**unit 2: determining the cost of inventory**

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**2.0 Aims and Objectives**

This unit aims at discussing inventory cost determination and inventory costing methods.

After going through this unit, you will be able to:

* 1. describe the determination of the cost of inventory
	2. aware of the most common inventory costing methods under a periodic system
	3. compare the effect of the methods on operating results
	4. describe the accounting for inventory under the perpetual system.

**2.1 Introduction**

This chapter is the continuation of the previous chapter, in which we have discussed the meaning and concepts of inventory. In this chapter, we will discuss the determination of the cost of inventory.

Costs included in merchandise inventory are those expenditures necessary, directly or indirectly, to bring an item to a salable condition and location. In other words, cost of an inventory item includes its invoice price minus any discount, plus any added or incidental costs necessary to put it in a place and condition for sale. Added or incidental costs can include import duties, transportation-in, storage, insurance against losses while the goods are in transit, and costs incurred in an aging process(for example, aging of wine and cheese).

Minor costs that are difficult to allocate to specific inventory items may be excluded from inventory cost and treated as operating expenses of the period. This is based on materiality principle or the cost-to –benefit constraint.

**Check Your Progress Exercise -1**

1. An art gallery purchases a painting for Br. 11,400 on terms FOB shipping point. Additional costs in obtaining and offering the artwork for sale include. 130 for transportation-in, Br. 150 for import duties, Br. 100 for insurance during shipment, Br. 180 for advertising, Br. 400 for training, and Br. 800 for sales salaries. For computing inventory, what cost is assigned to the painting?

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**2.2 Inventory costing methods under periodic inventory system**

One of the most important decisions in accounting for inventory is determining the per unit costs assigned to inventory items. When all units are purchased at the same unit cost, this process is simple since the same unit cost is applied to determine the cost of goods sold and ending inventory. But when identical items are purchased at different costs, a question arises as to what amounts are included in the cost of merchandise sold and what amounts remain in inventory. A periodic inventory system determines cost of merchandise sold and inventory at the end of the period. We must record cost of merchandise sold and reductions in inventory as sales occur using a perpetual inventory system. How we assign these costs to inventory and cost of merchandise sold affects the reported amounts for both systems.

There are four methods commonly used in assigning costs to inventory and cost of merchandise sold. These are:

 Specific identification

 First-in first-out(FIFO)

 Last-in first-out (LIFO)

 Weighted average

Let us see these costing methods under ***periodic inventory*** system based on the following illustration

***Illustration:***

Beza Company began the year and purchased merchandise as follows:

 Jan-1 Beginning inventory 80 units@ Br. 60 = Br. 4,800

 Feb. 16 Purchase 400 units@ 56 = 22,400

 Sep.2 Purchase 160 units @ 50 = 8,000

 Nov. 26 Purchase 320 units@ 46 = 14,720

 Dec. 4 Purchase 240 units@ 40 = 9,600

 Total 1200 units Br.59, 520

The ending inventory consists of 300 units, 100 from each of the last three purchases.

**2.2.1 Specific Identification Method**

When each item in inventory can be directly identified with a specific purchase and its invoice, we can use specific identification (also called specific invoice pricing) to assign costs. This method is appropriate when the variety of merchandise carried in stock is small and the volume of sales is relatively small. We can specifically identify the items sold and the items on hand.

***Example***

From the above illustration, the ending inventory consists of 300 units, 100 from each of the last purchases. So, the items on hand are specifically known from which purchases they are:

Cost of ending inventories under specific identification method

 Br. 40 x 100 = Br. 4,000

 Br. 46 x 100 = 4,600

 Br. 50 x 100 = 5,000

 300units Br. 13,600

 Cost of Ending inventory cost = Br. 13,600

 The cost of merchandise sold = Cost of goods available for sale - Ending inventory

 = Br. 59,520 – Br. 13,600

 = Br. 45,920

**2.2.2 First-in, First-out (FIFO)**

This method of assigning cost to inventory and the goods sold assumes inventory items are sold in the order acquired. This means the cost flow is in the order in which the expenditures were made. So, to determine the cost of ending inventory, we have to start from the most recent purchase and continue to the next recent. Because the first purchased items (old purchases) are the first to be sold they are used (included) in the computation of cost of goods sold.

