CHAPTER 11
Depreciation, Impairments, and Depletion

ANSWERS TO QUESTIONS

1. The differences among the terms depreciation, depletion, and amortization are that they imply a cost allocation of different types of assets. Depreciation is employed to indicate that tangible plant assets have decreased in carrying value. Where natural resources (wasting assets) such as timber, oil, coal, and lead are involved, the term depletion is used. The expiration of intangible assets such as patents or copyrights is referred to as amortization.

LO: 1, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

2. The factors relevant in determining the annual depreciation for a depreciable asset are the initial recorded amount (cost), estimated salvage value, estimated useful life, and depreciation method.

Assets are typically recorded at their acquisition cost, which is in most cases objectively determinable. But cost assignment in other cases—"basket purchases" and the selection of an implicit interest rate in asset acquisitions under deferred-payment plans—may be quite subjective, involving considerable judgment.

The salvage value is the estimated amount that a company will receive when the asset is sold or when the asset is retired from service. The estimate is based on judgment and is affected by the length of the useful life of the asset.

The useful life is also based on judgment. It involves selecting the “unit” of measure of service life and estimating the number of such units embodied in the asset based on the company’s experience with such assets. Such units may be measured in terms of time periods or in terms of activity (for example, years or machine hours). When selecting the life, one should select the lower (shorter) of the physical life or the economic life. Physical life involves wear and tear and casualties; economic life involves such things as technological obsolescence and inadequacy.

Selecting the depreciation method is generally a judgment decision, but a method may be inherent in the definition adopted for the units of service life, as discussed earlier. For example, if such units are machine hours, the method is a function of the number of machine hours used during each period. A method should be selected that will best measure the portion of services expiring each period. Once a method is selected, it may be objectively applied by using a predetermined, objectively derived formula.


3. Disagree. Accounting depreciation is defined as an accounting process of allocating the costs of tangible assets to expense in a systematic and rational manner to the periods expected to benefit from the use of the asset. Thus, depreciation is not a matter of valuation but a means of cost allocation.

LO: 1, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

4. The carrying value of a fixed asset is its cost less accumulated depreciation. If the company estimates that the asset will have an unrealistically long life, the result will be to lower periodic depreciation charges, and hence accumulated depreciation. As a result the carrying value of the asset will be higher.

LO: 1, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
5. A change in the amount of annual depreciation recorded does not change the facts about the decline in economic usefulness. It merely changes reported figures. Depreciation in accounting consists of allocating the cost of an asset over its useful life in a systematic and rational manner. Abnormal obsolescence, as suggested by the plant manager, would justify more rapid depreciation, but increasing the depreciation charge would not necessarily result in funds for replacement. It would not increase revenue but simply make reported income lower than it would have been, thus preventing overstatement of net income.

Questions Chapter 11 (Continued)

Recording depreciation on the books does not set aside any assets for eventual replacement of the depreciated assets. Fund segregation can be accomplished but it requires additional managerial action. Unless an increase in depreciation is accompanied by an increase in sales price of the product, or unless it affects management's decision on dividend policy, it does not affect funds.

Ordinarily higher depreciation will not lead to higher sales prices and thus to more rapid “recovery” of the cost of the asset, and the economic factors present would have permitted this higher price regardless of the excuse given or the particular rationalization used. The price could have been increased without a higher depreciation charge.

The funds of a firm operating profitably do increase, but these may be used as working capital policy may dictate. The measure of the increase in these funds from operations is not merely net income, but that figure plus charges to operations which did not require working capital, less credits to operations which did not create working capital. The fact that net income alone does not measure the increase in funds from profitable operations leads some non-accountants to the erroneous conclusion that a fund is being created and that the amount of depreciation recorded affects the fund accumulation.

Acceleration of depreciation for purposes of income tax calculation stands in a slightly different category, since this is not merely a matter of recordkeeping. Increased depreciation will tend to postpone tax payments, and thus temporarily increase funds (although the liability for taxes may be the same or even greater in the long run than it would have been) and generate gain to the firm to the extent of the value of use of the extra funds.

LO: 2, Bloom: K, Difficulty: Simple, Time: 5-10, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

6. Assets are retired for one of two reasons: physical factors or economic factors—or a combination of both. Physical factors are the wear and tear, decay, and casualty factors which hinder the asset from performing indefinitely. Economic factors can be interpreted to mean any other constraint that develops to hinder the service life of an asset. Some accountants attempt to classify the economic factors into three groups: inadequacy, supersession, and obsolescence. Inadequacy is defined as a situation where an asset is no longer useful to a given enterprise because the demands of the firm have changed. Supersession is defined as a situation where the replacement of an asset occurs because another asset is more efficient and economical. Obsolescence is the catchall term that encompasses all other situations and is sometimes referred to as the major concept when economic factors are considered.

LO: 2, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

7. Before the amount of the depreciation charge can be computed, three basic questions must be answered:
   (1) What is the depreciation base to be used for the asset?
   (2) What is the asset’s useful life?
   (3) What method of cost apportionment is best for this asset?

LO: 1, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: None, AICPA BB: None, AICPA FC: Measurement, Reporting, AICPA PC: None

8. Cost $800,000
   Depreciation rate X .30*
   Depreciation for 2020 $240,000
   Undepreciated cost in 2021 560,000
   Depreciation rate X .30*
   2020 Depreciation $168,000
9. Depreciation base:

<table>
<thead>
<tr>
<th>Cost</th>
<th>$162,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salvage</td>
<td>(15,000)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$147,000</strong></td>
</tr>
</tbody>
</table>

- Straight-line, $147,000 ÷ 20 = **$7,350**
- Units-of-output, $147,000 X \( \frac{20,000}{84,000} \) = **$35,000**
- Working hours, $147,000 X \( \frac{14,300}{42,000} \) = **$50,050**
- Sum-of-the-years'-digits, $147,000 X 20/210* = **$14,000**
- Double-declining-balance, $162,000 X .10* = **$16,200**

*\[\frac{20(20 + 1)}{2} = 210\]

*\[\frac{1}{5 \text{ years}} \times 150\%\]

**Questions Chapter 11 (Continued)**

10. From a conceptual point of view, the method which best matches revenue and expenses should be used; in other words, the answer depends on the decline in the service potential of the asset. If the service potential decline is faster in the earlier years, an accelerated method would seem to be more desirable. On the other hand, if the decline is more uniform, perhaps a straight-line approach should be used. Many firms adopt depreciation methods for more pragmatic reasons. Some companies use accelerated methods for tax purposes but straight-line for book purposes because a higher net income figure is shown on the books in the earlier years, but a lower tax is paid to the government. Others attempt to use the same method for tax and accounting purposes because it eliminates some recordkeeping costs. Tax policy sometimes also plays a role.

11. The composite method is appropriate for a company which owns a large number of heterogeneous plant assets and which would find it impractical to keep detailed records for them.

The principal advantage is that it is not necessary to keep detailed records for each plant asset in the group. The principal disadvantage is that after a period of time the book value of the plant assets may not reflect the proper carrying value of the assets. Inasmuch as the Accumulated Depreciation account is debited or credited for the difference between the cost of the asset and the cash received from the retirement of the asset (i.e., no gain or loss on disposal is recognized), the Accumulated Depreciation account is self-correcting over time.

12. Cash .............................................................. 14,000
Accumulated Depreciation—Plant Assets ........................................ 36,000
Plant Assets ................................................................. 50,000

No gain or loss is recognized under the composite method.
13. Original estimate: $2,500,000 ÷ 50 = $50,000 per year
Depreciation to January 1, 2021: $50,000 × 14 = $700,000
Depreciation in 2021 ($2,500,000 – $700,000) ÷ 15 years = $120,000

LO: 2, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: None, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

Questions Chapter 11 (Continued)

14. No, depreciation does not provide cash; revenues do. The funds for the replacement of the assets come from the revenues; without the revenues no income materializes and no cash inflow results. A separate decision must be made by management to set aside cash to accumulate asset replacement funds. Depreciation is added to net income on the statement of cash flows (indirect method) because it is a noncash expense, not because it is a cash inflow.

LO: 2, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: None, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

15. 1.0 ÷ 4 years = 25% straight-line rate X 2 = 50%* double-declining rate
$8,000 × 50%* = $4,000 Depreciation for first full year.
$4,000 × 6/12 = $2,000 Depreciation for half a year (first year), 2020.
$6,000 ($8,000 – $2,000) × 50%* = $3,000 Depreciation for 2021.

LO: 2, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: None, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

16. The accounting standards require that if events or changes in circumstances indicate that the carrying amount of such assets may not be recoverable, then the carrying amount of the asset should be assessed. The assessment or review takes the form of a recoverability test that compares the sum of the expected future cash flows from the asset (undiscounted) to the carrying amount. If the cash flows are less than the carrying amount, the asset has been impaired. The impairment loss is measured as the amount by which the carrying amount exceeds the fair value of the asset. The fair value of assets is measured by their market value if an active market for them exists. If no market price is available, the present value of the expected future net cash flows from the asset may be used.

LO: 3, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

17. Under U.S. GAAP, impairment losses on assets held for use may not be restored.

LO: 3, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

18. An impairment is deemed to have occurred if, in applying the recoverability test, the carrying amount of the asset exceeds the expected future net cash flows from the asset. In this case, the expected future net cash flows of $705,000 exceed the carrying amount of the equipment of $700,000, so no impairment is assumed to have occurred; thus, no measurement of the loss is made or recognized even though the fair value is $590,000.

LO: 3, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

19. Impairment losses are reported as part of income from continuing operations, generally in the “Other expenses and losses” section. Impairment losses (and recovery of losses for assets to be disposed of) are similar to other costs that would flow through operations. Thus, gains (recoveries of losses) on assets to be disposed of should be reported as part of income from continuing operations in the “Other revenues and gains” section.

LO: 3, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

20. In a decision to replace or not to replace an asset, the undepreciated cost of the old asset is not a factor to be considered. Therefore, the decision to replace plant assets should not be affected by the amount of depreciation that has been recorded. The relative efficiency of new equipment as compared with that presently in use, the cost of the new facilities, the availability of capital for the new asset, etc., are the factors entering into the decision. Normally, the fact that the asset had been fully depreciated through the use of some accelerated depreciation method, although the...
asset was still in use, should not cause management to decide to replace the asset. If the new asset under consideration for replacement was not any more efficient than the old, or if it cost a good deal more in relationship to its efficiency, it is illogical for management to replace it merely because all or the major portion of the cost had been charged off for tax and accounting purposes.

Questions Chapter 11 (Continued)

If depreciation rates were higher it might be true that a business would be financially more able to replace assets, since during the earlier years of the asset's use a larger portion of its cost would have been charged to expense, and hence during this period a smaller amount of income tax paid. By selling the old asset, which might result in a capital gain, and purchasing a new asset, the higher depreciation charge might be continued for tax purposes. However, if the asset were traded in, having taken higher depreciation would result in a lower basis for the new asset.

