R21 Inventories

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Version 1.1

1. Introduction

Inventories are assets held by a company to produce finished goods for sale. They are shown as a current asset on the balance sheet; and can represent a significant part of the total assets for many companies.

Manufacturing and merchandising companies (Ex: Nike, Caterpillar) generate sales and profit through the sale of inventory. An important measure in calculating profits is cost of goods sold, i.e., how much cost the company incurred from procuring raw materials to converting it to a finished product, and finally selling it.

There is no universal inventory valuation method. IFRS and US GAAP allow different identification methods to measure the cost of inventory such as specific identification, weighted average cost, first in, first out, and last in, first out.

2. Cost of Inventories

When a company spends money on inventory, most of the costs are capitalized. Capitalizing means creating an asset on the balance sheet. Inventory costs that are capitalized include:

- costs of purchase (this includes the purchase price, import and tax duties, transport and handling costs).
- costs of conversion (costs such as labor, material, and overheads which are directly related to converting raw materials to finished goods).
- costs necessary to bring inventories to their present location and condition (this will include the cost of transporting goods to a showroom).

Costs that are expensed in the period incurred include:

- Abnormal costs arising due to wastage of material, labor, or other production inputs.
- Storage costs of final/finished goods.
- Administrative overheads.
- Selling costs.
- Unused portion of fixed production overhead.
- Transportation of finished goods to the customer.

Example

Kevin Corporation manufactures high-end tractors. The inventory related costs are shown below:

Raw materials	$56,000
Direct labor	$40,000
Abnormal wastage	$6,000
Transportation of raw materials	$10,000
Transportation of finished goods to showroom	$1,000
Storage of finished product	$18,000
Transport of finished product to customer	$250

What value of inventory is recorded? Which costs are expensed?

Solution:

The value of inventory is based on the costs which are capitalized. These costs are raw materials, direct labor, transportation of raw materials and transportation of finished goods to showroom: $56,000 + $40,000 + $10,000 + $1,000 = $107,000. Abnormal wastage, storage of finished product, and transport of finished product to customer are expensed in the period incurred.

3. Inventory Valuation Methods

The four inventory valuation methods for accounting inventory are:

- Specific Identification
- FIFO (First In, First Out)
- Weighted Average Cost
- LIFO (Last In, First Out)

3.1 Specific Identification

Specific identification is used when:

- Items are unique in nature and not interchangeable.
- Cost of inventory is high.
- Every item in the inventory can be tracked individually.

Under specific identification, items are shown on the balance sheet at their actual costs.

Examples: Jewelry, expensive watches, highly valued art pieces, used cars, etc.

3.2 First In, First Out (FIFO)

Under First In, First Out:

- Oldest goods purchased or manufactured are assumed to be sold first.
- Newest goods purchased or manufactured remain in ending inventory.
- When prices are increasing or stable, cost assigned to items in inventory is higher than the cost of items sold.

The following example illustrates how cost of goods sold and inventory are accounted for in each period:

Assume you bought four pencils. The first two pencils were worth $1 each and the next two pencils were worth $2 each. Before you start selling, your inventory consists of four pencils.

In period 1, you sell two pencils. The cost of pencils sold in period 1 is $2 (two pencils of $1 each). The pencils that were bought first are considered sold. Inventory at the end of period 1 is $4 and looks like this (2 pencils of $2 each):

As you could see, cost of pencils sold in period 1 was $2 (cheaper pencils bought initially) whereas the cost of pencils in inventory was $4. In period 2, you again sell two pencils. The cost of pencils sold in period 2 is $4. Inventory at the end of period 2 is 0.

Advantage of using FIFO is that it is less subject to manipulation. The ending inventory is valued based on most recent purchases. COGS is based on earliest purchase costs. Therefore, in an inflationary environment FIFO results in higher net income.

3.3 Weighted Average Cost

Under weighted average cost method, each item in inventory is valued using an average cost of all items in the inventory.

$$\text{Weighted average cost} = \frac{\text{Total cost of units available for sale}}{\text{Total units available for sale}}$$

Let's use the pencils example again to illustrate how inventory is calculated using the WAC method.