For example, easily spoiled goods such as fruits, vegetables etc., must be sold near the time of their acquisition. So, the inventory on hand will be from the recent purchases. As an example, consider the previous illustration on page 21.

The cost of ending inventory under FIFO method

 = Br. 40 x 240 Br. 9,600

 = Br. 46 x 60 2,760

 300 units Br. 12,360

 Cost of Ending inventory Br. 12,360

 Cost of merchandise sold = Br. 59,520 – Br. 12,360

 Br. 47,160

**2.2.3 Last-in first-out (LIFO)**

This method of assigning cost assumes that the most recent purchases are sold first. Their costs are charged to cost of goods sold, and the costs of the earliest purchases are assigned to inventory. The cost flow is in the reverse order in which expenditures were made.

In calculating the cost of goods sold, we will start from the earliest purchases.

As an example, take the previous illustration

The cost-ending inventory under FIFO method

 =Br.60 x 80 = Br. 4,800

 =Br. 56 x 220 = 12,320

 300 units

Ending inventory cost = Br. 17,120

Cost of merchandise sold = Br. 59,520 – Br. 17,120

 = Br. 42,400

**2.2.4 Weighted Average Method**

This method of assigning cost requires computing the average cost per unit of merchandise available for sale. That means the cost flow is an average of the expenditures.

To calculate the cost of ending inventory, we will calculate first the cost per unit of goods available for sale

***Average cost per unit = Cost of goods available for sale***

 ***Total units available for sale***

Then the weighted average unit cost is multiplied by units on hand at the end of the period to calculate the cost of ending inventory. Also, the same average unit cost is applied in the computation of cost of goods sold.

As an example, take the previous illustration

Weighted average unit cost = Br. 59,520 = Br. 49.60

 1,200

 Ending inventory cost = Br. 49.60x 300

 = Br. 14,880

 Cost of merchandise sold = Br. 59,520-Br. 14,880

 = Br. 44,640

**2.3 Comparison of Inventory costing methods**

If the cost of units and prices at which they are sold remains stable, all the four methods yield the same results. But if prices change, the three methods usually yield different amounts for:

* + - Ending inventory
		- Cost of merchandise sold
		- Gross profit or net income

In periods of rising (increasing) prices: (or if there is inflationary trend):

***FIFO yields*** – higher ending inventory

 \_ Lower cost of merchandise sold

 \_ Higher gross profit (net income)

 ***LIFO yields*** \_ Lower ending inventory

 \_ Higher cost of merchandise sold

 \_ Lower gross profit (net income)

 Weighted average yields the results between the two.

***In periods of declining (decreasing) prices:***

 ***FIFO yields*** \_ Lower ending inventory

 \_ Higher cost of merchandise sold

 \_ Lower gross profit or net income

***LIFO yields***\_ higher ending inventory

 \_ Lower cost of merchandise sold

 \_ Higher gross profit or net income

 Weighted average- between the two

**Check Your Progress Exercise -2**

1. Which of the methods of inventory costing will in general yield an inventory cost nearly approximating current replacement cost?

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1. Does the terms FIFO and LIFO refer to techniques employed in determining quantities of various merchandise on hand?

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**2.4 Inventory costing methods under perpetual inventory system**

Under perpetual inventory systems we will apply the inventory costing methods each time sale of merchandise is made. We calculate the cost of goods (merchandise) sold and inventory on hand at the time of each sale. This means the merchandise inventory account is continually updated to reflect purchase and sales.

***Illustration:***

The beginning inventory, purchases and sales of Nesru Company for the month of January fare as follows:

  ***Units Cost***

Jan. 1 Inventory 12 Br. 10.00

 6 Sale 5

 10 purchase 10 Br. 12.00

 20 Sale 8

 25 purchase 8 Br. 12.50

 27 Sale 10

 30 purchase 15 Br. 14.00

**2.4.1 First-in first-out Method**

The assignment of costs to goods sold and inventory using FIFO is the same for both the perpetual and periodic inventory systems. Because each withdrawal of goods is from the oldest stock on hand. The oldest is the same whether we use periodic inventory system or perpetual inventory system.

Let us calculate the cost of goods sold and ending inventory under perpetual inventory system from the above illustration.

