pattern in which the allocation base is expected to be consumed.

### Question 11–4

Physical life provides the upper bound for service life. Physical life will vary according to the purpose for which the asset is acquired and the environment in which it is operated. Service life may be less than physical life for several reasons. For example, the expected rate of technological changes may shorten service life. Management intent also may shorten the period of an asset's usefulness below its physical life. For instance, a company may have a policy of using its delivery trucks for a three-year period before trading the trucks for new models.

## *Answers to Questions (continued)*

### **Question 11–5**

The total amount of depreciation to be recorded during an asset's service life is called its depreciable base. This amount is the difference between the initial value of the asset at its acquisition (its cost) and its residual value. Residual or salvage value is the amount the company expects to receive for the asset at the end of its service life less any anticipated disposal costs.

### **Question 11–6**

Activity-based allocation methods estimate service life in terms of some measure of productivity. Periodic depreciation or depletion is then determined based on the actual productivity generated by the asset during the period. Time-based allocation methods estimate service life in years. Periodic depreciation or amortization is then determined based on the passage of time.

### **Question 11–7**

The straight-line depreciation method allocates an equal amount of depreciable base to each year of an asset's service life. Accelerated depreciation methods allocate higher portions of depreciable base to the early years of the asset's life and lower amounts of depreciable base to later years. Total depreciation is the same by either approach.

### **Question 11–8**

Conceptually, the use of activity-based depreciation methods would provide a better relation between revenues and expenses. Clearly, the productivity of a plant asset is more closely associated with the benefits provided by that asset than the mere passage of time. However, activity-based methods quite often are either infeasible or too costly to use. For example, buildings do not have an identifiable measure of productivity. For assets such as equipment, there may be an identifiable measure of productivity, such as hours or units produced, but it is more costly to determine the amount each period than it is to simply measure the passage of time. For these reasons, most companies use time-based depreciation methods.

## *Answers to Questions (continued)*

### **Question 11–9**

Companies might use the straight-line method because they consider that the benefits derived from the majority of plant assets are realized approximately evenly over these assets' service lives. It also is the easiest method to understand and apply. The effect on net income also could explain why so many companies prefer the straight-line method to the accelerated methods. Straight line produces a higher net income in the early years of an asset's life. Net income can affect bonuses paid to management or debt agreements with lenders. Income taxes are not a factor in determining the depreciation method because a company is not required to use the same depreciation method for both financial reporting and income tax purposes.

### **Question 10–10**

Property, plant, and equipment may be disposed of by sale or retirement or abandonment. When an item of property, plant, and equipment is sold, a gain or loss is recognized for the difference between the consideration received and the asset's book value. Retirements and abandonments are handled in a similar fashion. The only difference is that there will be no monetary consideration received so there will be a loss if the asset is not fully depreciated. A loss is recorded for the remaining book value of the asset.

### **Question 11–11**

The group approach to aggregation is applied to a collection of depreciable assets that share similar service lives and other attributes. For example, group depreciation could be used for fleets of vehicles or collections of equipment. The composite approach to aggregation is applied to dissimilar operating assets, such as all of the depreciable assets in one manufacturing plant. Individual assets in the composite may have diverse service lives. Both approaches are similar in that they involve applying a single straight-line rate based on the average service lives of the assets in the group or composite.

### **Question 11–12**

The allocation of the cost of a natural resource to periods of use is called depletion. The process otherwise is identical to depreciation. The activity-based units-of-production method is the predominant method used to calculate depletion, not the time-based straight-line method.

## *Answers to Questions (continued)*

### **Question 11–13**

The amortization of finite-life intangible assets is based on the same concepts as depreciation and depletion. The capitalized cost of an intangible asset that has a finite useful life must be allocated to the periods the company expects the asset to contribute to its revenue-generating activities. Intangibles, though, generally have no residual values, so the amortizable base is simply cost. Also, intangibles possess no physical life to provide an upper bound to service life. However, most intangibles have a legal or contractual life that limits useful life. Intangible assets that have indefinite useful lives, including goodwill, are not amortized.

### **Question 11–14**

A company can calculate depreciation based on the actual number of days or months the asset was used during the year. A common simplifying convention is to record one-half of a full year's expense in the years of acquisition and disposal. This is known as the half-year convention. The modified half-year convention records a full year's expense when the asset is acquired in the first half of the year or sold in the second half. No expense is recorded when the asset is acquired in the second half of the year or sold in the first half.

### **Question 11–15**

A change in the service life of plant and equipment and finite-life intangible assets is accounted for as a change in an estimate. The change is accounted for prospectively by simply depreciating the remaining depreciable base of the asset (book value at date of change less estimated residual value) over the revised remaining service life.

## *Answers to Questions (continued)*

### **Question 11–16**

A change in depreciation method is accounted for prospectively by simply depreciating the remaining depreciable base of the asset (book value at date of change less estimated residual value) over the remaining service life using the new depreciation method, exactly as we would account for a change in estimate. One difference is that most changes in estimate do not require a company to justify the change. However, this change in estimate is a result of changing an accounting principle and therefore requires a clear justification as to why the new method is preferable. A disclosure note reports the effect of the change on net income and earnings per share along with clear justification for changing depreciation methods.

### **Question 11–17**

If a material error is discovered in an accounting period subsequent to the period in which the error is made, previous years' financial statements that were incorrect as a result of the error are retrospectively restated to reflect the correction. Any account balances that are incorrect as a result of the error are corrected by journal entry. If retained earnings is one of the incorrect accounts, the correction is reported as a prior period adjustment to the beginning balance in the statement of shareholders' equity. In addition, a disclosure note is needed to describe the nature of the error and the impact of its correction on net income, income before extraordinary items, and earnings per share.

## *Answers to Questions (continued)*

### **Question 11–18**

Impairment of the value of property, plant, and equipment and intangible assets results when there has been a significant decline in value below book value. For property, plant, and equipment and intangible assets with finite useful lives, GAAP requires an entity to perform a recoverability test to determine if the undiscounted sum of estimated future cash flows from an asset is less than the asset's book value.

If there is indication of an impairment, then the loss is measured and recognized as the amount by which the book value exceeds the fair value of the asset or group of assets when the fair value is readily determinable. If fair value is not determinable, it must be estimated. One method of estimating fair value is to compute the present value of estimated future cash flows from the asset or group of assets.

For intangible assets with indefinite useful lives, if fair value is less than book value, an impairment loss is recognized for the difference. For goodwill, an impairment loss is indicated if the fair value of the reporting unit is less than its book value.

For property, plant, and equipment and intangible assets held for sale, an impairment loss is recognized for the amount by which fair value is less than book value.

### **Question 11–19**

Repairs and maintenance are expenditures made to *maintain* a given level of benefits provided by the asset and do not *increase* future benefits. Expenditures for these activities should be expensed in the period incurred.

Additions involve adding a new major component to an existing asset. These expenditures usually are capitalized.

Improvements are expenditures for the replacement of a major component of plant and equipment. The costs of improvements usually are capitalized.

Rearrangements are expenditures to restructure plant and equipment without addition, replacement, or improvement. The objective is to create a new capability for the asset and not necessarily to extend useful life. The costs of material rearrangements should be capitalized if they clearly increase future benefits.

## *Answers to Questions (concluded)*

### **Question 11–20**

IFRS allows a company to value property, plant, and equipment (PP&E) and intangible assets subsequent to initial valuation at (1) cost less accumulated depreciation/amortization or (2) fair value (revaluation). If a company chooses revaluation, all assets within a class of PP&E must be revalued on a regular basis. U.S. GAAP prohibits revaluation.

### **Question 11–21**

Under U.S. GAAP, an impairment loss for property, plant, and equipment and finite-life intangible assets is measured as the difference between book value and fair value. Under IFRS, an impairment loss is measured as the amount by which the recoverable amount is less than book value. The recoverable amount is the higher of the asset's fair value less costs to sell and value-in-use (present value of estimated future cash flows).

### **Question 11–22**

Under U.S. GAAP, an impairment loss for goodwill is indicated if the fair value of a reporting unit is less than its book value. A reporting unit is an operating segment of a company or a component of an operating segment for which discrete financial information is available and segment management regularly reviews the operating results of that component. If goodwill is tested for impairment at the same time as other assets of the reporting unit, the other assets must be tested first and any impairment loss and asset write-down is recorded prior to testing goodwill.

Under IFRS, the measurement of an impairment loss for goodwill is determined by comparing the recoverable amount of the cash-generating unit to book value. A cash-generating unit is the lowest level at which goodwill is monitored by management, which cannot be lower than a segment. If the recoverable amount is less, reduce goodwill first, then other assets. The recoverable amount is the higher of fair value less costs to sell and value-in-use (present value of estimated future cash flows).

### **Question 11–23**

Under IFRS, litigation costs to successfully defend an intangible right are expensed, except in rare situations when the expenditure increases future benefits.

# BRIEF EXERCISES

## Brief Exercise 11-1

**No.** Depreciation is a process of cost allocation, not valuation. Koeplin should not record depreciation of \$18,000 for year one of the equipment's life. Instead, it should distribute the cost of the asset, less any anticipated residual value, over the estimated service life in a systematic and rational manner that attempts to match revenues with the *use* of the asset, not the periodic decline in its value.

## Brief Exercise 11-2

### 1. Straight-line:

$$\frac{\$30,000 - \$2,000}{4 \text{ years}} = \text{\$7,000 per year}$$

### 2. Double-declining balance:

Straight-line rate is 25% ( $1 \div 4 \text{ years}$ )  $\times 2$  = 50% DDB rate

2024	$\$30,000 \times 50\%$	=	<b>\\$15,000</b>
2025	$(\$30,000 - \$15,000) \times 50\%$	=	<b>\\$ 7,500</b>

### 3. Units-of-production:

$$\frac{\$30,000 - \$2,000}{10,000 \text{ hours}} = \$2.80 \text{ per hour depreciation rate}$$

2024	$2,200 \text{ hours} \times \$2.80$	=	<b>\\$6,160</b>
2025	$3,000 \text{ hours} \times \$2.80$	=	<b>\\$8,400</b>

## Brief Exercise 11–3

### 1. Straight-line:

$$\frac{\$30,000 - \$2,000}{4 \text{ years}} = \$7,000 \text{ per year}$$

2024	$\$7,000 \times 9/12$	=	<b>\$5,250</b>
2025	$\$7,000 \times 12/12$	=	<b>\$7,000</b>

### 2. Double-declining balance:

Straight-line rate is 25%  $(1 \div 4 \text{ years}) \times 2$  = 50% DDB rate

2024	$\$30,000 \times 50\% \times 9/12$	=	<b>\$11,250</b>
------	------------------------------------	---	-----------------

2025	$(\$30,000 - \$11,250) \times 50\%$	=	<b>\$ 9,375</b>
------	-------------------------------------	---	-----------------

### 3. Units-of-production:

$$\frac{\$30,000 - \$2,000}{10,000 \text{ hours}} = \$2.80 \text{ per hour depreciation rate}$$

2024	$2,200 \text{ hours} \times \$2.80$	=	<b>\$6,160</b>
------	-------------------------------------	---	----------------

2025	$3,000 \text{ hours} \times \$2.80$	=	<b>\$8,400</b>
------	-------------------------------------	---	----------------

Because the units-of-production method is not based on when the asset was acquired, but rather based on hours used, the calculation of depreciation each year is not affected by whether the equipment was purchased at the beginning of the year or during the year.

## Brief Exercise 11–4

### 1. January 1:

Sum-of-the-digits is  $([4 (4 + 1)] \div 2) = 10$

2024	$\$28,000 \times 4/10$	=	<b>\$11,200</b>
2025	$\$28,000 \times 3/10$	=	<b>\$ 8,400</b>

### 2. March 31:

Sum-of-the-digits is  $([4 (4 + 1)] \div 2) = 10$

2024	$\$28,000 \times 4/10 \times 9/12$	=	<b>\$8,400</b>
2025	$\$28,000 \times 4/10 \times 3/12$	=	\$2,800
	$+\$28,000 \times 3/10 \times 9/12$	=	<u>\$6,300</u>
			<b>\$9,100</b>

## Brief Exercise 11–5

Selling price (cash received)		\$16,000
Less: Book value of equipment		
Original cost	\$80,000	
Accumulated depreciation	<u>(71,000)</u>	<u>(9,000)</u>
<b>Gain on sale of equipment</b>		<b><u>\$ 7,000</u></b>

### Journal entry (not required):

Cash .....	16,000	
Accumulated depreciation (account balance) .....	71,000	
Gain on sale of equipment (selling price – book value) ...		7,000
Equipment (account balance).....		80,000

## Brief Exercise 11–6

<b>(1)</b>		
Cash .....	3,000	
Accumulated depreciation—tractor (account balance) .....	26,000	
Loss on sale of tractor (selling price – book value).....	1,000	
Tractor (account balance) .....		30,000

<b>(2)</b>		
Cash .....	10,000	
Accumulated depreciation—tractor (account balance) .....	26,000	
Tractor (account balance) .....		30,000
Gain on sale of tractor (selling price – book value) .....		6,000

Notice that no matter how much the asset is sold for, the same amounts are removed from the books for the account balance of the asset and its accumulated depreciation.

## Brief Exercise 11–7

(1) To record the sale of the patent.

<b>July 15, 2024</b>	
Cash .....	750,000
Patent (account balance) .....	120,000
Gain on sale of patent (selling price – book value).....	630,000

Selling price (cash received)	\$750,000
Less: Book value of patent	<u>(120,000)</u>
Gain on sale of patent	<u><b>\$630,000</b></u>

(2) To record the sale of equipment.

<b>July 15, 2024</b>	
Cash .....	325,000
Accumulated depreciation – equipment (account balance)	150,000
Loss on sale of equipment (selling price – book value) .....	75,000
Equipment (account balance) .....	550,000

Selling price (cash received)	\$325,000
Less: Book value of equipment	
Original cost	\$550,000
Accumulated depreciation	<u>(150,000)</u> <u>(400,000)</u>
Loss on sale of equipment	<u><b>\$(75,000)</b></u>

## Brief Exercise 11–8

Assets held for sale are reported at the lower of book value or fair value. The building will be reported in the balance sheet for its lower book value of **\$800,000**, and the equipment will be reported in the balance sheet for its lower fair value of **\$200,000**.

