

Al-Qadisiya University
Administration & Economic College
Accounting Department

Advance Cost Accounting

كفة متقدمة / الكورس الأول

1

قسم المحاسبة - المرحلة الرابعة

د. علي الزاهلي

Contents

الكورس الأول :

Ch. 1 : Introduction in Cost Accounting

Ch. 2 : Static and Flexible Budget

Ch. 3 : Standard Costing and Variance Analysis

Ch. 4 : Accounting Procedures for Standard Costing

Ch. 5 : Gross Profit Analysis

Appendix : Other Subjects - Standard Costs System in Process

Costing

Concept of Cost Accounting :

Cost accounting is the process of determining and accumulating the cost of product or activity . It is a process of accounting for the measurement and the control of cost .

Cost accounting is the process of recording, classifying, analyzing, summarizing, and allocating costs associated with a process, product and activity for costs control . Cost accounting provides information about control current operations and plan for the future .

The functional activities are included in the scope of cost accounting can be explain as follows :

1. **Cost Book Keeping :** Cost accounting records of all costs incurred in departments, activities, products and services in the company during the period .
2. **Cost System :** Systems and procedures are devised for proper accounting for costs . A cost accounting system is a framework used by firms to estimate the cost of products .
3. **Cost Ascertainment :** Ascertaining cost of products, processes, jobs, services, etc., it becomes the basis of managerial decision making such as pricing, planning and control .
4. **Cost Analysis :** It involves the process of finding out the causal factors of actual costs varying from the budgeted costs and fixation of responsibility for cost increases .
5. **Cost Control :** It involves a detailed examination of each cost for analyzed to know whether the current level of costs is satisfactory in the light of standards set in advance .
6. **Cost Reduction :** It is the process used by companies to reduce their costs and increase their profits . Depending on a company's services or product, the strategies can vary .
7. **Cost Reports :** Presentation of cost is the ultimate function of cost accounting . Cost reports form the basis for planning and control, performance appraisal and managerial decision making .

Objectives of Cost Accounting :

Cost accounting has the following main objectives, as follows :

1. Determining selling price .
2. Controlling cost .
3. Providing information for decision making .

This objectives can be explained as follows :

1. Determining Selling Price : The total product cost and cost per unit of product are important in deciding selling price of product in the company .
2. Controlling Cost : Cost accounting helps in controlling cost by using various techniques such as budgetary control, Standard costing, and inventory control .
3. Providing Information for Decision Making : Cost accounting provides information for decision making as follows :
 - a. Determination of cost volume profit relationship .
 - b. Make or buy a component .
 - c. Shut down or continue operation at a loss .
 - d. Continuing with the existing machinery or replacing them by improved and economical machines .

Importance of Cost Accounting :

The importance of cost accounting are three points, as follows :

1. Importance to management .
2. Importance to employees .
3. Cost accounting and creditors .

This Importance can be explained as follows :

1. Importance to Management : Cost accounting provides invaluable help to management. It is difficult to indicate where the work of cost accountant ends and managerial control begins . The advantages are as follows :
 - a. Determining the Costs of Cost Objectivities .
 - b. Helps in Cost Reduction .
 - c. Elimination of Wastage .
 - d. Helps in Identifying Unprofitable Activities .
 - e. Helps in Fixing Selling Prices .
 - f. Helps in Inventory Control and Estimate .

2. Importance to Employees : employees have an interest in which they are employed. An efficient costing system benefits employees through incentives plan in their enterprise, etc..
3. Cost accounting and creditors : Suppliers, investor's financial institution and other moneylenders have a stake in the success of the business concern and efficient costing system .

Difference between Cost Accounting and Financial Accounting :

The differences between cost accounting and financial accounting can be explain as follows :

Difference between Cost Accounting and Financial Accounting

Basis	Cost accounting	Financial Accounting
Objective	It provides information about the cost to control cost and for decision making .	It provides information about the financial performance and financial position of the business .
Recording of Data	It records and presents the estimated / budgeted data.	It records historical data .
Users of Information	The cost accounting is used by internal management at different levels .	The users of financial accounting are shareholders, creditors and government etc. .
Analysis of Costs & Profit	It provides the details of cost and profit of each product .	It shows the profit/ loss of the organization .
Time Period	Its reports and statements are prepared when required .	Financial Statements are prepared usually a year .
Presentation of Information	There are not any set formats for presenting cost information .	A set format is used for presenting financial information .
Information Characteristics	Current / forecasted, Quantitative / qualitative, Monetary / nonmonetary .	Historical, Quantitative, Monetary and Verifiable .

General Principles of Cost Accounting :

Following are the main principles of cost accounting :

1. Cause-effect relationship .
2. Charge of cost only after its incurrence .
3. Past costs should not form part of future costs .
4. Exclusion of abnormal costs from cost accounts .
5. Principles of double entry should be followed preferably .

Questions :

1. Define the following : Cost Accounting , Cost Book Keeping, Cost System , Cost Ascertainment , Cost Analysis , Cost Control , Cost Reduction , Cost Reports .
2. What are the objectives of cost accounting ? .
3. Cost accounting provides information for decision making, explain ? .
4. Explain the importance of cost accounting ? .
5. Explain the importance of cost account to management ? .
6. Explain the importance of cost account to employees ? .
7. Explain the importance of cost account to creditors ? .
8. What are the difference between cost accounting and financial accounting ? .
9. What are the main principles of cost accounting ? .
10. Fill the following :
 - a. Cost accounting is the process of,,,, and allocating costs associated with a process, product and activity for costs control .
 - b. Cost accounting provides information about and
 - c. A cost accounting system is a framework used by firms to estimate the.
 - d. The total product cost and cost per unit of product are important in.
 - e. Cost accounting helps in controlling cost by using various techniques such as, and

Chapter**2****Static and Flexible Budget**

Examples (1) :

The following data concerned with Hanford Company during 2020 :

Data	Actual Results	Static Budget
Sales Units	8000 Unit	10000 Unit
Sales Price Per Unit	\$12	\$15
Cost Per Unit	\$10	\$14
Fixed Cost	\$14000	\$7000

Required :

1. Prepare the income statement based on actual results, flexible budget and static budget .
2. Compute the total static budget variance .

Solution :

1. Income statement based on actual results, flexible and static budget :

Data	Actual Results	Flexible Budget	Static Budget
Sales Units	8000 Unit	8000 Unit	10000 Unit
Income Statement :			
Revenues	(8000 × 12) 96000	(8000 × 15) 120000	(10000 × 15) 150000
- Variable Costs	(8000 × 10) (80000)	(8000 × 14) (112000)	(10000 × 14) (140000)
= Contribution Margin	16000	8000	10000
- Fixed Costs	(14000)	(7000)	(7000)
= Operating Income	2000	1000	3000

2. Compute the total static budget variance :

$$\begin{aligned}\text{Flexible Budget Variance} &= 2000 - 1000 &= + 1000 \text{ Fav.} \\ \text{Total Sales Volume Variance} &= 1000 - 3000 &= - 2000 \text{ Unfav.} \\ \text{Total Static Budget Variance} &= (+1000) + (-2000) &= - 1000 \text{ Unfav.}\end{aligned}$$

Examples (2) :

The following data concerned with Gillman Company during 2020 :

Data	Actual Results	Static Budget
Sales Units	100000 Unit	90000 Unit
Sales Price Per Unit	\$250	\$400
Cost Per Unit	\$200	\$310
Fixed Cost	\$4000000	\$6000000

Required :

1. Prepare the income statement based on actual results, flexible budget and static budget .
2. Compute the total static budget variance .

Solution :

1. Income statement based on actual results, flexible and static budget :

Data	Actual Results	Flexible Budget	Static Budget
Sales Units	100000 Unit	100000 Unit	90000 Unit
Income Statement :			
Revenues	(100000 × 250) 25000000	(100000 × 400) 40000000	(90000 × 400) 36000000
- Variable Costs	(100000 × 200) (20000000)	(100000 × 310) (31000000)	(90000 × 310) (27900000)
= Contribution Margin	5000000	9000000	8100000
- Fixed Costs	(4000000)	(6000000)	(6000000)
= Operating Income	\$1000000	\$3000000	\$2100000

2. Compute the total static budget variance :

$$\begin{aligned}
 \text{Flexible Budget Variance} &= 1000000 - 3000000 = - 2000000 \text{ Unfav.} \\
 \text{Total Sales Volume Variance} &= 3000000 - 2100000 = + 900000 \text{ Fav.} \\
 \text{Total Static Budget Variance} &= (-2000000) + (+900000) = - 1100000 \text{ Unfav.}
 \end{aligned}$$

Example (3) :

The variable and fixed costs based on normal capacity level (500 DLH) for Scanlon Company during March 2020 as follows :

1. Variable Costs :

Indirect Materials	\$150
Indirect Labor	\$550
Equipment's Expenses	\$350
Maintenance and Repairs	\$175
Heating and lighting	\$200

2. Fixed Costs :

Insurance	\$600
Depreciation	\$800
Rents	\$700

Required :

1. Preparing a flexible budget within of the relevance range of capacity for five levels .
2. Calculate allocated rates for natural capacity .
3. Expressing a flexible budget in the form of an equation for normal capacity .