**Perpetual - FIFO**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** |  **Purchase** | **Cost of merchandise sold** | **Inventory** |
| **Qty.** | **Unit cost** | **Total cost** | **Qty** | **Unit cost** | **Total cost** | **Qty** | **Unit cost** | **Total cost** |
| Jan. 1 |  |  |  |  |  |  | 15 | Br. 10.00 | Br. 150.00 |
|  6 |  |  |  | 5 | Br. 10.00 | Br. 50.00 | 10 |  10.00 |  100.00 |
|  10  | 10 | Br. 12.00 | Br.120.00 |  |  |  | 1010 |  10.00 12.00 |  100.00 120.00 |
|  20 |  |  |  | 8 | 10.00 | 80.00 | 210 |  10.00 12.00 |  20.00 120.00 |
|   25 | 8 | 12.50 | 100.00 |  |  |  | 2108 |  10.00 12.00 12.50 |  20.00 120.00 100.00 |
|  27 |  |   |   | 28 | 10.0012.00 | 20.0096.00 | 28 |  12.00 12.50 |  24.00 100.00 |
|  30 | 15 | 14.00 | 210.00 |  |  |  | 285 |  12.00 12.50 14.00 |  24.00 100.00 210.00 |
|  | 23 |  | Br. 246.00 | 25 |  | Br. 334.00 |

So, the cost of merchandise sold and ending inventory under perpetual- FIFO method are Br. 246 and Br. 334 respectively.

Let us see them under periodic - FIFO method:

Units on hand = units available for sale – units sold

 = (15 + 10 + 8 + 15 ) – ( 5+ 8 + 10 )

 = 48 - 23 = 25

Cost of ending inventory = Br. 14 x 15 = Br. 210

 Br. 12.50 x 8 = 100

 Br. 12 x 2 = 24

 Br. 334

Cost of goods available for sale = Br. 120 + Br. 100 + Br. 210 = Br. 580

Cost of goods sold = Br. 580 – Br. 334

 Br 246

So, the same results of cost of gods sold and ending inventory under both periodic inventory systems.

**2.4.2 Lasting, First-Out method**

Unlike FIFO method, different results may occur under periodic and perpetual inventory system. The most recent purchases change when new purchase occurs.

Let us calculate first the cost of goods sold and ending inventory for the above illustration under perpetual inventory system. Then, we will see the results under periodic inventory system.

**Perpetual - LIFO**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Purchase** | **Cost of merch. Sold** | **Inventory** |
|  | **Qty** | **Unit cost** | **Total cost** | **Qty** | **Unit cost** | **Total cost** | **Qty**  | **Unit cost** | **Total cost** |
| Jan. 1 |  |  |  |  |  |  | 15 | Br. 10.00 | Br. 150.00 |
| 6 |  |  |  | 5 | Br. 10.00 | Br. 50.00 | 10 | 10.00 | 100.00 |
| 10 | 10 | Br. 12.00 | Br. 120.00 |  |  |  | 1010 | 10.0012.00 | 100.00120.00 |
| 20 |  |  |  | 8 | Br. 12.00 | Br. 96.00 | 102 | 10.0012.00 | 100.0024.00 |
| 25 | 8 | 12.50 | 100.00 |  |  |  | 1028 | 10.0012.0012.50 | 100.0024.00100.00 |
| 27 |  |  |  | 82 | 12.5012.00 | 100.0024.00 | 10 | 10.00 | 100.00 |
| 30 | 15 | 14.00 | 210.00 |  |  |  | 1015 | 10.0024.00 | 100.00210.00 |
|  |  |  |  | 23 |  | Br. 270.00 | 25 |  | Br. 310.00 |

So, the cost of merchandise sold and ending inventory under perpetual inventory system are Br. 270 and Br. 310 respectively.

The results under periodic inventory system are:

Cost of ending inventory = Br. 10 x 15 = Br. 150

 Br. 12 x 10 = 120

 25

 Br. 270

Cost of merchandise sold = Br. 580 - 270

 = Br. 310

As you see, the results are different under periodic & perpetual inventory systems.

**2.4.3 Weighted average cost method**.

Under this method, the average unit cost is calculated each time purchased is made to be applied on the sales made after the purchases. The results may be different under periodic and perpetual inventory system.

Let us calculate the cost of merchandise sold and ending inventory comes out from the previous illustration under perpetual inventory system.