It should be noted that expansion (not merely replacement) might be encouraged by increased depreciation rates. Management might be encouraged to expand, believing that in the first few years when they are reasonably sure that the expanded facilities will be profitable, they can charge off a substantial portion of the cost as depreciation for tax purposes. Similarly, since a replacement involves additional capital outlays, the tax treatment may have some influence.

Also, because of the inducement to expand or to start new businesses, there may be a tendency in the economy as a whole for the accounting and tax treatment of the cost of plant assets to influence the retirement of old plant assets.

It should be noted that increased depreciation may cause management to alter its decision about replacement.

LO: 2, Bloom: K, Difficulty: Moderate, Time: 5-10, AACSB: Communication, Reflective Thinking, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

21. In lieu of recording depreciation on replacement costs, management might elect to make annual appropriations of retained earnings in contemplation of replacing certain facilities at higher price levels. Such appropriations might help to eliminate misunderstandings as to amounts available for distribution as dividends, higher wages, bonuses, or lower sales prices. The need for these appropriations can be explained by supplementary financial schedules, explanations, and footnotes accompanying the financial statements. (However, neither depreciation charges nor appropriations of retained earnings result in the accumulation of funds for asset replacement. Fund accumulation is a result of profitable operations and appropriate funds management.)

LO: 2, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

22. (a) Depreciation and cost depletion are similar accounting concepts in that:
1. The cost of the asset is the starting point from which computation of the amount of the periodic charge to operations is made.
2. The estimated life is based on economic or productive life.
3. The accumulated total of past charges to operations is deducted from the original cost of the asset on the balance sheet.
4. When output methods of computing depreciation charges are used, the formulas are essentially the same as those used in computing depletion charges.
5. Both represent an apportionment of cost under the process of matching costs with revenue.
6. Assets subject to either are reported in the same classification on the balance sheet.
7. Appraisal values are sometimes used for depreciation while discovery values are sometimes used for depletion.
8. Salvage value is properly recognized in computing the charge to operations.
9. Depreciation and depletion may be included in inventory if the related asset contributed to the production of the inventory.
10. The rates may be changed upon revision of the estimated productive life used in the original rate computations.

(b) Depreciation and cost depletion are dissimilar accounting concepts in that:
1. Depletion is almost always based on output whereas depreciation is usually based on time.
2. Many formulas are used in computing depreciation but only one is used to any extent in computing depletion.
3. Depletion applies to natural resources while depreciation applies to plant and equipment.
4. Depletion refers to the physical exhaustion or consumption of the asset while depreciation refers to the wear, tear, and obsolescence of the asset.
5. Under statutes that base the legality of dividends on accumulated earnings, depreciation is usually a required deduction but depletion is usually not a required deduction.
6. The computation of the depletion rate is usually much less precise than the computation of depreciation rates because of the greater uncertainty in estimating the productive life.
7. A difference that is temporary in nature arises from the timing of the recognition of depreciation under conventional accounting and under the Internal Revenue Code, and it results in the recording of deferred income taxes. On the other hand, the difference between cost depletion under conventional accounting and its counterpart, percentage depletion, under the Internal Revenue Code is permanent and does not require the recording of deferred income taxes.

23. Cost depletion is the procedure by which the capitalized costs, less residual land values, of a natural resource are systematically charged to operations. The purpose of this procedure is to match the cost of the resource with the revenue it generates. The usual method is to divide the total cost less residual value by the estimated number of recoverable units to arrive at a depletion charge for each unit removed. A change in the estimate of recoverable units will necessitate a revision of the unit charge.

Percentage depletion is the procedure, authorized by the Internal Revenue Code, by which a certain percentage of gross income is charged to operations in arriving at taxable income. Percentage depletion is not considered to be a generally accepted accounting principle because it is not related to the cost of the asset and is allowed even though the property is fully depleted under cost depletion accounting. Applicable rates, ranging from 5% to 22% of gross income, are specified for nearly all natural resources. The total amount deductible in a given year may not be less than the amount computed under cost depletion procedures, and it may not exceed 50% of taxable income from the property before the depletion deduction. Cost depletion differs from percentage depletion in that cost depletion is a function of production whereas percentage depletion is a function of income.

Percentage depletion has arisen, in part, from the difficulty of valuing the natural resource or determining the discovery value of the asset and of determining the recoverable units. Although other arguments have been advanced for maintaining percentage depletion, a primary argument is its value in encouraging the search for additional resources. It is deemed to be in the national interest to provide an incentive to the continuing search for natural resources. As noted in the textbook, percentage depletion is no longer permitted for many enterprises.

24. Percentage depletion does not necessarily measure the proper share of the cost of a natural resource to be charged to expense for depletion and, in fact, may ultimately exceed the actual cost of the property.

25. The maximum dividend permissible is the amount of accumulated net income (after depletion) plus the amount of depletion charged. This practice can be justified for companies that expect to extract natural resources and not purchase additional properties. In effect, such companies are distributing gradually to stockholders their original investments.
26. Reserve recognition accounting (RRA) is the method (a fair value approach) that was proposed by the SEC to account for oil and gas resources. Proponents of this approach argue that oil and gas should be valued at the date of discovery. The value of the reserve still in the ground is estimated and this amount, appropriately discounted, is reported on the balance sheet as “oil deposits.”

Questions Chapter 11 (Continued)

The oil companies are concerned because the valuation issue is extremely tenuous. For example, to properly value the reserves, the following must be estimated: (1) amount of the reserves, (2) future production costs, (3) periods of expected disposal, (4) discount rate, and (5) the selling price.


27. Using full-cost accounting, the cost of unsuccessful ventures as well as those that are successful is capitalized, because a cost of drilling a dry hole is a cost that is needed to find the commercially profitable wells. Successful efforts accounting capitalizes only those costs related to successful projects. They contend that to measure cost and effort accurately for a single property unit, the only measure is in terms of the cost directly related to that unit. In addition, it is argued that full-cost is misleading because capitalizing all costs will make an unsuccessful company over a short period of time show no less income than does one that is successful.

LO: 4, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication

28. Asset turnover:

\[
\frac{71,879}{38,215} = 1.88 \text{ times}
\]

Return on assets:

\[
\frac{2,934}{38,215} = 7.68\%
\]

LO: 5, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

*29. The modified accelerated cost recovery system (MACRS) has been adopted by the Internal Revenue Service. It applies to depreciable assets acquired in 1987 and later. MACRS eliminates the need to determine each asset’s useful life. The selection of a depreciation method and a salvage value is also unnecessary under MACRS. The taxpayer determines the recovery deduction for an asset by applying a statutory percentage to the historical cost of the property. MACRS was adopted to permit a faster write-off of tangible assets so as to provide additional tax incentives and to simplify the depreciation process. The simplification should end disputes related to estimated useful life, salvage value, and so on.

LO: 5, Bloom: K, Difficulty: Simple, Time: 3-5, AACSB: Communication, AICPA BB: None, AICPA FC: Reporting, AICPA PC: Communication
SOLUTIONS TO BRIEF EXERCISES

BRIEF EXERCISE 11.1

2020: \[
\frac{($50,000 - $2,000) \times 23,000}{160,000} = $6,900
\]

2021: \[
\frac{($50,000 - $2,000) \times 31,000}{160,000} = $9,300
\]

LO: 1, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

BRIEF EXERCISE 11.2

(a) \[
\frac{$80,000 - $8,000}{8} = $9,000
\]

(b) \[
\frac{$80,000 - $8,000}{8} \times \frac{4}{12} = $3,000
\]

LO: 1, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

BRIEF EXERCISE 11.3

(a) \[
($80,000 - $8,000) \times \frac{8}{36} = $16,000
\]

(b) \[
\left(\frac{($80,000 - $8,000) \times 8}{36}\right) \times \frac{9}{12} = $12,000
\]

*\[\frac{8(8 + 1)}{2}\]

LO: 1, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

BRIEF EXERCISE 11.4

(a) \[
$80,000 \times .25 = $20,000
\]

(b) \[
($80,000 \times .25) \times \frac{3}{12} = $5,000
\]

*(1/8 \times 2)*

LO: 1, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
BRIEF EXERCISE 11.5

Depreciable Base = ($28,000 + $200 + $125 + $500 + $475) – $3,000 = $26,300.

LO: 1, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

BRIEF EXERCISE 11.6

<table>
<thead>
<tr>
<th>Asset</th>
<th>Depreciation Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>($70,000 – $7,000)/10 = 6,300</td>
</tr>
<tr>
<td>B</td>
<td>($50,000 – $5,000)/5 = 9,000</td>
</tr>
<tr>
<td>C</td>
<td>($82,000 – $4,000)/12 = 6,500</td>
</tr>
<tr>
<td></td>
<td>$202,000</td>
</tr>
<tr>
<td></td>
<td>$21,800</td>
</tr>
</tbody>
</table>

Composite rate = $21,800/$202,000 = 10.8%
Composite life = $186,000*/$21,800 = 8.5 years

*($63,000 + $45,000 + $78,000)

LO: 2, Bloom: AP, Difficulty: Simple, Time: 5-7, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

BRIEF EXERCISE 11.7

Annual depreciation expense: ($8,000 – $1,000)/5 = $1,400
Book value, 1/1/21: $8,000 – (2 x $1,400) = $5,200*
Depreciation expense, 2021: ($5,200* – $500)/2 = $2,350

LO: 2, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

BRIEF EXERCISE 11.8

Recoverability test:
Future net cash flows ($500,000) < Carrying amount ($520,000*); therefore, the asset has been impaired.

