Standard Costing

Practical Question on Standard Costing

Question 1: The standard cost of a certain chemical mixture is as under:

40% of Material A @ `30 per kg

60% of Material B @ `40 per kg

A standard loss of 10% of input is expected in production. The following actual cost data is given for the period.

350 kg Material – A at a cost of `25

400 kg Material – B at a cost of `45

Actual weight produced is 620 kg.

You are required to calculate the following variances raw material wise and indicate whether they are favorable (F) or adverse (A):

(i) Cost variance
(ii) Price variance
(iii) Mix variance
(iv) Yield variance

Solution:

Actual Output produced is 630 Kg. The Standard Quantity of Material required for 630 Kg. of output is 700 Kg. $\left(\frac{630\ kg}{90} \times 100\right)$

Statement Showing
"Computation of Standard Cost / Actual Cost / Revised Actual Quantity"

Material	Standard Cost			Actual Cost			Revised Actual Quantity [RAQ] (Kg.)
	Quantity [SQ] (Kg.)	Price [SP] (`)	Amount [SQ × SP] (`)	Quantity [AQ] (Kg.)	Price [AP] (`)	Amount [AQ × AP] (`)	
A	280 (40% of 700 Kg.)	30	8,400	350	25	8,750	300 (40% of 750 Kg.)
B	420 (60% of 700 Kg.)	40	16,800	400	45	18,000	450 (60% of 750 Kg.)

Total	700		25,200	750		26,750	750

Note:
SQ = Standard Quantity = Expected Consumption for Actual Output
AQ = Actual Quantity of *Material Consumed*
RAQ = Revised Actual Quantity = Actual Quantity Rewritten in Standard Proportion
SP = Standard Price per Unit
AP = Actual Price per Unit

COMPUTATION OF VARIANCES

Material Cost Variance	
A	= SQ × SP – AQ × AP
	= 280 Kg. × `30 – 350 Kg. × `25
	= `350(A
B	= 420 Kg. × `40 – 400 Kg. × `45
	= `1,200 (A)
Total	= `350 (A) + `1200(A)
	= `1,550 (A)

Material Price Variance	= AQ × (SP – AP)
A	= 350 Kg. × (`30 – `25)
	= `1,750 (F)
B	= 400 Kg. × (`40 – `45)
	= `2,000 (A)
Total	= `1,750 (F) + `2,000 (A)
	= `250 (A)
Material Mix Variance	= SP × (RAQ – AQ)
A	= `30 × (300 Kg – 350 Kg)
	= `1,500 (A)
B	= `40 × (450 Kg. – 400 Kg.)
	= `2,000 (F)
Total	= `1,500 (A) + `2,000 (F)
	= `500 (F)
Material Yield Variance	= SP × (SQ – RAQ)
A	= `30 × (280 Kg. – 300 Kg)
	= `600 (A)
B	= `40 × (420 Kg. – 450 Kg.)
	= `1,200 (A)
Total	= `600 (A) + `1,200 (A)
	= `1,800 (A)

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Overhead Variance

Question 8: In a manufacturing Co. the standard units of production of the year were fixed at 1,20,000 units and overhead expenditures were estimated to be:

Fixed	`12,000	Variable	`6,000
Semi-Variable	`1,800		

Actual production during April of the year was 8,000 units. Each month has 20 working days.

During the month in question there was one statutory holiday. The actual amounted to:

Fixed	`1,190	Variable	`480
Semi-Variable	`192		

Semi-Variable charges are considered to include 60 per cent expenses of fixed nature and 40 per cent of variable character.

Find out the

(a) Overhead Cost Variance
(b) Fixed Overhead Cost Variance
(c) Variable Overhead Cost Variance
(d) Fixed Overhead Volume Variance
(e) Fixed Overhead Expenditure Variance
(f) Calendar Variance.

Solution:

Computation Of variances

Overhead Cost variance	= Absorbed Overheads-Actual Overheads =(`872.00 + `448.00) – (` 1,305.20 +` 556.80) = `542.00(A)
Variable Overhead Cost variance	= Standard Variable Overheads for Production – Actual variable Overheads = ` 448.00 - `556.80 = ` 108.80(A)
Fixed Overhead Cost variance	= Absorbed Fixed overheads –Actual Fixed overheads = ` 872.00 - ` 1,305.20 = ` 433.20(A)
Fixed Overhead volume Variance	= Absorbed Fixed overheads- Budgeted Fixed overheads = ` 872.00 - `1,090.00 = `218.00(A)
Fixed overhead Expenditure Variance	=Budgeted Fixed Overheads –Actual Fixed Overheads = ` 0.109 × 10,000 units - `1,305.20 =`215.20(A)

Calendar Variance	= Possible Fixed Overheads - Budgeted Fixed Overheads = `1,035.50 - ` 1,090.00 = ` 54.50(A)

WORKING NOTES

Fixed Overheads = Budgeted Fixed Overheads / Budgeted Output = ` 12,000 / 1,20,000 units	= ` 0.100
Fixed Overheads element In Semi-Variable Overheads i.e. 60% of ` 1,800	= ` 1,080
Fixed Overheads = Budgeted Fixed overheads / Budgeted Output = ` 1,080 / 1,20,000 units	= ` 0.009
Standard Rate of Absorption of Fixed overheads per unit (` 0.100 + `0.009)	= ` 0.109
Fixed Overheads Absorbed on 8,000 units @ ` 0.109	**= ` 872**
Budgeted Variable Overheads Add: Variable element in semi variable overheads 40% of ` 1,800 Total Budgeted variable Overheads Standard Variable Cost per unit=Budgeted Variable Overheads / BudgetedOutput = ` 6,720 / 1,20,000 units	= ` 6,000 ` 720 `6,720 = ` 0.056
Standard Variable Overheads for 8,000 units @ ` 0.056	`448
Budgeted Annual Fixed Overheads (` 12,000 + 60% of ` 1,800)	`13,080
Possible Fixed Overheads = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted days}} \times \text{Actual Days}$ = $\frac{` 1,090}{20 \text{ days}} \times 19 \text{ Days}$	` 1,035.50
Actual Fixed Overheads (`1,190 + 60% of ` 192)	`1,305.20
Actual Variable Overheads (` 480 +40% of ` 192)	` 556.80

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Question 14: The following are the information regarding overheads of a company:

(a) Overheads cost variance = ` 2,800 (A)

(b) Overheads volume variance = `2,000 (A)

(c) Budgeted overheads = `12,000

(d) Actual Overhead recovery rate = `8 per hour

(e) Budgeted hours for the period = 2,400 hours

You are required to compute the following:

(i) Overheads expenditure variance.