**Average Cost Method (Moving Average)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Purchase** | **Cost of merchandise sold** | **Inventory** |
| **Qty**  | **Unit cost** | **Total cost** | **Qty** | **Unit cost** | **Total cost** | **Qty** | **Unit cost** | **Total cost** |
| Jan. 1 |  |  |  |  |  |  | 15 | Br. 10.00 | Br. 150.00 |
| 6 |  |  |  | 5 | Br. 10.00 | Br. 50.00 | 10 | 10.00 | 100.00 |
| 10 | 10 | 12.00 | Br. 120.00 |  |  |  | 20 | 11.00= 100+120 10+10 | 220.00 |
| 20 |  |  |  | 8 | 11.00 | 88.00 | 12 | 11.00 | 132.00 |
| 25 | 8 | 12.00 | 100.00 |  |  |  | 20 | 11.60 +132+10012+8 | 232.00 |
| 27 |  |  |  | 10 | 11.60 | 116.00 | 10 | 11.60 | 116.00 |
| 30 | 15 | 14.00 | 210.00 |  |  |  | 15 | 13.04116+21010+15 | 326.00 |
|  |  |  |  | 23 |  | Br. 254.00 | 25 | Br. 13.04 | Br 326.00 |

So, the cost of goods sold and ending inventory under perpetual inventory system are Br. 254.00 and Br. 326.00, respectively.

The results under periodic inventory system are:

Weighted average unit cost = Br. 580 = Br. 12.08

 48

Ending inventory cost = Br. 12.08 x 25

 = Br. 302

Cost of merchandise sold = Br. 580 – Br. 302

 = Br. 278

So, the result is different under periodic and perpetual inventory systems.

**Check Your Progress Exercise -3**

1. What are the advantages of perpetual inventory system over the periodic inventory system?

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2. In periods of steadily rising prices, which inventory method will give the highest,

1. inventory cost,
2. lowest inventory cost
3. highest net income, and
4. lowest net income?
5. Do the FIFO and LIFO inventory methods result in different quantities of ending inventory?

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**2.5 summary**

The cost of merchandise inventory is made up of the purchase price and all expenditure incurred in acquiring such merchandising including transportation, customs duties, and insurance against losses in transit.

Under periodic inventory system, in determining the cost of merchandise sold and the inventory at the end of the period, it is customary to use an assumption as to the flow of costs of merchandise through an enterprise. The four methods of costing an inventory are specific identification, FIFO, LIFO and weighted average of which the last three are the cost flow assumptions. The FIFO method of costing inventory is based on the assumption that costs should be charged against revenue in the order in which they were incurred. The LIFO method is based on the assumption that the most recent costs incurred should be charged against revenues. The weighted average method is based on the assumption that costs should be charged against revenue according to the weighted average unit costs of the goods sold.

If the cost of units and the prices at which they are sold remain stable, all three inventory costing methods will yield the same results. However, during a period of rising prices, the use of FIFO method will result in a higher amount of gross profit than the other two methods. In a period of declining prices, the use of LIFO method will result in a higher amount of gross profit than the other two methods. The average cost method is often viewed as a compromise between the FIFO and LIFO methods.

Under a perpetual inventory system, costs are assigned to the cost of merchandise sold account each time a sale occurs. Specific identification assigns a cost to each item sold by referring to its actual cost. Weighted average assigned a cost to items sold by taking the current balance in the merchandise inventory account and dividing it by the total items to determine the weighted average cost per unit.

**2.6 answers to check your progress**

***Check Your Progress 1***

1. Total c cost is Br. 12,180, computed as: Br. 11,400 + 130 + Br. 150 + Br. 100 + Br. 400.

Br. 180 for advertising and Br. 800 for sales salaries are not added to cost of the inventory. They are included in operating expenses

***Check Your Progress 2***

1) First-in, First-out (FIFO) method

2) No, They are the methods of determining cost of the inventory.

***Check Your Progress 3***

* 1. For internal c control purpose. This is by comparing the perpetual inventory record and inventory amount through physical count; we can determine the inventory shortage or overage.

For preparation of interim financial statements, there is no need of counting the inventory. Frequent comparisons of balance with predetermined maximum and minimum levels facilitate the timely recording of merchandise to avoid both excess inventory and the cost of sales.

**2.7 model examination questions**

* 1. ***Short answer questions***
		1. When costs and prices are rising, does LIFO or FIFO report higher net income?
		2. In periods of declining prices, which method are not preferable income tax purposes?