Solution :

1. Flexible budget within of the relevance range of capacity :

Costs Elements	Cost Per Unit	Capacity Levels / Direct Labor Hours				
		300	400	500	600	700
<u>Variable Costs :</u>						
Indirect Materials	0.3	90	120	150	180	210
Indirect Labor	1.1	330	440	550	660	770
Equipment's Expenses	0.7	210	280	350	420	490
Maintenance and Repairs	0.35	105	140	175	210	245
Heating and lighting	0.4	120	160	200	240	280
Total	2.85	855	1140	1425	1710	1995
<u>Fixed Costs :</u>						
Insurance		600	600	600	600	600
Depreciation		800	800	800	800	800
Rents		700	700	700	700	700
Total		2100	2100	2100	2100	2100
Total FOH.		2955	3240	3525	3810	4095

2. Allocated rates for natural capacity :

Variable Allocated Rate	=	$\frac{\text{Cost}}{\text{Allocated Bases}}$	=	$\frac{\$1425}{500 \text{ DLH.}}$	=	\$2.85 Hrs.
Fixed Allocated Rate	=	$\frac{\text{Cost}}{\text{Allocated Bases}}$	=	$\frac{\$2100}{500 \text{ DLH.}}$	=	\$4.2 Hrs.
Total Allocated Rate	=	$\frac{\text{Cost}}{\text{Allocated Bases}}$	=	$\frac{\$3525}{500 \text{ DLH.}}$	=	\$7.05 Hrs.

3. Expressing a flexible budget in the form of an equation for natural capacity :

$$\begin{aligned}
 \text{Total Cost} &= \text{Fixed Costs} + (\text{Production Volume} \times \text{Cost Per Unit}) \\
 &= 2100 + (500 \times 2.85) \\
 &= \$3525
 \end{aligned}$$

Example (4) :

The relevance range between 100 – 300 direct labor hours for Vulcan Company, the normal capacity level is 200 hours, The variable cost per unit and fixed costs for this department based on normal capacity level during September 2018 as follows :

1. Variable Cost Per Unit :	
Indirect Labor	\$2.5
Equipment's Expenses	\$1.5
2. Fixed Costs :	
Depreciation	\$225
Rents	\$300

Required :

1. Preparing a flexible budget within of the relevance range of capacity .
2. Calculate allocated rates for natural capacity .
3. Expressing a flexible budget in the form of an equation for normal capacity .

Solution :

1. Flexible budget within of the relevance range of capacity :

Costs Elements	Cost Per Unit	Capacity Levels / Direct Labor Hours		
		100	200	300
<u>Variable Costs :</u>				
Indirect Labor	2.5	250	500	750
Equipment's Expenses	1.5	150	300	450
Total	4	400	800	1200
<u>Fixed Costs :</u>				
Depreciation		225	225	225
Rents		300	300	300
Total		525	525	525
Total FOH.		925	1325	1725

2. Allocated rates for natural capacity :

$$\text{Variable Allocated Rate} = \$800 \div 200 \text{ DLH.} = \$4 \text{ Hrs.}$$

$$\text{Fixed Allocated Rate} = \$525 \div 200 \text{ DLH.} = \$2.625 \text{ Hrs.}$$

$$\text{Total Allocated Rate} = \$1325 \div 200 \text{ DLH.} = \$6.625 \text{ Hrs.}$$

3. Expressing a flexible budget in the form of an equation for natural capacity :

$$\begin{aligned} \text{Total Cost} &= \text{Fixed Costs} + (\text{Production Volume} \times \text{Cost Per Unit}) \\ &= 525 + (4 \times 200) \\ &= \$1325 \end{aligned}$$

Exercises :

Exercise (1) :

Pizza company operates a meal home-delivery service . It has agreements with 20 restaurants to pick up and deliver meals to customers who phone or fax orders to Pizza company. The company allocates variable and fixed overhead costs on the basis of delivery time. The company's owner, Allen Carter, obtains the following information for January 2018 overhead costs :

Data	Actual Results	Static Budget
Sales Units	16000 Unit	20000 Unit
Sales Price Per Unit	\$24	\$30
Cost Per Unit	\$20	\$28
Fixed Cost	\$28000	\$14000

Required :

Prepare the income statement based on actual results, flexible budget and static budget, and compute the total static budget variance .

Exercise (2) :

Douglass company uses the static and flexible budget system . The following table shows the budgeted amounts and actual results related to overhead for December 2018 :

Data	Actual Results	Static Budget
Sales Units	200000 Unit	180000 Unit
Sales Price Per Unit	\$500	\$800
Cost Per Unit	\$400	\$620
Fixed Cost	\$8000000	\$12000000

Required :

Prepare the income statement based on actual results, flexible budget and static budget, and Compute the total static budget variance .

Exercise (3) :

The following data concerned with Hanford Company during 2020 :

1. Actual Results	
Sales Units	16000 Unit
Sales Price Per Unit	\$24
Cost Per Unit	\$20
Fixed Cost	\$28000

2. Static Budget	
Sales Units	20000 Unit
Sales Price Per Unit	\$30
Cost Per Unit	\$28
Fixed Cost	\$14000

Required :

1. Prepare the income statement based on actual results, flexible budget and static budget .
2. Compute the total static budget variance .

Exercise (4) :

The following data relates to the manufacturing department of Karloff Company . The relevance range between 800 - 1200 direct labor hours, This department is based on the normal capacity rate of 1000 direct labor hours per month, The following costs of the manufacturing department under normal capacity during July 2018 :

1. Variable Costs :

Indirect Materials	\$800
Indirect Labor	\$1100
Equipment's Expenses	\$600
Maintenance and Repairs	\$1650

2. Fixed Costs :

Insurance	\$1200
Depreciation	\$1600
Rents	\$1400

Required :

1. Preparing a flexible budget within of the relevance range of capacity .
2. Calculate allocated rates for natural capacity .
3. Expressing a flexible budget in the form of an equation for normal capacity .

Exercise (5) :

The following data relates to the elements of factory overhead based on planning hours for maintenance department in Doffed Company, the relevance range between 400 – 600 direct labor hours, the normal capacity level is 500 hours, The variable cost per unit and fixed costs for based on normal capacity level during April 2018 as follows :

1. Variable Cost Per Unit :	
Indirect Labor	\$2.7
Utility Expenses	\$1.8
2. Fixed Costs :	
Depreciation	\$450
Rents	\$550

Required :

1. Preparing a flexible budget within of the relevance range of capacity .
2. Calculate allocated rates for natural capacity .
3. Expressing a flexible budget in the form of an equation for normal capacity .

Chapter**3****Standard Costing and Variance Analysis**

Example (1) :

Dowlas Company uses standard cost system . The following data concerned with its product during Jun 2018 :

Number of production unit 400 unit .

Actual price for direct material \$25 .

Actual quantity for direct material used in production 2000 kg. .

Standard price for direct material \$23 .

Standard quantity per unit 4 kg. .

Standard quantity for total 1600 kg. (400 unit * 4 kg.)

Required :

Compute the price and quantity variances for direct materials .

Solution :

$$\begin{aligned}\text{Total Variance of DM} &= (\text{AQ} \times \text{AP}) - (\text{SQ} \times \text{SP}) \\ &= (2000 \times 25) - (1600 \times 23) \\ &= 50000 - 36800 &= + 13200 \text{ Unfav.}\end{aligned}$$

$$\begin{aligned}1. \text{ Price Variance} &= (\text{AP} - \text{SP}) \times \text{AQ} \\ &= (25 - 23) \times 2000 \\ &= 2 \times 2000 &= + 4000 \text{ Unfav.}\end{aligned}$$

$$\begin{aligned}2. \text{ Quantity Variance} &= (\text{AQ} - \text{SQ}) \times \text{SP} \\ &= (2000 - 1600) \times 23 \\ &= 400 \times 23 &= + 9200 \text{ Unfav.}\end{aligned}$$

Example (2) :

Poly Containers makes plastic water tanks for a variety of commercial uses . The standard per unit of material are as follows :

Data	Standard Quality	Standard Price
Material (A)	3 Pounds	\$4 Per Pound
Material (B)	5 Pounds	\$2 Per Pound
Material (C)	2 Pounds	\$3 Per Pound

During May 2018, the company produced 600 tanks and 400 tanks work in process (50% completed) . Actual data for May 2018 are as follows :

1. Material (A) purchased and used 3200 pounds @ \$5 per pound .
2. Material (B) purchased and used 3800 pounds @ \$3 per pound .
3. Material (C) purchased and used 1500 pounds @ \$2 per pound .

