LONG-TERM ASSETS/INTANGIBLES

I. Long-term Assets:
   A. Long-term assets are those assets acquired for their service potential to the firm over more than one accounting period. They consist of:
      1. **Tangible** property, plant and equipment
      2. **Intangible assets** (those lacking in physical substance that serve more than one period such as patents, franchise agreements, copyrights etc.) and
      3. **Natural resources**

Long-term assets with limited service lives (all except land) are depreciated in order to allocate the cost and service potential of the assets to the periods served by the assets.

B. The valuation of Long-term assets involves questions about what items should be **capitalized** (recorded as an asset and then depreciated) and what items should be **expensed** (charged against revenues in the current period).

1. **Capitalized Costs:** (Capital expenditures) These costs are added to the cost of assets as opposed to being expensed in the current period. The following items are examples of costs that are capitalized:
   a. **Acquisition costs** (the cash price or equivalent) plus all costs that are normal and necessary to prepare the asset for productive use. It is important to note that costs resulting from avoidable mistakes or errors are not included in the acquisition costs but are expensed in the period in which they are incurred. Examples of costs that should be included in the depreciable cost of the asset are:
      i. Transportation
      ii. Set up and installation charges
      iii. Test runs
      iv. Normal repairs as part of the installation process
      v. Any improvement/betterment that increases the life or productivity of the asset
      vi. **Lump sum acquisitions** of several assets require that the cost of the assets be allocated to the individual assets in accordance with the relative FMV of the individual assets.

      All costs that are normal and necessary to get the asset set up for its intended use. **Exception:** Any costs associated with SEC registration or Stock issuance costs are expensed as incurred.

b. **Improvements** to the asset that:
   i. **extend the life of the asset or**
   ii. **increase the assets productivity** (this would include the legal expense of successfully defending a patent against infringement).

c. **Self-constructed assets** include all directly traceable expenses such as direct material, direct labor and overhead items over and above normal overhead including interest incurred during the construction period.

   i. If there is specific new borrowing in connection with the asset being constructed, that rate is used to capitalize the interest costs.
   ii. no specific new borrowings are incurred, or if expenditures on new construction exceed specific new borrowings, the specific rate is used to the extent it covers new construction liabilities and amounts owed over and above the specific amounts borrowed are capitalized at the weighted average rate applicable to other borrowings SFAS-34). To illustrate this process, assume the following facts:

   - Construction loan for self-constructed building (15% interest) ............ $ 1,000,000
   - Other borrowings (12% interest) .............................................. 3,000,000

   Note: The issue with lump sum acquisitions is to allocate the total cost of the assets purchased as a group to the individual assets. The allocation process takes the full cost of the group of assets and allocates to individual assets based on the relative fair market value of the individual assets. This process will allocate the group cost to the individual assets in such a way that each individual asset will be allocated a portion of the group cost in such a way that each asset will end up with a valuation that sums to the total cost of the group and simultaneously allocates each asset its relative Fair Market Value proportion of the total group cost. Consider the following example:

   Assume that a truck, land and building are acquired for $200,000 cash. The fair market values of the individual assets are $10,000, $190,000 and $150,000 respectively. The following table illustrates the proper method of allocation of cost to individual assets in a lump sum purchase:

<table>
<thead>
<tr>
<th>Relative FMV</th>
<th>Allocated Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMV</td>
<td>FMV</td>
</tr>
<tr>
<td></td>
<td>Cost</td>
</tr>
<tr>
<td>Truck</td>
<td>$ 10,000</td>
</tr>
<tr>
<td>Land</td>
<td>190,000</td>
</tr>
<tr>
<td>Building</td>
<td>150,000</td>
</tr>
<tr>
<td>Total</td>
<td>$350,000</td>
</tr>
</tbody>
</table>
• Total long-term debt of firm.......................................... $ 4,000,000

--During the year, the average amount owed (borrowed) on the new construction is $2,500,000. The amount of interest to be capitalized on the new construction would be computed as follows:

Specific amount borrowed for new construction ($1,000,000 @ 15%)............... $150,000
Excess borrowed for new construction over specific amount ($1,500,000 @ 12%)...  180,000
Total capitalized interest cost on self-constructed asset................... $330,000

--Journal entries to record the interest expense would be:

Interest Expense (plug or $510,000 - $330,000)........................................ 180,000
Building under construction (see computation above)............................... 330,000
Interest Payable ($1,000,000 @ 15% + $3,000,000 @ .12%)........................ 510,000

d. Land is a special case. The cost of land includes the purchase price, legal fees, commissions, title insurance and all other costs normal and necessary to the acquisition process. Land improvements with unlimited life are also capitalized (added to the cost of the land). Land improvements with limited life are set up in a separate improvements account and depreciated over their useful life.

e. Natural Resources: Natural resources (chemicals, minerals etc.) are treated like any other wasting asset (there cost and must be allocated to the periods benefited based on some estimate of their service life).

II. Depreciation (depletion, amortization) is the process of allocating the historical cost of assets (both tangible and intangible) with limited lives over their estimated productive (accounting) lives. In estimating the productive life of an asset, the accountant must consider both physical and functional factors that decrease the utility of the asset over time. Depreciation is affected by both the physical limitations of the asset and the functional affects of technological improvements

-- Physical effects of aging:
  a. normal wear and tear

-- Functional effects of aging:
  a. obsolescence
  b. super session by newer more efficient models

An example of the physical effect of aging would be a delivery truck that has an engine that is worn out and would cost more to fix than the truck could be sold for. An example of the functional effect of aging would be an old typewriter that still works perfectly but is too inefficient and obsolete to use from a productivity standpoint with the existence of the microcomputer and word-processing programs.
**Summary of Depreciation Methods**