(ii) Actual incurred overheads.
(iii) Actual hours for actual production.
(iv) Overheads capacity variance.
(v) Overheads efficiency variance.
(vi) Standard hours for actual production.

Solution:

BASIC WORKINGS

Overheads Cost Variance	= ` 2,800 (A)
Overheads Volume Variance	= ` 2,000 (A)
Budgeted Overheads	= ` 12,000
Actual Overhead Recovery Rate	= ` 8 per hour
Budgeted Hours *for the period*	= 2,400 hours

COMPUTATION OF REQUIREMENTS

Overheads expenditure variance

Overheads Expenditure Variance = Overheads Cost Variance (–) Overheads Volume Variance
= ` 2,800 (A) – ` 2,000 (A)
= ` 800 (A)

Actual incurred overheads

Overheads Expenditure Variance = Budgeted Overheads (–) Actual Overheads

⇒` 800(A) = ` 12,000 (–) Actual Overheads

Therefore, Actual Overheads = ` 12,800

Actual hours for actual production

$$\text{Actual hours for actual production} = \frac{\text{Actualoverehads}}{\text{ActualOverehadRecvoeryRatePerhour}}$$

$$= \frac{\text{Rs.12,800}}{\text{Rs.8}}$$

= 1,600 hours

Overheads capacity variance

Overheads Capacity Variance = Budgeted Overheads for Actual Hours (–) Budgeted Overheads
= ` 5 × 1,600 hrs. – ` 12,000
= ` 8,000 – ` 12,000
= ` 4,000 (A)

Overheads efficiency variance

Overheads Efficiency Variance = Absorbed Overheads (–) Budgeted Overheads for Actual Hours

= ` 10,000 – ` 5 × 1,600 hours

= ` 2,000 (F)

Standard hours for actual production

$$\text{Standard hours for actual output} = \frac{\text{AbsorbedVerehads}}{\text{SatdnardOverheadRateperhour}}$$

$$= \frac{\text{Rs.10,000}}{\text{Rs.5}}$$

= 2,000 hours

WORKING NOTE

Overhead Cost Variance = Absorbed Overheads (–) Actual Overheads

⇒` 2,800 (A) = Absorbed Overheads (–) `12,800

⇒ Absorbed Overheads = `10,000

$$\text{Standard Rate } \textit{per hour} = \frac{\text{BudgetedOverehads}}{\text{Budgetedhours}}$$

$$= \frac{\text{Rs.12,000}}{\text{2400 hours}}$$

= ` 5

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Question 16:The Standard Cost Sheet per unit for the product produced by Style Manufactures is worked out on this basis:—

Direct Materials 1.3 tons @`4.00 per ton
Direct Labour 2.9 hours @ `2.30 per hour
Factory Overhead 2.9 hours @ `2.00 per hour

Normal Capacity is 2,00,000 direct labour hours per month.

The Factory Overhead rate is arrived at on the basis of a fixed Overhead of `1,00,000 per month and a Variable Overhead of `1.50 per direct labour hour.

In the month of May, 50,000 units of the product was started and completed. An investigation of the raw material inventory account reveals that 78,000 tons of raw materials were transferred into and used by the factory during May. These goods cost `4.20 per ton. 1,50,000 hours of Direct Labour were spent during May at a cost of `2.50 per hour. Factory Overhead for the month amounted to `3, 40,000 out of which `1, 02,000 was fixed.

Compute and identify all variances under Material, Labour and overhead as favourable or adverse.

Identify one or more departments in the company who might be held responsible for each variance.

Solution:-

COMPUTATION OF VARIANCES

(i) Material Price Variance= Standard Cost of Actual Quantity – ActualCost

= (SP × AQ) – (AP × AQ)

Or

= (SP – AP) × AQ

= 78,000 tons X (Rs. 4.00 – Rs. 4.20)

= Rs.15,600 (A)

(ii) Material Usage Variance = Standard Cost of Standard Quantity for Actual Production – Standard Cost of Actual Quantity

= (SQ × SP) – (AQ × SP)

Or

= (SQ – AQ) ×SP

= Rs.4.00 × [(50,000 units × 1.3 tons) – 78,000 tons]

= Rs. 52,000(A)

(iii) Total Material Cost Variance=Standard Cost– Actual Cost

= (SQ × SP) – (AQ × AP)

= 65,000 tons × Rs.4 – 78,000 tons × Rs.4.2

= Rs.67,600 (A)

(iv) Labour Rate Variance = Standard Cost of Actual Time – Actual Cost

= (SR × AH) – (AR × AH)

Or

= (SR – AR) × AH

= 1,50,000 hrs. × (Rs. 2.30 – Rs. 2.50)

Rs. 30,000 (A)

(v) Labour Efficiency Variance = Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time

= (SH × SR) – (AH × SR)

Or

= (SH – AH) ×SR

= Rs.2.30 × [(50,000 units × 2.9 hrs.) – 1,50,000 hrs.]