Total cost of pencils available for sales = $6

Total number of pencils available for sale = 4

Weighted average cost per pencil = $6/4 = $1.5

WAC Method	
Item	**WAC**
Cost of 2 pencils sold in period 1	$3
Inventory for 2 pencils at the end of period 1	$3
Cost of 2 pencils sold in period 2	$3
Inventory at the end of period 2	$0

3.4 Last In, First Out (LIFO)

Under Last In, First Out method:

- The newest items purchased or manufactured are assumed to be sold first.
- Oldest goods purchased or manufactured remain in ending inventory.
- The cost of goods sold reflects the cost of goods purchased or manufactured recently; the value of inventory reflects the cost of older goods purchased.

Let's continue with the pencils example to see how inventory is accounted for in LIFO:

Unlike FIFO, at the end of period 1, LIFO inventory consists of the first two pencils:

LIFO Method	
Item	**LIFO**
Cost of 2 pencils sold in period 1	$4
Inventory for 2 pencils at the end of period 1	$2
Cost of 2 pencils sold in period 2	$2
Inventory at the end of period 2	$0

LIFO is not allowed under IFRS; it is allowed only under US GAAP. Companies use LIFO during inflation to reduce taxes as cost of goods sold (COGS) is high.

Under LIFO, ending inventory is valued using earliest purchase costs. Therefore, in an inflationary environment, LIFO ending inventory will be less than current costs. Also, LIFO COGS will be higher than FIFO COGS leading to a lower net income.

4. Calculations of Cost of Sales, Gross Profit, and Ending Inventory

Based on the inventory valuation method used by a company, the allocation of inventory costs between cost of goods sold on the income statement and inventory on the balance sheet varies in periods of changing prices.

Continuing with the pencils example, assume each of the pencils was sold for $5. The table below summarizes the cost of goods sold, inventory ending value, and gross profit under each of the methods:

Inventory Accounting under Various Methods			
Item	FIFO (in $)	LIFO (in $)	WAC (in $)
COGS for period 1	2	4	3
Gross profit for period 1	8	6	7
Inventory at end of period 1	4	2	3
COGS for period 2	4	2	3
Gross profit for period 2	6	8	7
Inventory at end of period 2	0	0	0

Some points to be noted:

- The total gross profit and COGS for all the periods combined is the same under each of the methods.
- As the prices of pencils were increasing, the ending inventory was highest and COGS was lowest under FIFO.
- Similarly, the ending inventory was lowest and COGS was highest under LIFO.

Example

A company bought 400 generators at a price of $300 each on January 5. Out of these 300 generators were sold at a price of $450 each by the end of March. On April 10, 250 more generators were bought at a price of $325 each. By May 31, 225 generators were sold at a price of $500 each. For the period ending 30 June, what is the ending inventory using FIFO?

Solution:

Purchased	400
Sold	(300)
Remainder as at March 2012	100
Purchased further	250
Sold (100 old+125 new)	(225)
Remainder (new)	125
Therefore, inventory cost	125 x 325 = $40,625

5. Periodic versus Perpetual Inventory Systems

The two types of inventory systems used to keep track of changes in the inventory are:

- Periodic system
- Perpetual system

Periodic system

The company measures the quantity of inventory on hand periodically. It is not a continuous process unlike the perpetual system. Purchases are recorded in a purchases account. Ending inventory is determined through a physical count of the units in inventory.

Cost of goods sold (COGS) = Beginning Inventory + Purchases – Ending Inventory

The formula above can be rearranged to determine the value of any of the items. For example:

Ending inventory = Beginning Inventory + Purchases - COGS

Perpetual system

As the name implies, inventory and COGS are continuously updated in this system. Purchases and sale of units are directly recorded in the inventory as and when they occur.

Instructor's Note

For Specific Identification and FIFO: Periodic and perpetual systems give the same values for COGS and ending inventory.

For LIFO and WAC**:** Periodic and perpetual systems may give different values for COGS and ending inventory.

6. Comparison of Inventory Valuation Methods

The allocation of total cost of goods available for sale to COGS and ending inventory varies under different inventory valuation methods. The following table compares LIFO vs. FIFO for different parameters when prices are rising and inventory levels are stable:

LIFO vs. FIFO with rising prices and stable inventory levels		
	LIFO	**FIFO**
COGS	Higher	Lower
Taxes	Lower	Higher
Earnings before taxes (EBT)	Lower	Higher
Earnings after taxes (Net Income)	Lower	Higher
Ending inventory	Lower	Higher
Working capital (CA-CL)	Lower	Higher
Cash flow (after tax)	Higher	Lower

Instructor's Note:

Weighted average costs provide results between FIFO and LIFO. Some tips for remembering the table above are listed below:

1. Remember the pencils example of $1, $1, $2, and $2. Deducing the LIFO values from this example for COGS, net income, and ending inventory becomes simpler.
2. FIFO is the opposite of LIFO.
3. Cash flow (after tax) is higher under LIFO as taxes paid are lower.
4. Companies following US GAAP prefer LIFO because the taxes paid are lower.
5. LIFO gives a better income statement and FIFO a better balance sheet as they reflect economic reality or recent costs. Under LIFO, cost of goods sold in income statement shows the most recent costs reflecting better quality. Similarly, under FIFO ending inventory on the balance sheet shows the most recent costs, reflecting better quality.