<table>
<thead>
<tr>
<th>Time Based Depreciation:</th>
<th>Activity Based Depreciation: (Variable charge Methods)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Straight Line (Fixed charge method)</strong></td>
<td>1. Depreciation charge is based on actual usage</td>
</tr>
<tr>
<td>a. assumes the utility of the asset is equal in all time periods;</td>
<td>a. Examples:</td>
</tr>
<tr>
<td>b. a fixed charge is made against revenues in each period;</td>
<td>1. <strong>Productivity Output (Units of Output)</strong></td>
</tr>
<tr>
<td>c. Cost - Salvage = Annual Depreciation</td>
<td>a. assumes that an asset is capable of producing a finite number of units and that the number of those units can be determined</td>
</tr>
<tr>
<td>Life</td>
<td>b. based on these assumptions a cost per unit of output number is computed;</td>
</tr>
<tr>
<td>2. <strong>Accelerated: (Reducing charge methods)</strong></td>
<td>c. Example: Depreciation based on milage</td>
</tr>
<tr>
<td>a. Declining Balance Approaches:</td>
<td>d. Cost - Salvage = Annual Depreciation</td>
</tr>
<tr>
<td>1. assumes the utility of the asset is greater in initial periods when the asset is new;</td>
<td>Est. total units of output</td>
</tr>
<tr>
<td>2. a reducing charge is made against revenues in each period;</td>
<td></td>
</tr>
<tr>
<td>3. <strong>Declining Balance depreciation does not take salvage values into account</strong> in the computation. This is the only time salvage value is ignored.</td>
<td></td>
</tr>
<tr>
<td>4. Examples:</td>
<td>2. <strong>Service Output</strong></td>
</tr>
<tr>
<td>a. <strong>declining balance:</strong></td>
<td>a. assumes that an assets contribution is best measured by the productive input factors rather than units of output; For example, a machine may have an estimated life of 500,000 hours and depreciation is charged based on the number of hours utilized in a given period</td>
</tr>
<tr>
<td>% (Straight-line rate)(declining balance)= Annual Deprec.</td>
<td>b. Example: Depreciation based on machine hours</td>
</tr>
<tr>
<td></td>
<td>1. Assumes that the service life of the asset is directly related to usage and that it is possible to predict the output of an asset;</td>
</tr>
<tr>
<td>b. <strong>sum-of-years’-digits (SYD)</strong></td>
<td>c. Cost - Salvage = Annual Depreciation</td>
</tr>
<tr>
<td>year in reverse order/SYD x Cost-Salvage = Annual Deprec.</td>
<td>Est. total service output</td>
</tr>
<tr>
<td>where: SYD = ( \frac{n(n+1)}{2} )</td>
<td></td>
</tr>
<tr>
<td>( n = ) number of years depreciation life</td>
<td></td>
</tr>
<tr>
<td>c. <strong>MACRS (Mod Accelerated Cost Recovery System)</strong></td>
<td></td>
</tr>
<tr>
<td>This is a tax based system with rules specified by the IRC. As explained above, depreciation for tax purposes differs from depreciation for book purposes. The use of MACRS is not permitted because it is not in accordance with GAAP. Again, it must be noted that this system is permissible or even required for tax purposes.</td>
<td></td>
</tr>
</tbody>
</table>

**B. Depreciation Procedures:**

1. **Determine the Salvage Value of the asset.** Salvage value is an estimated amount and represents the expected net residual value of the asset at the end of its productive life. This is the sales price less all costs incurred in liquidating the asset at the end of its productive life. For example if we estimate an asset can be sold for $5,000 in five years and that it will cost us $650 to dispose of it, the salvage value is $5,000 - $650 or $4,350.

2. **Determine the depreciable basis of the asset.** With the exception of declining balance methods, the depreciable basis of an asset is cost less salvage value.

3. **Estimate the Service Life of the asset:** The service life is an estimate of how long a specific asset will be productive rather than how long it will last. A computer system may be physically capable of lasting 25 years without a failure but may have a productive life of 5 years due to technological advances in the field. In this case the service life of the computer system is 5 years.

**C. Depreciation Issues Created by Differences in Accounting Rules (GAAP) and Tax Rules (IRC):** The rules of accounting for the allocation of the cost of long-lived assets (depreciation) on the financial statements are controlled by GAAP. Accounting rules (GAAP) are used to compute the amount of **income tax expense** reported in the financial statements. The rules for accounting for depreciation for tax purposes (i.e. the amount of tax owed to the government or tax liability) are controlled by the Tax Reform Act of 1986 (as amended) and codified in the Internal Revenue Code (IRC).

It must be understood that the tax expense of a business is computed in accordance with GAAP while the tax liability faced by a business must be computed and reported in accordance with the IRC procedures and without respect to GAAP.

1. **Alternative Goals and Objectives:** The tax laws established are written by the Congress, promulgated in the IRC and interpreted by the Internal Revenue Service (IRS). Congress often is concerned in raising revenues in a way that encourages certain behaviors on the part of individuals or businesses and is not at all concerned with how these procedures that are permitted for tax purposes fit into the framework of accounting theory. For example, in an attempt to encourage investment in capital equipment, the Congress has allowed...
Depreciation methods such as **Modified Accelerated Cost Recovery System (MACRS)** that allows depreciation over a period that is usually shorter than the productive life of the asset. In this case, there is no theoretical accounting justification to support the procedure. It is appropriate only because it is allowable for tax purposes.

2. **Superiority of a Specific Method**: No one approach to depreciation is categorically superior. In actual practice, both **practical** and **theoretical** factors are taken into account. The specific circumstances of each asset or class of assets must be examined and the method that best matches the allocation of costs to the utility provided by the asset should be used for depreciation. Once an approach has been adopted, it **must be used consistently** so that the financial statements of subsequent accounting periods are comparable. If a change is made, a sound business reason must underlie the change and the affects of the change on prior years reported income must disclosed.

3. **GAAP Approaches for tax purposes**: The amount of **tax liability** is computed under the rules promulgated in the IRC without respect to GAAP. The amount of **tax expense** may be computed under any depreciation method that is allowable for GAAP or the IRC in so far as the depreciation expense computed under the GAAP approach does not exceed the maximum allowable under MACRS. **It is essential note that there are two sets of rules**:
   a. the IRC determines the amount of tax liability;
   b. either GAAP or the IRC may be used to determine the amount of tax expense as long as the expense computed under GAAP in any period does not exceed the expense recognized under the IRC approach;
   c. to the extent that the tax liability computed under the IRC does not match the tax expense computed under GAAP the account deferred taxes is debited to balance the accounts.

**Example**: Assume the following facts:

--Tax liability and expense as computed under IRC is $20,000
--Tax expense is computed under GAAP to be $18,000

\[
\begin{align*}
\text{Tax Expense (per GAAP procedures)} & \quad \ldots \quad 18,000 \\
\text{Deferred tax (deferred tax expense)} & \quad \ldots \quad 2,000 \\
\text{Tax Liability (per IRC regulations)} & \quad \ldots \quad 20,000 \\
\end{align*}
\]

D. The **book value** of an asset is its recorded cost less accumulated depreciation to date. **There is little, if any, relationship between book values and market values in periods of changing prices**. This is because book values are tied to historical cost and, over time, the market values increasingly diverge from the cost established at any given point in time.