= Rs.11,500 (A

(vi) Total Labour Cost Variance= Standard Cost – Actual Cost

= (SH × SR) – (AH × AR)

= (1,45,000 hrs. × Rs.2.30) – (1,50,000 hrs. × Rs.2.50)

= Rs.41,500 (A)

(vii) Variable Overhead Cost Variance = Standard Variable Overheads for Production– Actual Variable Overheads

= (50,000 units × 2.9 hrs. × Rs.1.50) – Rs.2,38,000

= Rs.20,500 (A)

(viii) Fixed Overhead Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads

= Rs.1,00,000 – Rs.1,02,000

= Rs. 2,000 (A)

(ix) Fixed Overhead Volume = Absorbed Fixed Overheads – Budgeted Fixed Overheads Variance = 2.9 hrs. × Rs.0.50 × 50,000 units – Rs.1,00,000

= Rs. 27,500 (A)

(x) Fixed Overhead Capacity = Budgeted Fixed Overheads for Actual Hours – Budgeted Fixed Variance Overheads

= (1,50,000 hrs. × Rs.0.50) – Rs.1,00,000

= Rs. 25,000 (A)

(xi) Fixed Efficiency Variance= Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual Hours

= (2.9 hrs. × Rs.0.50 × 50,000 units) – (1,50,000 hrs.× Rs.0.50)

= Rs. 2,500 (A)

(xii) Total Fixed Overhead Variance = Absorbed Fixed Overheads – Actual Fixed Overheads

= (2.9 hrs. × Rs.0.50 × 50,000 units) – Rs.1,02,000

= Rs. 29,500 (A)

IDENTIFICATION OF DEPARTMENT(S) WHO MIGHT BE HELD RESPONSIBLE FOR EACH VARIANCE

Name of Variance	Name of the Department
Material Price Variance	Purchase Department
Material Usage Variance	Production Department / Factory Foreman
Labour Rate Variance	Personnel Department / Manager Policy
Labour Efficiency Variance	Production Department / Factory Foreman
Overhead Variances	Production Department / Factory Foreman

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Question 18:Bajaj Ltd. produces a product "M". The following information is available:

For one unit of product the standard materials input is 20 meters at a standard price of ` 2 per meter. The standard wage rate is ` 6 per hour and 5 hours are allowed in which to produce one unit.

Fixed production overhead is absorbed at the rate of 100% of direct wages cost. During the month just ended the following occurred:

Actual price paid for material purchased ` 1.95 per meter
Total direct wages cost was ` 1,56,000
Fixed production overhead incurred was ` 1,58,000

Variances	Favorable (`)	Adverse (`)
Direct material price (at the time of purchase)	8,000	-
Direct material usage	-	5,000
Direct labour rate	-	5,760
Direct labour efficiency	2,760	-
Fixed production overhead expenditure	-	8,000

Required:

Calculate the following for the month:

- Actual units produced.
- Actual hours worked
- Budgeted output in units,
- Number of meter purchased,
- Number of meters used above standard allowed.
- Average actual wage rate per hour.

Answer:

Budgeted output in units

Fixed Overhead Expenditure	= Budgeted Fixed Overheads –Actual Fixed Overheads Variance
= Rs.8,000 (A)	= Budgeted output X (Rs.6 X 5 hrs.) - Rs. 1,58,000
Budgeted output	= 5,000 units
Number of liters purchased	
Material Price variance	= Actual Quantity X (Std Price –Actual Price)
=Rs.8,000 (F)	= No. of liters purchased X (Rs.2 - Rs.1.95)
= No. of liters purchased	= 1,60,000 liters
Number of liters used above standard allowed	
Material Usage Variance	= Standard Price X (Standard Quantity – Actual Quantity)
= Rs.5000 (A)	= Rs.2 X (standard Quantity – 1,60,000 liters)
= standard Quantity	= 1,57,500 liters
No. of liters above Standard	= 1,60,000 liters – 1,57,500 liters
	= 2,500 liters
Actual units produced	
Labour Cost Variance	=Rate Variance + Efficiency Variance
	= Rs.5,760 (A) + Rs. 2,760 (F)
	= Rs.3,000 (A)
Labour Cost Variance	=Standard Cost- Actual Cost
=Rs.3000 (A)	= Actual Output X (Rs.6 X 5 hrs) - Rs.1,56,000
= Actual output	= 5,100 units
Actual hours worked	

Labour Efficiency variance	= Standard Rate X (Standard Hors –Actual Hours)
= Rs.27,60 (F)	= Rs.6 X (5,100 units X 5 hrs – Actual Hours)
= Actual Hours	= 25,040 hours
Average actual wage rate per hours	
Labour Rate Variance	=Actual Hours X (Standard Rate –Actual Rate)
= Rs.5,760 (A)	= 25,040 hours X (Rs.6 –Actual Rate)
=Actual Rate	= Rs.6.23… per hour

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Question 23: Apple Ltd., is following three variances method to analyse and understand production overhead variances. The three variances for a particular year were reported as given below:

	`
Production overhead expenditure variance	94,000 A
Production overhead volume variance	1,00,000 F
Production overhead efficiency variance	48,000 F
The other particulars furnished from the records of the company are:	
Standard machine hours for the year	11,500
Closing balance in the production Overhead Control Account	` 18,00,000
Fixed overhead rate per hour	` 125
Variable overhead rate per hour	` 80

Required:

Compute the following by considering the additional information also:

(i) Actual machine hours
(ii) Budgeted machine hours
(iii) Total Fixed Production Overhead amount
(iv) Applied Production Overhead amount

Additional Information:

- Expenditure variance was computed totally for fixed and variable overheads.
- Volume variance is applicable to fixed overhead only.

- Efficiency variance is applicable only to variable overhead and fixed overhead efficiency variance was already included in volume variance.