A loss is reported when fair value is less than book value. The equipment will result in a **loss of \$40,000** (\$200,000 fair value – \$240,000 book value). No gain is recognized on the building until sold.

## Brief Exercise 11–9

(1) Annual depreciation will equal the group rate multiplied by the original cost of the group:

$$\$425,000 \times 18\% = \mathbf{\$76,500}$$

(2) Since depreciation records are not kept on an individual asset basis, dispositions are recorded under the assumption that the book value of the disposed item exactly equals any proceeds received and **no gain or loss is recorded**. Any actual gain or loss is implicitly included in the accumulated depreciation account.

### Journal entry (not required):

Cash .....	35,000	
Accumulated depreciation (difference) .....	7,000	
Equipment (account balance).....		42,000

## Brief Exercise 11–10

$$\text{Depletion per foot} = \frac{\$8,250,000}{3,000,000 \text{ cubic feet}} = \$2.75 \text{ per foot}$$

$$\text{Year 1 depletion} = \$2.75 \times 700,000 \text{ feet} = \mathbf{\$1,925,000}$$

$$\text{Year 2 depletion} = \$2.75 \times 800,000 \text{ feet} = \mathbf{\$2,200,000}$$

## Brief Exercise 11–11

Expenses for the year include:

$$\text{Amortization of the patent}^\dagger = \$400,000$$

$$\text{Amortization of the developed technology}^* = \underline{300,000}$$

$$\text{Total} = \mathbf{\$700,000}$$

Goodwill is *not* amortized. A trademark is *not* amortized.

<sup>†</sup>Amortization of the patent:

$$(\$4,000,000 \div 5) \times 6/12 = \$400,000$$

\*Amortization of the developed technology:

$$(\$3,000,000 \div 5) \times 6/12 = \$300,000$$

## Brief Exercise 11–12

(1)

Research and development expense .....	4,000,000
Software development costs .....	2,000,000
Cash .....	6,000,000

(2)

*(1) Percentage-of-revenue method:*

$$\frac{\$3,000,000}{\$10,000,000} = 30\% \times \$2,000,000 = \$600,000$$

*(2) Straight-line method:*

$$1/5 \text{ or } 20\% \times \$2,000,000 = \$400,000.$$

The percentage-of-revenue method is used since it produces the greater amortization, **\$600,000**.

(3)

Software development costs	\$2,000,000
Less: Amortization to date	<u>(600,000)</u>
Net amount reported in balance sheet	<b><u>\$1,400,000</u></b>

## Brief Exercise 11–13

(1)

### 2024:

Research and development expense.....	2,200,000
Cash.....	2,200,000

### 2025:

Research and development expense.....	800,000
Software development costs .....	300,000
Cash.....	1,100,000

(2)

(1) *Percentage-of-revenue method:*

$$\frac{\$1,000,000}{\$5,000,000} = 20\% \times \$300,000 = \$60,000$$

(2) *Straight-line method:*

$$1/4 \text{ or } 25\% \times \$300,000 \times 8/12 = \$50,000.$$

The percentage-of-revenue method is used since it produces the greater amount of amortization, **\$60,000**.

## Brief Exercise 11–14

### Calculation of annual depreciation after the estimate change:

	\$9,000,000	Cost
\$320,000		Previous annual depreciation (\$8 million ÷ 25 years)
<u>× 2 years</u>	<u>(640,000)</u>	Less: Depreciation to date (2022–2023)
	8,360,000	Undepreciated cost
	<u>(500,000)</u>	Less: Revised residual value
	7,860,000	Revised depreciable base
	<u>÷ 18</u>	Estimated remaining life – 18 years (20 – 2)
	<b><u>\$ 436,667</u></b>	2024 depreciation

## Brief Exercise 11–15

In general, we report voluntary changes in accounting principles retrospectively. However, a change in depreciation method is considered a change in accounting estimate resulting from a change in accounting principle. In other words, a change in the depreciation method reflects a change in the (a) estimated future benefits from the asset, (b) the pattern of receiving those benefits, or (c) the company's knowledge about those benefits, and therefore the two events should be reported the same way. Accordingly, Robotics reports the change prospectively; previous financial statements are not revised. Instead, the company simply employs the double-declining-balance method from now on. The undepreciated cost remaining at the time of the change would be depreciated DDB over the remaining service life. A disclosure note should justify that the change is preferable and should describe the effect of the change on any financial statement line items and per share amounts affected for all periods reported.

Asset's cost	\$9,000,000
Less: Accumulated depreciation to date*	<u>(640,000)</u>
Undepreciated cost, Jan. 1, 2024	\$8,360,000
	<u>× 2/23 †</u>
Double-declining balance depreciation for 2024	<b><u>\$ 726,957</u></b>

$$*\$8,000,000 \div 25 = \$320,000 \times 2 \text{ years} = \$640,000$$

† Remaining life is 23 years. Twice the straight-line rate is 2/23.

## Brief Exercise 11–16

(1) If a material error is discovered in an accounting period subsequent to the period in which the error is made, previous years' financial statements that were incorrect as a result of the error are retrospectively restated to reflect the correction. Any account balances that are incorrect as a result of the error are corrected by a journal entry. If retained earnings is one of the incorrect accounts, the correction is reported as a prior period adjustment to the beginning balance in the statement of shareholders' equity. In addition, a disclosure note is needed to describe the nature of the error and the impact of its correction on net income, income from continuing operations, and earnings per share.

In this case, depreciation of \$32,000 should have been \$320,000 ( $\$8,000,000 \div 25$  years). Therefore, 2022 income before tax is overstated by \$288,000 ( $\$320,000 - 32,000$ ) and accumulated depreciation is understated by the same amount. The following journal entry is needed in 2024 to correct the error (ignoring income tax):

Retained earnings .....	288,000	
Accumulated depreciation .....		288,000

(2) Depreciation for 2024 would be **\$320,000**.

## Brief Exercise 11–17

**Recoverability test:** Because the undiscounted sum of future cash flows of \$28 million exceeds book value of \$26.5 million, there is **no impairment loss** to measure.

## Brief Exercise 11–18

**Recoverability test:** Because the undiscounted sum of future cash flows of \$24 million is less than book value of \$26.5 million, there is an impairment loss.

**Measurement:** The impairment loss is calculated as follows:

Fair value	\$21.0 million
Book value	<u>26.5 million</u>
Impairment loss	<b><u>\$(5.5) million</u></b>

## Brief Exercise 11–19

Under IFRS, the impairment loss is the difference between book value and the recoverable amount. The recoverable amount is \$22 million, the higher of the value-in-use of \$22 million (present value of estimated future cash flows) and the \$21 million fair value less costs to sell.

Recoverable amount	\$22.0 million
Book value	<u>26.5</u> million
Impairment loss	<b><u>\$(4.5)</u> million</b>

## Brief Exercise 11–20

Fair value of SCC	\$40 million
Less: Book value of SCC	<u>42</u> million
Impairment loss	<b><u>\$(2)</u> million</b>

## Brief Exercise 11–21

Because SCC's fair value of \$44 million is greater than the book value of SCC's net assets of \$42 million, there is **no impairment loss** indicated.

## Brief Exercise 11–22

Under IFRS, the impairment loss is the difference between book value and the recoverable amount of the cash-generating unit. The recoverable amount is \$41 million, the higher of the \$41 million value-in-use (present value of estimated future cash flows) and the \$40 million fair value less costs to sell.

Recoverable amount	\$41	million
Book value	<u>42</u>	million
Impairment loss	<u><b>\$(1)</b></u>	<b>million</b>

## Brief Exercise 11–23

**Annual maintenance on equipment**, \$5,400—This is an example of *normal repairs and maintenance*. Future benefits are not increased; therefore, the expenditure should be expensed in the period incurred.

**Remodeling of offices**, \$22,000—This is an example of an *improvement*. The cost of the remodeling should be capitalized and depreciated, either by (1) substitution, (2) direct capitalization of the cost, or (3) a reduction of accumulated depreciation.

**Rearrangement of the shipping and receiving area**, \$35,000—This is an example of a *rearrangement*. Because the rearrangement increased productivity, the cost should be capitalized and depreciated.

**Addition of a security system**, \$25,000—This is an example of an *addition*. The cost of the security system should be capitalized and depreciated.

# EXERCISES

## Exercise 11-1

### 1. Straight-line:

$$\frac{\$33,000 - \$3,000}{5 \text{ years}} = \$6,000 \text{ per year}$$

### 2. Double-declining balance:

Straight-line rate of 20% ( $1 \div 5 \text{ years}$ )  $\times 2 = 40\%$  DDB rate.

Year	Book Value Beginning of Year	X	Depreciation Rate per Year =	Depreciation	Book Value End of Year
2024	\$33,000		40%	<b>\$ 13,200</b>	\$19,800
2025	19,800		40%	<b>7,920</b>	11,880
2026	11,880		40%	<b>4,752</b>	7,128
2027	7,128		40%	<b>2,851</b>	4,277
2028	4,277			<b><u>1,277*</u></b>	3,000
Total				<b><u>\$30,000</u></b>	

\* Amount necessary to reduce book value to residual value

Exercise 11-1 (concluded)

**3. Units-of-production:**

$$\frac{\$33,000 - \$3,000}{100,000 \text{ miles}} = \$0.30 \text{ per mile depreciation rate}$$

<b>Year</b>	<b>Actual Miles Driven</b> X	<b>Depreciation Rate per Mile</b>	<b>=</b>	<b>Depreciation</b>	<b>Book Value End of Year</b>
2024	22,000	\$0.30		<b>\$ 6,600</b>	\$26,400
2025	24,000	0.30		<b>7,200</b>	19,200
2026	15,000	0.30		<b>4,500</b>	14,700
2027	20,000	0.30		<b>6,000</b>	8,700
2028	<u>21,000</u>			<b><u>5,700*</u></b>	3,000
Totals	<u>102,000</u>			<b><u>\$30,000</u></b>	

\* Amount necessary to reduce book value to residual value

## Exercise 11–2

### 1. Straight-line:

$$\frac{\$115,000 - \$5,000}{10 \text{ years}} = \text{\$11,000 per year}$$

### 2. Double-declining balance:

Straight-line rate is 10% ( $1 \div 10 \text{ years}$ )  $\times 2$  = 20% DDB rate

2024	$\$115,000 \times 20\%$	=	<b>\\$23,000</b>
2025	$(\$115,000 - \$23,000) \times 20\%$	=	<b>\\$18,400</b>

### 3. Units-of-production:

$$\frac{\$115,000 - \$5,000}{220,000 \text{ units}} = \$0.50 \text{ per unit depreciation rate}$$

2024	$30,000 \text{ units} \times \$0.50$	=	<b>\\$15,000</b>
2025	$25,000 \text{ units} \times \$0.50$	=	<b>\\$12,500</b>

## Exercise 11-3

### 1. Straight-line:

$$\frac{\$115,000 - \$5,000}{10 \text{ years}} = \mathbf{\$11,000} \text{ per year}$$

2024	$\$11,000 \times 3/12$	=	<b>\$ 2,750</b>
2025	$\$11,000 \times 12/12$	=	<b>\$11,000</b>

### 2. Double-declining balance:

Straight-line rate is 10% ( $1 \div 10 \text{ years}$ )  $\times 2$  = 20% DDB rate

2024	$\$115,000 \times 20\% \times 3/12$	=	<b>\$ 5,750</b>
2025	$(\$115,000 - \$5,750) \times 20\%$	=	<b>\$21,850</b>

### 3. Units-of-production:

$$\frac{\$115,000 - \$5,000}{220,000 \text{ units}} = \$0.50 \text{ per unit depreciation rate}$$

2024	$10,000 \text{ units} \times \$0.50$	=	<b>\$ 5,000</b>
2025	$25,000 \text{ units} \times \$0.50$	=	<b>\$12,500</b>

## Exercise 11–4

### 1. Sum-of-the-years' digits:

Sum-of-the-digits is  $([10 (10 + 1)] \div 2) = 55$

$$2024 \quad \$110,000 \times 10/55 = \mathbf{\$20,000}$$

$$2025 \quad \$110,000 \times 9/55 = \mathbf{\$18,000}$$

### 2. One hundred fifty percent declining balance:

Straight-line rate is  $10\% (1 \div 10 \text{ years}) \times 1.5 = 15\% \text{ rate}$

$$2024 \quad \$115,000 \times 15\% = \mathbf{\$17,250}$$

$$2025 \quad (\$115,000 - 17,250) \times 15\% = \mathbf{\$14,663}$$

### 3. Sum-of-the-years' digits:

Sum-of-the-digits is  $\{[10 (10 + 1)]/2\} = 55$

$$2024 \quad \$110,000 \times 10/55 \times 3/12 = \mathbf{\$ 5,000}$$

$$2025 \quad \$110,000 \times 10/55 \times 9/12 = \$15,000$$

$$+ \$110,000 \times 9/55 \times 3/12 = \underline{\quad 4,500}$$
$$\mathbf{\$19,500}$$

### One hundred fifty percent declining balance:

Straight-line rate is  $10\% (1 \div 10 \text{ years}) \times 1.5 = 15\% \text{ rate}$

$$2024 \quad \$115,000 \times 15\% \times 3/12 = \mathbf{\$ 4,313}$$

$$2025 \quad (\$115,000 - \$4,313) \times 15\% = \mathbf{\$16,603}$$

## Exercise 11–5

### Building depreciation:

$$\frac{\$5,000,000 - \$200,000}{30 \text{ years}} = \mathbf{\$160,000} \text{ per year}$$

### Building addition depreciation:

Remaining service life from June 30, 2024, is 27.5 years.

$$\frac{\$1,650,000}{27.5 \text{ years}} = \$60,000 \text{ per year}$$

$$2024 \quad \$60,000 \times 6/12 = \mathbf{\$30,000}$$

$$2025 \quad \$60,000 \times 12/12 = \mathbf{\$60,000}$$

## Exercise 11-6

### Asset A:

Straight-line rate is  $20\% (1 \div 5 \text{ years}) \times 2 = 40\%$  DDB rate

$$\frac{\$24,000}{0.40} = \$60,000 = \text{Book value at the beginning of year 2}$$

$$\text{Cost} - (\text{Cost} \times 40\%) = \$60,000$$

$$60\% \times \text{Cost} = \$60,000$$

$$\text{Cost} = \mathbf{\$100,000}$$

### Asset B:

$$(\$40,000 - \text{residual}) \times 1/8 = \$4,500$$

$$(\$40,000 - \text{residual}) = \$36,000$$

$$\text{Residual} = \mathbf{\$4,000}$$

### Asset C:

$$\frac{\$65,000 - \$5,000}{\text{Life}} = \$6,000$$

$$\text{Life} = \mathbf{10 \text{ years}}$$

### Asset D:

$$\$230,000 - \$10,000 = \$220,000 \text{ depreciable base}$$

$$\$220,000 \div 10 \text{ years} = \$22,000 \text{ per year}$$

Method used is **straight line**.