Required :

Compute the price and quantity variances for direct materials .

Solution :

Production Volume During Period = $600 + (400 \times 50\%) = 800$ tanks

Total Variance of DM	$= (AQ \times AP) - (SQ \times SP)$	
Material (A)	$= (3200 \times 5) - (800 \times 3 \times 4)$	$= \$6400$ Unfav.
Material (B)	$= (3800 \times 3) - (800 \times 5 \times 2)$	$= \$3400$ Unfav.
Material (C)	$= (1500 \times 2) - (800 \times 2 \times 3)$	$= \underline{\$1800}$ Fav.
		<u>$\\$8000$ Unfav.</u>
1. Price Variance	$= (AP - SP) \times AQ$	
Material (A)	$= (5 - 4) \times 3200$	$= \$3200$ Unfav.
Material (B)	$= (3 - 2) \times 3800$	$= \$3800$ Unfav.
Material (C)	$= (2 - 3) \times 1500$	$= \underline{\$1500}$ Fav.
		<u>$\\$5500$ Unfav.</u>
2. Quantity Variance	$= (AQ - SQ) \times SP$	
Material (A)	$= (3200 - 2400) \times 4$	$= \$3200$ Unfav.
Material (B)	$= (3800 - 4000) \times 2$	$= \$400$ Fav.
Material (C)	$= (1500 - 1600) \times 3$	$= \underline{\$300}$ Fav.
		<u>$\\$2500$ Unfav.</u>

Example (3) :

Gloria Dee Inc. use job order costing system . The following data concerned with three completed job order during February 2018 :

1. Actual quantity and price for direct material used in production :

Job Order	Actual Quantity	Actual Price
Job Order No. (10)	2500 Unit	\$5
Job Order No. (11)	5500 Unit	\$4
Job Order No. (12)	5000 Unit	\$7

2. Standard quantity and price of direct material for completed job order :

Job Order	Standard Quantity	Standard Price
Job Order No. (10)	2700 Unit	\$5
Job Order No. (11)	5000 Unit	\$5
Job Order No. (12)	4000 Unit	\$6

Required :

Compute the price and quantity variances for direct materials .

Solution :

Total Variance of DM :	= (AQ × AP) – (SQ × SP)	
Job Order No. (10)	= (2500 × 5) – (2700 × 5)	= \$1000 Fav.
Job Order No. (11)	= (5500 × 4) – (5000 × 5)	= \$3000 Fav.
Job Order No. (12)	= (5000 × 7) – (4000 × 6)	= <u>\$11000 Unfav.</u>
		<u>\$7000 Unfav.</u>
1. Price Variance :	= (AP – SP) × AQ	
Job Order No. (10)	= (5 – 5) × 2500	= Zero
Job Order No. (11)	= (5 – 4) × 5500	= \$5500 Fav.
Job Order No. (12)	= (6 – 7) × 5000	= <u>\$5000 Unfav.</u>
		<u>\$500 Fav.</u>
2. Quantity Variance :	= (AQ – SQ) × SP	
Job Order No. (10)	= (2500 – 2700) × 5	= \$1000 Fav.
Job Order No. (11)	= (5500 – 5000) × 5	= \$2500 Unfav.
Job Order No. (12)	= (5000 – 4000) × 6	= <u>\$6000 Unfav.</u>
		<u>\$7500 Unfav.</u>

Example (4) :

Genuine Nut Company produces 100-ounce cans of mixed pecans and cashews. Standard and actual information follows :

Standard quantities and prices :

Material (X) : 40 ounces at \$0.75 per pound

Material (Y) : 10 ounces at \$0.50 per pound

Material (Z) : 50 ounces at \$0.20 per pound

Actual quantities and prices :

Material (X) : 1400 pounds at \$0.8 per pound

Material (Y) : 400 pounds at \$0.52 per pound

Material (Z) : 3200 pounds at \$0.21 per pound

After process of mix and production treatments the company obtained one unit its standard weight 90 kg., the completed production during April 2018 was 48 unit .

Required :

Compute the price, quantity, mix and yield variances for direct materials .

Solution :

Total Variance of DM	=	$(AQ \times AP) - (SQ \times SP)$	
Material (X)	=	$(1400 \times 0.8) - (48 \times 40 \times 0.75)$	= \$320 Fav.
Material (Y)	=	$(400 \times 0.52) - (48 \times 10 \times 0.5)$	= \$32 Fav.
Material (Z)	=	$(3200 \times 0.21) - (48 \times 50 \times 0.2)$	= <u>\$192 Unfav.</u>
			<u>\$160 Fav.</u>
1. Price Variance	=	$(AP - SP) \times AQ$	
Material (X)	=	$(0.8 - 0.75) \times 1400$	= \$70 Unfav.
Material (Y)	=	$(0.52 - 0.5) \times 400$	= \$8 Unfav.
Material (Z)	=	$(0.21 - 0.2) \times 3200$	= <u>\$32 Unfav.</u>
			<u>\$110 Unfav.</u>
2. Quantity Variance	=	$(AQ - SQ) \times SP$	
Material (X)	=	$(1400 - 1920) \times 0.75$	= \$390 Fav.
Material (Y)	=	$(400 - 480) \times 0.5$	= \$40 Fav.
Material (Z)	=	$(3200 - 2400) \times 0.2$	= <u>\$160 Unfav.</u>
			<u>\$270 Fav.</u>

Material	Standard Quantity Per Unit	Standard Price	Standard Cost Per Unit
X	40 Ounces	\$0.75	\$30
Y	10 Ounces	\$0.5	\$5
Z	50 Ounces	\$0.2	\$10
Total	<u>100 Ounces</u>		<u>\$45</u>

$$\text{Weight Average Standard Cost of Input Material} = \frac{45}{100} = \$0.45$$

$$\text{Weight Average Standard Cost of Output Material} = \frac{45}{90} = \$0.5$$

Solution :

$$\begin{aligned} \text{Total Variance of DL} &= (\text{AH} \times \text{AR}) - (\text{SH} \times \text{SR}) \\ &= (4000 \times 50) - (6400 \times 46) \\ &= 200000 - 294400 &= - 94400 \text{ Fav.} \end{aligned}$$

$$\begin{aligned} 1. \text{ Rate Variance} &= (\text{AR} - \text{SR}) \times \text{AH} \\ &= (50 - 46) \times 4000 \\ &= 4 \times 4000 &= + 16000 \text{ Unfav.} \end{aligned}$$

$$\begin{aligned} 2. \text{ Efficiency Variance} &= (\text{AH} - \text{SH}) \times \text{SR} \\ &= (4000 - 6400) \times 46 \\ &= - 2400 \times 46 &= - 110400 \text{ Fav.} \end{aligned}$$

Example (6) :

Dolan Inc. uses standard cost system . The following data concerned with its direct labor during Jun 2018 :

1. Actual data :

Completed unit 80 unit .

Work in process 40 unit (50% completed) .

Actual work hours :

Work category (1) : 480 hour @ \$50 per hour .

Work category (2) : 300 hour @ \$30 per hour .

Work category (3) : 250 hour @ \$15 per hour .

2. Standard data :

Work category (1) : 5 hour per unit @ \$45 per hour .

Work category (2) : 3 hour per unit @ \$35 per hour .

Work category (3) : 2 hour per unit @ \$15 per hour .

Required :

Compute the rate and efficiency variances for direct labor .

Solution :

$$\begin{aligned} \text{Production Volume During Period} &= 80 + (40 \times 50\%) \\ &= 80 + 20 \\ &= 100 \text{ Unit} \end{aligned}$$

Total Variance of DL	= (AH × AR) – (SH × SR)	
Work category (1)	= (480 × 50) – (100 × 5 × 45)	= \$1500 Unfav.
Work category (2)	= (300 × 30) – (100 × 3 × 35)	= \$1500 Fav.
Work category (3)	= (250 × 15) – (100 × 2 × 15)	= <u>\$750 Unfav.</u>
		<u>\$750 Unfav.</u>
1. Rate Variance	= (AR – SR) × AH	
Work category (1)	= (50 – 45) × 480	= \$2400 Unfav.
Work category (2)	= (30 – 35) × 300	= \$1500 Fav.
Work category (3)	= (15 – 15) × 250	= <u>Zero</u>
		<u>\$900 Unfav.</u>
2. Efficiency Variance:	= (AH – SH) × SR	
Work category (1)	= (480 – 500) × 45	= \$900 Fav.
Work category (2)	= (300 – 300) × 35	= Zero
Work category (3)	= (250 – 200) × 15	= <u>\$750 Unfav.</u>
		<u>\$150 Fav.</u>

Example (7) :

Lisa Sampan Ltd. produces bags . It uses the standard cost system .
The following data concerned with production November 2018 :

1. Normal capacity hours 4000 direct labor hour .
2. Actual production volume 1000 unit .
3. Monthly factory overhead in normal capacity level \$8000 (\$4800 variable factory overhead, \$3200 fixed factory overhead) .
4. Actual factory overhead \$7384 .
5. Actual hour used in production 3475 hour .
6. Standard hour 3400 hour .