Solution:-

Calculation of Actual Machine Hours:-

Efficiency Variance	=₹48,000 (F), Given
	=Standard Varible Overehad Rate per hour X (Standard Hours -Actual Hours)
₹48,000 (F)	= ₹80 X (11,500 hrs -Actual Hours)
Actual Hours	= 10,900 hrs.
(ii) Budgeted Machine Hours	
Volume Variance =	₹1,00,000 (F)
	=Standard Fixed Overhead Rate per hour X (Standard Hours -Budgeted Hours)
₹1,00,000 (F)	= ₹125 X (11,500 hrs. -Budgeted Hours)
Budgeted Hours	= 10,700 hrs.
(iii) Total Fixed Production Overhead	
Fixed Production Overhead	=Standard Fixed Overhead Rate per Hour X Budgeted Hours
	=₹ 125 X 10,700 hrs.
	= ₹ 13,37,500
(v) Applied Manufacturing Overhead	
	=Standard Overhead Rate per Hour X Standard Hours
	= ₹ 205 X 11,500 hours
	=₹ 23,57,500
ALTERNATIVE (iii) & (iv)	
(iii) Total Fixed Production Overhead	
Expenditure variance	=Fixed Production Overhead (Budgeted) + Budgeted Variable Overheads for Actual Hours - Actual Overheads
₹ 94,000 (A)	= Fixed Production Overhead + 10,900 hrs. X ₹ 80 - ₹

	18,00,000
Fixed production Overhead	= ₹8,34,000
Applied Manufacturing Overhead	
	= Actual Overhead Incurred + Total Variance
	=₹ 18,00,000 +₹ 54,000
	= ₹ 18,54,000

Working Notes:-

Total Variance = Expenditure Variance + Efficiency Variance + Volume Variance

= ₹ 94,000 (A) + ₹ 48,000 (F) + ₹ 1,00,000 (F)

= ₹ 54,000 (F)

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Question24: A company operates a standard cost system to control the variable works cost of its only product. The following are the details of actual production, costs and variances for November, 2015.

Production and cost (actual)

Production	10,000 units
Direct Materials (1,05,000 kg.)	` 5,20,000
Direct Labour (19,500 hrs.)	` 3,08,000
Variable Overheads	` 4,10,000

Cost variances

Direct materials – Price	` 5,000 (F)
Direct materials – Usages	` 25,000 (A)
Direct labour – Rate	` 15,500(A)
Direct labour – Efficiency	` 7,500 (F)
Variable overheads	` 10,000 (A)

The Cost Accountant finds that the original standard cost data for the product is missing from the cost department files. The variance analysis for December, 2015 is held up for want of this data.

You are required to calculate:

(i) Standard price per kg. of direct material.

(ii) Standard quantity for each unit of output.

(iii) Standard rate of direct labour hour.

(iv) Standard time for actual production.

(v) Standard variable overhead rate.

Solution

Standard Price per Kg. of Direct Material

Material Price Variance = Standard Cost of Actual Quantity – Actual Cost

=5,000 (F) = Standard Cost of Actual Quantity – ` 5,20,000

Standard Cost of Actual Quantity

= ` 5,20,000 + ` 5,000

= ` 5,25,000

Standard Cost of Actual Quantity

= Standard Price per Kg. × Actual Quantity

=` 5,25,000 = Standard Price per Kg. × 1,05,000 Kg.

Standard Price per Kg. = $\left(\frac{Rs.5,25,000}{1,05,000\ kg}\right)$

= ` 5

Standard Quantity for each unit of output

Material Usage Variance = Standard Cost of Standard Quantity for Actual Output – Standard Cost of Actual Quantity

=25,000 (A) = Standard Cost of Standard Quantity for Actual Output – ` 5,25,000

Standard Cost of Standard Quantity for Actual Output

= ` 5,25,000 – ` 25,000

= ` 5,00,000

Standard Cost of Standard Quantity for Actual Output

= Standard Price per Kg. × Standard Quantity for Actual Output

=` 5,00,000 = ` 5 × Standard Quantity for Actual Output

Standard Quantity for Actual Output

= $\left(\frac{Rs.5,00,000}{Rs.5}\right)$

= 1,00,000 Kg.

Standard Quantity *for each unit of output*

= $\left(\frac{1,00,000\ Kg}{10,000\ units}\right)$

= 10 Kg.

Standard Rate of Direct Labour Hour

Direct Labour Rate Variance = Standard Cost of Actual Time – Actual Cost

=15,500 (A) = Standard Cost of Actual Time – ` 3,08,000

Standard Cost of Actual Time

= ` 3,08,000 – ` 15,500

= ` 2,92,500

Standard Cost of Actual Time

= Standard Rate per hr. × Actual Hours

=` 2,92,500 = Standard Rate per hr. × 19,500 hrs

Standard Rate per hr. = $\left(\frac{Rs.2\ 92,\ 500}{19,\ 500\ hrs.}\right)$

= ` 15

Standard Time for Actual Production

Labour Efficiency Variance = Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time

=7,500 (F) = Standard Cost of Standard Time for Actual Production – ` 2,92,500

Standard Cost of Standard Time for Actual Production

= ` 2,92,500 + ` 7,500

= ` 3,00,000

Standard Cost of Standard Time for Actual Production

= Standard Rate per hr. × Standard Time for Actual Production

=` 3,00,000 = ` 15 × Standard Time for Actual Production Standard Time for Actual Production

= $\left(\frac{Rs.3\ 00.000}{Rs.15}\right)$

= 20,000hrs

Standard Variable Overhead Rate

Variable Overhead Variance = Standard Variable Overheads for Production – Actual Variable Overheads

=10,000 (A) = Standard Variable Overheads for Production – ` 4,10,000

Standard Variable Overheads for Production

= ` 4,10,000 – ` 10,000

= ` 4,00,000

Standard Variable Overheads for Production

= Standard Variable Overhead Rate per Unit × Actual Production (Units)

= ` 4,00,000 = Standard Variable Overhead Rate per Unit × 10,000 units

Standard Variable Overhead Rate *per unit*

= $\left(\frac{\text{Rs. } 4,00,000}{10,000\text{units}}\right)$

= ` 40

Or

Standard Variable Overheads for Production

= Standard Variable Overhead Rate per Hour × Standard Hours for Actual Production

=` 4,00,000 = Standard Variable Overhead Rate per Hour × 20,000 hrs

Standard Variable Overhead Rate *per hour*

$$= \left(\frac{\text{Rs. } 4,00,000}{20,000 \text{ hrs}}\right)$$

= ` 20

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Sales Variance

Question 25:Compute the missing data indicated by the question marks from the following:

	Product R	Product S
Standard Sales Qty. (Units)	???	400
Actual Sales Qty. (Units)	500	???
Standard Price/Unit	`12	`15
Actual Price/Unit	`15	`20
Sales Price Variance	???	???
Sales Volume Variance	`1,200 (F)	???
Sales Value Variance	???	???