### Asset E:

Straight-line rate is  $12.5\% (1 \div 8 \text{ years}) \times 2 = 25\%$  rate

$$\text{Year 1 } \$200,000 \times 25\% = \$50,000$$

$$\text{Year 2 } (\$200,000 - \$50,000) \times 25\% = \mathbf{\$37,500}$$

## Exercise 11–7

### Requirement 1

#### Building depreciation:

$$\frac{\$8,000,000^* - \$800,000^{**}}{30 \text{ years}} = \$240,000 \text{ per year}$$

\*\$12,000,000 total  $\times$  2/3 for building cost

\*\*\$8,000,000  $\times$  10%

2024:  $\$240,000 \times 9/12 =$  **\$180,000**

2025: **\$240,000**

#### Furniture and fixtures depreciation:

$1/10$  or 10% (the straight-line rate)  $\times$  2 = 20% DDB rate

2024:  $\$1,200,000 \times 20\% \times 9/12 =$  **\$180,000**

2025:  $(\$1,200,000 - \$180,000) \times 20\% =$  **\$204,000**

#### Office equipment depreciation:

$1/5$  or 20% (the straight-line rate)  $\times$  2 = 40% DDB rate

2024:  $\$700,000 \times 40\% \times 9/12 =$  **\$210,000**

2025:  $(\$700,000 - \$210,000) \times 40\% =$  **\$196,000**

### Requirement 2

Book values on December 31, 2025:

Land **\$4,000,000** (1/3 of purchase price; no depreciation)

Building **\$7,580,000** ( $= \$8,000,000 - \$180,000 - \$240,000$ )

Furniture and fixtures **\$816,000** ( $= \$1,200,000 - \$180,000 - \$204,000$ )

Office equipment **\$294,000** ( $= \$700,000 - \$210,000 - \$196,000$ )

## Exercise 11–8

### Requirement 1

#### U.S. GAAP:

$$\begin{array}{l} 2024: \quad \$120,000 \div 8 = \$15,000 \times 6/12 = \mathbf{\$ 7,500} \\ 2025: \quad \$120,000 \div 8 = \mathbf{\$15,000} \end{array}$$

### Requirement 2

#### IFRS:

$$\begin{array}{l} 2024: \quad \mathbf{Equipment:} \\ \quad \$100,000 \div 8 = \$12,500 \times 6/12 = \mathbf{\$6,250} \end{array}$$

$$\begin{array}{l} \mathbf{Drill:} \\ \$ 20,000 \div 4 = \$5,000 \times 6/12 = \underline{2,500} \\ \quad \mathbf{Total} \quad \mathbf{\$8,750} \end{array}$$

$$\begin{array}{l} 2025: \quad \mathbf{Equipment:} \\ \quad \$100,000 \div 8 = \mathbf{\$12,500} \end{array}$$

$$\begin{array}{l} \mathbf{Drill:} \\ \$ 20,000 \div 4 = \underline{5,000} \\ \quad \mathbf{Total} \quad \mathbf{\$17,500} \end{array}$$

## Exercise 11–9

### Requirement 1

**Depreciation for 2024:**  $\$240,000 \div 6 = \$40,000 \times 9/12 = \mathbf{\$30,000}$

### Requirement 2

(\$ in thousands)	Before Revaluation		After Revaluation
Equipment	\$240,000	× 220/210 =	\$251,429
Accumulated depreciation	<u>30,000</u>	× 220/210 =	<u>31,429</u>
Book value	\$210,000	× 220/210 =	\$220,000
Equipment (\$251,429 – \$240,000)			11,429
Accumulated depreciation (\$31,429 – \$30,000)			1,429
Revaluation surplus–OCI (\$220,000 – \$210,000)			10,000

### Requirement 3

**Depreciation for 2025:**  $\$220,000 \div 5.25 \text{ years} = \mathbf{\$41,905}$

### Requirement 4

	Before Revaluation		After Revaluation
Equipment	\$240,000	× 195/210 =	\$222,857
Accumulated depreciation	<u>30,000</u>	× 195/210 =	<u>27,857</u>
Book value	\$210,000	× 195/210 =	\$195,000
Revaluation expense* (\$210,000 – \$195,000)			15,000
Accumulated depreciation (\$30,000 – \$27,857)			2,143
Equipment (\$240,000 – \$222,857)			17,143

\*If a revaluation surplus account relating to the same asset had existed, that account would have been debited up to the amount of its balance before debiting revaluation expense.

## Exercise 11–10

### Requirement 1

\* Depreciation per unit =  $(\$400,000 - \$50,000) \div 700,000 \text{ units} = \$0.50$ .

Accumulated depreciation 2022-2024 =  $340,000 \text{ units} \times \$0.50 = \$170,000$ .

Selling price (cash received)		\$ 210,000
Less: Book value of equipment		
Original cost	\$400,000	
Accumulated depreciation*	<u>(170,000)</u>	<u>(230,000)</u>
<b>Loss on sale of equipment</b>		<b><u>\$ (20,000)</u></b>

### Requirement 2

Cash.....	210,000	
Accumulated depreciation—equipment (account balance)	170,000*	
Loss on sale of equipment (selling price – book value).....	20,000	
Equipment (account balance) .....		400,000

### Requirement 3

Selling price (cash received)		\$ 245,000
Less book value of equipment:		
Original cost	\$400,000	
Accumulated depreciation	<u>(170,000)</u>	<u>(230,000)</u>
<b>Gain on sale of equipment</b>		<b><u>\$ 15,000</u></b>

### Requirement 4

Cash.....	245,000	
Accumulated depreciation—equipment (account balance)	170,000*	
Equipment (account balance).....		400,000
Gain on sale of equipment (selling price – book value) ...		15,000

## Exercise 11–11

Depreciation =  $(\$126,000 - \$30,000) \div 8 \text{ years} = \$12,000/\text{year}$  or  $\$1,000/\text{month}$

### Requirement 1

To update depreciation in 2024; 2 months of service to date of disposal.

Depreciation expense .....	2,000	
Accumulated depreciation .....		2,000

### Requirement 2

Selling price (cash received)		\$ 58,000
Less: Book value of equipment:		
Original cost	\$126,000	
Accumulated depreciation*	<u>( 56,000)</u>	<u>(70,000)</u>
Loss on sale of equipment		<u><u>\$(12,000)</u></u>

* July 1, 2019 to March 1, 2024 = 6 months (2019) + 48 months (2020-2023) + 2 months (2024) = 56 months
Total accumulated depreciation = 56 months $\times$ \$1,000 = \$56,000.

To record the sale of the truck.

Cash .....	58,000	
Loss on sale of truck (selling price – book value) .....	12,000	
Accumulated Depreciation (account balance) .....	56,000	
Truck (account balance) .....		126,000

*Exercise 11–11 (continued)*

**Requirement 3**

Selling price (cash received)		\$ 80,000
Less: Book value of equipment		
Original cost	\$126,000	
Accumulated depreciation	<u>(56,000)</u>	<u>(70,000)</u>
Gain on sale of equipment		<u>\$ 10,000</u>

To record the sale of the truck.

Cash .....	80,000	
Accumulated Depreciation (account balance) .....	56,000	
Truck (account balance) .....		126,000
Gain on sale of truck (selling price – book value) .....		10,000

## Exercise 11–12

### Requirement 1

Selling price (cash received)		\$170,000
Less: Book value of equipment		
Original cost	\$800,000	
Accumulated depreciation	<u>(562,500)*</u>	<u>237,500</u>
<b>Loss on sale of equipment</b>		<b><u><u>\$ (67,500)</u></u></b>

\*Annual depreciation =  $(\$800,000 - \$50,000) / 5 \text{ years} = \$150,000/\text{year}$

2020	$\$150,000 \times 1/2 =$	\$ 75,000
2021		150,000
2022		150,000
2023		150,000
2024	$\$150,000 \times 1/4 =$	<u>37,500</u>
Total		<u>\$562,500</u>

Cash .....	170,000
Accumulated depreciation—equipment (above) .....	562,500
Loss on sale of equipment (selling price – book value) .....	67,500
Equipment (balance) .....	800,000

*Exercise 11–12 (concluded)*

**Requirement 2**

Cash.....	170,000	
Accumulated depreciation—equipment (below).....	675,584	
Gain on sale (selling price – book value).....		45,584
Equipment (balance) .....		800,000

**Accumulated depreciation:**

2020	$\$800,000 \times 2/5 \times 6/12 =$	\$160,000
2021	$\$640,000 \times 2/5 =$	256,000
2022	$\$384,000 \times 2/5 =$	153,600
2023	$\$230,400 \times 2/5 =$	92,160
2024	$\$138,240 \times 2/5 \times 3/12 =$	<u>13,824</u>
	Total	<u><b>\$675,584</b></u>

Selling price (cash received)	\$170,000
Less book value of equipment:	
Original cost	\$ 800,000
Accumulated depreciation	<u>(675,584)</u> 124,416
<b>Gain on sale of equipment</b>	<u><b>\$ 45,584</b></u>

## Exercise 11–13

### Requirement 1

Straight-line depreciation:

$$\frac{\$260,000 - \$20,000}{6 \text{ years}} = \$40,000 \text{ per year}$$

2022		=	\$40,000
2023		=	\$40,000
2024	\$40,000 × 3/12	=	<u>\$10,000</u>
			\$90,000

Book value as of March 31, 2024 = \$260,000 – \$90,000 = **\$170,000**

### Requirement 2

The equipment would be reported for the lower of book value (\$170,000) or fair value (\$150,000). In this case, the fair value of **\$150,000** is lower.

The entry to record the loss is (not required):

Loss on asset held for sale	20,000	
Accumulated depreciation	90,000	
Equipment		110,000

## Exercise 11–14

### Requirement 1

Asset	Cost	Residual Value	Depreciable Base	Estimated Life(yrs.)	Depreciation per Year (straight line)
Stoves	\$15,000	\$3,000	\$12,000	6	\$2,000
Refrigerators	10,000	1,000	9,000	5	1,800
Dishwashers	<u>8,000</u>	<u>500</u>	<u>7,500</u>	4	<u>1,875</u>
Totals	<u>\$33,000</u>	<u>\$4,500</u>	<u>\$28,500</u>		<u><b>\$5,675</b></u>

$$\text{Group depreciation rate} = \frac{\$5,675}{\$33,000} = 17.2\% \text{ (rounded)}$$

$$\text{Group life} = \frac{\$28,500}{\$5,675} = 5.02 \text{ years (rounded)}$$

### Requirement 2

To record the purchase of new refrigerators.

Refrigerators.....	2,700	
Cash.....		2,700

To record the sale of old refrigerators.

Cash.....	200	
Accumulated depreciation (difference) .....	1,300	
Refrigerators.....		1,500

## Exercise 11–15

### Requirement 1

#### Capitalized cost of the equipment:

Purchase price	\$154,000
Freight charges	2,000
Installation charges	<u>4,000</u>
Capitalized cost	<u>\$160,000</u>

Straight-line rate of 12.5% ( $1 \div 8$  years)  $\times 2 = 25\%$  DDB rate.

Year	Book Value Beginning of Year	$\times$	Depreciation Rate per Year	=	Depreciation	Book Value End of Year
2024	\$160,000		25%		<b>\$ 40,000</b>	\$120,000
2025	120,000		25%		<b>30,000</b>	90,000
2026	90,000		25%		<b>22,500</b>	67,500
2027	67,500		25%		<b>16,875</b>	50,625
2028	50,625		*		<b>5,000</b>	45,625
2029	45,625		*		<b>5,000</b>	40,625
2030	40,625		*		<b>5,000</b>	35,625
2031	35,625		*		<b><u>5,000</u></b>	30,625
Total					<b><u>\$129,375</u></b>	

\* Switch to straight line in 2028:  
 $(\$50,625 - \$30,625) / 4 \text{ years} = \$5,000 / \text{year}$

### Requirement 2

#### Prospectively.

Generally accepted accounting principles allow a company to change from one depreciation method to another if the company can justify the change. For example, new information might become available to suggest that a different depreciation method would better represent the pattern of the asset's consumption relative to revenue production. We account for these changes prospectively.

## Exercise 11–16

### Requirement 1

$$\text{Depletion per ton} = \frac{\$4,500,000}{900,000 \text{ tons}} = \$5.00 \text{ per ton}$$

$$\text{2024 depletion} = \$5.00 \times 240,000 \text{ tons} = \mathbf{\$1,200,000}$$

### Requirement 2

**Yes.**

Depletion is part of product cost and is included in the cost of the inventory of copper, just as the depreciation on manufacturing equipment is included in inventory cost. The depletion is then included in cost of goods sold in the income statement when the copper is sold.