Journal entry:
Loss on Impairment........................................... 120,000
Accumulated Depreciation—
   Equipment ($520,000 – $400,000)............ 120,000

*($900,000 - $380,000)

LO: 3, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
BRIEF EXERCISE 11.9

Inventory ................................................................. 73,500**
Coal Mine ................................................................. 73,500

$400,000 + $100,000 + $80,000 − $160,000  4,000

= $105* per ton

700 X $105* = $73,500**

LO: 4, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

BRIEF EXERCISE 11.10

(a) Asset turnover:

$7,890
($7,837 + $7,726)

= 1.0139* times
2

(b) Profit margin on sales:

$887
$7,890

= 11.24%

(c) Return on assets:

1. 1.0139 X .1124 = 11.40%

2. $887
($7,837 + $7,726)

= 11.40%
2

LO: 5, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
*BRIEF EXERCISE 11.11

2020: $50,000 X 20% = $10,000
2021: $50,000 X 32% = 16,000
2022: $50,000 X 19.2% = 9,600
2023: $50,000 X 11.52% = 5,760
2024: $50,000 X 11.52% = 5,760
2025: $50,000 X 5.76% = 2,880

$50,000

LO: 6, Bloom: AP, Difficulty: Simple, Time: 3-5, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
SOLUTIONS TO EXERCISES

EXERCISE 11.1 (15–20 minutes)

(a) Straight-line method depreciation for each of Years 1 through 3 = \( \frac{($469,000 - $40,000)}{12} = $35,750 \)

(b) Sum-of-the-Years’-Digits = \( \frac{[12 \times (12 + 1)]}{2} = 78 \)
   
   \begin{align*}
   12/78 \times ($469,000 - $40,000) &= $66,000 \text{ depreciation Year 1} \\
   11/78 \times ($469,000 - $40,000) &= $60,500 \text{ depreciation Year 2} \\
   10/78 \times ($469,000 - $40,000) &= $55,000 \text{ depreciation Year 3}
   
   \end{align*}

(c) Double-Declining Balance method = \( \frac{1.0}{12} \times 2 = 16.67\% \)

\begin{align*}
$469,000 \times .1667 &= $78,182 \text{ depreciation Year 1} \\
($469,000 - $78,182) \times .1667 &= $65,149 \text{ depreciation Year 2} \\
($469,000 - $78,182 - $65,149) \times .1667 &= $54,289 \text{ depreciation Year 3}
\end{align*}

LO: 1, Bloom: AP, Difficulty: Simple, Time: 15-20, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

EXERCISE 11.2 (20–25 minutes)

(a) If there is any salvage value and the amount is unknown (as is the case here), the cost would have to be determined by looking at the data for the double-declining balance method.

\[
\frac{100\%}{5} = 20\% \text{ Straight-line rate; } 20\% \times 2 = 40\% \text{ Double declining balance rate}
\]

Cost \( \times 40\% = $20,000 \)

\[
$20,000 \div .40 = $50,000 \text{ Cost of asset}
\]

(b) \$50,000 cost [from (a)] - \$45,000 total depreciation = \$5,000 salvage value.
EXERCISE 11.2 (Continued)

(c) The highest charge to income for Year 1 will be yielded by the double-declining balance method, with depreciation expense of $20,000.

(d) The highest charge to income for Year 4 will be yielded by the straight-line method with depreciation expense of $9,000.

(e) The method that produces the highest book value at the end of Year 3 would be the method that yields the lowest accumulated depreciation at the end of Year 3, which is the straight-line method.

Computations:
St.-line = $50,000 – ($9,000 + $9,000 + $9,000) = $23,000 book value, end of Year 3.
S.Y.D. = $50,000 – ($15,000 + $12,000 + $9,000) = $14,000 book value, end of Year 3.
D.D.B. = $50,000 – ($20,000 + $12,000 + $7,200) = $10,800 book value, end of Year 3.

(f) The method that will yield the highest gain (or lowest loss) if the asset is sold at the end of Year 3 is the method which will yield the lowest book value at the end of Year 3, which is the double-declining balance method in this case.

LO: 1, Bloom: AP, Difficulty: Moderate, Time: 20-25, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

EXERCISE 11.3 (15–20 minutes)

(a) \[ \frac{[20 (20 + 1)]}{2} = 210 \]

\[ 9/12 \times 20/210 \times ($711,000 – $60,000) = $46,500 \] for 2020

\[ 3/12 \times 20/210 \times ($711,000 – $60,000) = $15,500 \]

\[ + \quad 9/12 \times 19/210 \times ($711,000 – $60,000) = \underline{44,175} \]

\[ \underline{59,675} \] for 2021
EXERCISE 11.3 (Continued)

(b) \[ \frac{1.0}{20} = 5\% \text{ Straight-line rate; } .05 \times 2 = 10\% \text{ Double declining balance rate} \]

\[ \frac{9}{12} \times .10 \times \$711,000 = \$53,325 \text{ for 2020} \]

\[ .10 \times (\$711,000 - \$53,325) = \$65,768 \text{ for 2021} \]

EXERCISE 11.4 (15–25 minutes)

(a) \( \$315,000 - \$15,000 = \$300,000^* \text{ Depreciable base; } \$300,000 \div 10 \text{ yrs.} = \$30,000 \)

(b) \( \$300,000 \div 240,000 \text{ units} = \$1.25; 25,500 \text{ units} \times \$1.25 = \$31,875 \)

(c) \( \$300,000 \div 25,000 \text{ hours} = \$12.00 \text{ per hr.; } 2,650 \text{ hrs.} \times \$12.00 = \$31,800 \)

(d) \( \frac{10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1}{2} = 55 \text{ OR } \frac{n(n + 1)}{2} = \frac{[10(10 + 1)]}{2} = 55 \)

\[ \frac{10}{55} \times \$300,000 \times \frac{4}{12} = \$18,182 \]

\[ \frac{9}{55} \times \$300,000 \times \frac{8}{12} = \$32,727 \]

Total for 2021 \( \$50,909 \)

(e) \( \$315,000 \times .20 \times \frac{4}{12} = \$21,000 \)

\[ [\$315,000 - (\$315,000 \times .20)] \times .20 \times \frac{8}{12} = \$33,600 \]

Total for 2021 \( \$54,600 \)

[May also be computed as \( .20 \times [\$315,000 - (8/12 \times .20 \times 315,000)] \)]

\[ [(1.0 \div 10) \times 2] = 20\% \text{ Double declining balance rate} \]

LO: 1, Bloom: AP, Difficulty: Simple, Time: 15-20, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
EXERCISE 11.5 (20–25 minutes)

(a) \( \frac{($117,900 \text{ – } $12,900)}{5} = $21,000/\text{yr.} = $21,000 \times 5/12 = $8,750 \)

2020 Depreciation—Straight line = $8,750

(b) \( \frac{($117,900 \text{ – } $12,900)}{21,000} = $5.00/\text{hr.} \)

2020 Depreciation—Machine Usage = 800 X $5.00 = $4,000

(c) | Machine Allocated to |
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

* $117,900 – $12,900
** $35,000 X 5/12 = $14,583
*** $35,000 X 7/12 = $20,417
**** $28,000 X 5/12 = $11,667

2021 Depreciation—Sum-of-the-Years’-Digits = $32,084

(d) 2020 .40 X ($117,900) X 5/12 = $19,650

2021 .40 X ($117,900 – $19,650) = $39,300

OR (1.0 ÷ 5 years) X 2 = D.D.B. Rate of 40%

1st full year (.40 X $117,900) = $47,160

2nd full year [.40 X ($117,900 – $47,160)] = $28,296

2020 Depreciation = 5/12 X $47,160 = $19,650

2021 Depreciation = 7/12 X $47,160 = $27,510

5/12 X $28,296 = 11,790

$39,300

EXERCISE 11.6 (20–30 minutes)

(a) 2020 Straight-line \( \frac{\$212,000 - \$12,000}{8} = \$25,000/\text{year} \)

3 months—Depreciation \( \$6,250 = (\$25,000 \times 3/12) \)

(b) 2020 Output \( \frac{\$212,000 - \$12,000}{40,000} = \$5.00/\text{output unit} \)

1,000 units \( \times \$5.00 = \$5,000 \)

(c) 2020 Working hours \( \frac{\$212,000 - \$12,000}{20,000} = \$10.00/\text{hour} \)

525 hours \( \times \$10.00 = \$5,250 \)

(d) \( (8 + 7 + 6 + 5 + 4 + 3 + 2 + 1) = 36 \) OR \( \frac{n (n + 1)}{2} = \frac{8(9)}{2} = 36 \)

<table>
<thead>
<tr>
<th>Sum-of-the-years’-digits</th>
<th>Total</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 8/36 X $200,000 =</td>
<td>$44,444</td>
<td>$11,111\text{a}</td>
<td>$33,333\text{b}</td>
<td></td>
</tr>
<tr>
<td>2 7/36 X $200,000 =</td>
<td>$38,889</td>
<td>9,722\text{c}</td>
<td>$29,167\text{d}</td>
<td></td>
</tr>
<tr>
<td>3 6/36 X $200,000 =</td>
<td>$33,333</td>
<td></td>
<td>8,333\text{e}</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$11,111</td>
<td>$43,055</td>
<td>$37,500</td>
</tr>
</tbody>
</table>

2022: \( \$37,500 = (9/12 \text{ of } 2^{\text{nd}} \text{ year of machine’s life} \text{ plus } 3/12 \text{ of } 3^{\text{rd}} \text{ year of machine’s life}) \)

\text{a}\$44,444 \times 3/12 \\
\text{b}\$44,444 \times 9/12 \\
\text{c}\$38,889 \times 3/12 \\
\text{d}\$38,889 \times 9/12 \\
\text{e}\$33,333 \times 3/12

(e) Double-declining balance 2021: \( 1.0/8 \times 2 = 25\% \).

2020: \( .25 \times \$212,000 \times 3/12 = \$13,250 \)

2021: \( .25 \times (\$212,000 - \$13,250) = \$49,688 \)
EXERCISE 11.6 (Continued)

OR

1\textsuperscript{st} full year (.25 \times $212,000) = $53,000

2\textsuperscript{nd} full year [.25 \times ($212,000 – $53,000)] = $39,750

2020 Depreciation 3/12 \times $53,000 = $13,250

2021 Depreciation 9/12 \times $53,000 = $39,750

\[ \frac{3}{12} \times 9,938 = \frac{9,938}{8} \]

\$49,688

LO: 1, Bloom: AP, Difficulty: Moderate, Time: 20-30, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

EXERCISE 11.7 (25–35 minutes)

(a) Methods of Depreciation

<table>
<thead>
<tr>
<th>Description</th>
<th>Date Purchased</th>
<th>Cost</th>
<th>Salvage</th>
<th>Life</th>
<th>Method to 2021</th>
<th>Accum. Depr. to 2022 Depr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2/12/20</td>
<td>$142,500</td>
<td>$16,000</td>
<td>10 (a) SYD</td>
<td>$33,350</td>
<td>(b) $19,550</td>
</tr>
<tr>
<td>B</td>
<td>8/15/19 (c)</td>
<td>79,000</td>
<td>21,000</td>
<td>5    SL</td>
<td>29,000</td>
<td>(d) 11,600</td>
</tr>
<tr>
<td>C</td>
<td>7/21/18</td>
<td>75,400</td>
<td>23,500</td>
<td>8    DDB (e)</td>
<td>47,567</td>
<td>(f) 4,333</td>
</tr>
<tr>
<td>D</td>
<td>10/15/20</td>
<td>219,000</td>
<td>69,000</td>
<td>5    SYD (f)</td>
<td>70,000</td>
<td>(g) 35,000</td>
</tr>
</tbody>
</table>

Machine A—Testing the methods

Straight-Line Method for 2020

\[
$6,325 = \frac{($142,500 \text{ – $16,000})}{10} \times 0.5
\]

Straight-Line Method for 2021

\[
$12,650 = \frac{($142,500 \text{ – $16,000})}{10} \times 0.5
\]

Total Straight Line

\[
$18,975 = $6,325 + $12,650
\]

Double-Declining Balance for 2020

\[
$14,250 = ($142,500 \times 0.2) \times (1/5 \text{ years}) \times 0.5
\]

Double-Declining Balance for 2021

\[
$25,650 = ($142,500 \text{ – $14,250}) \times 0.2 \times (1/5 \text{ years}) \times 0.5
\]

Total Double Declining Balance

\[
$39,900 = $14,250 + $25,650
\]

Sum-of-the-years-digits for 2020

\[
$11,500 = ($142,500 \text{ – $16,000}) \times (10/55 \times 0.5)
\]

Sum-of-the-years-digits for 2021

\[
$21,850 = ($126,500 \times 10/55 \times 0.5) + ($126,500 \times 9/55 \times 0.5)
\]

Total Sum-of-the-years-digits

\[
$33,350 = $11,500 + $21,850
\]

(b) Method used must be SYD

Using SYD, 2022 Depreciation is

\[
$19,550 = ($126,500 \times 9/55 \times 0.5) + ($126,500 \times 8/55 \times 0.5)
\]
EXERCISE 11.7 (Continued)

(c) Machine B—Computation of the cost
Asset has been depreciated for 2 1/2 years using the straight-line method.
Annual depreciation is then equal to $29,000 divided by 2.5 or $11,600.
11,600 times 5 plus the salvage value is equal to the cost.
Cost is $79,000 [($11,600 X 5) + $21,000].