Sales Mix Variance for both the products together was `450 (F). 'F' denote favourable.

Solution:

Statement Showing "Standard & Actual Data (incomplete)"

Product	Standard / Budgeted Data			Actual Data		
	Qty. (units)	Price (per unit)	Amount (`)	Qty. (units)	Price (per unit)	Amount (`)
R	? ??	` 12	???	500	` 15	7,500
S	400	` 15	6,000	???	` 20	???
Total	???		? ??	? ??		???

Product: R

Sales Price Variance = Actual Qty. × (Actual Price – Budgeted Price)

= 500 units × (` 15 – ` 12)

= ` 1,500 (F)

Sales Volume Variance = Budgeted Price × (Actual Qty. – Budgeted Qty.)

`1,200 (F) = ` 12 × (500 units – Budgeted Qty.)

= Budgeted Qty. = 400 units

Sales Value Variance = Sales Price Variance + Sales Volume Variance

= ` 1,500 (F) + ` 1,200 (F)

= ` 2,700 (F)

The table can now be presented as follows. Assumed **Actual Quantity of S** is **'T' units**.

Product	Standard / Budgeted Data			Actual Data		
	Qty. (units)	Price (per unit)	Amount (`)	Qty. (units)	Price (per unit)	Amount (`)
R	400	` 12	4,800	500	` 15	7,500
S	400	` 15	6,000	T	` 20	20 x T
	800		10,800	500 + T		7,500 + 20T

Sales Mix Variance = Total Actual Qty (units) × (*Average* Budgeted Price *per unit* of Actual Mix – *Average* Budgeted Price *per unit* of Budgeted Mix)

$=`450\ (F) = (500 \text{ units} + T \text{ units}) \times \left[\left(\frac{500\ units XRs.12 + T units XRs.15}{500\ units + T units}\right)\left(\frac{Rs.10,800}{800\ units}\right)\right]$

=`450 (F) = 6,000 +15T– 13.5 × (500 + T)

=T = 800 units

Statement Showing "Standard & Actual Data (Complete)"

Product	Standard / Budgeted Data			Actual Data		
	Qty. (units)	Price (per unit)	Amount (`)	Qty. (units)	Price (per unit)	Amount (`)
R	400	` 12	4,800	500	` 15	7,500
S	400	` 15	6,000	800	` 20	16,000
	800		10,800	1,300		23,500

Product: S

Sales Price Variance = Actual Qty. × (Actual Price – Budgeted Price)

= 800 units × (` 20 – ` 15)

= ` 4,000 (F)

Sales Volume Variance = Budgeted Price × (Actual Qty. – Budgeted Qty.)

= ` 15 × (800 units – 400 units)

= ` 6,000 (F)

Sales Value Variance = Sales Price Variance + Sales Volume Variance
= 4,000 (F) + 6,000 (F)
= `10,000 (F)

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Planning and Operational variances for Sales

The Sales volume variance can be sub-divided into a planning and operational variance:

Actual sales quantity × Standard margin

Revised budgeted sales × Standard margin } Market Share variance (Operational)

(to achieve target share of actual market)

Original budgeted sales × standard margin } Market size variance(planning)

Computation of Variances and Reconciliation of Budgeted/Standard Profit with Actual Profit

Question 28:Safron products Ltd. produces and sells a single product. Standard cost card per unit of the product is as follows.

	`
Direct Material, A 10 kg @ `5 per kg	50.00
B 5 kg @ `6 per kg	30.00
Direct Wages, 5 hours @ ` 5 per hour	25.00
Variable Production Overheads, 5 hours @ 12 per hour	60.00
Fixed Production Overheads	25.00
Total Standard Cost	190.00
Standard Gross Profit	35.00
Standard Selling Price	225.00

A fixed production overhead has been absorbed on the expected annual output of 25, 200 units produced evenly throughout the year. During the month of December, 2013, the following were the actual results for an actual production of 2,000 units:

	`
Sales, 2,000 units @ ` 225	4,50,000
Direct Materials, A 18,900 kg	99,225

	`
B 10,750 kg	61,275
Direct Wages, 10,500 hours (actually worked 10,300 hours)	50,400
Variable Production Overheads	1,15,000
Fixed Production Overheads	56,600
Gross Profit	67,500

The material price variance is extracted at the time of receipt of materials. Material purchase were a 20,000 kg. @ 5.25 per kg; B 11,500 kg @ ` 5.70 per kg.

Required:

(i) Calculate all Variances.

(ii) Prepare a reconciliation statement showing Standard Gross Profit, Variances and Actual Gross Profit.

(iii) Explain the reason for the difference in Actual Gross Profit given in the question and calculated in (ii) above.

Solution:

Computation of Variances

Direct Mateial Variances

Mateial Price Varaince = Standard Cost of Actual Quantity –Actual Cost

(At the time of receipt)

= PQ × SP –PQ × AP

Or

=PQ × (SP –AP)

(A) = 20,000 Kg. × (`5.00 - `5.25)

= `5,000 (A)

(B) = 11,500 kg. × (`6.00 - `5.70)

= `3,450 (F)

Total = `5,000 (a) + `3,450 (F)

= ` 1,550 (A)

Material Usage Variance = Standard Cost of Standard Quantity for Actual output- Standard Cost of Actual Quality

= SQ × SP-AQ × SP

Or

=SP × (SQ –AQ)

(A)= `5 × (2,000 units × 10 Kg. – 18,900 kg)

= `5,500 (F)

(B) = `6 × (2,000 units × 5 kg. – 10,750 kg.)