## Exercise 11–17

Timber tract:

$$\frac{\$3,200,000 - \$600,000}{5,000,000 \text{ board feet}} = \$0.52 \text{ per board foot}$$

$$500,000 \times \$0.52 = \mathbf{\$260,000} \text{ depletion}$$

Logging roads:

$$\$240,000 \div 5,000,000 \text{ board feet} = \$0.048 \text{ per board foot}$$

$$500,000 \times \$0.048 = \mathbf{\$24,000} \text{ depreciation}$$

## Exercise 11–18

### Requirement 1

#### Cost of copper mine:

Mining site	\$1,000,000
Development costs	600,000
Restoration costs	<u>303,939</u> <sup>†</sup>
	<u>\$1,903,939</u>

$$\begin{aligned}\dagger \$300,000 \times 25\% &= \$75,000 \\ 400,000 \times 40\% &= 160,000 \\ 600,000 \times 35\% &= \underline{210,000} \\ \$445,000 \times .68301^* &= \$303,939\end{aligned}$$

\*Present value of \$1,  $n = 4$ ,  $i = 10\%$  (Table 2)

#### Depletion:

$$\text{Depletion per pound} = \frac{\$1,903,939}{10,000,000 \text{ pounds}} = \$0.1904 \text{ per pound}$$

$$\begin{aligned}2024 \text{ depletion} &= \$0.1904 \times 1,600,000 \text{ pounds} = \mathbf{\$304,640} \\ 2025 \text{ depletion} &= \$0.1904 \times 3,000,000 \text{ pounds} = \mathbf{\$571,200}\end{aligned}$$

#### Depreciation:

$$\text{Depreciation per pound} = \frac{\$120,000 - 20,000}{10,000,000 \text{ pounds}} = \$0.01 \text{ per pound}$$

$$\begin{aligned}2024 \text{ depreciation} &= \$0.01 \times 1,600,000 \text{ pounds} = \mathbf{\$16,000} \\ 2025 \text{ depreciation} &= \$0.01 \times 3,000,000 \text{ pounds} = \mathbf{\$30,000}\end{aligned}$$

### Requirement 2

Depletion of natural resources and depreciation of assets used in the extraction of natural resources are part of product cost and are included in the cost of the inventory of copper, just as the depreciation on manufacturing equipment is included in inventory cost. The depletion and depreciation are then included in cost of goods sold in the income statement when the copper is sold.

## Exercise 11–19

### Requirement 1

- a. To record the purchase of a patent.

<b>January 1, 2022</b>		
Patent.....	700,000	
Cash.....		700,000

To record amortization on the patent.

<b>December 31, 2022 and 2023</b>		
Amortization expense (\$700,000 ÷ 10 years) .....	70,000	
Patent.....		70,000

- b. To record the purchase of a franchise.

<b>2024</b>		
Franchise .....	500,000	
Cash.....		500,000

- c. To record research and development expenses.

<b>2024</b>		
Research and development expense.....	380,000	
Cash.....		380,000

*Exercise 11–19 (concluded)*

**2024 Year-end adjusting entries**

**Patent:** To record amortization on the patent after change in useful life.

<b>December 31, 2024</b>		
Amortization expense (determined below) .....	112,000	
Patent .....		112,000

**Calculation of annual amortization after the estimate change:**

(\$ in thousands)

	\$700	Cost
\$70		Previous annual amortization ( $\$700 \div 10$ years)
$\times 2$ years	(140)	Less: Amortization to date (2022–2023)
	560	Unamortized cost (balance in the patent account)
	$\div 5$	Estimated remaining life
	\$112	New annual amortization

**Franchise:** To record amortization of franchise.

<b>December 31, 2024</b>		
Amortization expense ( $\$500,000 \div 10$ years) .....	50,000	
Franchise.....		50,000

**Requirement 2**

*Intangible assets:*

Patent	\$448,000	[1]
Franchise	<u>450,000</u>	[2]
Total intangibles	<u>\$898,000</u>	

[1]  $\$560,000 - 112,000$

[2]  $\$500,000 - 50,000$

## Exercise 11–20

To record the purchase of the patent.

<b>January 2, 2024</b>		
Patent.....	500,000	
Cash.....		500,000

To record amortization of the patent for the year **2024**.

Amortization expense (\$500,000 ÷ 8 years).....	62,500	
Patent.....		62,500

To record amortization of the patent for the year **2025**.

Amortization expense (\$500,000 ÷ 8 years).....	62,500	
Patent.....		62,500

To record costs of successfully defending the patent infringement suit.

<b>January, 2026</b>		
Patent.....	45,000	
Cash.....		45,000

**Exercise 11–20 (concluded)**

To record amortization of the patent for the year **2026**.

Amortization expense (determined below) .....	70,000	
Patent .....		70,000

**Calculation of revised annual amortization:**

	(\$ in thousands)	
	\$500	Cost
\$62.5		Previous annual amortization ( $\$500 \div 8$ years)
$\times$ <u>2 years</u>	( <u>125</u> )	Less: Amortization to date (2024–2025)
	375	Unamortized cost (balance in the patent account)
	<u>45</u>	Add: Legal fees of successful defense
	420	New unamortized cost
	$\div$ <u>6</u>	Estimated remaining life (8 years – 2 years)
	\$ 70	New annual amortization

**Exercise 11–21**

Adjustment of amortization expense to reflect change in useful life.

		(\$ in millions)
Amortization expense (determined below) .....		2.5
Patent .....		2.5

**Calculation of annual amortization after the estimate change:**

	(\$ in millions)	
	\$ 9	Cost
\$1		Previous annual amortization ( $\$9 \div 9$ years)
$\times$ <u>4 years</u>	( <u>4</u> )	Less: Amortization to date (2020–2023)
	5	Unamortized cost (balance in the patent account)
	$\div$ <u>2</u>	Estimated remaining life (6 years – 4 years)
	<u>\$2.5</u>	New annual amortization

## Exercise 11–22

### Requirement 1

**2024 amortization:**  $\$1,200,000 \div 10 = \$120,000 \times 6/12 = \mathbf{\$60,000}$

### Requirement 2

Franchise ( $\$1,180,000 - [\$1,200,000 - \$60,000]$ ).....	40,000	
Revaluation surplus–OCI.....		40,000

### Requirement 3

**2025 amortization:**  $\$1,180,000 \div 9.5 = \mathbf{\$124,211}$

## Exercise 11–23

### Requirement 1

Depreciation expense (determined below).....	3,088	
Accumulated depreciation—computer.....		3,088

### Calculation of annual depreciation after the estimate change:

	\$40,000	Cost
\$7,200		Previous annual depreciation ( $\$36,000 \div 5$ years)
$\times 2$ years	(14,400)	Less: Depreciation to date (2022–2023)
	25,600	Undepreciated cost
	( 900)	Less: Revised residual value
	24,700	Revised depreciable base
	$\div 8$	Estimated remaining life (10 years – 2 years)
	\$ 3,088	New annual depreciation

### Requirement 2

Depreciation expense (determined below).....	3,600	
Accumulated depreciation—computer.....		3,600

### Calculation of annual depreciation after the estimate change:

	\$40,000	Cost
		Previous depreciation:
\$16,000		2022 – ( $\$40,000 \times 20\% \times 2$ )
<u>9,600</u>		2023 – ( $\$24,000 \times 20\% \times 2$ )
	(25,600)	Less: Depreciation to date (2022–2023)
	14,400	Undepreciated cost
	$\times 2/8$	Estimated remaining life – 8 years
	\$ 3,600	2024 depreciation

## Exercise 11–24

### *DDB depreciation*

2022: $\$1,500,000 \times 2/10 =$	\$300,000
2023: $(\$1,500,000 - \$300,000) \times 2/10 =$	<u>\$240,000</u>
	\$540,000

\$1,500,000	Cost
( 540,000)	Less: Depreciation to date, DDB (2022–2023)
960,000	Undepreciated cost as of 1/1/2024
( 300,000)	Less: Residual value
660,000	Depreciable base
<u>÷ 8 yrs.</u>	Remaining life (10 years – 2 years)
<u>\$ 82,500</u>	New annual depreciation

### **Adjusting entry (2024 depreciation):**

Depreciation expense (calculated above).....	82,500	
Accumulated depreciation.....		82,500

## Exercise 11–25

### Requirement 1

In general, we report voluntary changes in accounting principles retrospectively. However, a change in depreciation method is considered a change in accounting estimate resulting from a change in accounting principle. In other words, a change in the depreciation method reflects a change in the (a) estimated future benefits from the asset, (b) the pattern of receiving those benefits, or (c) the company's knowledge about those benefits, and therefore the two events should be reported the same way. Accordingly, Clinton reports the change **prospectively; previous financial statements are not revised**. Instead, the company simply employs the straight-line method from now on. The undepreciated cost remaining at the time of the change would be depreciated straight line over the remaining useful life. A disclosure note should justify that the change is preferable and should describe the effect of the change on any financial statement line items and per share amounts affected for all periods reported.

### Requirement 2

Asset's cost	\$2,560,000
Less: Accumulated depreciation to date (given)	<u>(1,801,000)</u>
Undepreciated cost, Jan. 1, 2024	\$ 759,000
Less: Estimated residual value	<u>(160,000)</u>
To be depreciated over remaining 3 years	\$ 599,000
	<u>          </u> ÷ 3 years
Annual straight-line depreciation 2024–2026	<u>\$ 199,667</u> (rounded)

### Journal entry:

Depreciation expense (calculated above) .....	199,667
Accumulated depreciation .....	199,667

## Exercise 11–26

### Requirement 1

#### Analysis:

		<b>Correct</b>			<b>Incorrect</b>
		(Should Have Been Recorded)		(As Recorded)	
2021	Equipment	350,000		Expense	350,000
	Cash		350,000	Cash	350,000
2021	Expense	70,000		Depreciation entry omitted	
	Accum. deprec.		70,000		
2022	Expense	70,000		Depreciation entry omitted	
	Accum. deprec.		70,000		
2023	Expense	70,000		Depreciation entry omitted	
	Accum. deprec.		70,000		

Over the three-year period, depreciation expense was *understated* by \$210,000, but other expenses were *overstated* by \$350,000. This means that net income over the three-year period from 2021 through 2023 is ***understated by \$140,000***, which means retained earnings is ***understated by \$140,000*** by the end of 2023.

### Requirement 2

#### To correct incorrect accounts in 2024 (before adjusting entries)

Equipment .....	350,000	
Accumulated depreciation (\$70,000 × 3 years) ..		210,000
Retained earnings (\$350,000 – \$210,000) .....		140,000

### Requirement 3

#### Correcting entry in 2026:

Assuming the equipment had been disposed of, **no correcting entry** would be required because, after five years, the accounts would show appropriate balances.

## Exercise 11–27

### Requirement 1

**Recoverability test:** Because the undiscounted sum of future cash flows of \$4.0 million is less than book value of \$6.5 million, there is an impairment loss.

**Measurement:** The impairment loss is calculated as follows:

Fair value	\$ 3.5 million
Book value	<u>6.5 million</u>
Impairment loss	<u><b>\$(3.0) million</b></u>

### Requirement 2

Book value = **\$3.5 million\***

\* (\$6.5 million – \$3.0 million impairment loss; this amount equals the assets' fair value)

### Requirement 3

Because the undiscounted sum of future cash flows of \$6.8 million exceeds book value of \$6.5 million, there is **no impairment loss**. The reported amount of the assets remains at their book value of **\$6.5 million**.

## Exercise 11–28

### Requirement 1

IFRS requires an impairment loss to be recognized when an asset's book value exceeds the higher of the asset's value-in-use (present value of estimated future cash flows) and fair value less costs to sell. In this case, value-in-use and fair value less costs to sell are the same, \$3.5 million. Because book value (\$6.5 million) exceeds this amount, a loss is indicated. The loss is the difference between book value and the recoverable amount, which also is the higher of the asset's value-in-use (present value of estimated future cash flows) and fair value less costs to sell. Therefore, the amount of impairment loss is the same as under U.S. GAAP, \$3 million.

Recoverable amount	\$ 3.5 million
Book value	<u>(6.5) million</u>
Impairment loss	<b><u>\$(3.0) million</u></b>

### Requirement 2

An impairment loss also is indicated because book value (\$6.5 million) exceeds fair value less costs to sell/value-in-use (\$5 million). The amount of impairment loss is \$1.5 million.

Recoverable amount	\$ 5.0 million
Book value	<u>(6.5) million</u>
Impairment loss	<b><u>\$(1.5) million</u></b>

Under U.S. GAAP, because the undiscounted sum of future cash flows of \$6.8 million exceeds book value of \$6.5 million, there is no impairment loss.

## Exercise 11–29

### Requirement 1

IFRS requires an impairment loss to be recognized when an asset's book value exceeds the higher of the asset's value-in-use (present value of estimated future cash flows) and fair value less costs to sell. In this case, value-in-use of £150 million is higher. Because the value-in-use amount is less than book value (£220 million), a loss is indicated. The loss is the difference between book value and the recoverable amount, which also is the higher of the asset's value-in-use (present value of estimated future cash flows) and fair value less costs to sell. The amount of impairment loss is £70 million.

Recoverable amount	£150 million
Book value	<u>220</u> million
Impairment loss	<b><u>£ (70) million</u></b>

### Requirement 2

U.S. GAAP requires an impairment loss to be recognized when an asset's book value exceeds the undiscounted sum of estimated future cash flows. In this case, a loss is indicated because the undiscounted sum of estimated future cash flows of £210 million is less than the book value of £220 million. The loss is the difference between fair value and book value, or \$75 million in this case.

Fair value	£145 million
Book value	<u>220</u> million
Impairment loss	<b><u>£ (75) million</u></b>

## Exercise 11–30

### Requirement 1

#### Recoverability test:

An impairment loss is indicated because the estimated undiscounted sum of future cash flows of \$15 million is less than the book value of \$18.3 million.

#### Measurement:

The amount of the loss to be reported is calculated using the estimated fair value rather than the undiscounted future cash flows:

Fair value	\$11.0 million
Book value	<u>18.3 million</u>
Impairment loss	<u>\$ (7.3) million</u>

### Requirement 2

(\$ in millions)

Loss on impairment .....	7.3	
Accumulated depreciation .....	14.2	
Plant assets .....		21.5

### Requirement 3

#### Recoverability test:

An impairment loss is indicated because the estimated undiscounted sum of future cash flows of \$12 million is less than the book value of \$18.3 million.

#### Measurement:

The amount of the loss to be reported is calculated using the estimated fair value rather than the undiscounted future cash flows:

Fair value	\$11.0 million
Book value	<u>18.3 million</u>
Impairment loss	<u>\$ (7.3) million</u>

### Requirement 4

#### Recoverability test:

Because the estimated undiscounted sum of future cash flows of \$19 million exceeds the book value of \$18.3 million, **no impairment loss** is indicated.