E. **Financial statement presentation** of long-term assets is controlled by APBO No. 12 and requires the following:

1. Depreciation expense for the period;
2. Balances of major classes of depreciable assets at the balance sheet dated by nature or function;
   1. Accumulated depreciation at the balance sheet date by class of assets or in total;
   2. A general description of the methods used to compute depreciation by class of assets;
Consider the following facts:
--Purchased a Xerox machine on March 1, 20x6, for $5,640.
--Useful life is estimated at six years.
--Estimated disposal value at the end of the six years is $1,200.

Required:
a. What is the depreciation expense for the second year (20x7) using straight-line depreciation?
b. What is the balance of the accumulated depreciation account on January 1, 20y0, using straight-line depreciation?
c. What is the balance of the accumulated depreciation account on January 1, 20x9 using double-declining balance depreciation?
d. Present a schedule for all six years assuming sum-of-years digits depreciation.
e. Which depreciation method reports the highest net income in 20x6?
f. Assume that at the beginning of the fifth year (20x0) the machine was substantially modified, thus increasing its useful life by another two years beyond its original estimated life. If the extraordinary repair cost was $900, what will be the depreciation expense reported for 20x0 assuming straight-line depreciation was originally used (and is continued), and that disposal value at the end of the extra two years is now assumed to be $1,500?

Solution:
a. In straight-line depreciation, each year has the same depreciation expense, Therefore:
\[
\text{Cost} - \text{Salvage} = \frac{\$5,640 - \$1,200}{6} = \$740 \text{ for each year.}
\]
b. 20x6 10/12 x $740 = $ 617
   x7 12/12 x 740 = 740
   x8 12/12 x 740 = 740
   x9 12/12 x 740 = 740
   Balance 1/1/y0 $2,837

c. Straight-line depreciation rate: 1/6
   Accelerated rate: 2 x 1/6 = 1/3 (note: this is simply twice the straight-line rate)
   Depreciation basis: $5,640 (note that no salvage value is taken into account)

\[
\begin{array}{ccccc}
\text{Year} & \text{Balance} & \text{Rate} & \text{Depreciation of the Year} & \text{Annual Depreciation} \\
20x6 & $5,640 & 1/3 & $1,880 & 10/12 & $ 1,567 \\
20x7 & 4,073 & 1/3 & 1,358 & 12/12 & 1,358 \\
20x8 & 2,715 & 1/3 & 905 & 12/12 & 905 \\
\end{array}
\]
d. SYD: \( \frac{6(6+1)}{2} = 21 \); Depreciation Basis: Cost - Salvage = $5,640 - $1,200 = $4,440

\[
\begin{array}{cccccc}
\text{Year} & \text{Syd} & \text{months} & \text{Annual} \\
20x6 & 4,440 & 6/21 & 10/12 & $1,057 \\
20x7 & 4,440 & 6/21 & 2/12 & 211 \\
& 4,440 & 5/21 & 10/12 & 881 \\
20x8 & 4,440 & 5/21 & 2/12 & 176 \\
& 4,440 & 4/21 & 10/12 & 705 \\
20x9 & 4,440 & 4/21 & 2/12 & 141 \\
& 4,440 & 3/21 & 10/12 & 529 \\
20y0 & 4,440 & 3/21 & 2/12 & 106 \\
& 4,440 & 2/21 & 10/12 & 352 \\
20y1 & 4,440 & 2/21 & 2/12 & 70 \\
& 4,440 & 1/21 & 10/12 & 176 \\
20x2 & 4,440 & 1/21 & 2/12 & 36 \\
\end{array}
\]
\[
$4,440
\]
First Year

e. Summary:

<table>
<thead>
<tr>
<th>Depreciation Method</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight-line</td>
<td>$ 617</td>
</tr>
<tr>
<td>Double-declining Balance</td>
<td>$1,567</td>
</tr>
<tr>
<td>Sum-of-Years’ Digits</td>
<td>$1,057</td>
</tr>
</tbody>
</table>

Straight-line reports the highest net income for 20X6, since it reports the least depreciation expense.

f. Original cost of Machine        | $ 5,640  |
Accumulated depreciation (from Part b) | (2,837)  |
Book Value                          | 2,803    |
Add: Extraordinary repair           | 900      |
New Book Value                      | 3,703    |
Less: New Disposal Value            | (1,500)  |
New Depreciable cost                | $ 2,203  |

III. Disposal of long-term assets requires the determination of gain or loss. When an asset is disposed of, the asset and all related accounts must be removed from the books. The difference between the book value (cost less accumulated depreciation) of the asset and the sales price is the gain or loss. Consider the following facts:

Asset Cost.................. $ 120,000
Life......................... 5 years
Salvage value.............. $ 20,000
Depreciation method:........ Straight-line

a. Situation One: The asset is sold at the end of year 3 for $75,000.

b. Situation Two: The asset is sold at the end of year 3 for $56,000.

Required:
1. Present the journal entry to record each situation.

Solution:
a. Situation One annual depreciation: ($120,000 - $20,000)/5 years = $20,000/year

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost..................................</td>
<td>$ 120,000</td>
</tr>
<tr>
<td>Accumulated depreciation (3 x $20,000)</td>
<td>60,000</td>
</tr>
<tr>
<td>Book value................................</td>
<td>$ 60,000</td>
</tr>
<tr>
<td>Sales price................................</td>
<td>75,000</td>
</tr>
<tr>
<td>Gain (loss) on sale of asset..........</td>
<td>$ 15,000</td>
</tr>
</tbody>
</table>

Cash (at sales price)........................ 75,000
Accumulated depreciation (3 years @ 20,000). 60,000
Asset (at cost).............................. 120,000
Gain on sale of asset (plug)............. 15,000

b. Situation Two:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost..................................</td>
<td>$ 120,000</td>
</tr>
<tr>
<td>Accumulated depreciation (3 x $20,000)</td>
<td>60,000</td>
</tr>
<tr>
<td>Book value................................</td>
<td>$ 60,000</td>
</tr>
<tr>
<td>Sales price................................</td>
<td>56,000</td>
</tr>
<tr>
<td>Gain (loss) on sale of asset..........</td>
<td>4,000</td>
</tr>
</tbody>
</table>

Cash (at sales price)........................ 56,000
Accumulated depreciation (3 years @ 20,000). 60,000
Loss on sale of asset (plug).............. 4,000
Asset (at cost).............................. 120,000
IV. Acquisition and Disposal of Assets by Exchange (Nonmonetary Exchanges): companies sometimes acquire or dispose of assets in exchange for other assets in transactions that also involve the receipt or payment of small (incidental) amounts of cash used to adjust for the differences in the fair market values of the exchanged properties. Accounting for exchange transactions can become complicated. APB-29 establishes specific accounting procedures to be followed in exchange transactions. The following graphic illustrates the requirements of APB-29.