(d) Using SL, 2020 Depreciation is $11,600.

(e) Machine C—Using the double-declining balance method of depreciation
2018’s depreciation is $ 9,425  
2019’s depreciation is $16,494  
2020’s depreciation is $12,370  
2021’s depreciation is $ 9,278  
$47,567

(f) Using DDB, 2022 Depreciation is $4,333 ($75,400 – $47,567 – $23,500)

(g) Machine D—Computation of Year Purchased
2020 - First Half Year using SYD = $25,000  
[($219,000 – $69,000) X 5/15 X 1/2] 
2021 - Second Year using SYD = $45,000  
($150,000 X 5/15 X 1/2) + ($150,000 X 4/15 X 1/2) 
$70,000

Thus, the asset must have been purchased on October 12, 2020

(h) Using SYD, 2022 Depreciation is $35,000  
($150,000 X 4/15 X .5) + ($150,000 X 3/15 X .5)
EXERCISE 11.8 (20–25 minutes)

Old Machine

<table>
<thead>
<tr>
<th>June 1, 2018</th>
<th>Purchase</th>
<th>$31,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freight</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Installation</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td><strong>Total cost</strong></td>
<td><strong>$31,700</strong></td>
</tr>
</tbody>
</table>

Annual depreciation charge: \((\$31,700 - \$2,500) ÷ 10 = \$2,920\)**

On June 1, 2019, debit the old machine for \$1,980; the revised total cost is \$33,680 \((\$31,700 + \$1,980)\); thus the revised annual depreciation charge is: \((\$33,680 - \$2,500 - \$2,920) ÷ 9 = \$3,140\)**.

Book value, old machine, June 1, 2022:
\[
\text{[$33,680 - \$2,920** - ($3,140** X 3)]} = \$21,340
\]
Less: Fair value
\[
20,000^a
\]
Loss on exchange
\[
1,340
\]
Cost of removal
\[
75
\]
Total loss
\[
\$ 1,415
\]

(Note to instructor: The above computation is done to determine whether there is a gain or loss from the exchange of the old machine with the new machine and to show how the cost of removal might be reported. Also, if a gain occurs, the gain is not deferred (1) because the exchange has commercial substance and (2) the cost paid exceeds 25% of the total value of the property received.)

New Machine

<table>
<thead>
<tr>
<th>Basis of new machine</th>
<th>Cash paid (($35,000 - $20,000))</th>
<th>$15,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair value of old machine</td>
<td>20,000</td>
<td></td>
</tr>
<tr>
<td>Installation cost</td>
<td>1,500</td>
<td></td>
</tr>
<tr>
<td><strong>Total cost of new machine</strong></td>
<td><strong>$36,500</strong></td>
<td></td>
</tr>
</tbody>
</table>

Depreciation for the year beginning June 1, 2022 = \((\$36,500 - \$4,000) ÷ 10 = \$3,250\).

LO: 1, Bloom: AP, Difficulty: Moderate, Time: 20-25, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
EXERCISE 11.9 (15–20 minutes)

(a) | Asset | Cost | Estimated Salvage | Depreciable Cost | Estimated Life | Depreciation per Year |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$40,500</td>
<td>$5,500</td>
<td>$35,000</td>
<td>10</td>
<td>$3,500</td>
</tr>
<tr>
<td>B</td>
<td>33,600</td>
<td>4,800</td>
<td>28,800</td>
<td>9</td>
<td>3,200</td>
</tr>
<tr>
<td>C</td>
<td>36,000</td>
<td>3,600</td>
<td>32,400</td>
<td>9</td>
<td>3,600</td>
</tr>
<tr>
<td>D</td>
<td>19,000</td>
<td>1,500</td>
<td>17,500</td>
<td>7</td>
<td>2,500</td>
</tr>
<tr>
<td>E</td>
<td>23,500</td>
<td>2,500</td>
<td>21,000</td>
<td>6</td>
<td>3,500</td>
</tr>
</tbody>
</table>

$152,600 | $17,900 | $134,700 | $16,300

Composite life = $134,700 ÷ $16,300, or 8.26 years
Composite rate = $16,300 ÷ $152,600, or approximately 10.7%

(b) Depreciation Expense
Accumulated Depreciation—Plant Assets

16,300

16,300

(c) Cash
Accumulated Depreciation—Plant Assets
Plant Assets

4,800

14,200

19,000

EXERCISE 11.10 (10–15 minutes)

Sum-of-the-years’-digits = \[
\frac{8 \times (8 + 1)}{2} = 36
\]

Using Y to stand for the years of remaining life:

\[
\frac{Y}{36} \times ($430,000 - $70,000) = $60,000
\]

Multiplying both sides by 36:

\[
$360,000 \times Y = $2,160,000
\]

\[
Y = $2,160,000 \div $360,000
\]

\[
Y = 6
\]

The year in which there are six remaining years of life at the beginning of that given year is 2019 = \[(8 - 6) = 2 + 2017\].
EXERCISE 11.11 (10–15 minutes)

(a) No correcting entry is necessary because changes in estimate are handled in the current and prospective periods.

(b) Revised annual charge

Book value as of 1/1/2021 \[[$60,000 - ($7,000* \times 5)] = $25,000\]

Remaining useful life, 5 years (10 years – 5 years)

Revised salvage value, $4,500

\[($25,000 - $4,500) ÷ 5 = $4,100\]

\[*(60,000 - 4,000) / 8 \text{ years} = $7,000 \text{ Annual depreciation}\]

Depreciation Expense................................................. 4,100
Accumulated Depreciation—Machinery....... 4,100

EXERCISE 11.12 (20–25 minutes)

(a) 1994–2003—($2,000,000 – $60,000) ÷ 40 = $48,500/yr.

(b) 2004–2021—Building ($2,000,000 – $60,000) ÷ 40 = $48,500/yr.

Addition ($500,000 – $20,000) ÷ 30 = 16,000/yr.

$64,500/yr.

(c) No entry required.

(d) Revised annual depreciation

Building

Book value: ($2,000,000 – $1,358,000*) $642,000
Salvage value

\[
\begin{align*}
\text{Salvage value} & = 60,000 \\
\text{Remaining useful life} & = 32 \text{ years} \\
\text{Annual depreciation} & = 18,188 \\
\end{align*}
\]

\[*(48,500 \times 28 \text{ years} = $1,358,000)\]
EXERCISE 11.12 (Continued)

Addition

Book value: ($500,000 – $288,000**) $ 212,000
Less: Salvage value 20,000

Remainder useful life $192,000 ÷ 32 years $6,000

**$16,000 X 18 years = $288,000

Annual depreciation expense—building ($18,188 + $6,000) $24,188

EXERCISE 11.13 (15–20 minutes)

(a) $2,200,000 ÷ 40 = $55,000

(b) Loss on Disposal of Plant Assets ($160,000 - $80,000) ........................................................... 80,000

Accumulated Depreciation—Buildings
($160,000 X 20 years /40 years) .......................... 80,000
Buildings .................................................. 160,000

Buildings .................................................. 300,000
Cash ....................................................... 300,000

Note: The most appropriate entry would be to remove the old roof and record a loss on disposal, because the cost of the old roof is given. Another alternative would be to debit Accumulated Depreciation—Buildings on the theory that the replacement extends the useful life of the building. The entry in this case would be as follows:

Accumulated Depreciation—Buildings .......... 300,000
Cash ....................................................... 300,000

As indicated, this approach does not seem as appropriate as the first approach.
EXERCISE 11.13 (Continued)

(c) No entry necessary.

(d) (Assume the cost of the old roof is removed)

Buildings ($2,200,000 – $160,000 + $300,000) $2,340,000
Less: Accumulated Depreciation
($55,000 X 20 – $80,000) 1,020,000

1,320,000

Remaining useful life
Depreciation—2021

OR

(Assume the cost of the new roof is debited to Accumulated Depreciation—Building)

Book value of the building prior to the replacement of roof $2,200,000 – ($55,000 X 20) = $1,100,000
Cost of new roof 300,000 

$1,400,000

Remaining useful life
Depreciation—2021 ($1,400,000 ÷ 25) $56,000

LO: 1,2, Bloom: AP, Difficulty: Simple, Time: 15-20, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

EXERCISE 11.14 (20–25 minutes)

(a) Maintenance and Repairs Expense ...................... 500
   Equipment ......................................................... 500

(b) The proper ending balance in the asset account is:
   January 1 balance $134,750
   Add: New equipment:
      Purchases $32,000
      Freight 700
      Installation 2,700 35,400
   Less: Cost of equipment sold 23,000
   December 31 balance $147,150

(1) Straight-line: $147,150 ÷ 10 = $14,715
EXERCISE 11.14 (Continued)

(2) Sum-of-the-years’-digits: \((10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1) = 55\)

\[
\text{OR } \frac{n(n + 1)}{2} = \frac{10(10 + 1)}{2} = 55^*
\]

For equipment purchased in 2019: \($111,750 \text{ ($134,750 – $23,000)}\) of the cost of equipment purchased in 2019, is still on hand.

\[
8/55 \times 111,750 = $16,255
\]

For equipment purchased in 2021: \(10/55^* \times 35,400 = 6,436\)

Total \(= 22,691\)

EXERCISE 11-15 (25–35 minutes)