## Exercise 11–31

### Requirement 1

#### Measurement of impairment loss:

Fair value of Centerpoint, Inc.	\$220 million
Book value of Centerpoint, Inc.	<u>250 million</u>
Impairment loss	<u><b>\$(30) million</b></u>

### Requirement 2

Goodwill = **\$20 million\***

\* (\$50 million – \$30 million impairment loss)

### Requirement 3

Because the fair value of the reporting unit, \$270 million, exceeds book value, \$250 million, there is **no impairment loss**. The reported amount of goodwill remains at **\$50 million**.

## Exercise 11–32

Under IFRS, the impairment loss is the difference between book value and the recoverable amount of the cash-generating unit. The recoverable amount is \$225 million, the higher of the \$225 million value-in-use (present value of estimated future cash flows) and the \$220 million fair value less costs to sell.

Recoverable amount	\$225 million
Book value	<u>250 million</u>
Impairment loss	<u><b>\$(25) million</b></u>

## Exercise 11–33

### Requirement 1

#### Calculation of goodwill:

Consideration exchanged		\$420 million
Less <i>fair</i> value of identifiable net assets:		
Assets	\$512 million	
Less: Liabilities assumed	<u>(150) million</u>	<u>(362) million</u>
Goodwill		<b><u>\$ 58 million</u></b>

### Requirement 2

#### Measurement of impairment loss:

Fair value of Harman, Inc.	\$ 400 million
Book value of Harman, Inc. (including goodwill)	<u>410 million</u>
Impairment loss	<b><u>\$ (10) million</u></b>

### Requirement 3

Entry to record the impairment loss:	
	(\$ in millions)
Loss on impairment of goodwill .....	10
Goodwill .....	10

## Exercise 11–34

### Requirement 1

The Codification topic number that provides guidance on accounting for the impairment of long-lived assets is FASB ASC **Topic Number 360**: “Property, Plant, and Equipment.”

### Requirement 2

The specific citation that discusses the disclosures required in the notes to the financial statements for the impairment of long-lived assets classified as held and used is FASB ASC **360–10–50–2**: “Property, Plant, and Equipment–Overall–Disclosure–Impairment or Disposal of Long-Lived Assets.”

### Requirement 3

All of the following information shall be disclosed in the notes to financial statements that include the period in which an impairment loss is recognized:

- a. A description of the impaired long-lived asset (asset group) and the facts and circumstances leading to the impairment
- b. If not separately presented on the face of the statement, the amount of the impairment loss and the caption in the income statement or the statement of activities that includes that loss
- c. The method or methods for determining fair value (whether based on a quoted market price, prices for similar assets, or another valuation technique)
- d. If applicable, the segment in which the impaired long-lived asset (asset group) is reported under Topic 280.

## Exercise 11–35

The *FASB Accounting Standards Codification*® represents the single source of authoritative U.S. generally accepted accounting principles. The specific citation for each of the following items is:

**1. Depreciation involves a systematic and rational allocation of cost rather than a process of valuation:**

FASB ASC **360–10–35–4**: “Property, Plant, and Equipment–Overall–Subsequent Measurement–Depreciation.”

The cost of a productive facility is one of the costs of the services it renders during its useful economic life. Generally accepted accounting principles (GAAP) require that this cost be spread over the expected useful life of the facility in such a way as to allocate it as equitably as possible to the periods during which services are obtained from the use of the facility. This procedure is known as depreciation accounting, a system of accounting that aims to distribute the cost or other basic value of tangible capital assets, less salvage (if any), over the estimated useful life of the unit (which may be a group of assets) in a systematic and rational manner. It is a process of allocation, not of valuation.

**2. The calculation of an impairment loss for property, plant, and equipment:**

FASB ASC **360–10–35–17**: “Property, Plant, and Equipment–Overall–Subsequent Measurement.”

An impairment loss shall be recognized only if the carrying amount (book value) of a long-lived asset (asset group) is not recoverable and exceeds its fair value. The carrying amount of a long-lived asset (asset group) is not recoverable if it exceeds the sum of the undiscounted cash flows expected to result from the use and eventual disposition of the asset (asset group). That assessment shall be based on the carrying amount of the asset (asset group) at the date it is tested for recoverability, whether in use or under development. An impairment loss shall be measured as the amount by which the carrying amount of a long-lived asset (asset group) exceeds its fair value.

*Exercise 11–35 (concluded)*

**3. Accounting for a change in depreciation method:**

FASB ASC **250–10–45–18**: “Accounting Changes and Error Correction—Overall—Other Presentation Matters—Change in Accounting Estimates.” Distinguishing between a change in an accounting principle and a change in an accounting estimate is sometimes difficult. In some cases, a change in accounting estimate is effected by a change in accounting principle. One example of this type of change is a change in method of depreciation, amortization, or depletion for long-lived, nonfinancial assets (hereinafter referred to as depreciation method). The new depreciation method is adopted in partial or complete recognition of a change in the estimated future benefits inherent in the asset, the pattern of consumption of those benefits, or the information available to the entity about those benefits. The effect of the change in accounting principle, or the method of applying it, may be inseparable from the effect of the change in accounting estimate. Changes of that type often are related to the continuing process of obtaining additional information and revising estimates and, therefore, shall be considered changes in estimates for purposes of applying this Subtopic.

**4. Goodwill should not be amortized:**

FASB ASC **350–20–35–1**: “Intangibles—Goodwill and Other—Goodwill—Subsequent Measurement—Overall Accounting for Goodwill.” Goodwill shall not be amortized. Instead, goodwill shall be tested for impairment at a level of reporting referred to as a reporting unit.

## Exercise 11–36

1. To record the replacement of the heating system.

Accumulated depreciation—building .....	250,000	
Cash.....		250,000

2. To record the addition to the building.

Building.....	750,000	
Cash.....		750,000

3. To expense annual maintenance costs.

Maintenance expense .....	14,000	
Cash.....		14,000

4. To capitalize rearrangement costs.

Equipment .....	50,000	
Cash.....		50,000

## Exercise 11–37

### Requirement 1

**2022 amortization:**  $\$6,000,000 \div 10 = \$600,000 \times 3/12 = \mathbf{\$150,000}$

**2023 amortization:**  $\$6,000,000 \div 10 = \mathbf{\$600,000}$

### Requirement 2

Patent.....	500,000	
Cash.....		500,000

### Requirement 3

#### Calculation of revised annual amortization:

\$6,000,000	Cost
<u>( 750,000)</u>	Less: Amortization to date (above)
5,250,000	Unamortized cost (balance in the patent account)
<u>500,000</u>	Add: Successful defense of patent
5,750,000	New unamortized cost
<u>÷ 8 3/4</u>	Estimated remaining life (10 years – 1 1/4 years)
<b><u>\$ 657,143</u></b>	New annual amortization

### Requirement 4

#### *Requirement 1:*

**2022 amortization:**  $\$6,000,000 \div 10 = \$600,000 \times 3/12 = \mathbf{\$150,000}$

**2023 amortization:**  $\$6,000,000 \div 10 = \mathbf{\$600,000}$

#### *Requirement 2:*

Litigation expense...	500,000	
Cash.....		500,000

#### *Requirement 3:*

**2024 amortization:**  $\$6,000,000 \div 10 = \mathbf{\$600,000}$

## Exercise 11–38

### List A

- g 1. Depreciation
- d 2. Service life
- f 3. Depreciable base
- e 4. Activity-based method
- k 5. Time-based method
- h 6. Double-declining balance
- a 7. Depletion
- j 8. Amortization
- b 9. Change in useful life
- i 10. Change in depreciation method
- c 11. Write-down of asset

### List B

- a. Cost allocation for natural resource.
- b. Accounted for prospectively.
- c. When there has been a significant decline in value.
- d. The amount of use expected from plant and equipment and finite-life intangible assets.
- e. Estimates service life in units of output.
- f. Cost less residual value.
- g. Cost allocation for plant and equipment.
- h. Does not subtract residual value from cost.
- i. Accounted for the same way as a change in estimate.
- j. Cost allocation for an intangible asset.
- k. Estimates service life in years.

## Exercise 11–39

### Requirement 1

To record the acquisition of small tools.

<b>2022</b>		
Small tools .....	8,000	
Cash .....		8,000

To record additional small tool acquisitions.

<b>2024</b>		
Small tools .....	2,500	
Cash .....		2,500

To record the sale/depreciation of small tools.

<b>2024</b>		
Cash .....	250	
Depreciation expense (difference) .....	1,750	
Small tools .....		2,000

*Exercise 11–39 (concluded)*

**Requirement 2**

To record the acquisition of small tools.

<b>2022</b>		
Small tools .....	8,000	
Cash.....		8,000

To record the replacement/depreciation of small tools.

<b>2024</b>		
Depreciation expense .....	2,500	
Cash.....		2,500

To record the sale of small tools.

<b>2024</b>		
Cash .....	250	
Depreciation expense .....		250

## Exercise 11–40

### Requirement 1

<u>January 1</u>	<u>Debit</u>	<u>Credit</u>
<b>Equipment</b>	<b>19,500</b>	
<b>Cash</b>		<b>19,500</b>
<i>(Purchase equipment for cash)</i>		
<u>January 4</u>	<u>Debit</u>	<u>Credit</u>
<b>Accounts Payable</b>	<b>9,500</b>	
<b>Cash</b>		<b>9,500</b>
<i>(Pay cash on account)</i>		
<u>January 8</u>	<u>Debit</u>	<u>Credit</u>
<b>Inventory</b>	<b>82,900</b>	
<b>Accounts Payable</b>		<b>82,900</b>
<i>(Purchase inventory on account)</i>		
<u>January 15</u>	<u>Debit</u>	<u>Credit</u>
<b>Cash</b>	<b>22,000</b>	
<b>Accounts Receivable</b>		<b>22,000</b>
<i>(Receive cash on account)</i>		
<u>January 19</u>	<u>Debit</u>	<u>Credit</u>
<b>Salaries Expense</b>	<b>29,800</b>	
<b>Cash</b>		<b>29,800</b>
<i>(Pay for salaries)</i>		
<u>January 28</u>	<u>Debit</u>	<u>Credit</u>
<b>Utilities Expense</b>	<b>16,500</b>	
<b>Cash</b>		<b>16,500</b>
<i>(Pay for utilities)</i>		
<u>January 30</u>	<u>Debit</u>	<u>Credit</u>
<b>Accounts Receivable</b>	<b>220,000</b>	
<b>Sales Revenue</b>		<b>220,000</b>
<i>(Sell inventory on account)</i>		
<b>Cost of Goods Sold</b>	<b>115,000</b>	
<b>Inventory</b>		<b>115,000</b>
<i>(Record cost of inventory sold)</i>		

Exercise 11-40 (continued)

Requirement 2

<u>(a) January 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Depreciation Expense</b>	<b>300</b>	
<b>Accumulated Depreciation</b>		<b>300</b>
<i>(Record depreciation)</i>		
<i>(\$300 = [\$19,500 - \$1,500] / 60 months)</i>		
<u>(b) January 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Bad Debt Expense</b>	<b>5,900</b>	
<b>Allowance for Uncollectible Accounts</b>		<b>5,900</b>
<i>(Adjust uncollectible accounts)</i>		
<u>(c) January 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Interest Receivable</b>	<b>50</b>	
<b>Interest Revenue</b>		<b>50</b>
<i>(Adjust interest revenue)</i>		
<i>(\$50 = \$12,000 × 5% × 1/12)</i>		
<u>(d) January 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Salaries Expense</b>	<b>32,600</b>	
<b>Salaries Payable</b>		<b>32,600</b>
<i>(Adjust salaries payable)</i>		
<u>(e) January 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Income Tax Expense</b>	<b>9,000</b>	
<b>Income Taxes Payable</b>		<b>9,000</b>
<i>(Accrue income taxes)</i>		

*Exercise 11-40 (continued)*  
**Requirement 3**

**TNT Fireworks**  
**Adjusted Trial Balance**  
**January 31, 2024**

<u>Accounts</u>	<u>Debit</u>	<u>Credit</u>
Cash	\$ 5,400	
Accounts Receivable	223,000	
Interest Receivable	50	
Inventory	4,200	
Notes Receivable	12,000	
Land	155,000	
Equipment	19,500	
Allowance for Uncollectible Accounts		\$ 8,100
Accumulated Depreciation		300
Accounts Payable		88,200
Salaries Payable		32,600
Income Taxes Payable		9,000
Common Stock		220,000
Retained Earnings		50,000
Sales Revenue		220,000
Interest Revenue		50
Cost of Goods Sold	115,000	
Salaries Expense	62,400	
Utilities Expense	16,500	
Bad Debt Expense	5,900	
Depreciation Expense	300	
Income Tax Expense	9,000	
Totals	<u>\$628,250</u>	<u>\$628,250</u>

*Exercise 11-40 (continued)*  
**Requirement 3 (continued)**

Accounts	Ending Balance	=	Beginning balance in <b>bold</b> , entries during January in <b>blue</b> , and adjusting entries in <b>red</b> .
Cash	5,400	=	<b>58,700</b> –19,500–9,500+22,000–29,800–16,500
Accounts Receivable	223,000	=	<b>25,000</b> –22,000+220,000
Interest Receivable	50	=	<b>50</b>
Inventory	4,200	=	<b>36,300</b> +82,900–115,000
Notes Receivable	12,000	=	<b>12,000</b>
Land	155,000	=	<b>155,000</b>
Equipment	19,500	=	<b>19,500</b>
Allowance for Uncollectible Accounts	8,100	=	<b>2,200</b> +5,900
Accumulated Depreciation	300	=	<b>300</b>
Accounts Payable	88,200	=	<b>14,800</b> –9,500+82,900
Salaries Payable	32,600	=	<b>32,600</b>
Income Taxes Payable	9,000	=	<b>9,000</b>
Common Stock	220,000	=	<b>220,000</b>
Retained Earnings	50,000	=	<b>50,000</b>
Sales Revenue	220,000	=	<b>220,000</b>
Interest Revenue	50	=	<b>50</b>
Cost of Goods Sold	115,000	=	<b>115,000</b>
Salaries Expense	62,400	=	<b>29,800</b> +32,600
Utilities Expense	16,500	=	<b>16,500</b>
Bad Debt Expense	5,900	=	<b>5,900</b>
Depreciation Expense	300	=	<b>300</b>
Income Tax Expense	9,000	=	<b>9,000</b>