A. Terminology:
1. **Boot**: additional cash paid or received in addition to an exchanged asset in order to make the FMV of the asset exchanged equivalent to the FMV of the asset received
2. **Monetary Asset/Liabilities**: Claims to or obligations to pay fixed amounts of cash
3. **Nonmonetary Assets/Liabilities**: Assets and liabilities that are not monetary
4. **Exchange Transaction**: A reciprocal transfer of net assets with only incidental amounts of cash (boot) between entities.
**Summary of Nonmonetary Exchange Procedures**

- Is the disposal/acquisition part of a reciprocal exchange?
  - Yes
  - Can you determine the FMV of the old asset (asset given up)?
    - Yes
      - Are the exchanged assets dissimilar? (If so the earnings process is complete)
        - No
          - This is an exchange of similar assets
            - Or
              - An exchange of inventory to facilitate customers other than the party of the exchange
                - Yes
                  - Is a loss indicated in the exchange? (is the BV of the asset given up > than FMV of asset acquired?)
                    - No
                      - Is cash (BOOT) given or received?
                        - Yes
                          - Is BOOT received?
                            - Yes
                              - Cannot Determine FMV of Old Asset
                                - Reciprocal Transfer
                              - No
                                - Exchange of Dissimilar Assets
                                  - Record new asset at FMV of old asset;
                                    - If FMV of old asset is not readily determinable, record at FMV new asset;
                                    - If neither FMV is determinable, record at FMV of old + Boot paid
                                  - Rule:
                                    1. Gains and losses are both recognized 100% (no special accounting treatment)
                                - No
                                  - Exchange of Similar Assets
                                    - Record new asset: BV of old asset + Recognized Gain - Boot Received
                                    - The receipt of boot makes the transaction part sale, part exchange
                                      - Rule:
                                        1. Losses are recognized immediately
                                        2. Gains are recognized to the extent the transaction is a sale
                                    - The percentage of exchange and sale are computed as follows:
                                      % Sale: Boot Received
                                      % Exchange: FMV New Asset
                                        FMV New + Boot
  - No
    - Yes
      - Is the disposal/acquisition part of a reciprocal exchange?
        - Yes
          - Can you determine the FMV of the old asset (asset given up)?
            - Yes
              - Are the exchanged assets dissimilar? (If so the earnings process is complete)
                - No
                  - This is an exchange of similar assets
                    - Or
                      - An exchange of inventory to facilitate customers other than the party of the exchange
                        - Yes
                          - Is a loss indicated in the exchange? (is the BV of the asset given up > than FMV of asset acquired?)
                            - No
                              - Is cash (BOOT) given or received?
                                - Yes
                                  - Is BOOT received?
                                    - Yes
                                      - Cannot Determine FMV of Old Asset
                                        - Reciprocal Transfer
                                    - No
                                      - Exchange of Dissimilar Assets
                                        - Record new asset at FMV of old asset;
                                          - If FMV of old asset is not readily determinable, record at FMV new asset;
                                          - If neither FMV is determinable, record at FMV of old + Boot paid
                                        - Rule:
                                          1. Gains and losses are both recognized 100% (no special accounting treatment)
                                    - No
                                      - Exchange of Similar Assets
                                        - Record new asset: BV of old asset + Recognized Gain - Boot Received
                                        - The receipt of boot makes the transaction part sale, part exchange
                                          - Rule:
                                            1. Losses are recognized immediately
                                            2. Gains are recognized to the extent the transaction is a sale
                                        - The percentage of exchange and sale are computed as follows:
                                          % Sale: Boot Received
                                          % Exchange: FMV New Asset
                                            FMV New + Boot
    - No
      - Exchange of Similar Assets
        - Record new asset at BV of old asset + boot (if any); cannot exceed FMV of new asset if known
          - Rule:
            1. Gains and losses are not recorded (earnings process is not complete)
To Illustrate these procedures, consider the following examples:

<table>
<thead>
<tr>
<th>Facts</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Asset Cost</td>
<td>$150,000</td>
<td></td>
</tr>
<tr>
<td>Old Asset Accumulated Depreciation</td>
<td>80,000</td>
<td></td>
</tr>
<tr>
<td>Book Value</td>
<td>70,000</td>
<td></td>
</tr>
</tbody>
</table>

**Example 1:** Exchange of dissimilar assets (FMV of Old Asset not known, FMV of New Asset known). Old asset is traded for a dissimilar asset with FMV of $75,000, no boot is paid or received.

| New Asset (record at most readily determinable FMV) | 75,000 |
| Accumulated depreciation—old asset | 80,000 |
| Old Asset | 150,000 |
| Gain on exchange | 5,000 |

**Example 2:** Exchange of dissimilar assets: (FMV of neither asset is determinable). Old asset is traded for a dissimilar asset and neither assets FMV is apparent.

| New Asset (record at BV of old plus boot paid) | 70,000 |
| Accumulated depreciation—old asset | 80,000 |
| Old Asset | 150,000 |

**Example 3:** Exchange of similar assets, boot paid and loss is indicated: Old assets plus $5,000 cash are traded for similar assets with FMV of $60,000.

| New Asset (record at most apparent FMV) | 60,000 |
| Accumulated depreciation—old asset | 80,000 |
| Loss on exchange | 10,000 |
| Old Asset | 150,000 |
| Cash | 5,000 |

**Example 4:** Exchange of similar assets, boot is paid and gain is indicated: Old asset plus $5,000 is traded for similar assets with FMV of $95,000

| New Asset (record at BV of Old plus boot paid) | 75,000 |
| Accumulated depreciation—old asset | 80,000 |
| Old Asset | 150,000 |
| Cash | 5,000 |

**Example 5:** Exchange of similar assets, boot is received and gain is indicated: Old asset is traded for a similar asset with a FMV of $95,000, and in addition, 10,000 cash is received as part of the transaction.