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016–2021 Incl.</th>
<th>2022</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>$192,000 – $16,800 = $175,200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$175,200 ÷ 12 = $14,600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>per yr. ($40 per day)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>133*/365 of $14,600 = $ 5,320</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2016–2021 Include. (6 X $14,600)</td>
<td>$87,600</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>**68/365 of $14,600 =</td>
<td></td>
<td>$2,720</td>
<td>$95,640</td>
</tr>
<tr>
<td>(2)</td>
<td>0</td>
<td>87,600</td>
<td>14,600</td>
<td>102,200</td>
</tr>
<tr>
<td>(3)</td>
<td>14,600</td>
<td>87,600</td>
<td>0</td>
<td>102,200</td>
</tr>
<tr>
<td>(4)</td>
<td>7,300</td>
<td>87,600</td>
<td>7,300</td>
<td>102,200</td>
</tr>
<tr>
<td>(5)</td>
<td>4/12 of $14,600</td>
<td>4,867</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2016–2021 Inc.</td>
<td>87,600</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/12 of $14,600</td>
<td></td>
<td>3,650</td>
<td>96,117</td>
</tr>
<tr>
<td>(6)</td>
<td>0</td>
<td>87,600</td>
<td>0</td>
<td>87,600</td>
</tr>
</tbody>
</table>

*(11 + 30 + 31 + 30 + 31) **(31 + 28 + 9)

(b) The most accurate distribution of cost is given by methods 1 and 5 if it is assumed that straight-line is satisfactory. Reasonable accuracy is normally given by 2, 3, or 4. The simplest of the applications are 6, 2, 3, 4, 5, and 1, in about that order. Methods 2, 3, and 4 combine reasonable accuracy with simplicity of application.
EXERCISE 11.16 (10–15 minutes)

(a) December 31, 2020

Loss on Impairment ........................................... 3,200,000*
Accumulated Depreciation—Equipment .......... 3,200,000

Cost .................................................. $9,000,000
Less: Accumulated depreciation .................. 1,000,000
Carrying amount ..................................... 8,000,000
Less: Fair value ...................................... 4,800,000
Loss on impairment ................................ $3,200,000*

Note: Expected undiscounted cash flows ($7,000,000) < carrying value ($8,000,000).

(b) December 31, 2021

Depreciation Expense ...................................... 1,200,000
Accumulated Depreciation—Equipment .......... 1,200,000

New carrying amount ................................ $4,800,000
Useful life ........................................... 4 years
Depreciation per year ................................ $1,200,000

(c) No entry necessary. Restoration of any impairment loss is not permitted.


EXERCISE 11.17 (15–20 minutes)

(a) Loss on Impairment ........................................... 3,220,000
Accumulated Depreciation—Equipment .......... 3,220,000

Cost .................................................. $9,000,000
Accumulated depreciation .................. 1,000,000
Carrying amount ..................................... 8,000,000
Less: Fair value ...................................... 4,800,000
Plus: Cost of disposal .................. 20,000
Loss on impairment ................................ $3,220,000
EXERCISE 11.17 (Continued)

(b) No entry necessary. Depreciation is not taken on assets intended to be sold.

(c) Accumulated Depreciation—Equipment ........ 500,000
     Recovery of Loss from Impairment ........ 500,000

Fair value $5,300,000
Less: Cost of disposal 20,000 $5,280,000
Less: Carrying amount 4,780,000
Recovery of loss on impairment $ 500,000

EXERCISE 11.18 (15–20 minutes)

(a) December 31, 2020
Loss on Impairment ........................................... 270,000*
Accumulated Depreciation—Equipment .. 270,000

Cost $900,000
Less: Accumulated depreciation 400,000
Carrying amount 500,000
Less: Fair value 230,000
Loss on impairment $270,000*

(b) It may be reported in the Other expenses and losses section or it may be highlighted as an unusual item in a separate section.

(c) No entry necessary. Restoration of any impairment loss is not permitted.

(d) Management first had to determine whether there was an impairment. To evaluate this step, management does a recoverability test. The recoverability test estimates the future cash flows expected from use of that asset and its eventual disposition. If the sum of the expected future net cash flows (undiscounted) is less than the carrying amount of the asset, an impairment results. If the recoverability test indicates that an impairment has occurred, a loss is computed. The impairment loss is the amount by which the carrying amount of the asset exceeds its fair value.
EXERCISE 11.19 (15–20 minutes)

(a) Depreciation Expense: \( \frac{\$84,000}{30 \text{ years}} = \$2,800 \text{ per year} \)

Cost of Timber Sold: \( \$1,400 - \$400 = \$1,000 \)
\( \$1,000 \times 9,000 \text{ acres} = \$9,000,000 \text{ of value of timber} \)
\( \left( \frac{\$9,000,000}{3,500,000 \text{ bd. ft.}} \right) \times 700,000 \text{ bd. ft.} = \$1,800,000 \)

(b) Cost of Timber Sold: \( \$9,000,000 - \$1,800,000 = \$7,200,000 \)
\( \$7,200,000 + \$100,000 = \$7,300,000 \)
\( \left( \frac{\$7,300,000}{5,000,000 \text{ bd. ft.}} \right) \times 900,000 \text{ bd. ft.} = \$1,314,000 \)

Note: The spraying costs as well as the costs to maintain the fire lanes and roads are expensed each period and are not part of the depletion base.

EXERCISE 11.20 (10–15 minutes)

Cost per barrel of oil:

Initial payment = \( \frac{\$500,000}{250,000} = \$2.00 \)

Rental = \( \frac{\$31,500}{18,000} = 1.75 \)

Premium = 5% of \( \$55 = 2.75 \)

Reconditioning of land = \( \frac{\$30,000}{250,000} = .12 \)

Total cost per barrel = \$6.62
EXERCISE 11.21 (15–20 minutes)

(a) $1,300 – $300 = $1,000 per acre for timber

\[
\frac{\$1,000 \times 7,000 \text{ acres}}{8,000 \text{ bd. ft.} \times 7,000 \text{ acres}} \times 850,000 \text{ bd. ft.} = \frac{\$7,000,000}{56,000,000 \text{ bd. ft.}} \times 850,000 \text{ bd. ft.} = \$106,250.
\]

(b) \(\frac{\$78,400}{56,000,000 \text{ bd. ft.}} \times 850,000 \text{ bd. ft.} = \$1,190\).

(c) Forda should capitalize the cost of $70,000 ($20 \times 3,500 trees) and adjust the depletion the next time the timber is harvested.

LO: 4, Bloom: AP, Difficulty: Simple, Time: 15-20, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

EXERCISE 11.22 (15–20 minutes)

Depletion base: $1,190,000 + $90,000 – $100,000 + $200,000 = $1,380,000

Depletion rate: $1,380,000 \div 60,000 = \$23/ton\

(a) Per unit material cost: $23/ton

(b) 12/31/20 inventory: $23 \times (30,000 \text{ tons} – 22,000 \text{ tons}) = \$184,000

(c) Cost of goods sold 2020: $23 \times 22,000 \text{ tons} = \$506,000

LO: 4, Bloom: AP, Difficulty: Simple, Time: 15-20, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None

EXERCISE 11.23 (15–20 minutes)

(a) \(\frac{\$970,000 + \$170,000 + \$40,000^* – \$100,000}{12,000,000} = \$.09 \text{ depletion per unit}\)

*Note to instructor: The $40,000 should be depleted because it is an asset retirement obligation.

2,500,000 units extracted \times \$.09 = \$225,000 depletion for 2020

(b) 2,100,000 units sold \times \$.09 = \$189,000 charged to cost of goods sold for 2020

LO: 4, Bloom: AP, Difficulty: Simple, Time: 15-20, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
EXERCISE 11.24 (15–20 minutes)

(a) Asset turnover:

\[
\frac{515.7}{\frac{930.9 + 920.1}{2}} = 0.557 \text{ times}
\]

(b) Return on assets:

\[
\frac{80.7}{\frac{930.9 + 920.1}{2}} = 8.72\%
\]

(c) Profit margin on sales:

\[
\frac{80.7}{515.7} = 15.65\%
\]

(d) The asset turnover times the profit margin on sales provides the rate of return on assets computed for Tootsie Roll as follows:

\[
\text{Profit margin on sales} \times \text{Asset Turnover} = \frac{15.65\%}{0.557} = 8.72\%
\]

Note the answer 8.72% is the same as the rate of return on assets computed in (b) above.

LO: 5, Bloom: AP, Difficulty: Moderate, Time: 15-20, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
*EXERCISE 11.25 (20–25 minutes)

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(a)</strong> Revenues</td>
<td>$200,000</td>
<td>$200,000</td>
</tr>
<tr>
<td>Operating expenses (excluding depreciation)</td>
<td>130,000</td>
<td>130,000</td>
</tr>
<tr>
<td>Depreciation [($27,000 – $6,000) ÷ 7]]</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Income before income taxes</td>
<td>$67,000</td>
<td>$67,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(b)</strong> Revenues</td>
<td>$200,000</td>
<td>$200,000</td>
</tr>
<tr>
<td>Operating expenses (excluding depreciation)</td>
<td>130,000</td>
<td>130,000</td>
</tr>
<tr>
<td>Depreciation*</td>
<td>5,400</td>
<td>8,640</td>
</tr>
<tr>
<td>Taxable income</td>
<td>$64,600</td>
<td>$61,360</td>
</tr>
</tbody>
</table>

*2020 $27,000 X .20 = $5,400
2021 $27,000 X .32 = $8,640

(c) Book purposes ($27,000 – $6,000) $21,000
Tax purposes (entire cost of asset) $27,000

(d) Differences will occur for the following reasons:
1. different depreciation methods.
2. half-year convention used for tax purposes.
3. estimated useful life and tax life different.
4. tax system ignores salvage value.

*EXERCISE 11.26 (15–20 minutes)

(a) (1) ($31,000 – $1,000) X 1/10 X 10/12 = $2,500 depreciation expense for book purposes.

(2) $31,000 X 1/5 X 1/2 = $3,100 depreciation for tax purposes.

(b) (1) $31,000 X .20* X 10/12 = $5,167 depreciation expense for book purposes. *(1 / 10 years X 2 = D.D.B. rate)

(2) $31,000 X .40 X 1/2 = $6,200 depreciation expense for tax purposes.
EXERCISE 11.26 (Continued)

(c) Differences will occur for the following reasons:
   1. half-year convention used for tax purposes.
   2. estimated useful life and tax life different.
   3. tax system ignores salvage value.

SOLUTIONS TO PROBLEMS

PROBLEM 11.1

(a) 1. Depreciation Base Computation:

   Purchase price ......................... $85,000
   Less: Purchase discount (2%) .......  1,700
   Plus: Freight-in...........................  800
   Installation .............................  3,800
                      87,900
   Less: Salvage value .................  1,500
   Depreciation base ....................... $86,400

   2020—Straight line: ($86,400 ÷ 8 years) X 8/12 year = $7,200

   2. Sum-of-the-years’-digits for 2021

<table>
<thead>
<tr>
<th>Machine Year</th>
<th>Total Depreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 8/36 X $86,400</td>
<td>$19,200</td>
</tr>
<tr>
<td>2 7/36 X $86,400</td>
<td>$16,800</td>
</tr>
</tbody>
</table>

   * $19,200 X 8/12 (May – December) = $12,800
   ** $19,200 X 4/12 (January – April) = $ 6,400
   *** $16,800 X 8/12 (May – December) = $11,200

   3. Double-declining-balance for 2020
   
   \[
   \left[87,900 \times 0.25 \times 8/12 \text{ (May – December)}\right] = \$14,650
   \]

   * (1.0 ÷ 8) X 2 = 25%

(b) An activity method should be recommended.