*Exercise 11-40 (continued)*  
**Requirement 4**

<b>TNT Fireworks</b>		
<b>Income Statement</b>		
<b>For the month ended January 31, 2024</b>		
Sales revenue	\$220,000	
Cost of goods sold	115,000	
Gross profit		\$105,000
Salaries expense	62,400	
Utilities expense	16,500	
Bad debt expense	5,900	
Depreciation expense	300	
Total operating expenses		85,100
Operating income		19,900
Interest revenue		50
Income before taxes		19,950
Income tax expense		9,000
Net income		<u>\$ 10,950</u>

**Requirement 5**

<b>TNT Fireworks</b>			
<b>Balance Sheet</b>			
<b>January 31, 2024</b>			
<b><u>Assets</u></b>		<b><u>Liabilities</u></b>	
Current assets:		Current liabilities:	
Cash	\$ 5,400	Accounts payable	\$ 88,200
Accounts receivable	223,000	Salaries payable	32,600
Less: Allowance for uncollectible accounts	(8,100)	Income taxes payable	9,000
Interest receivable	50	Total current liabilities	129,800
Inventory	4,200		
Total current assets	224,550		
Long-term assets:		<b><u>Stockholders' Equity</u></b>	
Notes receivable	12,000	Common stock	220,000
Land	155,000	Retained earnings	60,950 *
Equipment	19,500	Total stockholders' equity	280,950
Less: Accumulated depreciation	(300)	Total liabilities and stockholders' equity	410,750
Total assets	<u>\$410,750</u>		

\* Retained earnings = Beginning retained earnings + Net income – Dividends  
= \$50,000 + \$10,950 – \$0

= \$60,950

*Exercise 11-40 (continued)*  
**Requirement 6**

<u>January 31, 2024</u>	<u>Debit</u>	<u>Credit</u>
<b>Sales Revenue</b>	220,000	
<b>Interest Revenue</b>	50	
<b>Retained Earnings</b> <i>(Close revenue accounts)</i>		220,050
<b>Retained Earnings</b>	209,100	
<b>Cost of goods sold</b>		115,000
<b>Salaries expense</b>		62,400
<b>Utilities expense</b>		16,500
<b>Bad debt expense</b>		5,900
<b>Depreciation expense</b>		300
<b>Income tax expense</b> <i>(Close expense accounts)</i>		9,000

*Exercise 11-40 (concluded)*

**Requirement 7**

(a) The return on assets ratio is:

$$\text{Return on Assets Ratio} = \frac{\text{Net income}}{\text{Average total assets}} = \frac{\$10,950}{(\$284,800 + \$410,750) / 2} = \mathbf{3.1\%}$$

Compared to the industry average of 2%, TNT Fireworks is **more** profitable than other companies in the same industry. Note these are monthly, rather than annual, return on asset calculations. A consistent monthly return on assets of 1% results in a 12% return on assets for the entire year.

(b) The profit margin is:

$$\text{Profit Margin} = \frac{\text{Net income}}{\text{Net sales}} = \frac{\$10,950}{\$220,000} = \mathbf{5.0\%}$$

Compared to the industry average profit margin of 4%, TNT Fireworks is **more** efficient at converting sales to profit than other companies in the same industry.

(c) The asset turnover ratio is:

$$\text{Asset Turnover Ratio} = \frac{\text{Net sales}}{\text{Average total assets}} = \frac{\$220,000}{(\$284,800 + \$410,750) / 2} = \mathbf{0.63 \text{ times}}$$

Compared to the industry average asset turnover of 0.5 times per month, TNT Fireworks is also **more** efficient at producing revenues with its assets.

## Exercise 11–41

### Requirement 1

<u>Jan. 1 to Dec. 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Inventory</b>	<b>325,800</b>	
<b>Accounts payable</b>		<b>325,800</b>
<i>(Purchased inventory on account)</i>		
<u>Jan. 1 to Dec. 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Accounts receivable</b>	<b>567,200</b>	
<b>Sales revenue</b>		<b>567,200</b>
<i>(Revenue from sales on accounts)</i>		
<b>Cost of goods sold</b>	<b>342,600</b>	
<b>Inventory</b>		<b>342,600</b>
<i>(Cost of inventory from sales on account)</i>		
<u>Jan. 1 to Dec. 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Cash</b>	<b>558,700</b>	
<b>Accounts receivable</b>		<b>558,700</b>
<i>(Received cash from customers on account)</i>		
<u>Jan. 1 to Dec. 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Accounts payable</b>	<b>328,500</b>	
<b>Cash</b>		<b>328,500</b>
<i>(Paid cash on account)</i>		
<u>Jan. 1 to Dec. 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Salaries expense</b>	<b>94,700</b>	
<b>Utilities expense</b>	<b>52,700</b>	
<b>Cash</b>		<b>147,400</b>
<i>(Paid for salaries and utilities)</i>		
<u>April 1</u>	<u>Debit</u>	<u>Credit</u>
<b>Equipment</b>	<b>102,000</b>	
<b>Notes payable</b>		<b>95,000</b>
<b>Cash</b>		<b>7,000</b>
<i>(Purchased equipment with note)</i>		
<i>(\$95,000 + \$3,200 + \$3,800)</i>		
<u>June 30</u>	<u>Debit</u>	<u>Credit</u>
<b>Patent</b>	<b>40,000</b>	
<b>Cash</b>		<b>40,000</b>
<i>(Purchased patent)</i>		
<u>October 1</u>	<u>Debit</u>	<u>Credit</u>
<b>Depreciation expense</b>	<b>8,500</b>	
<b>Accumulated depreciation</b>		<b>8,500</b>
<i>(Update depreciation for the current year)</i>		
<b>Cash</b>	<b>30,200</b>	
<b>Accumulated depreciation</b>	<b>45,900</b>	
<b>Equipment</b>		<b>60,700</b>
<b>Gain on sale of equipment</b>		<b>15,400</b>
<i>(Sold equipment)</i>		

November 15	Debit	Credit
<b>Equipment</b>	<b>54,100</b>	
<b>Cash</b>		<b>54,100</b>
<i>(Capitalization of improvements to equipment)</i>		

## Requirement 2

December 31	Debit	Credit
<b>Depreciation expense</b>	<b>6,900</b>	
<b>Accumulated depreciation</b>		<b>6,900</b>
<i>(Record depreciation)</i>		
<i>(\$6,900 = ((\$102,000 - \$10,000) ÷ 10 years) × 9/12)</i>		
December 31	Debit	Credit
<b>Depreciation expense</b>	<b>21,500</b>	
<b>Accumulated depreciation</b>		<b>21,500</b>
<i>(Record depreciation)</i>		
December 31	Debit	Credit
<b>Amortization expense</b>	<b>1,000</b>	
<b>Patent</b>		<b>1,000</b>
<i>(Record amortization)</i>		
<i>(\$1,000 = \$40,000 ÷ 20 years × 6/12)</i>		
December 31	Debit	Credit
<b>Interest expense</b>	<b>5,700</b>	
<b>Interest payable</b>		<b>5,700</b>
<i>(Record interest payable)</i>		
<i>(\$95,000 × 8% × 9/12)</i>		
December 31	Debit	Credit
<b>Loss on impairment</b>	<b>14,300</b>	
<b>Accumulated depreciation</b>	<b>40,300</b>	
<b>Equipment</b>		<b>54,600</b>
<i>(Record impairment)</i>		
<i>((\$65,400 - \$40,300) - \$10,800)</i>		
December 31	Debit	Credit
<b>Income tax expense</b>	<b>12,600</b>	
<b>Income taxes payable</b>		<b>12,600</b>
<i>(Record income taxes payable)</i>		

**Requirement 3**

**Parts Unlimited  
Adjusted Trial Balance  
December 31, 2024**

Accounts	Debit	Credit
Cash	\$ 174,300	
Accounts receivable	20,900	
Inventory	21,000	
Land	340,000	
Equipment	388,300	
Patent	39,000	
Accumulated depreciation		\$ 122,700
Accounts payable		12,100
Interest payable		5,700
Income taxes payable		12,600
Notes payable		95,000
Common stock		520,000
Retained earnings		193,300
Sales revenue		567,200
Gain on sale of equipment		15,400
Cost of goods sold	342,600	
Salaries expense	94,700	
Utilities expense	52,700	
Depreciation expense	36,900	
Amortization expense	1,000	
Loss on impairment	14,300	
Interest expense	5,700	
Income tax expense	12,600	
Totals	<u>\$1,544,000</u>	<u>\$1,544,000</u>

## Requirement 4

**Parts Unlimited**  
**Income Statement**  
**For the year ended January 31, 2024**

Sales revenue		\$567,200
Cost of goods sold		<u>342,600</u>
Gross profit		224,600
Operating expenses:		
Salaries expense	\$94,700	
Utilities expense	52,700	
Depreciation expense	36,900	
Amortization expense	1,000	
Loss on impairment	<u>14,300</u>	<u>199,600</u>
		25,000
Gain on sale of equipment		<u>15,400</u>
Operating income		40,400
Interest expense		<u>5,700</u>
Income before taxes		34,700
Income tax expense		<u>12,600</u>
Net income		<u><u>\$ 22,100</u></u>

## Requirement 5

**Parts Unlimited**  
**Balance Sheet**  
**December 31, 2024**

<u>Assets</u>		<u>Liabilities</u>	
Cash	\$174,300	Accounts payable	\$ 12,100
Accounts receivable	20,900	Interest payable	5,700
Inventory	<u>21,000</u>	Income taxes payable	12,600
Total current assets	216,200	Notes payable	<u>95,000</u>
<i>Property, plant, and equipment</i>		Total liabilities	125,400
Equipment	388,300		
Less: Accumulated depreciation	(122,700)	<b><u>Stockholders' Equity</u></b>	
Land	340,000	Common stock	520,000
<i>Intangible assets</i>		Retained earnings	<u>215,400</u> *
Patent	<u>39,000</u>	Total stockholders' equity	<u>735,400</u>
		Total liabilities and	
Total assets	<u><u>\$860,800</u></u>	stockholders' equity	<u><u>\$860,800</u></u>

\* Retained earnings = Beginning retained earnings + Net income – Dividends  
= \$193,300 + \$22,100 – 0  
= \$215,400

### Requirement 6

<u>December 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Sales revenue</b>	<b>567,200</b>	
<b>Gain on sale of equipment</b>	<b>15,400</b>	
<b>Retained Earnings</b>		<b>582,600</b>
<i>(Close temporary credit accounts)</i>		
<u>December 31</u>	<u>Debit</u>	<u>Credit</u>
<b>Retained Earnings</b>	<b>560,500</b>	
<b>Cost of goods sold</b>		<b>342,600</b>
<b>Salaries expense</b>		<b>94,700</b>
<b>Utilities expense</b>		<b>52,700</b>
<b>Depreciation expense</b>		<b>36,900</b>
<b>Amortization expense</b>		<b>1,000</b>
<b>Loss on impairment</b>		<b>14,300</b>
<b>Interest expense</b>		<b>5,700</b>
<b>Income tax expense</b>		<b>12,600</b>
<i>(Close temporary debit accounts)</i>		

### Requirement 7

(a) The fixed asset turnover ratio is:

$$\text{Fixed Asset Turnover Ratio} = \frac{\text{Net Sales}}{\text{Average Fixed Assets}} = \frac{\$567,200}{(\$515,500 + \$605,600)/2} = \mathbf{\$1.01}$$

A ratio of 1.01 suggests that the company is able to generate \$1.01 in sales for every \$1 invested in fixed assets. Typically, a higher ratio is good. Therefore, the company appears to be managing its fixed assets **more** efficiently than the average company in the same industry.

(b) Units-of-production depreciation:

$$\text{Depreciation per unit} = \frac{(\$102,000 - \$10,000)}{20,000 \text{ units}} = \$4.60 \text{ per unit}$$

$$\text{Units-of-production depreciation} = \$4.6 \times 2,000 \text{ units} = \mathbf{\$9,200}$$

Straight-line depreciation is \$6,900. Depreciation expense under units-of-production is higher by \$2,300 (= \$9,200 – \$6,900), so net income and total assets in 2024 would have been **lower by \$2,300** (ignoring tax effects).

(c) The costs of internally developed patents are recorded as research and development expense in the period incurred. The cost of an externally purchased patent is capitalized and then amortized over the remaining life of the patent. The difference for 2024 is calculated as:

Internal development – Research and development expense	\$40,000
External patent – Amortization expense*	<u>1,000</u>
Additional expense for 2024	<u><u>\$39,000</u></u>

\*\$1,000 = \$40,000 ÷ 20 years × 6/12. The remaining \$39,000 of the capitalized patent cost is amortized over the remaining 19.5 years of the patent.

The amount of the expense for the internally developed patent is higher by \$39,000, so net income and total assets in 2024 would have been **lower by \$39,000** (ignoring tax effects).

# PROBLEMS

## Problem 11-1

### Requirement 1

#### Determine useful life:

$$\frac{\$200,000 \text{ depreciable base}}{\$10,000 \text{ annual depreciation}} = 20\text{-year useful life}$$

#### Determine age of assets:

$$\frac{\$40,000 \text{ accumulated depreciation}}{\$10,000 \text{ annual depreciation}} = 4 \text{ years old}$$

#### Double-declining balance in 4th year of life:

Year 1 (2021)	$\$200,000 \times 10\%$	=	\$20,000
Year 2 (2022)	$180,000 \times 10\%$	=	18,000
Year 3 (2023)	$162,000 \times 10\%$	=	16,200
Year 4 (2024)	$145,800 \times 10\%$	=	<b>14,580</b>

### Requirement 2

Depreciation expense (below) .....	20,000	
Accumulated depreciation .....		20,000
\$200,000	Cost	
<u>30,000</u>	Depreciation to date, SL 3 years (2021–2023)	
\$170,000	Undepreciated cost as of 1/1/2024	

Seventeen-year remaining life, or  $1/17 \times 2 = 2/17 \times \$170,000 = \mathbf{\$20,000}$

A disclosure note reports the effect of the change on net income and earnings per share along with clear justification for changing depreciation methods.