| New Asset (record at BV Old - Boot Rod + gain recognized) | 63,333 |
| Accumulated depreciation—old asset | 80,000 |
| Cash | 10,000 |
| Old Asset | 150,000 |
| Gain Recognized (.0952 x 35,000) | 3,333 |

% Sale = \[
\text{Boot Received} = \frac{10,000}{95,000 + 10,000} = .0952
\]

% Exchange = \[
\text{FMV of New Asset} = \frac{95,000}{95,000 + 10,000} = .9048
\]
Example 6: Assume that at the end of year 3, an asset is exchanged for another similar asset and no cash (boot) is received in the trade:

--Assume the following facts:  
Asset Cost................. $120,000  
Life....................... 5 years  
Salvage value.............. $20,000  
Depreciation method:     Straight-line  
annual depreciation:       $120,000 - $20,000/5 years = $20,000/year  

Cost......................................... $120,000  
Accumulated depreciation (3 x $20,000)....... 60,000  
Book value................................... $60,000  

Required: Present the journal entry to record each of the following situations on the books in accordance with GAAP:

a. **Situation One:** The new asset has a FMV of $50,000  
   New Asset (@ FMV because FMV new > BV old)..... 50,000  
   Accumulated depreciation (3 years @ 20,000).... 60,000  
   Loss on exchange.................................. 10,000  
   Asset (at cost).................................... 120,000  

b. **Situation Two:** The new asset has a FMV of $85,000  
   New Asset (@ BV of old because BV < FMV of New) 60,000  
   Accumulated depreciation (3 years @ 20,000).... 60,000  
   Asset (at cost).................................... 120,000  

**NOTE:** in Situation 2 (above), no gain is recognized because no cash was received; For tax purposes (IRC rules) no gain or loss is recognized on exchanges of similar assets. The tax entry for both situations (a) and (b) would be illustrated in c below  

c. **Situation Three:** How would the entries for situations a, and b differ if the entries were recorded in accordance with the IRC rules as opposed to GAAP?  
   New Asset (@ BV of old, loss is amortized)..... 60,000  
   Accumulated depreciation (3 years @ 20,000).... 60,000  
   Asset (at cost).................................... 120,000  

Example 7: Exchanges of similar assets involving Boot or trade-ins: When the exchange of similar assets involves boot (cash or other liquid consideration) or the trade-in of the old asset:

d. new asset is recorded at the BV of the old asset plus boot given less trade-in received as long as the sum of these items does not exceed the FMV of the new asset. It must also be noted that the list price of the new asset only represents the FMV of the new asset if it is less than the value of the consideration given. To illustrate, assume the following facts:

**Situation One:**  
MDC Delivery Service trades in an old delivery truck costing $150,000 and accumulated depreciation of $110,000 for a new truck with a list price of $120,000. In addition to the trade-in, MDC pays $80,000 cash ($30,000 from its bank account and $50,000 from the bank truck loan). MDC would record the trade-in as follows:

New Truck ($40,000+$80,000-$10,000).... 110,000*  
Accumulated Depreciation-old truck..... 110,000  
Loss on exchange......................... 10,000  
Old Truck................................. 150,000  
Cash........................................ 30,000  
Truck loan payable..................... 50,000  

*BV of old truck + boot paid - trade-in allowance
Situation Two:
assume the same facts as situation one above except that the list price of the new machine is $75,000. In this case, the new machine will be
recorded at FMV (list price is assumed to be FMV in that it is less than the sum of BV + boot-trade-in).

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Truck</td>
<td>75,000*</td>
</tr>
<tr>
<td>Accumulated Depreciation-old truck</td>
<td>110,000</td>
</tr>
<tr>
<td>Loss on exchange</td>
<td>45,000</td>
</tr>
<tr>
<td>Old Truck</td>
<td>150,000</td>
</tr>
<tr>
<td>Cash</td>
<td>30,000</td>
</tr>
<tr>
<td>Truck loan payable</td>
<td>50,000</td>
</tr>
</tbody>
</table>

*BV is greater than FMV so FMV must be used.

V. Intangible Assets:
A. **Intangible Assets** have no physical substance but convey rights and privileges that are long-lived. Examples of intangible assets include
goodwill; patents; franchise rights, licenses and trademarks; copyrights and organization costs. The process of allocating the cost
basis of intangible assets to their useful or legal life is usually called amortization.

B. types of Intangible Assets:
1. **Goodwill**: The excess of purchase cost over the fair market value of identifiable assets.
   a. goodwill can only be created (and recognized) as a result of a purchase situation;
   b. the existence of goodwill is evidence that the business, taken as a whole, is worth more than the net assets due to such things as
      reputation, managerial quality, product superiority, or other favorable factors.
   c. goodwill must be amortized over its useful life or 40 years whichever is less.

2. **Patents**: A patent is an exclusive right granted by the federal government to exclude others from manufacturing, using, or selling a
patented design, product, process etc. for 17 years.
   a. patents are amortized over the lesser of their useful life or 17 years.
   b. the cost basis of a purchased patent is its historical cost;
   c. the cost basis of an internally developed patent is limited to the costs incurred to legally get the patent recognized or defended;
      registration fees and the costs of models, drawings and other patent office requirements. Note that SFAS-2 requires that all
      research and development costs are expensed in the year expended, so no R&D is included in the valuation of self-generated
      patent rights.

3. **Franchise rights, Licenses and trademarks**: These are agreements that convey the right of the holder to sell designated products or
services and/or use certain symbols and/or trade names;
   a. The cost of these rights are amortized over the shorter of 40 years or the life of the agreement.

4. **Copyrights**: A copyright provides the holder with the exclusive right to publication, production and sale of rights for literary, dramatic,
musical or artistic work.
   a. Since 1978 the life of a copyright is the authors life plus 50 years; prior to 1978 a copyright was good for 28 years and could be
      renewed once more for an additional 28 years

5. **Organization Costs**: Organization costs are the costs incurred to start (organize) a business. They include legal fees, promotional
expenses, stock issuance costs and other related charges directly related to organizing the business.
   a. Organization costs are **usually amortized over a minimum period of 5 years for both tax and book purposes**; and must be
      amortized in 40 years or less.