= `4,500 (A)

Total = ` 5,500 (F) + ` 4,500 (A)

= ` 1,000 (F)

Material Mix variance = Total Actual Quantity (units) X (Average Standard Price per unir of Standard Mix – Average Standard Price per unit of Actual Mix)

= 29,650 Kg. ×

$$\left(\frac{(Rs.50+Rs.30)X\ 2,000\ units}{2,000\ units X\ (10\ kg.+5Kg.} - \frac{Rs.5\ X\ 18,900\ kg.+Rs.6\ X\ 10,750kg.}{18,900kg.\ +10,750Kg.}\right)$$

= `866.66…..(A)

Material Yield Variance = Average Standard Price per unit of Standard mix X (Total Standard Quantity (units) – Total Actual Quantity (units)

$$= \left\{\frac{(Rs.50+Rs.30)X\ 2,000\ units}{2,000\ units X\ (10\ Kg.+5Kg.)}\right\} X$$

$$[(10kg+5Kg)X\ 2,000\ units-(18,900\ kg+10,750\ Kg.)]$$

= ` 1,866.66…. (F)

Direct Labour Variances

Labour Rate Variance = Standard Cost of Actual Time –Actual Cost

= SR X AH* –AR X AH*

Or

=(SR-AR) X AH*

$$= \left(Rs.5-\frac{Rs.50,400}{10,500\ hours}\right) X\ 10,500\ hours$$

= `2,100 (F)

AH* refers to Actual Hours paid

Labour Efficiency Variance = Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time

= (SH × SR) – (AH* × SR)

Or

= (SH –AH*) × SR

= `5.00 × (2,000 units × 5 hours – 10,300 hours)

= ` 1,500(A)

Idle Time variance = Standard Rate per hour × Actual idle Hours

= (AH* × SR) - (AH* × SR)

Or

= (AH* -AH*) × SR

= `5.00 × (10,500 hours – 10,300 hours)

= `1,000 (A)

AH* refers to Actual Hours Worked

Variable Overhead Variances

Cost Variance = Standard Variable Overheads for production – Actual Variable overheads

= 2,000 units × `60 - `1,15,000

= `5,000 (F)

Expenditure Variance = Budgeted Variable overheads fro Actual Hours – Actual variable Overheads

= 10,300 hours × `12 - ` 1,15,000

= ` 8,600 (f)

Efficiency Variances = Standard variable overheads for production –Budgeted Varible overheads for Actual Hours

= 2,000 units × `60 – 10,300 hours × `12

= `3,600 (a)

Fixed Overhead Variances

Cost Variance = Absorbed Fixed overheads –Actual Fixed Overehads

= 2,000 units × `25.00 - `56,600

= `50,000 - `56,600

= 6,600 (A)

Expenditure Variance =Budgeted Fixed Overheads –Actual Fixed Overheads

= 2,100 units × `25.00 - ` 56,600

= `52,500 - `56,600

= `4,100 (A)

Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads

= ` 50,000 - `52,500

= `2,500 (a)

Reconciliation Statement

Particulars	(`)	(`)	(`)
Standard Profit (`35 × 2,000 units)			
Variances	Favorable	Adverse	
Material:			
Price (at the time of receipt)	—	1,550	
Mix	—	866.66…	
Yield	1,866.66…	—	(550)

Particulars	(`)	(`)	(`)
Labour:			
Rate	2,100	—	
Efficiency	—	1,500	
Idle time	—	1,000	(400)
Variable Overheads			
Expenditure	8,600	--	
Efficiency	--	3,600	5,000
Fixed Overheads.			
Expenditure	---	4,100	
Volume	---	2,500	(6,600)
Gross profit			67,450

Reason For the Difference in Actual Gross Profit

Actual Gross profit given in the problem is ` 67,500 while cas ` 67,450. The difference amount is due to Material Price variance that is calculated at the time of receipt of material instead of consumption if material.

Material Price variance	=Standard Cost of Actual Quantity –Actual Cost
	=AQ × SP – AQ × AP
	Or
	= AQ × (SP-AP)
(A)	= 18,900kg × (`5.00 - `5.25)
	= `4,725 (A)
(B)	= 10,750 Kg. × (`6.00 - `5.70)
	= `3,225 (F)
Total	= `4,725(A) + `3,225(F)
	= `1,500 (a)

Over Recovery in the reconciliation statement is `50 (`1,550 - ` 1,500). Should be added in Gross Profit ` 67,500 (`67,450 + `50).

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With Semi Variable Overhead

Question 29:Fo-Tan Ltd. operating on a standard costing system, for a given four week period budgeted for sales of 10,000 units at ` 50 per unit, actual sales were 9,000 units at `51.25 per unit. Costs relating to that period were as follows:

	Standard (`) 10,000	Actual (`) 9000
Materials	2,50,000	2,57,400
Wages	75,000	70,875
Fixed Overhead	20,000	18,810
Variable Overhead	10,000	9,250
Semi-Variable Overhead	2,700	2,430
Hours	50,000	40,500

The standard material content of each unit is estimated at 25 kg. at`1 per kg. actual figures was 26 Kg. at ` 1.10 per kg.

The standard wages per unit are 5 hours at `1.50 per unit, actual wages were 4.5 hours at `1.75.

Semi-variable overhead consists of five-ninths fixed expenses and four-ninths variable.

There were no opening stocks and the whole production for the period was sold.

The four week period was a normal period.

You are required:

(a) To compute the variance in sales, materials, labour and overhead due to all possible causes, andZ

(b) With the help of such a computation draw-

– a statement reconciling the actual profit for the period with the standard profit.

– a statement reconciling the actual profit for the period with the budgeted profit.

Solution:

COMPUTATION OF VARIANCES

Sales Variances

Sales Value Variance	= Actual Sales – Budgeted Sales
	= ` 51.25 × 9,000 units – ` 50 × 10,000 units
	= ` 38,750 (A)
Sales Price Variance	= Actual Sales – Standard Sales *Or* = Actual Quantity × (Actual Price – Budgeted Price) = 9,000 units × (` 51.25 – ` 50)

	= 11,250 (F)
Sales Volume Variance	= Standard Sales – Budgeted Sales *Or* = Budgeted Price × (Actual Quantity – Budgeted Quantity) = ` 50 × (9,000 units – 10,000 units) = 50,000 (A)
Sales Margin Price Variance	= Sales Price Variance = `11,250 (F)
Sales Margin Volume Variance	= Sales Volume Variance × Budgeted Net Profit Ratio
	=50,000(a) X $\left(\frac{Rs.1423}{Rs.50.00}\right)$ % 100 = `14,230 (A)
Sales Margin Variance	= Sales Margin Price Variance + Sales Margin Volume Variance = `11,250 (F) + `14,230 (A) = `2,980 (A)

Sales Price Variance is equal to **Sales Margin Price Variance**. This is because, for the actual quantity sold, standard cost remaining constant, change in selling price will have equal impact or turnover and profit.