## Problem 11–2

### Requirement 1

**CORD COMPANY**  
**Analysis of Changes in Plant Assets**  
**For the Year Ending December 31, 2024**

	Balance 12/31/2023	Increase	Decrease	Balance 12/31/2024
Land	\$ 175,000	\$ 312,500 [1]	\$ --	\$ 487,500
Land improvements	--	192,000	--	192,000
Buildings	1,500,000	937,500 [1]	--	2,437,500
Equipment	1,125,000	385,000 [2]	17,000	1,493,000
Automobiles and trucks	172,000	12,500	24,000	160,500
Leasehold improvements	<u>216,000</u>	<u>--</u>	<u>--</u>	<u>216,000</u>
	<u>\$3,188,000</u>	<u>\$1,839,500</u>	<u>\$41,000</u>	<u>\$4,986,500</u>

### Explanations of Amounts:

- [1] Plant facility acquired from King 1/6/2024—allocation to Land and Building:  
 Fair value—25,000 shares of Cord common  
 stock at \$50 per share fair value \$1,250,000

Allocation in proportion to appraised values at date of exchange:

	Amount	% of Total
Land	\$187,500	25
Building	<u>562,500</u>	<u>75</u>
	<u>\$750,000</u>	<u>100</u>

Land	\$1,250,000 × 25% =	\$ 312,500
Building	\$1,250,000 × 75% =	<u>937,500</u>
		<u>\$1,250,000</u>

- [2] Equipment purchased 7/1/2024:
- |                        |                  |
|------------------------|------------------|
| Invoice cost           | \$325,000        |
| Delivery cost          | 10,000           |
| Installation cost      | <u>50,000</u>    |
| Total acquisition cost | <u>\$385,000</u> |

*Problem 11–2 (continued)*

**Requirement 2**

**CORD COMPANY**  
**Depreciation and Amortization Expense**  
**For the Year Ended December 31, 2024**

**Land Improvements:**

Cost	\$192,000	
Straight-line rate (1 ÷ 12 years)	<u>× 8 1/3%</u>	
Annual depreciation	16,000	
Depreciation on land improvements for 2024: (3/25 to 12/31/2024)	<u>× 3/4</u>	<u>\$ 12,000</u>

**Buildings:**

Book value, 1/1/2024 (\$1,500,000 – \$328,900)	\$1,171,100	
Building acquired 1/6/2024	<u>937,500</u>	
Total amount subject to depreciation	2,108,600	
150% declining balance rate: (1 ÷ 25 years = 4% × 1.5)	<u>× 6%</u>	<u>\$ 126,516</u>

**Equipment:**

Balance, 1/1/2024	\$1,125,000	
Straight-line rate (1 ÷ 10 years)	<u>× 10%</u>	112,500
Purchased on 7/1/2024	385,000	
Depreciation for one-half year	<u>× 5%</u>	<u>19,250</u>
Depreciation on equipment for 2024		<u>\$ 131,750</u>

**Automobiles and trucks:**

Book value, 1/1/2024 (\$172,000 – \$100,325)	\$71,675	
Deduct 1/1/2024 book value of truck sold on 9/30 (\$9,100 + \$2,650 depr. taken for 9 months)	<u>(11,750)</u>	
Amount subject to depreciation at 1/1/2024	59,925	
200% declining balance rate: (1 ÷ 5 years = 20% × 2)	<u>× 40%</u>	23,970
Automobile purchased 9/30/2024	12,500	
Depreciation for 2024 (40% × 3/12)	<u>× 10%</u>	1,250
Truck sold on 9/30/2024 – depreciation (given)		<u>2,650</u>
Depreciation on automobiles and trucks		<u>\$ 27,870</u>

**Problem 11–2 (concluded)**

**Leasehold improvements:**

Book value, 1/1/2024 (\$216,000 – \$108,000)	\$108,000	
Amortization period (1/1/2024 to 12/31/2028)	<u>÷ 5 years</u>	
Amortization of leasehold improvements for 2024		<u>\$ 21,600</u>
Total depreciation and amortization expense for 2024		<b><u>\$319,736</u></b>

Note: the amortization period was originally over the shorter of the asset life (8 years) or the lease (6 years). Three years have passed. The lease will end in 2030 but the life will end in 2028. The new amortization period is thus 5 years.

## Problem 11–3

### PELL CORPORATION Depreciation For the Year Ended December 31, 2024

#### Land improvements:\*

Cost	\$ 180,000	
Straight-line rate (1 ÷ 15 years)	<u>× 6 2/3%</u>	<u>\$ 12,000</u>

#### Building:

Book value 12/31/2023 (\$1,500,000 – \$350,000)	\$1,150,000	
150% declining balance rate: (1 ÷ 20 years = 5% × 1.5)	<u>× 7.5%</u>	\$ 86,250
Building donated on 3/31/2024	\$17,000	
150% declining balance rate: (1 ÷ 20 years = 5% × 1.5 × 9/12)	<u>× 5.625%</u>	<u>956</u>
Total depreciation on buildings		<u>\$87,206</u>

#### Equipment:

Balance, 12/31/2023	\$1,158,000	
Straight-line rate (1 ÷ 10 years)	<u>× 10%</u>	\$115,800
Purchased 1/2/2024	287,000	
Depreciation	<u>× 10%</u>	<u>28,700</u>
Total depreciation on equipment		<u>\$144,500</u>

#### Automobiles:

Activity-based (38,000 miles × \$0.50):		<u>\$ 19,000</u>
Total depreciation for 2024		<u><b>\$262,706</b></u>

\*The repaving of the parking lots is considered a repair that doesn't provide future benefits beyond those originally anticipated.

## Problem 11–4

1. Depreciation for 2022 and 2023.

<b>December 31, 2022</b>		
Depreciation expense ( $\$48,000 \div 8 \text{ years} \times 9/12$ ) .....	4,500	
Accumulated depreciation—equipment.....		4,500

<b>December 31, 2023</b>		
Depreciation expense ( $\$48,000 \div 8 \text{ years}$ ) .....	6,000	
Accumulated depreciation—equipment.....		6,000

2. The year 2024 expenditure. [Any capitalized amounts are recorded using Alternative 2—capitalization of new cost].

<b>January 4, 2024</b>		
Repair and maintenance expense .....	2,000	
Equipment .....	10,350	
Cash.....		12,350

3. Depreciation for the year 2024.

<b>December 31, 2024</b>		
Depreciation expense ( <i>determined below</i> ) .....	5,800	
Accumulated depreciation—equipment.....		5,800

### Calculation of annual depreciation after the estimate change:

\$ 48,000	Cost
<u>(10,500)</u>	Less: Depreciation to date ( $\$4,500 + 6,000$ )
37,500	Undepreciated cost
<u>10,350</u>	Add: Asset addition
47,850	New depreciable base
<u><math>\div 8 \frac{1}{4}</math></u>	Estimated remaining life (10 years – 1 $\frac{3}{4}$ years)

\$ 5,800 New annual depreciation

### Problem 11-5

(1) \$65,000

Allocation in proportion to appraised values at date of exchange:

	<b>Amount</b>	<b>% of Total</b>
Land	\$ 72,000	8
Building	<u>828,000</u>	<u>92</u>
	<u>\$900,000</u>	<u>100</u>

Land	$\$812,500 \times 8\% =$	\$ 65,000
Building	$\$812,500 \times 92\% =$	<u>747,500</u>
		<u>\$812,500</u>

(2) \$747,500 [From (1)]

(3) 50 years  $\$747,500 - \$47,500$

---

\$14,000 annual depreciation

(4) \$ 14,000 Same as prior year, since method used is straight line.

(5) \$ 85,400  $3,000 \text{ shares} \times \$25 \text{ per share} = \$75,000$   
 Plus demolition of old building 10,400  
\$85,400

(6) None No depreciation before use.

(7) \$ 16,000 Fair value [given in item e].

(8) \$ 3,200  $\$16,000 \times 20\%$  (2  $\times$  Straight-line rate of 10%).

(9) \$ 2,560  $(\$16,000 - 3,200) \times 20\%$ .

(10) \$ 99,000 Total cost of \$110,000 – \$11,000 in normal repairs.

(11) \$ 9,000  $(\$99,000 - \$9,000) \times 1/10$ .

(12) \$ 750  $(\$99,000 - \$9,000) \times 1/10 \times 1/12$ .

(13) \$ 30,840 PVAD = \$4,000 (7.71008 \* )

\* Present value of an annuity due of \$1:  $n = 11$ ,  $i = 8\%$  (from Table 6)

(14) \$ 2,056 \$30,840

15 years

## Problem 11–6

### Requirement 1

#### Building:

$$\frac{\$500,000}{25 \text{ years}} = \$20,000 \text{ per year} \times 9/12 = \mathbf{\$15,000}$$

#### Equipment:

$$\frac{\$240,000 - (10\% \times \$240,000)}{8 \text{ years}} = \$27,000 \text{ per year} \times 9/12 = \mathbf{\$20,250}$$

#### Vehicles:

$$\$160,000 \times 25\% \text{ (2} \times \text{ straight-line rate of 12.5\%)} = \$40,000 \times 9/12 = \mathbf{\$30,000}$$

### Requirement 2

(a)

June 29, 2025		
Depreciation expense (determined below) .....	5,625	
Accumulated depreciation—equipment.....		5,625

$$\frac{\$100,000 - (10\% \times \$100,000)}{8 \text{ years}} = \$11,250 \times 6/12 = \mathbf{\$5,625}$$

**Problem 11–6 (concluded)**

**(b)**

<b>June 29, 2025</b>		
Cash .....	80,000	
Accumulated depreciation—equipment (below) .....	14,063	
Loss on sale of equipment (difference) .....	5,937	
Equipment.....		100,000

**Accumulated depreciation on equipment sold:**

2024 depreciation = $\$11,250 \times 9/12 =$	\$ 8,438
2025 depreciation = $\$11,250 \times 6/12$	<u>5,625</u>
Total	<u>\$14,063</u>

**Requirement 3**

**Building:**

$$\frac{\$500,000}{25 \text{ years}} = \mathbf{\$20,000}$$

**Equipment:**

$$\frac{\$140,000 - (10\% \times \$140,000)}{8 \text{ years}} = \mathbf{\$15,750}$$

**Vehicles:**

$$(\$160,000 - \$30,000) \times 25\% \text{ (2} \times \text{ straight-line rate of 12.5\%, calculated as } 1 \div 8 \text{ years)} = \mathbf{\$32,500}$$

## Problem 11–7

### Requirement 1

#### Cost of mineral mine:

Purchase price	\$1,600,000
Development costs	<u>600,000</u>
	<u>\$2,200,000</u>

#### Depletion:

$$\text{Depletion per ton} = \frac{\$2,200,000 - \$100,000}{400,000 \text{ tons}} = \$5.25 \text{ per ton}$$

$$\text{2024 depletion} = \$5.25 \times 50,000 \text{ tons} = \mathbf{\$262,500}$$

2025 depletion:

$$\text{Revised depletion rate} = \frac{(\$2,200,000 - \$262,500) - \$100,000}{487,500 - 50,000 \text{ tons}} = \$4.20$$

$$\text{2025 depletion} = \$4.20 \times 80,000 \text{ tons} = \mathbf{\$336,000}$$

#### Depreciation:

*Structures:*

$$\text{Depreciation per ton} = \frac{\$150,000}{400,000 \text{ tons}} = \$0.375 \text{ per ton}$$

$$\text{2024 depreciation} = \$0.375 \times 50,000 \text{ tons} = \mathbf{\$18,750}$$

2025 depreciation:

$$\text{Revised depreciation rate} = \frac{\$150,000 - \$18,750}{487,500 - 50,000 \text{ tons}} = \$0.30 \text{ per ton}$$

$$\text{2025 depreciation} = \$0.30 \times 80,000 \text{ tons} = \mathbf{\$24,000}$$

**Problem 11–7 (continued)**

**Equipment:**

$$\text{Depreciation per ton} = \frac{\$80,000 - \$4,000}{400,000 \text{ tons}} = \$0.19 \text{ per ton}$$

$$2024 \text{ depreciation} = \$0.19 \times 50,000 \text{ tons} = \mathbf{\$9,500}$$

2025 depreciation:

$$\text{Revised depreciation rate} = \frac{(\$80,000 - \$9,500) - \$4,000}{487,500 - 50,000 \text{ tons}} = \$0.152 \text{ per ton}$$

$$2025 \text{ depreciation} = \$0.152 \times 80,000 \text{ tons} = \mathbf{\$12,160}$$

**Requirement 2**

**Mineral mine:**

Cost		\$2,200,000
Less accumulated depletion:		
2024 depletion	\$262,500	
2025 depletion	<u>336,000</u>	<u>598,500</u>
Book value, 12/31/2025		<u><b><u>\$1,601,500</u></b></u>

**Structures:**

Cost		\$150,000
Less accumulated depreciation:		
2024 depreciation	\$18,750	
2025 depreciation	<u>24,000</u>	<u>42,750</u>
Book value, 12/31/2025		<u><b><u>\$107,250</u></b></u>

**Equipment:**

Cost		\$80,000
Less accumulated depreciation:		
2024 depreciation	\$ 9,500	
2025 depreciation	<u>12,160</u>	<u>21,660</u>
Book value, 12/31/2025		<u><b><u>\$58,340</u></b></u>

***Problem 11–7 (concluded)***

**Requirement 3**

Depletion of natural resources and depreciation of assets used in the extraction of natural resources are part of product cost and are included in the cost of the inventory of the mineral, just as the depreciation on manufacturing equipment is included in inventory cost. The depletion and depreciation are then included in cost of goods sold in the income statement when the mineral is sold.

In 2024, since all of the ore was sold, all of 2024's depletion and depreciation is included in cost of goods sold. In 2025, since not all of the extracted ore was sold, a portion of both 2025's depletion and depreciation remains in inventory.

## Problem 11–8

### Requirement 1

*Calculation of goodwill:*

Consideration exchanged	\$2,000,000
Less: Fair value of net identifiable assets	<u>1,700,000</u>
Goodwill acquired	<u>\$ 300,000</u>

**Goodwill** is **not amortized**.

To record amortization of **patent**.