VI. Natural Resources
A. Natural resources include such items as oil, timber and mineral deposits.
   1. The process of allocating the depreciable basis of mineral deposits as the assets are utilized is normally called **depletion**

   2. The process of computing depletion allowances is illustrated below:
--assume that a producing oil well is purchased for $2,000,000 and is estimated to have a reserve of 250,000 barrels of crude oil. If 10,000
barrels are pumped from the well this year, depletion would be recorded as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depletion Expense</td>
<td>80,000</td>
</tr>
<tr>
<td>Investment in oil well</td>
<td>80,000</td>
</tr>
</tbody>
</table>

**Note**: For both Intangibles and Natural Resources it is common practice to reduce the asset account directly rather than use a contra account such as
accumulated amortization or accumulated depletion. This is because in these two cases, the assets are actually being physically used up. However, it is
permissible to use the contra approach if so desired.
Key Concept Comprehension

Short Answer:

1. The two main classifications of fixed assets discussed in the chapter are:
   a. 
   b. 

2. Expenditures are ________ when they benefit only the current year.

3. When assets are purchased in a lump sum, the cost is allocated to each asset group on the basis of the ________ value.

4. The net book value of an asset is the ________ less the ________.

5. The expenditure made to acquire a fixed asset is called a ________ expenditure.

6. Four methods of accounting for asset depreciation are:
   a. ________ c. 
   b. ________ d. 

7. Wasting assets are written off against revenues as ________ expense.

8. When an asset is sold for an amount above the book value, there is a ________ on the transaction.

9. Depreciation expense for the period is shown on the ________.

True or False Questions

1. The usage method of depreciation of a machine requires the estimated productive capacity of the machine.

2. The cost of a fixed asset should include all costs incurred to prepare the asset for use.

3. Declining balance depreciation charges are equal over the useful life of the asset.

4. The method of depreciation may be changed during the life of an asset.

5. The disposal value of an asset is the amount received for the asset when it is sold.

6. Gains and losses on disposal of fixed assets are computed by subtracting the disposal value from the book value of the asset at the time of the disposal.

7. The estimated salvage value of an asset should never be subtracted from the cost of an asset when computing both straight-line and usage methods of depreciation.

8. Fixed assets benefit only the current accounting period.
Problem 1  (Three methods of depreciation)

Morton Inc. acquired a new machine at a cost of $195,600 with a salvage value estimated to be $19,600, and an estimated life of 4 years or 80,000 units of production. The machine may be used at the end of its estimated useful life.

Required:
1. Compute the annual depreciation expense through the 4-year life of the machine under each of the following methods of depreciation:
   a. Straight-line method
   b. Activity based (units of output)
   c. Declining balance method at twice the straight-line rate

<table>
<thead>
<tr>
<th>Year</th>
<th>Units Produced</th>
<th>Straight-Line</th>
<th>Units of Output</th>
<th>Declining Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>26,500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>21,600</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>17,900</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Problem 2  (Acquisition, depreciation, and improvement of fixed assets)

Kortlin Inc. acquired two machines. Subsequently, major improvements were made to these machines, extending the useful life of each machine. The following information was taken from the records:

<table>
<thead>
<tr>
<th>Machine A</th>
<th>Machine B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Acquired</td>
<td>1/2/2021</td>
</tr>
<tr>
<td>Original Cost</td>
<td>$36,000</td>
</tr>
<tr>
<td>Estimated Salvage Value</td>
<td>$4,000</td>
</tr>
<tr>
<td>Estimated Useful Life</td>
<td>4 years</td>
</tr>
<tr>
<td>Date Improvements Completed</td>
<td>7/2/2023</td>
</tr>
<tr>
<td>Improvement Costs</td>
<td>$4,000</td>
</tr>
<tr>
<td>Revised Estimated Salvage Value</td>
<td>$2,500</td>
</tr>
<tr>
<td>Revised Estimated Useful Life</td>
<td>5 years</td>
</tr>
<tr>
<td>Method of Depreciation</td>
<td>Straight-line</td>
</tr>
</tbody>
</table>

Required: Prepare the journal entries to record the transactions, including year-end adjustments for the first 3 years. The books are closed annually on December 31.
Problem 3 (Lump sum purchase of fixed assets)

- Three machines were purchased by Snider Inc. during 20x7 and 20x8. Machine A was acquired and placed in use at the end of October 20x7. The cost was $38,650, the estimated life was 8 years, and the estimated salvage value $2,650. Depreciation was to be on the units of production basis. Estimated production over the 8 years would be 50,000 units. In 20x7, 2000 units were produced; 8,500 units were produced in 20x8; and 9,000 during 20x9.

--Machines B and C were purchased for $46,800 in March 20x8 and were in production on June 1 of that year. The company's year-end is December 31.

--The following additional information about Machines B and C is available.

<table>
<thead>
<tr>
<th>Machine</th>
<th>Appraised Value</th>
<th>Salvage Value</th>
<th>Estimated Life</th>
<th>Installation Cost</th>
<th>Depreciation Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>$19,000</td>
<td>$1,400</td>
<td>6 years</td>
<td>$680</td>
<td>Straight-line</td>
</tr>
<tr>
<td>C</td>
<td>$28,500</td>
<td>$2,100</td>
<td>5 years</td>
<td>$1,920</td>
<td>Double Declining balance</td>
</tr>
</tbody>
</table>

Required: Prepare the journal entries for
--the acquisition of Machine A;
--the adjusting entry at December 31, 20X7;
--the acquisition of Machines B and C;
--the adjusting entries at December 31, 20X8, and 20X9.

Problem 4 (Depletion of natural resources and depreciation of the assets required in the mining process)

--On June 30, 19X2, Bowline Mines Inc. acquired land, an asset bearing recoverable ore deposits estimated by geologists to contain 1,600,000 tons of ore. The cost of this land was $925,000, and it was estimated to be worth $125,000 after extraction of the ore.

--Before the mining could start, improvements were made at a total cost of $36,800. Various buildings and sheds were constructed at a cost of $43,200. During the year, 64,000 tons was mined. Of this tonnage, 6,400 tons were on hand and unsold on June 30, 19X3, the balance having been sold for cash at $3.00 per ton. Expenses incurred and paid during the year, exclusive of depletion and depreciation, were as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>$106,000</td>
</tr>
<tr>
<td>Delivery</td>
<td>$19,500</td>
</tr>
<tr>
<td>Administration</td>
<td>$18,800</td>
</tr>
</tbody>
</table>

--It is believed that the buildings and sheds will be useful over the life of the mine only; therefore, depreciation should be recognized in terms of mine output.