Sales Margin Volume Variance is **equal** to **Sales Volume Variance × Budgeted Net Profit Ratio**

Material Variances Cost Variance	= Standard Cost* – Actual Cost = ` 1 × 25 Kg. × 9,000 units – ` 2,57,400 = `32,400 (A) **Standard Cost refers to 'Standard Cost of Standard Quantity of Actual Output'*
Price Variance	= Standard Cost of Actual Quantity – Actual Cost = SP × AQ – AP × AQ *Or* = AQ × (SP – AP) = $\left(\frac{Rs.2\,57,400}{Rs.1.10}\right) XRs.\ 1.00 - Rs.1.10$
Usage Variance	= Standard Cost of Standard Quantity for Actual Production – Standard Cost of Actual Quantity = (SQ × SP) – (AQ × SP) *Or* = (SQ – AQ) × SP

	= $9000 units x 25 kg X \frac{Rs.2,57,400}{1.10} X Rs.1.00$ **= `9,000 (A)**
Labour Variances Cost Variance	= Standard Cost* – Actual Cost = SH × SR – AH × AR = ` 1.50 × (5 hours × 9,000 units) – ` 70,875 = ` 67,500 – ` 70,875 = ` 3,375 (A) **Standard Cost refers to 'Standard Cost of Standard Time for Actual Output'*
Rate Variance	= Standard Cost of Actual Time – Actual Cost = SR × AH – AR × AH *Or* = (SR – AR) × AH = (` 1.50 – ` 1.75) × 40,500 hours = ` 10,125 (A)

Efficiency Variance	= Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time = (SH × SR) – (AH × SR) *Or* = (SH – AH) × SR = (45,000 hours – 40,500 hours) × ` 1.50 = ` 6,750 (F)
4. Variable Overhead Cost Variances	
Cost Variance	= Standard Variable Overheads for Production – Actual Variable Overheads = `1.12 × 9,000 units – `10,330 = ` 250 (A)
Expenditure Variance	= Budgeted Overheads for Actual Hours – Actual Overheads = 40,500 hours × ` 0.224 – ` 10,330 = ` 1,258 (A)
Efficiency Variance	= Standard Variable Overheads for Production – Budgeted Overheads for Actual Hours = `1.12 × 9,000 units – 40,500 hours × ` 0.224 = ` 1,008 (F)
5. **Fixed Overhead Variances**	
Cost Variance	= Absorbed Fixed Overheads – Actual Fixed Overheads = 9,000 units × ` 2.15 – ` 20,160 = ` 19,350 – ` 20,160 = ` 810 (A)
Expenditure Variance	= Budgeted Fixed Overheads – Actual Fixed Overheads = ` 21,500 – ` 20,160 = ` 1,340 (F)
Volume Variance	= Absorbed Fixed Overheads – Budgeted Fixed Overheads = ` 19,350 – ` 21,500 = ` 2,150 (A)

Capacity Variance	= Budgeted Fixed Overheads for Actual Hours – Budgeted Fixed Overheads = 40,500 hours × ` 0.43 – ` 21,500 = ` 4,085 (A)
Efficiency Variance	= Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual Hours = ` 19,350 – 40,500 hours × ` 0.43 = ` 1,935 (F)

RECONCILIATION STATEMENT

(Standard and Actual Profit)

Particulars	(`)	(`)
Profit- Standard		1,28,070
Sales Margin Variances		
Volume	N.A.	
Price	11,250 (F)	11,250
Direct Material Variances		
Price	23,400 (A)	
Usage	9,000 (A)	(32,400)
Direct Labour Variances		
Labour Rate	10,125 (A)	
Labour Efficiency	6,750 (F)	(3,375)
Variable Overhead Variances		
Expenditure	1,258 (A)	
Efficiency	1,008 (F)	(250)
Fixed Overhead Variances		
Expenditure	1,340 (F)	
Capacity	4,085 (A)	
Efficiency	1,935 (F)	(810)
Actual Profit		1,02,485

RECONCILIATION STATEMENT

(Budgeted & Actual Profit)

Particulars	(`)	(`)

Budgeted Profit (10,000 units x ` 14.23)		1,42,300
Sales Margin Variances		
Volume	14,230 (A)	
Price	11,250 (F)	(2,980)
Direct Material Variances		
Price	23,400 (A)	
Usage	9,000 (A)	(32,400)
Direct Labour Variances		
Labour Rate	10,125 (A)	
Labour Efficiency	6,750 (F)	(3,375)
Variable Overhead Variances		
Expenditure	1,258 (A)	
Efficiency	1,008 (F)	(250)
Fixed Overhead Variances		
Expenditure	1,340 (F)	
Capacity	4,085 (A)	
Efficiency	1,935 (F)	(810)
	Actual Profit	1,02,485

WORKING NOTES

Standard Variable Overheads	= ` 10,000 + ` 2,700 × 4/9 = ` 11,200
Std. Variable Overhead Rate *per unit*	$= \frac{\text{Rs.11,200}}{\text{10,000units}}$ = `1.12
Std. Variable Overheads Rate *per hour*	$= \frac{\text{Rs.11,200}}{\text{50,000hours}}$ = ` 0.224
Actual Variable Overheads	= ` 9,250 + ` 2,430 × 4/9 = ` 10,330
Budgeted Fixed Overheads	= ` 20,000 + 5/9 × ` 2,700 = ` 21,500