LO: 6, Bloom: AP, Difficulty: Moderate, Time: 15-20, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
PROBLEM 11.2

<table>
<thead>
<tr>
<th>Depreciation Expense</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Straight-line:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>($89,000 – $5,000) ÷ 7 = $12,000/yr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020: $12,000 X 7/12</td>
<td>$7,000</td>
<td></td>
</tr>
<tr>
<td>2021: 12/12 x $12,000</td>
<td>$12,000</td>
<td></td>
</tr>
<tr>
<td>(b) Units-of-output:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>($89,000 – $5,000) ÷ 525,000 units = $.16/unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020: $.16 X 55,000</td>
<td>8,800</td>
<td></td>
</tr>
<tr>
<td>2021: $.16 X 48,000</td>
<td>7,680</td>
<td></td>
</tr>
<tr>
<td>(c) Working hours:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>($89,000 – $5,000) ÷ 42,000 hrs. = $2.00/hr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020: $2.00 X 6,000</td>
<td>12,000</td>
<td></td>
</tr>
<tr>
<td>2021: $2.00 X 5,500</td>
<td>11,000</td>
<td></td>
</tr>
<tr>
<td>(d) Sum-of-the-years’-digits:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1 + 2 + 3 + 4 + 5 + 6 + 7) = 28 or ( \frac{n(n + 1)}{2} = \frac{7(7 + 1)}{2} = 28^* )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020: 7/28^* X $84,000 X 7/12</td>
<td>12,250</td>
<td></td>
</tr>
<tr>
<td>2021: 7/28^* X $84,000 X 5/12 = 6/28^* X $84,000 X 7/12 = 10,500</td>
<td>$8,750</td>
<td></td>
</tr>
<tr>
<td>$19,250</td>
<td>19,250</td>
<td></td>
</tr>
<tr>
<td>(e) Declining-balance:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate = (1.0 ÷ 7) X 2 = 28.57%**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020: 7/12 X .2857** X $89,000</td>
<td>$14,833</td>
<td></td>
</tr>
<tr>
<td>2021: .2857** X ($89,000 – $14,833) = 21,190</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PROBLEM 11.3

(a) Depreciation Expense ........................................... 3,900
Accumulated Depreciation—Machinery (A)
(5/55 X [$46,000 – $3,100]) ......................... 3,900

Accumulated Depreciation—Machinery (A) .......... 35,100
($31,200 + $3,900)
Machinery (A) ($46,000 – $13,000) ............... 33,000
Gain on Disposal of Machinery ......................... 2,100*
*([$31,200 + $3,900] – $33,000 = $2,100) .......

(b) Depreciation Expense ........................................... 6,720
Accumulated Depreciation—Machinery (B)
([51,000 – $3,000] ÷ 15,000) X 2,100 ........... 6,720

(c) Depreciation Expense ........................................... 6,000
Accumulated Depreciation—Machinery (C)
([80,000 – $15,000 – $5,000] ÷ 10) ............... 6,000

(d) Machinery (E) .................................................. 28,000
Retained Earnings ............................................. 28,000
Retained Earnings ($28,000 X .20*) ............... 5,600
Accumulated Depreciation—Machinery (E) .... 5,600

*D.D.B. rate = (1.0 ÷ 10) X 2 = 20%

LO: 1, Bloom: AP, Difficulty: Moderate, Time: 40-50, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
### Problem 11.4

#### Net Income Overstated (Understated)

<table>
<thead>
<tr>
<th></th>
<th>Per Company Books</th>
<th>As Adjusted</th>
<th>Net</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trucks dr. (cr.)</td>
<td>Acc. Dep. Trucks dr. (cr.)</td>
<td>Retained Earnings dr. (cr.)</td>
</tr>
<tr>
<td>Balance</td>
<td>$ 94,000</td>
<td>$(30,200)</td>
<td>$94,000</td>
</tr>
<tr>
<td>Purchase Truck #5</td>
<td>22,000</td>
<td></td>
<td>40,000</td>
</tr>
<tr>
<td>Trade Truck #3</td>
<td></td>
<td>(30,000)</td>
<td>9,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td></td>
<td>(21,000)</td>
<td>$21,000</td>
</tr>
<tr>
<td>Balances</td>
<td>116,000</td>
<td>(51,200)</td>
<td>21,000</td>
</tr>
<tr>
<td>Sale of Truck #1</td>
<td>(3,500)</td>
<td>(18,000)</td>
<td>14,400</td>
</tr>
<tr>
<td>Depreciation</td>
<td></td>
<td>(22,500)</td>
<td>22,500</td>
</tr>
<tr>
<td>Balances</td>
<td>112,500</td>
<td>(73,700)</td>
<td>43,500</td>
</tr>
<tr>
<td>Purchase of Truck #6</td>
<td>42,000</td>
<td></td>
<td>42,000</td>
</tr>
<tr>
<td>Disposal of Truck #4</td>
<td>(2,500)</td>
<td>(700)</td>
<td>(24,000)</td>
</tr>
<tr>
<td>Depreciation</td>
<td></td>
<td>(25,050)</td>
<td>25,050</td>
</tr>
<tr>
<td>Balances</td>
<td>152,000</td>
<td>(98,750)</td>
<td>67,850</td>
</tr>
<tr>
<td>Depreciation</td>
<td></td>
<td>(30,400)</td>
<td>30,400</td>
</tr>
<tr>
<td>Balances</td>
<td>$152,000</td>
<td>$(129,150)</td>
<td>$82,250</td>
</tr>
<tr>
<td>Income effect</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Implied fair value of Truck #3 ($40,000 - $30,000/5 X 1/2 yrs.) = $18,000**

2. **Book value of Truck #3 [$30,000 = ($30,000/5 X 1.5 yrs.) = $30,000 - $9,000 (21,000)]**

   - **Loss on Trade:** $ 3,000

   - **Truck #1:** $18,000/5 = $3,600
   - **Truck #2:** $22,000/5 = 4,400
   - **Truck #3:** $30,000/5 = 3,000
   - **Truck #4:** $24,000/5 = 4,800
   - **Truck #5:** $40,000/5 = 4,000

   **Total:** $19,800
<table>
<thead>
<tr>
<th>(a)</th>
<th>1/1/18</th>
<th>7/1/18</th>
<th>12/31/18</th>
<th>11/19</th>
<th>12/31/19</th>
<th>7/1/20</th>
<th>12/31/20</th>
<th>12/31/21</th>
<th>12/31/21</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PROBLEM 11.4 (Continued)

3 Book value of Truck #1 [$18,000 – ($18,000/5 X 4 yrs.)] =
   ($18,000 – $14,400)................................................ = $3,600
Cash received on sale ............................................................... = 3,500
Loss on sale ........................................................................ $ 100

Truck #2: $22,000/5 = $ 4,400
Truck #4: $24,000/5 = 4,800
Truck #5: $40,000/5 = 8,000
Total $17,200

5 Book value of Truck #4 [$24,000 – ($24,000/5 X 3 yrs.)] =
   ($24,000 - $14,400)................................................ = $9,600
Cash received ($700 + $2,500)................................................... = 3,200
Loss on disposal .................................................................... $6,400

6 Truck #2: $22,000/5 X 1/2 = $ 2,200
Truck #4: $24,000/5 X 1/2 = 2,400
Truck #5: $40,000/5 = 8,000
Truck #6: $42,000/5 X 1/2 = 4,200
Total $16,800

7 Truck #2: (fully dep.) = $ 0
Truck #5: $40,000/5 = 8,000
Truck #6: $42,000/5 = 8,400
Total $16,400

(b) Compound journal entry December 31, 2021:

Accumulated Depreciation—Trucks ......................... 66,550
   Trucks ................................................................................. 48,000
   Retained Earnings .................................................................. 4,550
   Depreciation Expense ....................................................... 14,000
PROBLEM 11.4 (Continued)

Summary of Adjustments:

<table>
<thead>
<tr>
<th></th>
<th>Per Books</th>
<th>As Adjusted</th>
<th>Adjustment Dr. or (Cr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trucks</td>
<td>$152,000</td>
<td>$104,000</td>
<td>$(48,000)</td>
</tr>
<tr>
<td>Accumulated Depreciation</td>
<td>$129,150</td>
<td>$ 62,600</td>
<td>$ 66,550</td>
</tr>
<tr>
<td>Prior Years’ Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retained Earnings, 2018</td>
<td>$ 21,000</td>
<td>$ 22,800</td>
<td>$ 1,800</td>
</tr>
<tr>
<td>Retained Earnings, 2019</td>
<td>22,500</td>
<td>17,300</td>
<td>(5,200)</td>
</tr>
<tr>
<td>Retained Earnings, 2020</td>
<td>24,350</td>
<td>23,200</td>
<td>(1,150)</td>
</tr>
<tr>
<td>Totals</td>
<td>$ 67,850</td>
<td>$ 63,300</td>
<td>$(4,550)</td>
</tr>
<tr>
<td>Depreciation Expense, 2021</td>
<td>$ 30,400</td>
<td>$ 16,400</td>
<td>$(14,000)</td>
</tr>
</tbody>
</table>

LO: 1, Bloom: AP, Difficulty: Complex, Time: 45-60, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
PROBLEM 11.5

(a) Estimated depletion:

<table>
<thead>
<tr>
<th>Depletion Base</th>
<th>Estimated Yield</th>
<th>Estimated Depletion</th>
</tr>
</thead>
<tbody>
<tr>
<td>$870,000*</td>
<td>120,000 tons</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Per Ton</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1st &amp; 11th Yrs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Each of Yrs. 2-10 Incl.</td>
</tr>
<tr>
<td>$7.25</td>
<td>$43,500**</td>
<td>$87,000***</td>
</tr>
</tbody>
</table>

*(900,000 – $30,000)
**(7.25 X 6,000)
***($7.25 X 12,000)

Estimated depreciation:

<table>
<thead>
<tr>
<th>Asset</th>
<th>Cost</th>
<th>Per ton Mined</th>
<th>1st Yr.</th>
<th>2–5 Yrs.</th>
<th>6th Yr.</th>
<th>7–10 Yrs.</th>
<th>11th Yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td>$36,000</td>
<td>$.30*</td>
<td>$1,800</td>
<td>$3,600</td>
<td>$3,600</td>
<td>$3,600</td>
<td>$1,800</td>
</tr>
<tr>
<td>Machinery (1/2)</td>
<td>30,000</td>
<td>.25**</td>
<td>1,500</td>
<td>3,000</td>
<td>3,000</td>
<td>3,000</td>
<td>1,500</td>
</tr>
<tr>
<td>Machinery (1/2)</td>
<td>30,000</td>
<td>.50***</td>
<td>3,000</td>
<td>6,000</td>
<td>3,000</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*$36,000 ÷ 120,000 = $.30
**$30,000 ÷ 120,000 = .25
***($30,000 ÷ [120,000 ÷ 2]) = .50

(b) Depletion: $7.25 X 5,000 tons = $36,250

Depreciation:
- Building $.30 X 5,000 = $1,500
- Machinery $.25 X 5,000 = 1,250
- Machinery $.50 X 5,000 = 2,500
Total depreciation $5,250
PROBLEM 11.6

(a) Original cost $\$550 \times 3,000 = \$1,650,000$
Deduct residual value of land $\$200 \times 3,000 = \$600,000$
Cost of logging road 150,000
Depletion base $\frac{\$1,200,000}{500,000 \text{ ft.}} = \$2.40 \text{ depletion per board foot}$

(b) Inventory .............................................. 240,000
Timber .................................................. 240,000

Depletion, 2020: \(0.20 \times 500,000 \text{ bd. ft.} = 100,000 \text{ bd. ft.} \)
\[100,000 \text{ bd. ft.} \times \$2.40 = \$240,000\]

(c) Loss of timber
\[\$1,050,000 - (\$1,050,000 \times 0.20)\] .......... $840,000
Cost of salvaging timber .................. 700,000
Less: Recovery $(\$3 \times 400,000 \text{ bd. ft.})$ .......... $1,200,000$ 340,000
Loss of land value ......... 600,000
Loss of logging roads
\[\$150,000 - (0.20 \times \$150,000)\] ............... 120,000
Logging equipment .......... 300,000
Unusual loss due to the eruption
of Mt. Leno ......................... $1,360,000

Instructors should note the changing depletion base in this problem.

### 2020

**Computation of depletion base for 2020**

**Timber**

<table>
<thead>
<tr>
<th>Cost per acre</th>
<th>$1,700</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land cost</td>
<td>(800)</td>
</tr>
<tr>
<td>Timber cost</td>
<td>$ 900</td>
</tr>
<tr>
<td>10,000 acres</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$9,000,000</td>
</tr>
<tr>
<td>Road cost</td>
<td>250,000</td>
</tr>
<tr>
<td>Total depletion base</td>
<td>$9,250,000*</td>
</tr>
</tbody>
</table>

**Estimated depletion for 2020**

\[ 9,250,000^* \times 0.08 \left(\frac{540,000}{6,750,000}\right) \]

**Depletion expense for 2020**

\[ \$740,000 \]

**Depreciation of removable equipment**

<table>
<thead>
<tr>
<th>Cost</th>
<th>$225,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salvage value</td>
<td>(9,000)</td>
</tr>
<tr>
<td>Depreciable base</td>
<td>$216,000</td>
</tr>
</tbody>
</table>

**Annual depreciation using SL ($216,000/15)**

\[ \$14,400 \]

**Depreciation expense for 2020**

\[ \$10,800 \left(\frac{9}{12} \times \$14,400\right) \]

### 2021

**Depletion base for 2021**

- **Base for 2020** $9,250,000
- **Less: Depletion for 2020** 740,000
- **Plus: Seedling Planting Costs** 120,000

**Depletion base for 2021** $8,630,000

**Depletion base for 2021** $8,630,000

\[ 8,630,000 \times 0.12 \left(\frac{774,000}{6,450,000}\right) \]

**Depletion for 2021** $1,035,600

**Depreciation expense for 2021** $14,400
PROBLEM 11.7 (Continued)

2022
Depletion Base for 2022
  Base for 2021          $ 8,630,000
  Less: Depletion for 2021 1,035,600
  Plus: Seedling Planting Costs  150,000
Depletion Base for 2022          $ 7,744,400

Depletion Base for 2022          $ 7,744,400
Times X .10 (650,000/6,500,000)
Depletion for 2022          $  774,440

Depreciation Expense for 2022          $   14,400

Note to instructor: Results are the same if using per-unit costs rounded to four decimal points.

(a) The amounts to be recorded on the books of Darby Sporting Goods Inc. as of December 31, 2020, for each of the properties acquired from Encino Athletic Equipment Company are calculated as follows:

### Cost Allocations to Acquired Properties

<table>
<thead>
<tr>
<th>Appraisal Value</th>
<th>Remaining Purchase Price</th>
<th>Renovations</th>
<th>Capitalized Interest</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$290,000</td>
<td>$290,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$77,000</td>
<td>$100,000</td>
<td>$21,000</td>
<td></td>
<td>198,000</td>
</tr>
<tr>
<td>$33,000</td>
<td>$33,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>$290,000</td>
<td>$110,000</td>
<td>$21,000</td>
<td>521,000</td>
</tr>
</tbody>
</table>

### Supporting Calculations

1. Balance of purchase price to be allocated.

Total purchase price ............................ $400,000
Less: Land appraisal ................................ 290,000
Balance to be allocated ................................ $110,000

<table>
<thead>
<tr>
<th>Appraisal Values</th>
<th>Ratios</th>
<th>Allocated Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings</td>
<td>105/150 = .70</td>
<td>$77,000</td>
</tr>
<tr>
<td>Machinery</td>
<td>45/150 = .30</td>
<td>$33,000</td>
</tr>
<tr>
<td>Totals</td>
<td>1.00</td>
<td>$110,000</td>
</tr>
</tbody>
</table>
PROBLEM 11.8 (Continued)

2. Capitalizable interest.

<table>
<thead>
<tr>
<th>Date</th>
<th>Amount</th>
<th>Capitalization Period</th>
<th>Weighted-Average Accumulated Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1</td>
<td>$50,000</td>
<td>12/12</td>
<td>$50,000</td>
</tr>
<tr>
<td>4/1</td>
<td>120,000</td>
<td>9/12</td>
<td>90,000</td>
</tr>
<tr>
<td>10/1</td>
<td>140,000</td>
<td>3/12</td>
<td>35,000</td>
</tr>
<tr>
<td>12/31</td>
<td>190,000</td>
<td>0/12</td>
<td>0/12</td>
</tr>
<tr>
<td></td>
<td>$500,000</td>
<td></td>
<td>$175,000</td>
</tr>
</tbody>
</table>

Weighted-Average Accumulated Expenditures  
$175,000 \times .12 = $21,000

Note to instructor: If the interest is allocated between the building and the machinery, $14,700 ($21,000 \times 105/150) would be allocated to the building and $6,300 ($21,000 \times 45/150) would be allocated to the machinery.

(b) Darby Sporting Goods Inc.’s 2021 depreciation expense, for book purposes, for each of the properties acquired from Encino Athletic Equipment Company is as follows:

1. Land: No depreciation.

2. Building: Depreciation rate  
   = 1.50 \times 1/15 = .10  
   2021 depreciation expense  
   = Cost \times Rate \times 1/2 year  
   = $198,000 \times .10 \times 1/2  
   = $9,900

3. Machinery: Depreciation rate  
   = 2.00 \times 1/5 = .40  
   2021 depreciation expense  
   = Cost \times Rate \times 1/2  
   = $33,000 \times .40 \times 1/2  
   = $6,600
PROBLEM 11.8 (Continued)

(c) Arguments for the capitalization of interest costs include the following:
1. Diversity of practices among companies and industries called for standardization in practices.
2. Total interest costs should be allocated to enterprise assets and operations, just as material, labor, and overhead costs are allocated. That is, under the concept of historical costs, all costs incurred to bring an asset to the condition and location necessary for its intended use should be reflected as a cost of that asset.

Arguments against the capitalization of interest include the following:
1. Interest capitalized in a period would tend to be offset by amortization of interest capitalized in prior periods.
2. Interest cost is a cost of financing, not of construction.
PROBLEM 11.9

(a) Carrying value of asset: $10,000,000 – $2,500,000\(^*\) = $7,500,000.

\(^*\)($10,000,000 \div 8) \times 2

Future cash flows ($6,300,000) < Carrying value ($7,500,000)

Impairment entry:
Loss on Impairment ........................................... 1,900,000\(^*\)
Accumulated Depreciation—Equipment ..... 1,900,000

\(^*\)$7,500,000 – $5,600,000

(b) Depreciation Expense................................. 1,400,000\(^\text{**}\)
Accumulated Depreciation—Equipment ..... 1,400,000

\(^\text{**}\)($5,600,000 \div 4)

(c) No depreciation is recorded on impaired assets held for disposal. Recovery of impairment losses are recorded.

12/31/20 Loss on Impairment................................. 1,900,000
Accumulated Depreciation—
Equipment .................................................... 1,900,000

12/31/21 Accumulated Depreciation—
Equipment ................................................... 300,000
Recovery of Loss from Impairment
($5,900,000 – $5,600,000) .......... 300,000

PROBLEM 11.10

(1) $80,000  Allocated in proportion to appraised values
     (1/10 \times $800,000) or \left[\frac{$90,000}{$90,000 + $810,000}\times $800,000\right].

(2) $720,000  Allocated in proportion to appraised values
     (9/10 \times $800,000) or \left[\frac{$810,000}{$90,000 + $810,000} \times $800,000\right].

(3) Fifty years  Cost less salvage ($720,000 – $40,000) divided by
     annual depreciation ($13,600).

(4) $13,600  Same as prior year since it is straight-line depreciation.

(5) $91,000  [Number of shares (2,500) times fair value ($30)]
     plus demolition cost of existing building ($16,000).

(6) None  No depreciation before use.

(7) $40,000  Fair value.

(8) $6,000  Cost ($40,000) times percentage (1/10 \times 1.50).

(9) $5,100  Cost ($40,000) less prior year’s depreciation ($6,000)
     equals $34,000. Multiply $34,000 times (1/10 \times 1.50).

(10) $168,000^d  Total cost ($182,900) less repairs and maintenance
     ($14,900).

(11) $36,000  Cost less salvage ($168,000 – $6,000) times 8/36^*.

(12) $10,500  Cost less salvage ($168,000 – $6,000) times 7/36 times
     one-third (4/12) of a year.

     ^* \left(1 + 2 + 3 + 4 + 5 + 6 + 7 + 8\right) or \left[8 \times (8+1) / 2\right]
PROBLEM 11.10 (Continued)

(13) $52,000  
Annual payment ($6,000) times present value of annuity due at 8% for 11 years (7.710) plus down payment ($5,740). This can be found in an annuity due table since the payments are at the beginning of each year. Alternatively, to convert from an ordinary annuity to an annuity due factor, proceed as follows: For eleven payments use the present value of an ordinary annuity for 11 years (7.139) times 1.08. Multiply this factor (7.710) times $6,000 annual payment to obtain $46,260, and then add the $5,740 down payment.