Required: Prepare an income statement for the year ended June 30, 20X3.
Problem 5

The Grandeur Corp. applied for and received a patent on a new process. The patent was received at the end of 20X5 and was used at the beginning of 20X6. Research costs were incurred in 20X4 and 20X5 in the amounts of $15,000 and $35,000, respectively. The following other costs were also incurred:

<table>
<thead>
<tr>
<th>Cost</th>
<th>20X5</th>
<th>20X4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Testing</td>
<td>$3,105</td>
<td>$4,300</td>
</tr>
<tr>
<td>Estimated Salary Spent on the Project:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>President</td>
<td>3,600</td>
<td>2,100</td>
</tr>
<tr>
<td>Research Employees</td>
<td>9,800</td>
<td>8,600</td>
</tr>
<tr>
<td>Legal Fees for the Patent</td>
<td>1,150</td>
<td>1,500</td>
</tr>
<tr>
<td>Cost of General Plant Improvements</td>
<td>10,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Depreciation of Machinery and Equipment</td>
<td>2,000</td>
<td>3,000</td>
</tr>
</tbody>
</table>

**Required:**
1. On the basis of the above information, calculate the total cost of the patent to the end of 20X5.
2. Prepare the adjusting entry for the year 20X6 to amortize the patent.

Problem 6

RJC, Inc. purchased production machinery with a useful life of three years on 7/1/x1 for $120,000. Studies have shown that the machinery will last approximately 10,000 operating hours over its three year life and have a salvage value of $15,000.

**Required:**
1. Determine depreciation expense for years 20x1, 20x2, 20x3 and 20x4 using
   a. straight-line amortization
   b. double declining balance depreciation
   c. Sum-of-years digits depreciation
   d. Units of production depreciation (assume hourly usage of 1,000, 2,500, 2,500 and 1,000 respectively)
SOLUTIONS TO KEY CONCEPT COMPREHENSION

1.  a. tangible assets
    b. natural resources
2. expensed
3. appraised
4. cost / accumulated depreciation
5. capital
6.  a. straight-line
    b. declining balance
    c. usage
    d. capital cost allowance
7. depletion
8. gain
9. income statement

True or False Questions

1. T
2. T
3. F Declining balance depreciation charges are highest in the earlier years of use of the asset and decline over its useful life even though the depreciation rate remains constant.
4. T
5  T
6. T
7. F The estimated salvage value of an asset should be subtracted from the cost of an asset before computing both straight-line and usage methods of depreciation.
8. F Fixed assets benefit two or more accounting periods.

Solution Problem 1

<table>
<thead>
<tr>
<th>Year</th>
<th>Units Produced</th>
<th>Straight-Line</th>
<th>Units of Output</th>
<th>Declining Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14,000</td>
<td>$44,000</td>
<td>$30,800</td>
<td>$97,800</td>
</tr>
<tr>
<td>2</td>
<td>26,500</td>
<td>44,000</td>
<td>58,300</td>
<td>48,900</td>
</tr>
<tr>
<td>3</td>
<td>21,600</td>
<td>44,000</td>
<td>47,520</td>
<td>24,450</td>
</tr>
<tr>
<td>4</td>
<td>17,900</td>
<td>44,000</td>
<td>39,380</td>
<td>4,850</td>
</tr>
<tr>
<td>Total</td>
<td>80,000</td>
<td>$176,000</td>
<td>$176,000</td>
<td>$176,000</td>
</tr>
</tbody>
</table>

Supporting Computations:

a. Straight-line: $195,600 - $19,600/4 years = $44,000 per year

b. Units of Output: $195,600 - $19,600/80,000 units = $2.20 per unit

c. Double Declining Balance:

--Straight-line rate at 4 years is 25% per year;
--twice the straight-line rate is 50% per year;
--recall that salvage values are not taken into account with decline balance depreciation techniques (this is the only case that salvage values are ignored)

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
<th>Declining Balance</th>
<th>Depreciation</th>
<th>Book Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.50</td>
<td>$195,600</td>
<td>$97,800</td>
<td>$97,800</td>
</tr>
<tr>
<td>2</td>
<td>.50</td>
<td>97,800</td>
<td>48,900</td>
<td>48,900</td>
</tr>
<tr>
<td>3</td>
<td>.50</td>
<td>48,900</td>
<td>24,450</td>
<td>24,450</td>
</tr>
</tbody>
</table>
| 4    | .50  | 24,450            | 4,850**      | 19,600     **Book value cannot be reduced below estimated salvage value
### Solution Problem 2

#### General Journal

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1/x1</td>
<td>Machine</td>
<td>36,000</td>
<td>36,000</td>
</tr>
<tr>
<td></td>
<td>Cash</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Purchase of Machine A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/1/x1</td>
<td>Machine</td>
<td>48,000</td>
<td>48,000</td>
</tr>
<tr>
<td></td>
<td>Cash</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Purchase Machine B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/31/x1</td>
<td>Depreciation Expense (((36,000-4,000)/4)+(7/12)(48,000-6,000)/5)</td>
<td>12,900</td>
<td>12,900</td>
</tr>
<tr>
<td></td>
<td>Accumulated Depreciation-machine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Expense for year 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/31/x2</td>
<td>Depreciation Expense ((36,000-4,000)/4+(48,000-6,000)/5)</td>
<td>16,400</td>
<td>16,400</td>
</tr>
<tr>
<td></td>
<td>Accumulated Depreciation-machine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Expense for year 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/1/x3</td>
<td>Machine</td>
<td>12,700</td>
<td>12,700</td>
</tr>
<tr>
<td></td>
<td>Cash</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Record improvements to machine B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/2/x3</td>
<td>Machine</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td></td>
<td>Cash</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Record improvements to machine A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/31/x3</td>
<td>Depreciation Expense (((new basis)-new salvage)/new life)</td>
<td>12,750</td>
<td>12,750</td>
</tr>
<tr>
<td></td>
<td>Acc. Depr. Machine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A:</td>
<td>(((36,000-20,000+4,000)-2,500)/5) years=3,500 per year</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depreciation for year 3: ((6/12)8,000=4,000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>((6/12)3,500=1,750 \ 5,750)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B:</td>
<td>((48,000-16,800+12,700)-1,900) years=6,000 per year</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depreciation for year 3: ((5/12)8,400=3,500)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>((7/12)3,500=3,500 \ 7,000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(12,750)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Solution Problem 3