7. The LIFO Method and LIFO Reserve

LIFO is permitted under US GAAP, but not under IFRS. Under the LIFO conformity rule, the When prices are increasing, LIFO method will result in higher COGS, lower profit, income tax expense, and net income. Due to lower taxes, the LIFO method will also result in higher after-tax cash flow.

7.1 LIFO Reserve

The LIFO reserve is the difference between the reported LIFO inventory carrying amount and the inventory amount that would have been reported if the FIFO method had been used instead. The equation for LIFO reserve is given by:

LIFO reserve = FIFO inventory value – LIFO inventory value

US GAAP requires companies using the LIFO method to disclose the amount of the LIFO reserve either in the notes to financial statements or in the balance sheet. An analyst can use the disclosure to adjust a company's COGS and ending inventory from LIFO to FIFO. This makes it easier to compare the company's performance with other companies that use FIFO.

The following formulas show how to make adjustments for inventory, COGS, and net income from LIFO to FIFO:

FIFO inventory = LIFO inventory + LIFO reserve

FIFO COGS = LIFO COGS – (ending LIFO reserve – beginning LIFO reserve)

(The adjusted COGS is also impacted by inventory write-downs)

FIFO NI = LIFO NI + change in LIFO reserve (1 - T)

FIFO retained earnings = LIFO retained earnings + LIFO reserve (1 – T)

Example

Ace Inc. uses the LIFO method for reporting inventory. Excerpts from Ace's financial statements are given below:

All numbers in millions of USD	**2014**	**2015**
Ending inventory balance	100	110
LIFO reserve at the end of the year	10	15
Cost of sales	500	550
Net income	20	25
Net cash flow from operating	22	27

1. What inventory values would Ace report for 2015 if it had used the FIFO method instead of the LIFO method?

Solution:

FIFO inventory = LIFO inventory + LIFO reserve = 110 + 15 = 125

2. What amount would Ace's cost of goods sold for 2015 be if it had used the FIFO method instead of the LIFO method?

Solution:

FIFO COGS = LIFO COGS – (ending LIFO reserve – beginning LIFO reserve) = 550 – (15 - 10) = 545

3. What net income (profit) would Ace report for 2015 if it had used the FIFO method instead of the LIFO method? Assume tax rate 30%.

Solution:

FIFO NI = LIFO NI + change in LIFO reserve (1 - T) = 25 + 5 - (5 x 0.3) = 28.5

4. By what amount would net cash flow from operating activities change if Ace used the FIFO method instead of the LIFO method?

Solution:

$CFO_{FIFO} = CFO_{LIFO} -$ impact of the change on income taxes paid = 27 – 1.5 = 25.5

5. What is the tax savings that Ace has generated in 2015 by using the LIFO method instead of the FIFO method? Assume last year tax rate 40%.

Solution:

Tax saving = change in LIFO reserve x new tax rate + last year LIFO x old tax rate = 5 x 0.3 + 10 x 0.4 = 5.5

Instructor's Note:

Listed below are some tips to remember the equations:

- In equations involving the balance sheet, such as FIFO inventory and FIFO retained earnings, use LIFO reserve.
- In equations involving the income statement, such as FIFO COGS and FIFO NI, use change in LIFO reserve.
- It can be confusing to figure out whether to add LIFO or subtract reserve. The intuitive way is to think which value is lower: FIFO or LIFO. For instance, inventory value is higher for FIFO as the last purchased units at higher prices are added to the inventory. So LIFO reserve *must be added* to LIFO inventory to get the FIFO inventory.
- But FIFO COGS is lower, so a change in reserve must be subtracted from LIFO COGS to get FIFO COGS = LIFO COGS – (ending LIFO reserve – beginning LIFO reserve).
- For FIFO, if COGS is lower, then net income and retained earnings must be higher. So, LIFO reserve/change in reserve must be added to LIFO.