Required :

Calculate and analysis the FOH variance by using two variance method, three variance method and four variance method .

Solution :

Variable Allocated Rate	=	4800 ÷ 4000	=	\$1.2
Fixed Allocated Rate	=	3200 ÷ 4000	=	\$0.8
Total Allocated Rate				\$2
Total Variance of FOH	=	7384 – (2 × 3400)		
	=	7384 – 6800	=	\$584 Unfav.

Two Variance Method :

1. Controllable Variance = $7384 - [3200 + (1.2 \times 3400)]$
= $7384 - 7280$ = \$104 Unfav.
 2. Volume Variance = $7280 - 6800$ = \$480 Unfav.
\$584 Unfav.
- Or :
- Volume Variance = $(4000 - 3400) \times 0.8$ = \$480 Unfav.

Three Variance Method :

1. Spending Variance = $7384 - [3200 + (1.2 \times 3475)]$
= $7384 - 7370$ = \$14 Unfav.
 2. Idle Capacity Variance = $7370 - (3475 \times 2)$
= $7370 - 6950$ = \$420 Unfav.
 3. Efficiency Variance = $6950 - 6800$ = \$150 Unfav.
584 Unfav.
- Or :
- Idle Capacity Variance = $(4000 - 3475) \times 0.8$ = \$420 Unfav.
- Efficiency Variance = $(3475 - 3400) \times 2$ = \$150 Unfav.

Four Variance Method :

1. Spending Variance = $7384 - 7370$ = \$14 Unfav.
2. Idle Capacity Variance = $7370 - 6950$ = \$420 Unfav.
3. Variable Efficiency Variance = $(3475 - 3400) \times 1.2$ = \$90 Unfav.
4. Fixed Efficiency Variance = $(3475 - 3400) \times 0.8$ = \$60 Unfav.
\$584 Unfav.

Example (8) :

Pony Containers makes plastic water tanks for a variety of commercial uses . The standard per unit material, labor and overhead costs are as follows :

Direct material : 20 pounds @ \$0.9

Direct labor : 4 hours @ \$6 per hour

Variable overhead : 4 hours @ \$3.75 per hour

Fixed overhead : 4 hours @ \$1.25 per hour

The overhead application rates were developed using a normal capacity of 2400 direct labor hour . Production is assumed to occur evenly throughout the year . During May 2018, the company produced 500 completed unit . Actual data for May 2018 are as follows :

Direct material purchased : 10000 pounds @ \$0.92 per pound

Direct material used : 9500 pounds (all from May's purchases)

Total labor cost : \$12180 for 2100 hours (\$5.8 per hour)

Factory overhead incurred : \$11100 (6100 variable, 5000 fixed)

Required :

1. Calculate the standard cost per unit .
2. Prepare the summary of costs elements variances .
3. Calculate and analysis the variance of direct materials, direct labor and factory overhead by using two, three and four variance method .

Solution :

1. Standard Cost Per Unit :

Costs Elements	Calculation		Cost Per Unit
Direct Material	20 pounds × \$0.9	=	\$18 per unit
Direct Labor	4 hours × \$6	=	\$24 per unit
Factory Overhead	4 hours × (\$1.25 + \$3.75)	=	\$20 per unit
Total			\$62 per unit

2. Summary of Costs Elements Variances :

Costs Elements	Actual Cost	Standard Cost	The Variance
Direct Material	8740	(500 × 20 × 0.9) = 9000	\$260 Fav.
Direct Labor	12180	(500 × 4 × 6) = 12000	\$180 Unfav.
Factory Overhead	11100	(500 × 20) = 10000	\$1100 Unfav.
Total	32020	31000	\$1020 Unfav.

3. Calculation and analyzing the variance of DM, DL and FOH :

The Variance of DM :

1. Price Variance : $= (0.92 - 0.9) \times 9500$ = \$190 Unfav.
2. Quantity Variance : $= (9500 - 10000) \times 0.9$ = \$450 Fav.
\$260 Fav.

The Variance of DL :

1. Rate Variance : $= (5.8 - 6) \times 2100$ = \$420 Fav.
2. Efficiency Variance : $= (2100 - 2000) \times 6$ = \$600 Unfav.
\$180 Unfav.

The Variance of FOH :

Two Variance Method :

1. Controllable Variance $= 11100 - [(2400 \times 1.25) + (3.75 \times 2000)]$
 $= 11100 - 10500$ = \$600 Unfav.
 2. Volume Variance $= 10500 - 10000$ = \$500 Unfav.
\$1100 Unfav.
- Or :
- Volume Variance $= (2400 - 2000) \times 1.25$ = \$500 Unfav.

Three Variance Method (Traditional Approach) :

1. Spending Variance $= 11100 - [(2400 \times 1.25) + (3.75 \times 2100)]$
 $= 11100 - 10875$ = \$225 Unfav.
2. Idle Capacity Variance $= 10875 - (2100 \times 5)$
 $= 10875 - 10500$ = \$375 Unfav.

$$3. \text{ Efficiency Variance} = 10500 - 10000 = \underline{\$500 \text{ Unfav.}}$$

$$\underline{\underline{1100 \text{ Unfav.}}}$$

Or :

$$\text{Idle Capacity Variance} = (2400 - 2100) \times 1.25 = \$375 \text{ Unfav.}$$

$$\text{Efficiency Variance} = (2100 - 2000) \times 5 = \$500 \text{ Unfav.}$$

Four Variance Method (Traditional Approach) :

$$1. \text{ Spending Variance} = 11100 - 10875 = \$225 \text{ Unfav.}$$

$$2. \text{ Idle Capacity Variance} = 10875 - 10500 = \$375 \text{ Unfav.}$$

$$3. \text{ Variable Efficiency} = (2100 - 2000) \times 3.75 = \$375 \text{ Unfav.}$$

Variance

$$4. \text{ Fixed Efficiency} = (2100 - 2000) \times 1.25 = \underline{\$125 \text{ Unfav.}}$$

Variance

$$\underline{\underline{\$1100 \text{ Unfav.}}}$$

Three variance method (Modern Approach) :

$$1. \text{ Spending} = 11100 - [(2400 \times 1.25) + (3.75 \times$$

Variance 2100)]

$$= 11100 - 10875 = \$225 \text{ Unfav.}$$

$$2. \text{ Efficiency} = 10875 - [(2400 \times 1.25) + (3.75 \times$$

Variance 2000)]

$$= 10875 - 10500 = \$375 \text{ Unfav.}$$

$$3. \text{ Volume} = 10500 - 10000 = \underline{\$500 \text{ Unfav.}}$$

Variance

$$= \underline{\underline{\$1100 \text{ Unfav.}}}$$

Four variance method (Modern Approach) :

1. Variable FOH Variance	= 6100 – (3.75 × 2000)		
	= 6100 – 7500	=	<u>\$1400 Fav.</u>
a. Variable Spending Variance	= 6100 – (3.75 × 2100)		
	= 6100 – 7875	=	\$1775 Fav.
b. Variable Efficiency Variance	= 7875 – 7500	=	<u>\$375 Unfav.</u>
			<u>\$1400 Fav.</u>
2. Fixed FOH Variance	= 5000 – (1.25 × 2000)		
	= 5000 – 2500	=	<u>\$2500 Unfav.</u>
a. Fixed Spending Variance	= 5000 – (1.25 × 2400)		
	= 5000 - 3000	=	\$2000 Unfav.
a. Fixed Volume Variance	= 3000 – 2500	=	<u>\$500 Unfav.</u>
			<u>\$2500 Unfav.</u>
Total Variance For FOH	= Variable FOH Variance	+ Fixed FOH Variance	
	= \$1400 Fav. + \$2500 Unfav.	=	<u>\$1100 Unfav.</u>

Exercises :

Exercise (1) :

In February 2018, Marshal Company's costs and quantities of paper consumed in manufacturing its executive planner and calendar were as follow :

Actual quantity purchased and issued during August	18000 page
Actual unit purchase price	\$0.44 pages
Standard quantity per unit	34 per pages
Standard price per unit	\$0.46 per pages
Actual hour worked during August	11600 hour
Actual labor rate per hour	1.23 per hour
Standard hour per unit	24 hour
Standard labor rate per hour	1.21 per hour
Production	500 unit

Required :

1. Compute and analysis of the material variances .
2. Compute and analysis of the Labor variances

Exercise (2) :

The Pony company uses three types of material for manufacturing its product . The standard product mix for making 12500 tube of liquid solder is :

Material (A) :	1500 kilogram	@	\$0.060	\$90
Material (B) :	625 kilogram	@	\$0.400	\$250
Material (C) :	1000 kilogram	@	\$0.250	\$250

During April 2018, 77500 tube to solder were product from input of :

Material (A) :	8750 kilogram	@	\$0.056	\$490
Material (B) :	3750 kilogram	@	\$0.380	\$1425
Material (C) :	6250 kilogram	@	\$0.280	\$1750

Required :

Compute the material price, mix and yield variances, including an analysis the mix and yield variances for each material .