General Journal

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/1/x7</td>
<td>Machine A</td>
<td>38,650</td>
<td>38,650</td>
</tr>
<tr>
<td></td>
<td>Cash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/31/x7</td>
<td>Depreciation Expense (((38,650-2,650)/5,000 units)=$0.72x2,000 units</td>
<td>1,440</td>
<td>1,440</td>
</tr>
<tr>
<td></td>
<td>Accumulated Depreciation-machine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Expense for year 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/1/x8</td>
<td>Machine B (46,800(19,000/47,500))</td>
<td>18,720</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Machine C (46,800(28,5000/47,500))</td>
<td>28,080</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cash</td>
<td></td>
<td>46,800</td>
</tr>
<tr>
<td></td>
<td>Record lump sum purchase of machines B and C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Machine B</td>
<td>680</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Machine C</td>
<td>1,920</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cash</td>
<td></td>
<td>2,600</td>
</tr>
<tr>
<td></td>
<td>Record installation cost of machines B and C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depreciation Expense A: $0.72 x 8,500 units</td>
<td>6,120</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depreciation Expense B: (7/12)(((18,720+680)-1,400)/6 years</td>
<td>1,750</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depreciation Expense C: (7/12)(28,080+1,920)(.40)</td>
<td>7,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accumulated Depreciation--Machinery</td>
<td></td>
<td>14,870</td>
</tr>
<tr>
<td></td>
<td>Record depreciation expense for year x8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/31/x9</td>
<td>Depreciation Expense A: $0.72 x 9,000 units</td>
<td>6,480</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depreciation Expense B: (18,720+680)-1,400/6</td>
<td>3,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depreciation Expense C: (30,000-7,000)(.40)</td>
<td>9,200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accumulated Depreciation--Machinery</td>
<td></td>
<td>18,680</td>
</tr>
<tr>
<td></td>
<td>Record depreciation expense for year x9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Solution Problem 4

Bowline Mines Inc.
INCOME STATEMENT
For the year ended June 30, 19X3

Sales(57,600 tons @ $3/ton) $ 172,800

Cost of Goods Sold:
  Depletion Expense $ 32,000*
  Depreciation Expense 3,200**
  Mining Costs 106,000
  Total Cost of Goods Available $ 141,200
Less: Ending Inventory (14,120)*** $ 127,080
Gross Profit $ 45,720

Operating Expenses:
  Delivery Expense $ 19,500
  Administration Expense 18,800 38,300
Net Income $ 7,420

* Depletion Expense for the Year:
Cost of the Mine $925,000
Less: Salvage Value 125,000
Amount to Be Depleted $ 800,000/1,600,000 est. recoverable deposits = $0.50/ton
Current year depletion: 64,000 tons extracted x $0.50/ton = $32,000

** Depreciation Expense for the Year:
Cost of the improvements $ 36,800
Cost of the buildings and sheds 43,200
Amount to be Depreciated $ 80,000/1,600,000 estimated recoverable deposits = $0.05
Current year depreciation: 64,000 tons extracted x $0.05/ton = $3,200

*** Ending Inventory
Percentage of Tonnage Left in Inventory: 6,400/64,000 = 10%
Cost of Goods Available: $141,200
Ending Inventory: Cost of Goods Available x 10% = $14,120
Solution Problem 5

Requirement 1:

<table>
<thead>
<tr>
<th></th>
<th>20x4</th>
<th>20x5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Costs</td>
<td>$15,000</td>
<td>$35,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>Cost of Testing</td>
<td>4,300</td>
<td>3,105</td>
<td>7,405</td>
</tr>
<tr>
<td>Research Employees Salaries</td>
<td>8,600</td>
<td>9,800</td>
<td>18,400</td>
</tr>
<tr>
<td>Patent Legal Fees</td>
<td>1,500</td>
<td>1,150</td>
<td>2,650</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$29,400</strong></td>
<td><strong>$49,055</strong></td>
<td><strong>$78,455</strong></td>
</tr>
</tbody>
</table>

Requirement 2: Present the journal entry to amortize the patent at end of year 6.

Amortization Expense ($78,455/17 years)............. 4,615
Patents........................................... 4,615

To amortize the patent at end of year 6

**Solution Problem 6:**

(a) Straight-line method:

\[
20x1: \left(\frac{120,000 - 15,000}{3}\right) \times \frac{1}{2} = 17,500
\]

\[
20x2: \left(\frac{120,000 - 15,000}{3}\right) \times \frac{1}{2} = 35,000
\]

\[
20x3: \left(\frac{120,000 - 15,000}{3}\right) \times \frac{1}{2} = 35,000
\]

\[
20x4: \left(\frac{120,000 - 15,000}{3}\right) \times \frac{1}{2} = 17,500
\]

\[
\text{Total} = 105,000
\]

(b) Declining balance method:

\[
20x1: \frac{120,000 \times 2}{3} \times \frac{1}{2} = 40,000
\]

\[
20x2: \frac{(120,000 - 40,000) \times 2}{3} = 53,333
\]

\[
20x3: \frac{(120,000 - 40,000 - 53,333)}{2} = 17,778
\]

\[
20x4: \text{No depreciation this year, salvage value has been attained.}
\]

*Book value must not be reduced below $15,000, the salvage value.  $105,000

(c) Sum-of-the-years-digits method:

\[
20x1: \left(\frac{120,000 - 15,000}{6}\right) \times \frac{1}{2} = 26,250
\]

\[
20x2: \left(\frac{120,000 - 15,000}{6}\right) \times \frac{1}{2} = 26,250
\]

\[
\left(\frac{120,000 - 15,000}{6}\right) \times \frac{1}{2} = 17,500
\]

\[
20x3: \left(\frac{120,000 - 15,000}{6}\right) \times \frac{1}{2} = 8,750
\]

\[
20x4: \left(\frac{120,000 - 15,000}{6}\right) \times \frac{1}{2} = 8,750
\]

\[
\text{Total} = 105,000
\]

(d) Units-of-production method:

\[
20x1: 1,200 \text{ hours} \times 10.50 = 12,600
\]

\[
20x2: 4,500 \times 10.50 = 47,250
\]

\[
20x3: 3,500 \times 10.50 = 36,750
\]

\[
20x4: 800 \times 10.50 = 8,400
\]

\[
\text{Total} = 105,000
\]

\[
\text{*(120,000 - 15,000/ 10,000 hrs = 10.50/hr)}
\]

\[
\text{Total} = 105,000
\]