8. LIFO Liquidations

In periods of rising inventory, the carrying amount of inventory under FIFO will exceed the carrying amount of inventory under LIFO. LIFO reserve is equal to the difference between LIFO inventory and FIFO inventory. LIFO reserve may increase for two reasons:

- The number of inventory units manufactured or purchased exceeds the number of units sold.
- Increasing difference between the older costs used to value inventory under LIFO and the more recent costs used to value inventory under FIFO.

If a firm is liquidating its inventory or if the prices are declining, the LIFO reserve will decline.

When the number of units sold in a period exceeds the number of units purchased/manufactured, it is called **LIFO liquidation**. In LIFO liquidation, the costs from older LIFO layers will flow to COGS and it can be used by the management to manipulate earnings and margins. The gross profits increase because the older inventory carrying amounts are used for COGS while sales are at current prices. An increase in gross profit accompanied by a decrease in LIFO reserve must be used as a warning sign. LIFO liquidation occurs for a number of reasons such as labor strikes, to reduce inventory during an economic recession when demand is low, and earnings manipulation.

The consequences of LIFO liquidation are as follows:

- COGS does not reflect recent costs during periods of rising prices.
- Overstates net income.
- Higher taxable income and higher tax payments.
- Positive cash flow.

Analysts must make the following adjustments to account for LIFO liquidation:

- Net income must be lowered.
- COGS must be adjusted to reflect current prices for the replaced units.

Example

Company A uses LIFO and has an increasing LIFO reserve. Company B uses FIFO. Company C uses LIFO and has a decreasing LIFO reserve. Which company's COGS best reflect current costs?

Solution:

Company A's COGS best reflects current costs because it uses the LIFO method and has an increasing LIFO reserve. Even though company C uses LIFO, it has a decreasing LIFO reserve, which may be an indicator of LIFO liquidation. In that case, COGS will not reflect current costs. Company B uses FIFO, hence its COGS reflects older costs.

9. Inventory Method Changes

Companies occasionally change their inventory valuation method. The change is acceptable if it results in the financial statements providing reliable and more relevant information.

If the change is justified, then it must be applied retrospectively.

Analysts must carefully analyze why a company is actually changing the inventory valuation method. Often, the company might be trying to reduce taxes or increase reported net income.

10. Inventory Adjustments

Holding inventory for a prolonged period results in the risk of spoilage, obsolescence, or decline in prices, and the cost of inventory may not be recoverable in such circumstances. We define some terms first before looking at the differences in how inventory is measured under IFRS and GAAP.

Net realizable value: Estimated selling price under ordinary business conditions minus estimated costs necessary to get the inventory in condition for sale. NRV is from a seller's perspective.

Net realizable value = estimated sales price – estimated selling costs

Market value: Current replacement cost subject to lower or upper limits. Market value has upper limit of net realizable value and lower limit of NRV less a normal profit margin. Market value is from a buyer's perspective.

Market value limits = (NRV - normal profit margin, NRV)

The following table describes how inventory is measured under IFRS and GAAP:

Inventory measurement under IFRS and US GAAP	
IFRS	**US GAAP**
Lower of cost or **net realizable value**.	Lower of cost or **market value**.
If NRV is less than the balance sheet cost, the inventory is "**written down**" to NRV. The loss in value is reflected in the income statement in cost of goods sold. Inventory write-down has a negative effect on profitability, liquidity, and solvency ratios and positive effect on activity ratios.	If cost exceeds market, inventory is **written down** to market value on the balance sheet and the loss is recognized.
If value recovers subsequently, inventory can be written up and gain is recognized in the income statement. The amount of gain is limited to loss previously recognized.	If value recovers subsequently, no write up is allowed. There is no reversal of write-downs. This may motivate companies not to record inventory write-downs unless the decline is permanent as it affects profitability ratios.
Commodities and agricultural goods prices can be reported above historical cost.	Commodities and agricultural goods prices can be reported above historical cost.

An inventory write-down reduces both profit and carrying amount of inventory on the balance sheet, which, in turn, affects the ratios. The following table shows the effect of inventory write-downs on various financial ratios:

Ratio	**Effect**	**Reason**
Liquidity ratios		
Current ratio	Lower	Current assets decrease due to lower inventory.
Activity ratios		
Inventory turnover	Higher	COGS increases assuming inventory write-downs are reported as part of cost of sales. Average inventory decreases. Lower inventory carrying amounts make it appear as if the company is managing its inventory effectively, but write-downs reflect poor inventory management.
Days of inventory on hand	Lower	Inventory turnover is higher.
Profitability ratios		
Net profit margin	Lower	Cost of sales is higher. Sales stay the same.
Gross profit margin	Lower	Cost of sales is higher. Sales stay the same.