Exercise (3) :

The following data for June 2018 production of Spans company :

Production during month	2400 handbags
Actual cost of material purchased and used	\$9534.36

Standard material allowed	1/3 square yard per bag
Material quantity variance	\$1188 Unfav.
Actual hours worked	5040 hours
Standard labor time per handbag	4 hours
Labor rate variance	\$1260 Fav.
Standard labor rate per hour	\$14
Standard price per yard of material	\$16

Required :

1. Calculation the standard quantity of material allowed for June production .
2. Calculation the standard direct labor hours allowed for June production .
3. Calculation the material price variance .
4. Calculation the labor efficiency variance .
5. Calculation the standard prime (DM and DL) cost to produce one bag .
6. Calculation the actual cost to produce one bag in November .

Exercise (4) :

For 2018, Blankly company has set 120000 direct labor hours as the annual capacity measure for computing its predetermined variable overhead rate . At that level, budgeted variable overhead costs are \$540000 . The company has decided to apply fixed overhead on the basis of machine hours . Total budgeted annual machine hours are 6600 & annual budgeted fixed overhead is \$237600 . Both machine hours and fixed overhead costs are expected to be incurred evenly each month . During August 2018, Blankly incurred 9800 direct labor hours and 500 machine hours . Variable and fixed overhead were, respectively, \$42350 and \$21000 . The standard times allowed for March production were 9910 direct labor hours and 480 machine hours .

Required :

Determine the FOH variances for 2018 by using the following methods :

1. Two variance method .
2. Three variance method .
3. Four variance method

Exercise (5) :

Pony Containers makes plastic water tanks for a variety of commercial uses . The standard per unit material, labor and overhead costs are as follows :

Direct material : 20 pounds @ \$1.8
Direct labor : 2 hours @ \$12 per hour
Variable overhead : 2 hours @ \$7.5 per hour
Fixed overhead : 2 hours @ \$2.5 per hour

The overhead application rates were developed using a normal capacity of 4800 direct labor hour . Production is assumed to occur evenly throughout the year . During April 2018, the company produced 1000 completed unit . Actual data for April 2018 are as follows :

Direct material purchased : 20000 pounds @ \$1.84 per pound
Direct material used : 19000 pounds (all from April's purchases)
Total labor cost : \$24360 for 2100 hours (\$11.6 per hour)
Factory overhead incurred : \$22200 (12200 variable, 10000 fixed)

Required :

1. Calculate the standard cost per unit .
2. Prepare the summary of costs elements variances .
3. Calculate and analysis the variance of direct materials, direct labor and factory overhead by using two, three and four variance method .

Exercise (6) :

Sprewell company uses standard costing system . The standard costs per unit of material, labor, and overhead are as follows :

Direct material: 80 pounds @ \$4	\$160
Direct labor: 1.25 hours @ \$32 per hour	\$20
Variable overhead: 45 minutes of machine time @ \$100 per hour	\$25
Fixed overhead: 45 minutes of machine time @ \$80 per hour	\$20

The overhead application rates were developed using a practical capacity of 5400 units per year . Production is assumed to occur evenly throughout the year . During November 2018, the company produced 500 tank . Actual data for November 2018 are as follows :

Direct material purchased : 46000 pounds @ \$3.84 per pound
Direct material used : 44000 pounds (all from November's purchases)
Total labor cost : \$22100 for 680 hours

Variable overhead incurred : \$27400 for 230 hours of machine time
Fixed overhead incurred : \$21600 for 230 hours of machine time

Required :

1. Calculate the standard cost per unit .
2. Prepare the summary of costs elements variances .
3. Calculate and analysis the variance of direct materials, direct labor and factory overhead by using two, three and four variance method .

Chapter**4****Accounting Procedures for
Standard Costing**

Example (1) :

Mississippi Marine products manufactures a neon lamp sign with the following standard costs :

Direct Material (2 kg. @ \$5 per kg.)	\$10
Direct labor (2 hours @ \$7.5 per hour)	\$15
Factory overhead :	
Variable (2 hours @ \$1.5 per hour)	\$3
Fixed (2 hours @ \$1 per hour)	\$2

The following data are given for December 2018 :

Price Variance	\$1500 Unfav.	
Quantity Variance	<u>\$500 Unfav.</u>	
Total Variance of DM		<u>\$2000 Unfav.</u>
Rate Variance	\$1000 Unfav.	
Efficiency Variance	<u>\$500 Fav.</u>	
Total Variance of DM		<u>\$500 Unfav.</u>
Controllable Variance	\$500 Fav.	
Volume Variance	<u>\$500 Unfav.</u>	
Total Variance of DM		<u>Zero</u>

During December 2018, 1800 completed unit, 1000 unit work in process (completed 20%), 1500 sales unit, purchase material during month 15000 kg. @ \$2.15 per kg., used material during month 10250 kg. .

Required :

Record a journal entries by using partial and comprehensive methods .

Solution :

Equivalent units = $1800 + (1000 \times 20\%) = 2000$ unit

Purchase cost of materials = $15000 \times 2.15 = \$32250$

Costs Elements	Standard Cost	The Variance	Actual Cost
DM	$(2000 \times 10) = \$20000$	\$2000 Unfav.	\$22000
DL	$(2000 \times 15) = \$30000$	\$500 Unfav.	\$30500
FOH	$(2000 \times 5) = \$10000$	Zero	\$10000

First : Partial Method :

1. Direct Materials Entries :

Materials Inventory Control	\$32250	
Accounts Payable		\$32250

Work In Process Inventory Control	\$22000	
Materials Inventory Control		\$22000

2. Direct Labor Entries :

Labor Control	\$30500	
Accrual Labor		\$30500

Work In Process Inventory Control	\$30500	
Labor Control (Actual)		\$30500

3. Factory Overhead Entries :

Actual Factory Overhead	\$10000	
Various Accounts		\$10000

Work In Process Inventory Control	\$10000	
Actual Factory Overhead		\$10000

4. Completed the Production Units Entry [$1800 \times (10 + 15 + 5)$]:

Finished Goods Inventory Control	\$54000	
Work In Process Inventory Control		\$54000

5. Standard Cost of Sales Units Entry :

[$1500 \times (10 + 15 + 5)$] = \$45000

Cost of Goods Sold	\$45000	
Finished Goods Inventory Control		\$45000

6. Recording the Variances at Ending the Period :

Price Variance (Unfav.)	\$1500	
Quantity Variance (Unfav.)	\$500	
Rate Variance (Unfav.)	\$1000	
Volume Variance (Unfav.)	\$500	
Work In Process Inventory Control		\$3500
Work In Process Inventory Control	\$1000	
Efficiency Variance (Fav.)		\$500
Controllable Variance (Fav.)		\$500

Work In Process Inventory Control			
Beginning Balance	Zero	Finished Goods (Standard)	\$54000
Direct Materials (Actual)	\$22000	Variances (Unfav.)	\$3500
Direct Labor (Actual)	\$30500		
FOH (Actual)	\$10000		
Variances (Fav.)	\$1000	Ending Balance	\$6000
\$63500		\$63500	

Two : Comprehensive Method :

1. Direct Materials Entries :

Materials Inventory Control	\$32250	
Accounts Payable		\$32250
Work In Process Inventory Control	\$20000	
Price Variance (Unfav.)	\$1500	
Quantity Variance (Unfav.)	\$500	
Materials Inventory Control		\$22000

2. Direct Labor Entries :

Labor Control	\$30500	
Accrual Labor		\$30500

Work In Process Inventory Control	\$30000	
Rate Variance (Unfav.)	\$1000	
Labor Control		\$30500
Efficiency Variance (Fav.)		\$500

3. Factory Overhead Entries :

Actual Factory Overhead	\$10000	
Various Accounts		\$10000

Work In Process Inventory Control	\$10000	
Applied Factory Overhead		\$10000

Applied Factory Overhead	\$10000	
Volume Variance (Unfav.)	\$500	
Actual Factory Overhead		\$10000
Controllable Variance (Fav.)		\$500

4. Completed the Production Units Entry :

Finished Goods Inventory Control	\$54000	
Work In Process Inventory Control		\$54000

5. Standard Cost of Sales Units Entry :

Cost of Goods Sold	\$45000	
Finished Goods Inventory Control		\$45000

Work In Process Inventory Control			
Beginning Balance	Zero	Finished Goods (Standard)	\$54000
Direct Materials (Standard)	\$20000		
Direct Labor (Standard)	\$30000		
FOH (Standard)	\$10000	Ending Balance	\$6000
	\$60000		\$60000

Equivalent units of ending WIP = 1000 × 20% = 200 unit

Standard Cost of DM	=	200 × 10	=	\$2000
Standard Cost of DL	=	200 × 15	=	\$3000
Standard Cost of FOH	=	200 × 5	=	<u>\$1000</u>
				<u>\$6000</u>

Example (2) :

By using the data in example (1) .