Amortization expense ( $\$80,000 \div 8 \text{ years} \times \frac{6}{12}$ ) .....	5,000	
Patent .....		5,000

To record amortization of **franchise**.

Amortization expense ( $\$200,000 \div 10 \text{ years} \times \frac{3}{12}$ ).....	5,000	
Franchise.....		5,000

**Problem 11–8 (concluded)**

**Requirement 2**

**Intangible assets:**

Goodwill	\$300,000	[1]
Patent	75,000	[2]
Franchise	<u>195,000</u>	[3]
Total intangibles	<u>\$570,000</u>	

[1] \$300,000

[2] \$ 80,000 – \$5,000

[3] \$200,000 – \$5,000

## Problem 11–9

### Requirement 1

#### Machine 101:

$$\frac{\$70,000 - \$7,000}{10 \text{ years}} = \$6,300 \text{ per year} \times 3 \text{ years} = \$18,900$$

#### Machine 102:

$$\frac{\$80,000 - \$8,000}{8 \text{ years}} = \$9,000 \text{ per year} \times 1.5 \text{ years} = 13,500$$

#### Machine 103:

$$\frac{\$30,000 - \$3,000}{9 \text{ years}} = \$3,000 \text{ per year} \times 4/12 = \underline{1,000}$$

Accumulated depreciation, 12/31/2023 **\$33,400**

### Requirement 2

To record depreciation on machine 102 up to the date of sale.

#### March 31, 2024

Depreciation expense (\$9,000 per year $\times$ $3/12$ ).....	2,250	
Accumulated depreciation—equipment.....		2,250

**Problem 11–9 (continued)**

**Requirement 3**

Selling price (cash received)		\$ 52,500
Less: Book value of machine 102:		
Original cost	\$80,000	
Accumulated depreciation*	<u>( 15,750)</u>	<u>(64,250)</u>
<b>Loss on sale of equipment (machine 102)</b>		<b><u><u>\$(11,750)</u></u></b>

\*Accumulated depreciation:

Depreciation through 12/31/2023	\$13,500
Depreciation from 1/1/2024 to 3/31/2024 ( $\$9,000 \times 3/12$ )	<u>2,250</u>
	<u>\$15,750</u>

**Requirement 4**

To record sale of equipment (machine 102).

<b>March 31, 2024</b>		
Cash.....	52,500	
Accumulated depreciation—equipment ( $\$13,500 + \$2,250$ )	15,750	
Loss on sale of equipment ( <i>determined in requirement 3</i> ).....	11,750	
Equipment .....		80,000

**Problem 11–9 (concluded)**

**Requirement 5**

**Building:**

*Useful life of the building:*

$$\frac{\$200,000}{5 \text{ years (2019–2023)}} = \$40,000 \text{ in depreciation per year}$$

$$\frac{\$840,000 - \$40,000}{\$40,000} = 20\text{-year useful life}$$

To record depreciation on the building.

Depreciation expense [(\$840,000 – \$40,000) ÷ 20 years].....	40,000	
Accumulated depreciation—building.....		40,000

To record depreciation on the equipment.

Depreciation expense (determined below).....	15,775	
Accumulated depreciation—equipment.....		15,775

**Equipment:**

Machine 103 (determined in requirement 1)		\$ 3,000
Machine 101:		
Cost	\$ 70,000	
Less: Accumulated depreciation	<u>(18,900)</u>	
Book value, 12/31/2023	51,100	
Revised remaining life (7 years – 3 years)	<u>÷ 4 years</u>	<u>12,775</u>
		<u>\$15,775</u>

## Problem 11–10

a. This is a change in estimate.

No entry is needed to record the change.

### 2024 Journal entry:

Depreciation expense (determined below) .....	370,000	
Accumulated depreciation .....		370,000

### Calculation of annual depreciation after the estimate change:

\$10,000,000	Cost
\$250,000	Previous depreciation (\$10,000,000 ÷ 40 years)
× <u>3 yrs</u> (750,000)	Less: Depreciation to date (2021–2023)
9,250,000	Undepreciated cost
<u>÷ 25 yrs.</u>	Estimated remaining life (25 years: 2024–2048)
\$ 370,000	New annual depreciation

A disclosure note should describe the effect of a change in estimate on income from continuing operations, net income, and related per-share amounts for the current period.

**Problem 11–10 (concluded)**

b. This is a change in accounting principle that is accounted for as a change in estimate.

Depreciation expense (below) .....	66,000	
Accumulated depreciation .....	66,000	
\$330,000		Cost
<u>(132,000)</u>		Less: Depreciation to date, straight-line ( $\$33,000 \times 4$ years)
198,000		Undepreciated cost as of 1/1/2024
<u>        0</u>		Less: Residual value
198,000		Depreciable base
<u>    × 2/6</u>		Double-declining-balance rate ( $1/6$ remaining years $\times 2$ )
\$ 66,000		New annual depreciation

A disclosure note reports the effect of the change on net income and earnings per share along with clear justification for changing depreciation methods.

c. This is a change in accounting principle accounted for as a change in estimate.

Because the change will be effective only for assets placed in service after the date of change, depreciation schedules do not require revision because the change does not affect assets depreciated in prior periods. A disclosure note still is required to provide justification for the change and to report the effect of the change on current year’s income.

## Problem 11–11

### Requirement 1

#### Analysis:

<b>Correct</b>		<b>Incorrect</b>	
(Should Have Been Recorded)		(As Recorded)	
2022			
Equipment	1,900,000	Equipment	2,000,000
Maintenance expense	100,000	Cash	2,000,000
Cash	2,000,000		
2022			
Depreciation expense	475,000 [1]	Depreciation expense	500,000 [2]
Accum. deprec.	475,000	Accum. deprec.	500,000
2023			
Depreciation expense	356,250 [3]	Depreciation expense	375,000 [4]
Accum. deprec.	356,250	Accum. deprec.	375,000

[1]  $\$1,900,000 \times 25\%$  (2 times the straight-line rate of 12.5%)

[2]  $\$2,000,000 \times 25\%$

[3]  $(\$1,900,000 - 475,000) \times 25\%$

[4]  $(\$2,000,000 - 500,000) \times 25\%$

During the two-year period, depreciation expense was **overstated** by \$43,750, but other expenses were **understated** by \$100,000, so net income during the period was **overstated** by \$56,250, which means retained earnings is currently **overstated** by that amount.

During the two-year period, accumulated depreciation was overstated, and continues to be overstated by \$43,750.

#### To correct incorrect accounts

Retained earnings .....	56,250	
Accumulated depreciation .....	43,750	
Equipment .....		100,000

**Problem 11–11 (concluded)**

**Requirement 2**

This is a change in accounting principle accounted for as a change in estimate.

No entry is needed to record the change.	
<b>2024 Journal entry:</b>	
Depreciation expense (determined below) .....	178,125
Accumulated depreciation .....	178,125

A change in depreciation method is considered a change in accounting estimate resulting from a change in accounting principle. Accordingly, the Collins Corporation reports the change prospectively; previous financial statements are not revised. Instead, the company simply employs the straight-line method from now on. The undepreciated cost remaining at the time of the change is depreciated straight line over the remaining useful life.

Asset's cost (after correction)	\$1,900,000	
Less: Accumulated depreciation to date (\$475,000 + \$356,250)	<u>(831,250)</u>	
Undepreciated cost, Jan. 1, 2024	1,068,750	
Less: Estimated residual value	<u>(0)</u>	
To be depreciated over remaining 6 years	1,068,750	
	<u>        </u>	÷ 6 years
Annual straight-line depreciation 2024–2029	<b><u>\$ 178,125</u></b>	

## Problem 11–12

### Requirement 1

#### Plant and equipment:

Depreciation to date:

$$\$150 \text{ million} \div 10 \text{ years} = \$15 \text{ million per year} \times 3 \text{ years} = \$45 \text{ million}$$

Book value:  $\$150 \text{ million} - \$45 \text{ million} = \mathbf{\$105 \text{ million}}$

#### Patent:

Amortization to date:

$$\$40 \text{ million} \div 5 \text{ years} = \$8 \text{ million per year} \times 3 \text{ years} = \$24 \text{ million}$$

Book value:  $\$40 \text{ million} - \$24 \text{ million} = \mathbf{\$16 \text{ million}}$

### Requirement 2

Property, plant, and equipment and finite-life intangible assets are tested for impairment **only when events or changes in circumstances indicate** book value may not be recoverable.

### Requirement 3

A qualitative assessment of goodwill impairment is required **at least annually** to determine if quantitative measurement is necessary. Alternatively, a company may proceed directly to performance of the quantitative goodwill impairment test.

## Requirement 4

### Plant and equipment:

#### Recoverability test:

An **impairment loss is indicated** because the \$80 million undiscounted sum of future cash flows is less than the \$105 million book value of the assets.

#### Measurement:

The **amount of the impairment loss** to be reported is calculated using the fair value rather than the undiscounted future cash flows:

Fair value	\$ 60 million
Book value	<u>(105) million</u>
Impairment loss	<b><u>\$ (45) million</u></b>

### Patent:

#### Recoverability test:

There is **no impairment loss** because the undiscounted sum of future cash flows, \$20 million, exceeds the book value of \$16 million.

### Goodwill:

#### Measurement of impairment loss:

Fair value of Ellison Technology's net assets	\$450 million
Book value of Ellison Technology's net assets (including goodwill)	<u>470 million</u>
Impairment loss	<b><u>\$ (20) million</u></b>

## Problem 11–13

### Requirement 1

Hecala's cost of the mineral mine is \$13,721,871, determined as follows:

Mining site	\$10,000,000
Development costs	3,200,000
Restoration costs	<u>521,871</u> †
	<b>\$13,721,871</b>

$$\begin{aligned}\dagger \$600,000 \times 30\% &= \$180,000 \\ 700,000 \times 30\% &= 210,000 \\ 800,000 \times 40\% &= \underline{320,000} \\ \$710,000 \times .73503^* &= \$521,871\end{aligned}$$

\*Present value of \$1,  $n = 4$ ,  $i = 8\%$

### Requirement 2

#### Depletion:

$$\$13,721,871 \div 800,000 \text{ tons} = \$17.1523 \text{ per ton}$$

$$120,000 \text{ tons} \times \$17.1523 = \mathbf{\$2,058,276}$$

#### Depreciation of equipment:

$$\frac{\$140,000 - \$10,000}{800,000 \text{ tons}} = \$.1625 \text{ per ton}$$

$$120,000 \text{ tons} \times \$.1625 = \mathbf{\$19,500}$$

#### Depreciation of structures:

$$\$68,000 \div 800,000 \text{ tons} = \$.085 \text{ per ton}$$

$$120,000 \text{ tons} \times \$.085 = \mathbf{\$10,200}$$

### Problem 11–13 (continued)

#### Requirement 3

2024 accretion expense:  
 $\$521,871 \times 0.08 \times 8/12 = \mathbf{\$27,833}$

#### Requirement 4

Depletion of natural resources and depreciation of assets used in the extraction of natural resources are part of product cost and therefore are included in the cost of the inventory of the mineral, just as the depreciation on manufacturing equipment is included in inventory cost. The depletion and depreciation are then included in cost of goods sold in the income statement when the mineral is sold.

#### Requirement 5

A change in the service life of plant and equipment and finite-life intangible assets is accounted for as a change in an estimate. The change is accounted for prospectively by simply depreciating/depleting the remaining depreciable/depletable base of the asset (book value at date of change less estimated residual value) over the revised remaining service life (tons of ore in this case).

#### 2025 Depletion:

Original cost	\$13,721,871
Less: 2024 depletion	<u>(2,058,276)</u>
Remaining depletable cost	\$11,663,595
÷ Revised estimate of tons remaining (1,000,000 – 120,000)	<u>880,000</u> tons
Depletion rate	\$ 13.2541 per ton
× Tons extracted	<u>150,000</u> tons
2025 depletion	<u><b>\$ 1,988,115</b></u>

**Problem 11–13 (concluded)**

**2025 Depreciation of equipment:**

Original cost	\$140,000	
Less: 2024 depreciation	<u>(19,500)</u>	
	\$120,500	
Less: residual value	<u>(10,000)</u>	
Remaining depreciable cost	\$110,500	
÷ Revised estimate of tons remaining (1,000,000 – 120,000)	<u>880,000</u>	tons
Depreciation rate	\$0.1256	per ton
× Tons extracted	<u>150,000</u>	tons
2025 depreciation	<u><b>\$18,840</b></u>	

**2025 Depreciation of structures:**

Original cost	\$ 68,000	
Less: 2024 depreciation	<u>(10,200)</u>	
Remaining depreciable cost	\$ 57,800	
÷ Revised estimate of tons remaining (1,000,000 – 120,000)	<u>880,000</u>	tons
Depreciation rate	\$ 0.0657	per ton
× Tons extracted	<u>150,000</u>	tons
2025 depreciation	<u><b>\$ 9,855</b></u>	

## Problem 11–14

### Requirement 1

Year	Depreciation Basis for MACRS \$20,000*	×	Depreciation Rate per MACRS	=	MACRS Depreciation	Bonus Depreciation	Total Depreciation
2024			20.00%		\$ 4,000	\$30,000**	\$34,000
2025			32.00%		6,400	0	6,400
2026			19.20%		3,840	0	3,840
2027			11.52%		2,304	0	2,304
2028			11.52%		2,304	0	2,304
2029			5.76%		1,152	0	1,152
Total			<u>100.00%</u>		<u>\$20,000</u>	<u>\$30,000</u>	<u>\$50,000</u>

\* Book value after bonus depreciation = \$50,000 – (\$50,000 × 60%) = \$20,000.

\*\* Bonus depreciation = \$50,000 × 60% = \$30,000.

### Requirement 2

Year	Depreciable Base	×	Depreciate Rate	=	Depreciation
2024	\$50,000		1/5 × 3/4		\$ 7,500
2025	50,000		1/5		10,000
2026	50,000		1/5		10,000
2027	50,000		1/5		10,000
2028	50,000		1/5		10,000
2029	50,000		1/5 × 1/4		2,500
Total					<u>\$50,000</u>

### Requirement 3

Only in **2024** is tax depreciation (\$34,000) greater than financial reporting depreciation (\$7,500).