Companies that use weighted average, specific identification, and FIFO are more likely to have inventory write-downs than companies using the LIFO method.

11. Evaluation of Inventory Management: Disclosures & Ratios

The efficiency and effectiveness of inventory management can be evaluated using the following ratios:

- Inventory Turnover
- Days of Inventory on hand
- Gross Profit Margin

An analyst must understand that the choice of inventory valuation method can impact several financial ratios and make comparisons between two firms difficult. He needs to be particularly careful when comparing an IFRS and US GAAP firm.

11.1 Presentation and Disclosure

IFRS requires the following financial statement disclosures concerning inventory:

- The accounting policies used to measure inventory, including the cost formula.
- The total carrying amount of inventories and the carrying amount in classification (for example, merchandise, raw materials, production supplies, work in progress, and finished goods appropriate to entity).
- The carrying amount of inventories carried at fair value less costs to sell.
- The amount of inventories recognized as an expense in the period (cost of sales).
- The amount of any reversal of any write-down recognized as a reduction in cost of sales in the period.
- What led to the reversal of a write-down in the inventories?
- Carrying amount of inventories pledged as a security for liabilities.

Disclosures under U.S. GAAP are similar to IFRS except that it does not permit reversal of write down of inventories. In addition, any income from liquidation of LIFO inventory must be disclosed.

11.2 Inventory Ratios

The choice of inventory valuation method impacts various components of the financial statements such as cost of goods sold, net income, current assets, and total assets. As a result, it affects the financial ratios containing these items. Analysts must consider the differences in valuation methods when evaluating a company's performance over time or in comparison to other companies.

The table below summarizes the impact of valuation method on inventory-related ratios in an inflationary environment:

Ratio	Numerator	Denominator	Impact on ratio
Inventory turnover	Cost of goods sold is higher under LIFO.	Average inventory is lower under LIFO.	Higher under LIFO.

Days of inventory	No. of days are the same.	Higher under LIFO.	Lower under LIFO.
Total asset turnover	Revenue is the same.	Lower average total assets under LIFO.	Higher under LIFO.
Current ratio	Ending inventory is lower under LIFO so current assets are lower.	Current liabilities are the same.	Lower under LIFO.
Cash ratio	Cash is higher under LIFO because taxes are lower.	Current liabilities are the same.	Higher under LIFO.
Gross profit margin	Gross profit is lower under LIFO as COGS is higher.	Revenue is the same.	Lower under LIFO.
Return on assets	Net income is lower under LIFO as COGS is higher.	Lower average total assets under LIFO.	Lower under LIFO.
Debt to equity	Debt is the same.	Lower equity under LIFO. Equity = assets – liabilities. Total assets under LIFO are lower as ending inventory is lower.	Higher under LIFO.

The ratios that are important in evaluating a company's management of inventory are inventory turnover, number of days of inventory, and gross profit margin. A high inventory turnover implies that a company is utilizing inventory efficiently.

12 &13. Illustrations of Inventory Analysis

Retailers normally report inventory in a single account. Whereas, manufacturing companies usually classify inventory into three separate accounts: raw materials, work in progress, and finished goods. These classifications can provide insights into a company's future sales and profits.

For example, a significant increase in the raw materials or work in progress inventory may be considered as a sign of increased demand, and higher future sales and profits. On the other hand, a significant increase in the finished goods inventory may be considered as a sign of slowing demand, and lower future sales and profits.

Analysts should also compare the growth rate of finished good inventory to the growth rate of sales. For example, if growth of inventories is greater than the growth of sales, this could indicate slowing demand.

Summary

LO.a: Contrast costs included in inventories and costs recognized as expenses in the period in which they are incurred.

Costs included in the inventory are:

- Cost of purchase.
- Cost of conversion.
- Fixed production overhead under normal operating capacity.
- Other costs necessary to bring the inventories to its present location and condition.

Costs that are recognized as expenses are:

- Storage costs of finished inventory.
- Abnormal costs due to waste.
- Administrative costs.
- Selling costs.

LO.b: Describe different inventory valuation methods (cost formulas).