Required :

Treatment the variances by using the following method :

1. Closed the variances in profits and losses .
2. Closed the variances in cost of goods sold .
3. Distribution the variances on the units (sold units, ending finished goods and ending WIP) .

Solution :

1. Closed the Variances in Profits and Losses :

Profits and Losses	\$3500	
Price Variances (Unfav.)		\$1500
Quantity Variances (Unfav.)		\$500
Rate Variances (Unfav.)		\$1000
Volume Variances (Unfav.)		\$500
Efficiency Variances (Fav.)	\$500	
Controllable Variances (Fav.)	\$500	
Profits and Losses		\$1000

2. Closed the Variances in Cost of Goods Sold :

Cost of Goods Sold	\$3500	
Price Variances (Unfav.)		\$1500
Quantity Variances (Unfav.)		\$500
Rate Variances (Unfav.)		\$1000
Volume Variances (Unfav.)		\$500
Efficiency Variances (Fav.)	\$500	
Controllable Variances (Fav.)	\$500	
Cost of Goods Sold		\$1000

3. Distribution the Variances on the Units (Sold Units, Ending Finished Goods and Ending WIP) :

$$\begin{aligned} \text{Equivalent Unit} &= 1800 + (1000 \times 20\%) \\ &= 1800 + 200 \\ &= 2000 \text{ Unit} \end{aligned}$$

Sold Units	1500 Unit
Ending Finished Goods	300 Unit
Ending WIP	<u>200 Unit</u>
	<u>2000 Unit</u>

$$\begin{aligned} \text{Net of Variances} &= \text{Variances (Fav.)} + \text{Variances (Unfav.)} \\ &= \$1000 \text{ Fav.} + \$3500 \text{ Unfav.} \\ &= \$2500 \text{ Unfav.} \end{aligned}$$

$$\begin{aligned} \text{Share of Sold Units} &= \$2500 \times \frac{1500 \text{ Unit}}{2000 \text{ Unit}} = \$1875 \text{ Unfav.} \\ \text{From Variances Net} & \end{aligned}$$

$$\begin{aligned} \text{Share of Ending Finished} &= \$2500 \times \frac{300 \text{ Unit}}{2000 \text{ Unit}} = \$375 \text{ Unfav.} \\ \text{Goods from Variances Net} & \end{aligned}$$

$$\begin{aligned} \text{Share of Ending WIP} &= \$2500 \times \frac{200 \text{ Unit}}{2000 \text{ Unit}} = \underline{\underline{\$250 \text{ Unfav.}}} \\ \text{from Variances Net} & \end{aligned}$$

\$2500 Unfav.

Cost of Goods Sold	\$1875	
Finished Goods Inventory Control	\$375	
Work In Process Inventory Control	\$250	
Efficiency Variances (Fav.)	\$500	
Controllable Variances (Fav.)	\$500	
Price Variances (Unfav.)		\$1500
Quantity Variances (Unfav.)		\$500
Rate Variances (Unfav.)		\$1000
Volume Variances (Unfav.)		\$500

Exercises :

Exercise (1) :

Doorknob Design company uses standard costing system . At the beginning of 2018, the company budgeted annual production of 800,000 doorknobs and adopted the following standards for each doorknob :

Direct materials (brass) : (0.3 lb. @ \$20/lb.)	\$6
Direct manufacturing labor : (1.2 hours @ \$40/hour)	\$48
Manufacturing overhead :	
Variable : (\$12/lb. × 0.3 lb.)	\$3.6
Fixed : (\$30/lb. × 0.3 lb.)	\$9
Standard cost per doorknob	\$66.6

Actual results for April 2018 were as follows :

Production	70000 doorknobs
Direct materials purchased	12,000 lb. at \$22/lb.
Direct materials used	10500 lb.
Direct manufacturing labor	38500 hours for \$1617000
Variable manufacturing overhead	\$128300
Fixed manufacturing overhead	\$304000

Required :

1. Calculate and analysis the variance of direct materials, direct labor and factory overhead by using two, Three and four variance method .
2. Record a journal entries by using partial and comprehensive methods .

Exercise (2) :

By using the data in exercise (1) .

Required :

Treatment the variances by using the following method : 1. Closed the variances in P&L, 2. Closed the variances in COGS, and 3. Distribution the variances on the units .

Exercise (3) :

Bell company allocated to products on the basis of standard direct labor hours (DLH) . At the beginning of 2018, the company adopted the following standards for its manufacturing costs :
adopted the following standards for each doorknob :

Direct materials : (3 lb. at \$4 per lb.)	\$12
Direct manufacturing labor : (5 hrs. at \$30 per hr.)	\$150
Manufacturing overhead :	
Variable : (\$8 per DLH)	\$40
Fixed : (\$10 per DLH)	\$50
Standard manufacturing cost per output unit	\$252

The denominator level for total manufacturing overhead per month in 2018 is 80000 direct labor hours . Bell's flexible budget for January 2018 was based on this denominator level . The records for January indicated the following :

Direct materials purchased	50000 lb. at \$4.4 per lb.
Direct materials used	46200 lb.
Direct manufacturing labor	80400 hrs. at \$28.6 per hr.
Variable manufacturing overhead	\$800000
Fixed manufacturing overhead	\$400000
Actual production	15600 output units

Required :

1. Calculate and analysis the variance of direct materials, direct labor and factory overhead by using two, Three and four variance method .
2. Record a journal entries by using partial and comprehensive methods .

Exercise (4) :

By using the data in exercise (3) .

Required :

Treatment the variances by using the following method : 1. Closed the variances in P&L, 2. Closed the variances in COGS, and 3. Distribution the variances on the units .

Chapter
5

Gross Profit Analysis

Example (1) :

Morocco Co. presents the following data for one inventory items :

Data	Actual	Budget
Sales Volume	9000 unit	10000 unit
Sales Revenues	\$10800	\$10000
Cost of Goods Sold	(\$6750)	(\$6000)
Gross Profit	\$4050	\$4000

Required :

Compute the following variances concerned with Gross Profit Analysis :

1. Sales Revenues Variance :
 - a. Sales Price Variance .
 - b. Sales Volume Variance .
2. Cost of Goods Sold Variance :
 - a. Cost Price Variance .
 - b. Cost Volume Variance .

Solution :

Actual Sales Price Per Unit = \$10800 ÷ 9000 unit = 1.2 Dollar/Unit

Budget Sales Price Per Unit = \$10000 ÷ 10000 unit = 1 Dollar/Unit

Actual Cost Price Per Unit = \$6750 ÷ 9000 unit = 0.75 Dollar/Unit

Budget Cost Price Per Unit = \$6000 ÷ 10000 unit = 0.6 Dollar/Unit

Gross Profit Analysis = 4050 – 4000 = \$50 Fav.

Analysis to :

1. Sales Revenues = 10800 – 10000 = \$800 Fav.
 Variance
 2. Cost of Goods = 6750 – 6000 = \$750 Unfav.
 Sold Variance
- \$750 Unfav.

1. Sales Revenues Variance :

- a. Sales Price Variance = $(1.2 - 1) \times 9000 = \1800 Fav.
- b. Sales Volume Variance = $(9000 - 10000) \times 1 = \underline{\$1000 \text{ Unfav.}}$
- \$800 Fav.

2. Cost of Goods Sold Variance :

- a. Cost Price Variance = $(0.75 - 0.6) \times 9000 = \1350 Unfav.
- b. Cost Volume Variance = $(9000 - 10000) \times 0.6 = \underline{\$600 \text{ Fav.}}$
- \$750 Unfav.

Example (2) :

Dallas Co. presents the following data for one inventory items :

Data	Actual	Budget
Total unit	22000 unit	20000 unit
Sales Price Per Unit	\$1200	\$1000
Cost Per Unit	\$800	\$600

Required :

Compute the following variances concerned with Gross Profit

Analysis :

1. Sales Revenues Variance :
 - a. Sales Price Variance .
 - b. Sales Volume Variance .
2. Cost of Goods Sold Variance :
 - a. Cost Price Variance .
 - b. Cost Volume Variance .

Solution :

Actual Sales Revenues = $22000 \times 1200 = \$26400000$
Budget Sales Revenues = $20000 \times 1000 = \$20000000$
Actual Cost of Goods Sold = $22000 \times 800 = \$17600000$

Budget Cost of Goods Sold = 20000 × 600 = \$12000000
Actual Gross Profit = 26400000 – 17600000 = \$8800000
Budget Gross Profit = 20000000 – 12000000 = \$8000000

Gross Profit Analysis = 8800000 – 8000000 = \$800000 Fav.