***B. Workout question***

Tale Company had the following beginning inventory and purchases during 2002:

  **Item X**

 ***Date***  ***Unit’s*** ***Unit cost***

 Jan. 1 Inventory 400 Br. 14

 March 10 Purchase 200 15

 May 9 Purchase 300 16

 Sep. 22 Purchase 250 20

 Nov. 28 Purchase 100 21

At December 31, 2002, there were 550 units of X on hand.

Sales of units were as follows:

 Jan.15 200 units at Br. 30

 April 1 200 units at Br. 30

 Nov. 1 300 units at Br. 35

Additional data for use in applying the specific identification method

1. Jan. 15 sale - 200 units@ Br. 14
2. April 1 Sale - 200 units@ Br. 15
3. Nov. 1 Sale - 200 units@ Br. 20

***Required:***

* 1. Calculate the cost of merchandise available for sale
	2. Apply the four different methods of inventory costing to calculate ending inventory & Cost of merchandise sold under:
1. Periodic inventory system
2. Perpetual inventory system
	1. What is the difference between goods flow and cost flow?
	2. What are the relative advantages and disadvantages of FIFO and LIFO methods of inventory costing?
	3. Why do you think it is more expensive to maintain a perpetual inventory system?
	4. What are the three most important advantages of the perpetual inventory system?
	5. A company using a perpetual inventory system sells merchandise to a customer on account for Br. 1250; the cost of the merchandise was Br. 1000.
		1. What entries would be made on the general ledger accounts as a result of the transaction?
		2. What is the amount of gross profit realized from this specific sale?

II. Choose the best answer from the given alternatives

* + 1. The inventory system that does not attempt to record the cost of goods sold each time sale is made is;

a) FIFO b) Periodic c) Perpetual d) Physical

e) b and d f) c and d

* + 1. If merchandise inventory is being valued at cost and the price level is consistently falling, which method of costing will yield the largest net income?

a) LIFO b) FIFO c) Average cost d) a or b

e) None of the above

* + 1. Identify the correct statement
			1. If the FIFO method of inventory costing is selected by a company the method shall be used for all inventory items.
			2. Under the average cost method, the same unit cost is used to compute both the cost of goods sold and the cost of inventory.
			3. One of the major drawbacks of LIFO is that it does not attempt to match current costs with current revenues.
			4. All of the above
			5. None of the above
		2. Identify the wrong statement:
			1. The FIFO method in periods of rising prices causes businesses to report more than their true profit resulting in the payment of excess income taxes.
			2. Over a period of rising prices a business that use LIFO method may report the value of inventory at a cost figure far below what it currently pays for the same item.
			3. Pricing the inventory and cost of goods sold using the specific identification method is the same under both periodic and perpetual systems.
			4. The FIFO method of inventory costing is not the best measure of the current balance sheet value of inventory.
			5. None of the above.
		3. In which method of inventory costing the flow of cost and income determination is given due consideration?

a) Average cost b) FIFO c) LIFO

d) Gross profit e) None of the above

**III. Problems**

1. Eyassu Furniture Company sold 2200 doors during 19 x 5 at Br. 320 per door. Its beginning inventory on January 1 was 130 doors at Br. 112. Purchases made during the year were as follows:

February 225 doors @ Br. 124

April 350 doors @ Br. 130

June 700 doors @ Br. 140

August 300 doors @ Br. 132

October 400 doors @ Br. 136

November 250 doors @ Br. 144

The company's selling and administrative expenses for the year were Br. 202,000, and the company uses the periodic inventory system.

***Required:***

1. Prepare a schedule to compute the lost of goods available for sale.
2. Prepare an income statement under each of the following assumptions:
	1. costs are assigned to inventory using the average cost method
	2. costs are assigned to inventory using the FIFO method
	3. costs are assigned to inventory using LIFO method

**2.8 glossary**

* 1. **Cost-to-benefit constraint-** it is a concept that says accounting information is used disclosed if the cost perceived to be associated with it is balanced against the benefits perceived to be associated with it.
	2. **First-in, First-out (FIFO) method-** method of inventory costing based on the assumption that the costs of merchandise sold should be charged against revenue in the order in which the costs were incurred.
	3. **Last-in, First-out (LIFO) method-** a method of inventory costing based on the assumption that the most recent merchandise costs should be charged against revenue.