The four inventory valuation methods are:

FIFO

- The cost of the first item purchased is assumed to be the cost of the first item sold.
- Ending inventory is based on the cost of the most recent purchases.

LIFO

- The cost of the last item purchased is assumed to be the cost of the first item sold.
- Ending inventory is based on the cost of the earliest purchases.

Weighted average cost

- Each item in the inventory is valued using an average cost of all items in the inventory.
- COGS and inventory values are between their FIFO and LIFO values.

Specific identification

- Each unit sold is matched with the unit's actual cost.
- This method is usually used for items that are unique in nature, for example, jewelry.

All four methods are permitted under U.S. GAAP. However, IFRS does not permit LIFO method.

LO.c: Calculate and compare cost of sales, gross profit, and ending inventory using different inventory valuation methods and using perpetual and periodic inventory systems.

Suppose you bought 10 shirts for $1 each on 1st Jan and bought 5 shirts for $1.5 each on 15th Jan. You sold 7 shirts for $2 each on 20th Jan. Inventory accounting under various methods is as follows:

Item	FIFO (in $)	LIFO (in $)	WAC (in $)
COGS for period	7 * 1 = 7	(5 * 1.5) + 2 = 9.5	(1.17 * 7) = 8.17
Gross profit for period	(7 * 2) – 7 = 7	(7 * 2) – 9.5 = 4.5	(7 * 2) – 8.17 = 5.8
Inventory at end of period	(5 * 1.5) + 3 = 10.5	8 * 1 = 8	8 * 1.17 = 9.33

Periodic system: The company measures the quantity of inventory on hand periodically.

Cost of goods sold (COGS) = Beginning Inventory + Purchases – Ending Inventory

Perpetual system: As the name implies, inventory and COGS are continuously updated in this system. Purchases and sale of units are directly recorded in the inventory as and when they occur.

Specific Identification and FIFO: Periodic and perpetual systems give the same values for COGS and ending inventory.

LIFO and WAC: Periodic and perpetual systems may give different values for COGS and ending inventory.

LO.d: Calculate and explain how inflation and deflation of inventory costs affect the financial statements and ratios of companies that use different inventory valuation methods.

The following table compares LIFO and FIFO when prices are rising and inventory levels are stable. (We get the opposite effect during periods of falling prices)

LIFO vs. FIFO with rising prices and stable inventory levels		
	LIFO	**FIFO**
COGS	Higher	Lower
Taxes	Lower	Higher
Earnings before taxes (EBT)	Lower	Higher
Earnings after taxes (Net Income)	Lower	Higher
Ending inventory	Lower	Higher
Working capital (CA-CL)	Lower	Higher
Cash flow (after tax)	Higher	Lower

For weighted average costs, all values will be between those for the LIFO and FIFO methods.

LO.e: Explain LIFO reserve and LIFO liquidation and their effects on financial statements and ratios.

LIFO reserve = FIFO inventory value – LIFO inventory value

A LIFO liquidation occurs when a firm using LIFO sells more inventory during a period than it produces/purchases. This results in an unsustainable increase in the gross profit margin because the firm is tapping into old lower-cost inventory.

LO.f: Demonstrate the conversion of a company's reported financial statements from LIFO to FIFO for purposes of comparison.

FIFO inventory = LIFO inventory + LIFO reserve

FIFO COGS = LIFO COGS – (ending LIFO reserve – beginning LIFO reserve)

FIFO NI = LIFO NI + change in LIFO reserve (1 - T)

FIFO retained earnings = LIFO retained earnings + LIFO reserve (1 – T)

LO.g: Describe the measurement of inventory at the lower of cost and net realizable value.

Net realizable value: It is calculated as estimated selling price under ordinary business conditions minus estimated costs necessary to get the inventory in condition for sale.

Net realizable value = estimated sales price – estimated selling costs

Market value: It is the current replacement cost subject to lower or upper limits. Market value has upper limit of net realizable value and lower limit of NRV less a normal profit margin.

Market value limits = (NRV - normal profit margin, NRV)

Under IFRS, inventories are valued at the lower of cost or net realizable value. Inventory write-ups are allowed but only to the extent a previous write-down to net realizable value was recorded.

Under US GAAP, inventories are valued at lower of cost or market. If cost exceeds market, inventory is written down. No subsequent write-ups are allowed.

LO.h: Describe implications of valuing inventory at net realizable value for financial statements and ratios.