Analysis to :

1.	Sales Revenues	=	26400000 – 20000000	=	6400000 Fav.
	Variance				
2.	Cost of Goods Sold	=	17600000 – 12000000	=	<u>\$5600000 Unfav.</u>
	Variance				
					<u>\$40000 Fav.</u>

1. Sales Revenues Variance :

a.	Sales Price	=	(1200 - 1000) ×	=	\$4400000 Fav.
	Variance		22000		
b.	Sales Volume	=	(22000 – 20000)	=	<u>\$2000000 Fav.</u>
	Variance		×1000		
					<u>\$6400000 Fav.</u>

2. Cost of Goods Sold Variance :

a.	Cost Price	=	(800 – 600) ×	=	\$4400000 Unfav.
	Variance		22000		
b.	Cost Volume	=	(22000 – 20000) ×	=	<u>\$1200000 Unfav.</u>
	Variance		600		
					<u>\$5600000 Unfav.</u>

Example (3) :

A cost analysis has prepared a monthly gross profit analysis for Marten company, comparing to actual and budget for three products X, Y and Z, June actual and budget data follows :

Actual Data						
Products	Units	Sales Revenues		Cost of Goods Sold		Gross Profit
		Sales Price	Amount	Cost Per Unit	Amount	
X	10000	6.6	66000	4	40000	26000
Y	4000	3.5	14000	3.5	14000	0
Z	20000	3	60000	2.8	56000	4000
			140000		110000	30000

Budget Data						
Products	Units	Sales Revenues		Cost of Goods Sold		Gross Profit
		Sales Price	Amount	Cost Per Unit	Amount	
X	8000	5	40000	4	32000	8000
Y	7000	4	28000	3.5	24500	3500
Z	20000	2.6	52000	2.175	43500	8500
			120000		100000	20000

Required :

Compute the price and volume variances for sales and cost, and the sales mix and final sales volume variances .

Solution :

Gross Profit Analysis = 30000 – 20000 = \$10000 Fav.

Analysis to :

1. Sales Revenues = 140000 – 120000 = \$20000 Fav.
Variance
2. Cost of Goods = 110000 – 100000 = \$10000 Unfav.
Sold Variance
\$10000 Fav.

1. Sales Revenues Variances :

a. Sales Price Variance = (AP – BP) × ASV

- | | | | | |
|-----------|---|-------------------|---|---------------------|
| Product X | = | (6.6 – 5) × 10000 | = | \$16000 Fav. |
| Product Y | = | (3.5 – 4) × 4000 | = | \$2000 Unfav. |
| Product Z | = | (3 – 2.6) × 20000 | = | <u>\$8000 Fav.</u> |
| | | | | <u>\$22000 Fav.</u> |

b. Sales Volume Variance = (ASV – BSV) × BP

Product X	=	(10000 – 8000) × 5	=	\$10000 Fav.
Product Y	=	(4000 – 7000) × 4	=	\$12000 Unfav.
Product Z	=	(20000 – 20000) × 2.6	=	<u>Zero</u>
				<u>\$2000 Unfav.</u>

Sales Revenues	=	Sales Price Variance + Sales Volume
Variations		Variance
	=	\$22000 Fav. + \$2000 Unfav.
	=	\$20000 Fav.

2. Cost of Goods Sold Variances :

a. Cost Price Variance = (ACPU – BCPV) × ACV

Product X	=	(4 – 4) × 10000	=	Zero
Product Y	=	(3.5 – 3.5) × 4000	=	Zero
Product Z	=	(2.8 – 2.175) × 20000	=	<u>\$12500 Unfav.</u>
				<u>\$12500 Unfav.</u>

b. Cost Volume Variance = (ACV - BCV) × BCPV

Product X	=	(10000 – 8000) × 4	=	\$8000 Unfav.
Product Y	=	(4000 – 7000) × 3.5	=	\$10500 Fav.
Product Z	=	(20000 – 20000) × 2.175	=	<u>Zero</u>
				<u>\$2500 Fav.</u>

Cost of Goods Sold	=	Cost Price Variance + Cost Volume Variance
Variations		
	=	\$12500 Unfav. + \$2500 Fav.
	=	\$10000 Unfav.

Net Volume	=	Sales Volume Variance + Cost Volume
Variance		Variance
	=	\$2000 Unfav. + \$2500 Fav.
	=	\$500 Unfav.

Exercises :

Exercise (1) :

Darleen company presents the following data for one inventory items :

Data	Actual	Budget
Sales Volume	18000 unit	20000 unit
Sales Revenues	\$21600	\$20000
Cost of Goods Sold	(\$13500)	(\$12000)
Gross Profit	\$8100	\$8000

Required :

Compute the following variances concerned with Gross Profit

Analysis :

1. Sales Revenues Variance :
 - a. Sales Price Variance .
 - b. Sales Volume Variance .
2. Cost of Goods Sold Variance :
 - a. Cost Price Variance .
 - b. Cost Volume Variance .

Exercise (2) :

Daft company presents the following data for one inventory items :

Data	Actual	Budget
Total unit	44000 unit	40000 unit
Sales Price Per Unit	\$2400	\$2000
Cost Per Unit	\$1600	\$1200
Contribution Margin Per Unit	\$800	\$800

Required :

Compute the following variances concerned with Gross Profit

Analysis :

1. Sales Revenues Variance :
 - a. Sales Price Variance .
 - b. Sales Volume Variance .
2. Cost of Goods Sold Variance :
 - a. Cost Price Variance .
 - b. Cost Volume Variance .

Exercise (3) :

Mitten company manufacturing two products Alfa and Beta . Cost accountant prepared a monthly gross profit analysis, therefore, he comparing the actual and budget for two products during June 2018 as following :

Actual Data						
Products	Units	Sales Revenues		Cost of Goods Sold		Gross Profit
		Sales Price	Amount	Cost Per Unit	Amount	
Alfa	20000	7.8	156000	5.6	112000	44000
Beta	8000	4.5	36000	3.7	29600	6400
			192000		141600	50400

Budget Data						
Products	Units	Sales Revenues		Cost of Goods Sold		Gross Profit
		Sales Price	Amount	Cost Per Unit	Amount	
Alfa	16000	8	128000	4	64000	64000
Beta	10000	4	40000	3.8	38000	2000
			168000		102000	66000

Required :

Compute the price and volume variances for sales and cost, and the sales mix and final sales volume variances .

Other Subjects
**Standard Costs System in
Process Costing**

Example (1) :

Griddle corporation uses the standard costs system in process costing .
The following data for first process :

1. Standard cost per unit of their product :

Direct Materials : 4 litters	\$200
Direct Labor : 3 hours	\$75
Factory Overhead : applied as bases DLH	\$150
Standard Cost Per Unit	\$425

2. Fixed factory overhead budget was \$300000, and the normal capacity was 5000 unit per month .
3. The beginning work in process 1000 unit completed 20% of conversion costs, and the ending work in process 2000 unit completed 40% of conversion costs .
4. 4500 unit were started through month, and 3000 unit were completed .
5. The inspection occurred when production was 50%, and the normal spoilage was 5% of good units .
6. 16500 litters of materials were issued to production at \$60 per litter .
7. The direct labor is \$317200 for 12200 hours .
8. Actual factory overhead was \$600000 .
9. Materials added to production at four point as follows : (40% added in beginning of process, 30% added in level 30% of process, 20% added in level 60% of process, The remain in ending of process) .
10. The corporation uses FIFO method for work in process .

Required :

1. Prepare process cost report .
2. Prepare cost summarization report .

3. Prepare performance report and analysis the variances by using two variances method .
4. Prepare a journals entries by using partial and comprehensive methods .

Solution :

1. Process Cost Report :

Data	Physical Flow	Equivalent Unit	
		Materials	Conversion
Beginning WIP	1000		
Started Units	<u>4500</u>		
Inputs	<u>5500</u>		
Units of Completed :			
From Beginning WIP (20%)	1000	600	800
From Started Units	2000	2000	2000
Ending WIP (40%)	2000	1400	800
Normal Spoilage (50%)	150	105	75
Abnormal Spoilage (50%)	<u>350</u>	<u>245</u>	<u>175</u>
Output	<u>5500</u>	<u>4350</u>	<u>3850</u>

2. Cost Summarization Report :

A. Cost of Completed Unit :	
(3000 × 425)	= \$1275000
+ Share of Normal Spoilage (Current Period)	
[(105 × 200) + (75 × 225)]	= <u>\$37875</u>
	<u>\$1312875</u>
B. Cost of Ending WIP :	
[(1400 × 200) + (800 × 225)]	= \$460000
C. Cost of Abnormal Spoilage :	
[(245 × 200) + (175 × 225)]	= <u>\$88375</u>
Total Cost Account For	<u>\$1861250</u>

Realization :

A. Cost of Beginning WIP :	
[(400 × 200) + (200 × 225)]	= \$125000
B. Cost of Current Period (Standard) :	
[(4350 × 200) + (3850 × 225)]	= <u>\$1736250</u>
Total Cost Account For	<u>\$1861250</u>

3. Performance Report :

Data	Actual Cost	Standard Cost	Variances
Direct Materials	(16500 × 60) \$990000	(4350 × 4 × 50) \$870000	\$120000 Unfav.
Direct Labor	(12200 × 26) \$317200	(3850 × 3 × 25) \$288750	\$28450 Unfav.
Factory Overhead	\$600000	(3850 × 3 × 50) \$577500	\$22500 Unfav.
Total	\$1907200	\$1736250	\$170950 Unfav.