(14) $2,600  
Cost ($52,000) divided by estimated life (20 years).

LO: 1, Bloom: AP, Difficulty: Complex, Time: 45-60, AACSB: Analytic, AICPA BB: None, AICPA FC: Measurement, Reporting, AICPA PC: None
PROBLEM 11.11

(a) (1) Straight-line Method: \[ \frac{\$90,000 - \$6,000}{5 \text{ years}} = \$16,800 \text{ a year for all 5 years} \]

(2) Activity Method: \[ \frac{\$90,000 - \$6,000}{100,000 \text{ hours}} = \$0.84 \text{ per hour} \]

<table>
<thead>
<tr>
<th>Year</th>
<th>Hours</th>
<th>Hours X $0.84</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>20,000</td>
<td>20,000 X $0.84</td>
<td>$16,800</td>
</tr>
<tr>
<td>2019</td>
<td>25,000</td>
<td>25,000 X $0.84</td>
<td>21,000</td>
</tr>
<tr>
<td>2020</td>
<td>15,000</td>
<td>15,000 X $0.84</td>
<td>12,600</td>
</tr>
<tr>
<td>2021</td>
<td>30,000</td>
<td>30,000 X $0.84</td>
<td>25,200</td>
</tr>
<tr>
<td>2022</td>
<td>10,000</td>
<td>10,000 X $0.84</td>
<td>8,400</td>
</tr>
</tbody>
</table>

(3) Sum-of-the-Years’-Digits: \((5 + 4 + 3 + 2 + 1) = 15 \text{ or } [5 \times (5 + 1)/2]\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Years</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>5/15</td>
<td>$28,000</td>
</tr>
<tr>
<td>2019</td>
<td>4/15</td>
<td>22,400</td>
</tr>
<tr>
<td>2020</td>
<td>3/15</td>
<td>16,800</td>
</tr>
<tr>
<td>2021</td>
<td>2/15</td>
<td>11,200</td>
</tr>
<tr>
<td>2022</td>
<td>1/15</td>
<td>5,600</td>
</tr>
</tbody>
</table>

(4) Double-Declining-Balance Method: Each year is 20% \((100\% \div 5)\) of its total life. Double the rate to 40%.

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>.40</td>
<td>$36,000</td>
</tr>
<tr>
<td>2019</td>
<td>.40</td>
<td>21,600</td>
</tr>
<tr>
<td>2020</td>
<td>.40</td>
<td>12,960</td>
</tr>
<tr>
<td>2021</td>
<td>.40</td>
<td>7,776</td>
</tr>
<tr>
<td>2022</td>
<td>Enough to reduce to salvage = 5,664*((84,000 - 78,336))</td>
<td></td>
</tr>
</tbody>
</table>

(b) (1) Straight-line Method:

<table>
<thead>
<tr>
<th>Year</th>
<th>Days</th>
<th>Days X $16,800 = Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>9/12</td>
<td>$12,600</td>
</tr>
<tr>
<td>2019</td>
<td>Full year</td>
<td>16,800</td>
</tr>
<tr>
<td>2020</td>
<td>Full year</td>
<td>16,800</td>
</tr>
<tr>
<td>2021</td>
<td>Full year</td>
<td>16,800</td>
</tr>
<tr>
<td>2022</td>
<td>Full year</td>
<td>16,800</td>
</tr>
<tr>
<td>2023</td>
<td>Full year X 3/12 year</td>
<td>4,200</td>
</tr>
</tbody>
</table>
PROBLEM 11.11 (Continued)

(2) Sum-of-the-Years’-Digits Method:

\[
\begin{align*}
2018 & \quad (5/15 \times \$84,000) \times 9/12 = \quad \$21,000 \\
2019 & \quad (5/15 \times \$84,000) \times 3/12 = \quad \$7,000 \\
 & \quad (4/15 \times \$84,000) \times 9/12 = \quad 16,800 \\
2020 & \quad (4/15 \times \$84,000) \times 3/12 = \quad 5,600 \\
 & \quad (3/15 \times \$84,000) \times 9/12 = \quad 12,600 \\
2021 & \quad (3/15 \times \$84,000) \times 3/12 = \quad 4,200 \\
 & \quad (2/15 \times \$84,000) \times 9/12 = \quad 8,400 \\
2022 & \quad (2/15 \times \$84,000) \times 3/12 = \quad 2,800 \\
 & \quad (1/15 \times \$84,000) \times 9/12 = \quad 4,200 \\
2023 & \quad (1/15 \times \$84,000) \times 3/12 = \quad 1,400 \\
\end{align*}
\]

*Depreciable Base = ($90,000 – $6,000)

(3) Double-Declining Balance Method:

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost</th>
<th>Accum. Depr. at beg. of year</th>
<th>Book Value at beg. of year</th>
<th>Depr. Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>$90,000</td>
<td>—</td>
<td>$90,000</td>
<td>$27,000 (1)</td>
</tr>
<tr>
<td>2019</td>
<td>90,000</td>
<td>$27,000</td>
<td>63,000</td>
<td>25,200 (2)</td>
</tr>
<tr>
<td>2020</td>
<td>90,000</td>
<td>52,200</td>
<td>37,800</td>
<td>15,120 (3)</td>
</tr>
<tr>
<td>2021</td>
<td>90,000</td>
<td>67,320</td>
<td>22,680</td>
<td>9,072 (4)</td>
</tr>
<tr>
<td>2022</td>
<td>90,000</td>
<td>76,392</td>
<td>13,608</td>
<td>5,443 (5)</td>
</tr>
<tr>
<td>2023</td>
<td>90,000</td>
<td>81,835</td>
<td>8,165</td>
<td>2,165 (6)</td>
</tr>
</tbody>
</table>

(1) $90,000 \times 0.40 \times 9/12
(2) ($90,000 – $27,000) \times 0.40
(3) ($90,000 – $52,200) \times 0.40
(4) ($90,000 – $67,320) \times 0.40
(5) ($90,000 – $76,392) \times 0.40
(6) to reduce to $6,000 salvage value ($8,165 - $6,000).

LO: 1, Bloom: AP, Difficulty: Moderate, Time: 30-35, AACSB: Analytic, AICPA BB: None, AICPA FC: Reporting, AICPA PC: None
(a) The straight-line method would provide the highest total net income for financial reporting over the three years, as it reports the lowest total depreciation expense. These computations are provided below.

Computations of depreciation expense and accumulated depreciation under various assumptions:

(1) Straight-line:

\[
\text{Depreciation Expense} = \frac{\$1,260,000 - \$60,000}{5 \text{ years}} = \$240,000
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>Depreciation Expense</th>
<th>Accumulated Depreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>$240,000*</td>
<td>$ 240,000</td>
</tr>
<tr>
<td>2020</td>
<td>240,000*</td>
<td>$ 480,000</td>
</tr>
<tr>
<td>2021</td>
<td>240,000*</td>
<td>$ 720,000</td>
</tr>
<tr>
<td></td>
<td>$720,000</td>
<td></td>
</tr>
</tbody>
</table>

(2) Double-declining-balance:

\[
\text{Depreciation Expense} = (0.40 \times \text{Book Value})
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>Depreciation Expense</th>
<th>Accumulated Depreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>$504,000 (0.40 \times $1,260,000)</td>
<td>$ 504,000</td>
</tr>
<tr>
<td>2020</td>
<td>302,400 (0.40 \times $756,000)</td>
<td>$ 806,400</td>
</tr>
<tr>
<td>2021</td>
<td>181,440 (0.40 \times $453,600)</td>
<td>$ 987,840</td>
</tr>
<tr>
<td></td>
<td>$987,840</td>
<td></td>
</tr>
</tbody>
</table>

*[(1.0 ÷ 5) X 2] = 40%*

(3) Sum-of-the-years’-digits:

\[
\text{Depreciation Expense} = (\text{Year} / \text{Sum of Years}) \times \text{Book Value}
\]

<table>
<thead>
<tr>
<th>Year</th>
<th>Depreciation Expense</th>
<th>Accumulated Depreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>$400,000 (5/15 \times $1,200,000)</td>
<td>$ 400,000</td>
</tr>
<tr>
<td>2020</td>
<td>320,000 (4/15 \times $1,200,000)</td>
<td>$ 720,000</td>
</tr>
<tr>
<td>2021</td>
<td>240,000 (3/15 \times $1,200,000)</td>
<td>$ 960,000</td>
</tr>
<tr>
<td></td>
<td>$960,000</td>
<td></td>
</tr>
</tbody>
</table>

**[5(5 + 1) / 2] = 15**
PROBLEM 11.12 (Continued)

(4) Units-of-output:

<table>
<thead>
<tr>
<th>Year</th>
<th>Depreciation Expense</th>
<th>Accumulated Depreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>$288,000 (24*** X 12,000)</td>
<td>$288,000</td>
</tr>
<tr>
<td>2020</td>
<td>264,000 (24 X 11,000)</td>
<td>552,000</td>
</tr>
<tr>
<td>2021</td>
<td>240,000 (24 X 10,000)</td>
<td>792,000</td>
</tr>
<tr>
<td></td>
<td>$792,000</td>
<td></td>
</tr>
</tbody>
</table>

*** $1,200,000 ÷ 50,000 (total units) = $24 per unit

(b) General MACRS method:

<table>
<thead>
<tr>
<th>Total Cost</th>
<th>MACRS Rates (%)****</th>
<th>Annual Depreciation</th>
<th>Accumulated Depreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019 $1,260,000</td>
<td>14.29</td>
<td>$180,054</td>
<td>$180,054</td>
</tr>
<tr>
<td>2020 1,260,000</td>
<td>24.49</td>
<td>308,574</td>
<td>488,628</td>
</tr>
<tr>
<td>2021 1,260,000</td>
<td>17.49</td>
<td>220,374</td>
<td>709,002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$709,002</td>
<td></td>
</tr>
</tbody>
</table>

**** Taken from the MACRS rates schedule.

Optional straight-line method:

<table>
<thead>
<tr>
<th>Total Cost</th>
<th>Depreciation Rate</th>
<th>Annual Depreciation</th>
<th>Accumulated Depreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019 $1,260,000</td>
<td>(1/7 X 1/2)</td>
<td>$90,000</td>
<td>$90,000</td>
</tr>
<tr>
<td>2020 1,260,000</td>
<td>1/7</td>
<td>180,000</td>
<td>270,000</td>
</tr>
<tr>
<td>2021 1,260,000</td>
<td>1/7</td>
<td>180,000</td>
<td>450,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$450,000</td>
<td></td>
</tr>
</tbody>
</table>

The general MACRS method would have higher depreciation expense ($709,002) than that of the optional straight-line method ($450,000) for the three-year period ending December 31, 2021. Therefore, the general MACRS method would minimize net income for income tax purposes for this period.