When inventory is written down from cost to net realizable value:

- It decreases inventory, assets, and equity.
- It increases asset turnover, debt to equity ratio, and the debt to assets ratio.
- It results in a loss on the income statement, which decreases net income, net profit margin, return on assets, and return on equity.

LO.i: Describe the financial statement presentation of and disclosures relating to inventories.

IFRS requires the following financial statement disclosures concerning inventory:

- The accounting policies used to measure inventory, including the cost formula.
- The total carrying amount of inventories and the carrying amount in classification.

- The carrying amount of inventories carried at fair value less costs to sell.
- The amount of inventories recognized as an expense in the period (cost of sales).
- The amount of any reversal of any write-down recognized as a reduction in cost of sales in the period.
- What led to the reversal of a write-down in the inventories?
- Carrying amount of inventories pledged as a security for liabilities.

Disclosures under U.S. GAAP are similar to IFRS except that U.S. GAAP does not permit reversal of write-down of inventories. In addition, any income from liquidation of LIFO inventory must be disclosed.

LO.j: Explain issues that analysts should consider when examining a company's inventory disclosures and other sources of information.

- If finished goods inventory is increasing while raw material and work in progress inventory is decreasing, then this may indicate decreasing demand for the product.
- If raw material and work in progress inventory is increasing, then this may indicate increasing demand for the product.
- If finished goods inventory is increasing at a greater rate than increases in sales, then this may indicate decreasing demand for the product.

LO.k: Calculate and compare ratios of companies, including companies that use different inventory methods.

The table below summarizes the impact of valuation method on inventory-related ratios:

Ratio	Numerator	Denominator	Impact on ratio
Inventory turnover	Cost of goods sold is higher under LIFO.	Average inventory is lower under LIFO.	Higher under LIFO.
Days of inventory	No. of days are the same.	Higher under LIFO.	Lower under LIFO.
Total asset turnover	Revenue is the same.	Lower average total assets under LIFO.	Higher under LIFO.
Current ratio	Ending inventory is lower under LIFO so current assets are lower.	Current liabilities are the same.	Lower under LIFO.
Gross profit margin	Gross profit is lower under LIFO as COGS is higher.	Revenue is the same.	Lower under LIFO.
Return on assets	Net income is lower under LIFO as COGS is higher.	Lower average total assets under LIFO.	Lower under LIFO.

Debt to equity	Debt is the same.	Lower equity under LIFO. Equity = assets – liabilities. Total assets under LIFO are lower as ending inventory is lower.	Higher under LIFO.

LO. l: Analyze and compare the financial statements of companies, including companies that use different inventory methods.

Before comparing the financial statements of companies that use different inventory methods, we need to adjust the statements so that they reflect the same inventory costing methods.

Practice Questions

1. Which of the following costs is *least likely* included in a firm's ending inventory?
   A. Storage costs related to production.
   B. Transportation cost incurred to bring inventory to the business location.
   C. Costs incurred as a result of abnormal waste.

2. ABC Inc. reports under IFRS. Which inventory valuation method will the company *least likely* use?
   A. LIFO.
   B. FIFO.
   C. Specific identification.

3. The balance sheet inventory values will reflect the most recent costs if a company accounts for inventory using the:
   A. FIFO method.
   B. LIFO method.
   C. weighted average cost method.

4. Company A uses the FIFO method, and company B uses the LIFO method. Assuming stable inventory quantities during periods of rising prices, the cost of goods sold reported by:
   A. company A would be higher.
   B. company B would be higher.
   C. both companies will be the same.

5. The information on a company's inventory is given below:
   - Opening inventory 0 units
   - 1st purchase 50 units at $4/unit
   - 2nd purchase 100 units at $4.5/unit
   - 3rd purchase 120 units at $5/unit
   - Total Sales 200 units at $6/unit

   Using a periodic inventory system and the weighted average method, the ending inventory value is *closest* to:
   A. $324.
   B. $366.
   C. $395.

6. A company uses a periodic inventory system and calculates inventory and COGS at the end of the year. The beginning of the year inventory of the company was 30 units at $2 per unit. During the year the company's inventory purchases were

Quarter	Units Purchased	Cost per unit
1	50	$2
2	30	$2.5
3	25	$3
4	20	$4

The company sold a total of 70 units during the year. Its COGS for the year under FIFO and LIFO are:

	FIFO	LIFO
A.	$217.5	$140
B.	$160	$196.5
C.	$140	$217.5

7. Company A operates in an environment of falling prices. Its reported profits will tend to be the highest if it accounts for inventory using the:
   A. FIFO method.
   B. LIFO method.
   C. weighted average method.