Notes :

4350 Equivalent Unit of Direct Materials

3850 Equivalent Unit of Conversion Costs

5000 Unit × Hour = 15000 Normal Capacity Hour

\$300000 ÷ 15000 Hour = \$20 Fixed Allocated Rate

150 ÷ 3 = \$50 Total Allocated Rate

50 – 20 = \$30 Variable Allocated Rate

Analyzing of the variances :

The Variance of DM :

1. Price Variance : = $(60 - 50) \times 16500$ = \$165000 Unfav.
2. Quantity Variance : = $(16500 - 17400) \times 50$ = \$45000 Fav.
\$120000 Unfav.

The Variance of DL :

1. Rate Variance : = $(26 - 25) \times 12200$ = \$12200 Unfav.
2. Efficiency Variance : = $(12200 - 11550) \times 25$ = \$16250 Unfav.
\$28450 Unfav.

The Variance of FOH :

Two Variance Method :

1. Controllable Variance = $600000 - [300000 + (30 \times 3850 \times 3)]$
= $600000 - 646500$ = \$46500 Fav.
2. Volume Variance = $646500 - 577500$ = \$69000 Unfav.
\$22500 Unfav.

4. Journals Entries :

A. Partial Method :

1. Direct Materials Entry :

Work In Process Inventory Control	\$990000	
Materials Inventory Control		\$990000

2. Direct Labor Entry :

Work In Process Inventory Control	\$317200	
Labor Control		\$317200

3. Factory Overhead Entry :

Work In Process Inventory Control	\$600000	
Actual Factory Overhead		\$600000

4. Completed the Production Units Entry :

Finished Goods Inventory Control	\$1312875	
Work In Process Inventory Control		\$1312875

5. Abnormal Spoilage Entry :

Abnormal Spoilage (Profits and Losses)	\$88375	
Work In Process Inventory Control		\$88375

6. Recording the Variances at Ending the Period :

Price Variances (Unfav.)	\$165000	
Rate Variances (Unfav.)	\$12200	
Efficiency Variances (Unfav.)	\$16250	
Volume Variances (Unfav.)	\$69000	
Work In Process Inventory Control		\$262450
Work In Process Inventory Control	\$91500	
Quantity Variances (Fav.)		\$45000
Controllable Variances (Fav.)		\$46500

Work In Process Inventory Control			
Beginning Balance	\$125000	Finished Goods (Standard)	\$1312875
Direct Materials (Actual)	\$990000	Abnormal Spoilage (Standard)	\$88375
Direct Labor (Actual)	\$317200	Variances (Unfav.)	\$262450
FOH (Actual)	\$600000		
Variances (Fav.)	\$91500	Ending Balance	\$460000
	\$2123700		\$2123700

B. Comprehensive Method :

1. Direct Materials Entry :

Work In Process Inventory Control	\$870000	
Price Variances (Unfav.)	\$165000	
Materials Inventory Control		\$990000
Quantity Variances (Fav.)		\$45000

2. Direct Labor Entry :

Work In Process Inventory Control	\$288750	
Rate Variances (Unfav.)	\$12200	
Efficiency Variances (Unfav.)	\$16250	
Labor Control		\$317200

3. Factory Overhead Entry :

Actual Factory Overhead	\$600000	
Various Accounts		\$600000
Work In Process Inventory Control	\$577500	
Applied Factory Overhead		\$577500
Applied Factory Overhead	\$577500	
Volume Variances (Unfav.)	\$69000	
Actual Factory Overhead		\$600000
Controllable Variances (Fav.)		\$46500

4. Completed the Production Units Entry :

Finished Goods Inventory Control	\$1312875	
Work In Process Inventory Control		\$1312875

5. Spoilage Entry :

Abnormal Spoilage (Profits and Losses)	\$88375	
Work In Process Inventory Control		\$88375

Work In Process Inventory Control			
Beginning Balance	\$125000	Finished Goods (Standard)	\$1312875
Direct Materials (Standard)	\$870000	Abnormal Spoilage (Standard)	\$88375
Direct Labor (Standard)	\$288750		
FOH (Standard)	\$577500	Ending Balance	\$460000
	\$1899125		\$1899125

Exercises :

Exercise (1) :

Garnett company uses the standard costs system in process costing .
The following data for first process :

1. Standard cost per unit of their product :

Direct Materials : (1 kg. per unit)	\$50
Direct Labor :	\$60
Factory Overhead : (\$15 of them variable)	<u>\$22.5</u>
Standard Cost Per Unit	<u>\$132.5</u>

2. The company applied FOH based on direct labor hours, the budget normal capacity for May 2018 was 15000 unit at 0.5 standard hour of direct labor per unit .
3. The beginning WIP 1000 unit completed 40% of conversion costs, and the ending WIP (?) unit completed 40% of conversion costs .
4. Unit started through month 12000 unit, and 11000 unit were completed and transferred out the process .
5. The inspection occurred in 2%, and the normal spoilage was 10% of good units, and the company not submitted any abnormal spoilage .
6. 11500 kg. of direct materials were issued to production at \$49 per kg. .
7. Actual direct labor was 5500 hours at \$130 per hour .
8. Actual factory overhead was \$250000 .
9. Direct materials added at beginning was 25% and the remain at 70% of production .
10. The company uses FIFO method for work in process .

Required :

1. Prepare process cost report .
2. Prepare cost summarization report .
3. Prepare performance report and analysis the variances by using two variances method .
4. Prepare a journals entries by using partial and comprehensive methods .

Exercise (2) :

Ford company uses the standard costs system in process costing . The following data for first process :

1. Standard cost per unit of their product :

Direct Materials : 4 ton	\$400
Direct Labor : 3 hours	\$150
Factory Overhead : applied as bases DLH	<u>\$300</u>
Standard Cost Per Unit	<u>\$850</u>

2. Fixed factory overhead budget was \$600000, and the normal capacity was 5000 unit per month .
3. The beginning work in process 2000 unit completed 30% of conversion costs, and the ending work in process 4000 unit completed 80% of conversion costs .
4. 9000 unit were started through month, and 6000 unit were completed .
5. The inspection occurred when production was 75%, and the normal spoilage was 4% of good units .
6. 38000 ton of materials were issued to production at \$96 per litter .
7. The direct labor is \$1390800 for 24400 hours .
8. The following addition data is available for month :
Actual FOH was \$1200000 . Materials added to production at four point as follows : (25% added in beginning of process, 50% added in level 30% of process, 15% added in level 30% of process, The remain in ending of process) . The company uses FIFO method for work in process .

Required :

1. Prepare process cost report .
2. Prepare cost summarization report .
3. Prepare performance report and analysis the variances by using two variances method .
4. Prepare a journals entries by using partial and comprehensive methods .

Exercise (3) :

Johnstown manufacturing company produces custom made, dyed sweat shirt for distribution on college campuses . The following standard have been established :

Direct Materials :	
Cotton Cloth : 2 yards @ \$1	\$2
Dyes : 1 pint @ 0.5	\$0.5
Direct Labor : 1/2 hours @ 6 per hour	\$3
Factory Overhead : 1/2 hour @ \$10 per hour	<u>\$5</u>
Total Standard Cost Per Unit	<u>\$10.5</u>

The monthly production budget is based on normal plant operation of 1600 hour, with fixed factory overhead of \$11200 . the following data concerned with transaction during January 2018 :

1. Work in process inventory at Jan.1, 1000 unit 1/4 finished as to conversion .
2. 3000 unit completed and transferred to finished goods .
3. 3200 unit started this month .
4. Work in process inventory at Jan.31, 800 unit 2/3 finished as to conversion .
5. Normal spoilage 5% of good unit pass the inspection, inspection point at the middle of production .
6. Cotton cloth issued and used at the beginning 5600 yard at \$1.1
7. Dyes issued and used when production was 20%, 2700 pints at \$0.45 .
8. Direct labor payroll 1550 hour at \$5.9 .
9. Actual factory overhead \$16100 .
- 10.The company used FIFO method .

Required :

1. Prepare process cost report .
2. Prepare cost summarization report .
3. Prepare performance report and analysis the variances by using two variances method .
4. Prepare a journals entries by using partial and comprehensive methods .