8. During periods of rising prices, a LIFO liquidation will:
   A. reduce cost of goods sold.
   B. reduce gross margins.
   C. increase LIFO reserve.

9. Company A accounts for inventory using the LIFO method. During the current period it reported a COGS of $40,000 and an ending inventory of $15,000. Its LIFO reserve decreased from $5,000 to $4,000 over the period. If the firm had reported using FIFO, its COGS would have been:
   A. $39,000.
   B. $40,000.
   C. $41,000.

10. The following information is available for a manufacturing company:

Cost of ending inventory computed using FIFO	$1.5 million
Net realizable value	$1.4 million
Current replacement cost	$1.3 million

If the company uses International Financial Reporting Standards (IFRS), instead of U.S. GAAP, its cost of goods sold ($ millions) is *most likely*:
   A. the same.
   B. 0.1 lower.
   C. 0.1 higher.

11. Company A adheres to US GAAP whereas company B adheres to IFRS. It is *most likely* that:
    A. company A has reversed an inventory write-down.
    B. company B has reversed an inventory write-down.
    C. both companies use the LIFO inventory accounting method.

12. Company A uses LIFO method, company B uses FIFO method. During a period of rising prices, as compared to company B, company A will *most likely* have a higher:
    A. current ratio.
    B. gross margin.
    C. inventory turnover.

13. Compared to the industry average, a company has a high inventory turnover and lower sales growth. The company is *most likely*:
    A. managing its inventory efficiently.
    B. losing sales by not carrying enough inventory.
    C. has slow moving or obsolete inventory.

Solutions

1. C is correct. Costs incurred as a result of abnormal waste must be expensed.

2. A is correct. LIFO is not permitted under IFRS; it is only allowed under US GAAP.

3. A is correct. Under FIFO, ending inventory consists of items that were most recently purchased. Therefore, balance sheet inventory values reflect the most recent costs.

4. B is correct. When prices are increasing and inventory quantities are stable or increasing, LIFO results in higher COGS as compared to FIFO.

5. A is correct.
   Ending Inventory Weighted Average Calculations

	Units	**$/unit**	**Total $**
Purchase #1	50	$4	$200
Purchase #2	100	$4.5	$450
Purchase #3	120	$5	$600
Total available	270		$1,250

   Average cost 1,250 ÷ 270 = $4.63
   Ending inventory 270 – 200 = 70 units
   Ending inventory value = 70 x $4.63 = $324.1

6. C is correct.
   FIFO COGS:
   30 units from beginning inventory x $2 per unit = $60.
   40 units from Quarter 1 x $2 per unit = $80
   Total = $140
   LIFO COGS:
   20 units from Quarter 4 x $4 per unit = $80
   25 units from Quarter 3 x $3 per unit = $75
   25 units from Quarter 2 x $2.5 per unit = $62.5
   Total = $217.5

7. B is correct. In an environment of falling prices, the most recent inventory is the lowest-cost inventory. Therefore, selling the newer, cheaper inventory first (LIFO) will result in lower cost of sales and higher profit.

8. A is correct. When a LIFO liquidation occurs, older and lower-cost inventory is included in the cost of goods sold. Thus, the cost of goods sold decreases.

9. C is correct.
   FIFO COGS = LIFO COGS – change in LIFO reserve.
   FIFO COGS = $40,000 – ($4,000 - $5,000) = $41,000.

10. B is correct. Under IFRS, the inventory would be written down to its net realizable value ($1.4 million), whereas under U.S. GAAP market is defined as current replacement cost and hence would be written down to its current replacement cost ($1.3 million). The smaller write-down under IFRS will reduce the amount charged to the cost of goods sold as compared with U.S. GAAP, and result in a lower cost of goods sold of $0.1 million.

11. B is correct. US GAAP does not permit inventory write-downs to be reversed. LIFO is not allowed under IFRS.

12. C is correct. During a period of rising prices, ending inventory under LIFO will be lower than that of FIFO and cost of goods sold higher. Therefore, inventory turnover (COGS/average inventory) will be higher. Since COGS will be higher for Company A, gross margin which is (sales - COGS) / Sales, would be lower. Since ending inventory would be lower for Company A, current ratio will also be lower.

13. B is correct. High inventory turnover combined with low sales growth indicates that the company is not maintaining adequate inventory levels to meet sales.