Standard Fixed Overheads Rate *per unit*	$= \frac{Rs.21,500}{10,000 units}$ =Rs. 2.15
Std. Fixed Overheads Rate *per hour*	$= \frac{Rs.21,500}{50,000 hours}$ = ` 0.43
Actual Fixed Overheads	= ` 18,810 + ` 2,430 × 5/9 = ` 20,160
Standard Hrs. for *actual production*	= 9,000 units × $\frac{50.000\ hours}{10,000\ units}$ = 45,000 hours
Standard Cost *per unit*	$= \frac{Rs.3,57,700}{10,000\ units}$ = `35.77
Budgeted Margin *per unit*	= `50 – `35.77 = `14.23
Standard Profit/Margin	= Actual Qty. Sold × Budgeted Margin *per unit* = 9,000 units × ` 14.23 = `1,28,070
Computation of Actual Profit Actual Sales (9,000 units × ` 51.25) Actual Cost of Sales Actual Profit	= ` 4,61,250 = ` 3,58,765 = Actual Sales – Actual Cost of Sales = ` 4,61,250 – ` 3,58,765 = `1,02,485

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Question 30:BOM & CO. operate a system of standard costs. For the four weeks ended 31st March, 2013 the Following was their profit and Loss Account:

Particulars	`	Particulars	`
Material Consumed	1,89,000	Transfer to Sales Deptt. 3,500 units of Finished articles at. `140 each	4,90,000
Direct Wages	22,100		
Fixed Expenses	1,88,000		

Variable Expenses	62,000		
Profit	28,900		
	4,90,000		**4,90,000**

The following Further information is given:

(a) There was no opening or closing work-in-progress. The articles manufactured are identical and get transferred to sales department after manufacture.

(b) Materials were drawn for 3,600 units at ` 52.50 per unit.

(c) For the four week period, the standard production capacity is 4,800 units, and the break-up of the standard selling prices is given below:

	` Per unit
Material	50
Direct Wages	6
Fixed Expenses	40
Variable Expenses	20
Standard Cost of Sale	116
Standard Profit	24
Standard Selling Price	140

(d) The standard wages per article is based on 9,600 hours worked for the four-week period at a rate of ` 3.00 per hour. 6,400 hours were actually worked during the four-week period and, in addition, wages for 400 hours were paid to compensate for idle time due to breakdown of a machine, and the overall wage rate was `3.25.

You have to present a Trading and profit and loss account indicating the comparison between standards and actual and analyse the variances.

Solution

COMPARISON BETWEEN STANDARD AND ACTUAL

Trading and Profit and Loss Account for 4 weeks ended 31st March, 2013

Particulars	**Std. 3,500 units**	**Actual 3,500 units**	**Variance**	**Particulars**	**Std. 3,500 units**	**Actual 3,500 units**	**Variance**
	`	`	`		`	`	`
Material	1,75,000	1,89,000	14,000(A)	Transfer to Sales Dept. at `140 each	4,90,000	4,90,000	-

Particulars	Std. 3,500 units	Actual 3,500 units	Variance	Particulars	Std. 3,500 units	Actual 3,500 units	Variance
	`	`	`		`	`	`
Direct Wages	21,000	22,100	1,100(A)				
Variable Exp.	70,000	62,000	8,000(F)				
Fixed Exp.	1,40,000	1,88,000	48,000(A)				
Profit	84,000	28,900	55,100(A)				
	4,90,000	4,90,000			4,90,000	4,90,000	

COMPUTATION OF VARIANCES

1. Direct Material Variances

Material Price Variance	= Actual Quantity × (Standard Price – Actual Price) = 3,600 units × (` 50.00 – ` 52.50) = ` 9,000 (A)
Material Usage Variance	= Standard Price × (Standard Quantity – Actual Quantity) = ` 50 × (3,500 units – 3,600 units) = ` 5,000 (A)
Material Cost Variance	= ` 9,000 (A) + ` 5,000 (A) = `14,000 (A)
2. Direct Labour Cost Variance	
Labour Rate Variance	= Actual Hours × (Standard Rate – Actual Rate) = 6,800 hours × (` 3.00 – ` 3.25) = ` 1,700 (A)

Labour Efficiency Variance	= Standard Rate × (Standard Hours – Actual Hours) = ` 3 × (3,500 units × 2 hours – 6,400 hours) = ` 1,800 (F)
Idle Time Variance	= Standard Rate × Idle Hours = ` 3 × 400 = ` 1,200 (A)
Labour Cost Variance	= ` 1,700 (A) + ` 1,800 (F) + ` 1,200 (A) = ` 1,100 (A)
3. Variable Expense Variance	
	= Standard Variable Expenses – Actual Variable Expenses = 3,500 units × ` 20 – ` 62,000 = ` 8,000 (F)
4. Fixed Expenses Variances	
Expenditure Variance	= Budgeted Fixed Expenses – Actual Fixed Expenses = 4,800 units × ` 40 – ` 1,88,000 = ` 4,000 (F)
Volume Variance	= Absorbed Fixed Expenses – Budgeted Fixed Expenses = ` 40 × 3,500 units – ` 40 × 4,800 units = ` 52,000 (A)
Capacity Variance	= Std. Rate *per hour* × (Actual Hours – Budgeted Hours) = ` 20 × (6,400 hours – 9,600 hours) = ` 64,000 (A)
Efficiency Variance	= Std. Rate *per hour* × (Std. Hours for Actual Output – Actual Hours) = ` 20 × (7,000 hours – 6,400 hours) = ` 12,000 (F)
Fixed Expense Variance	=` 4,000 (F) + ` 64,000 (A) + ` 12,000 (F) = ` 48,000 (A)
Total Cost Variance	= Direct Material Cost Variance + Direct Labour Cost Variance + Variable Expenses Variance + Fixed Expenses Variance = ` 14,000 (A) +1,100 (A) + ` 8,000 (F) + ` 48,000 (A) = ` 55,100 (A)
6. Profit Variance	= Standard Profit – Actual Profit = ` 84,000 – ` 28,900 = ` 55,100 (A)

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Question 33:Young Chin limited uses standard and marginal costing system. It provides the following details for the year 2012-13 relating to its production, cost and sales:

Particulars	Budget	Actual
Sales units	24,000	2,6000
Sales value (`)	6,000	6,784
Materials (`)	960	1,080
Labour (`)	1,440 4800	1,664
Variable Overheads (`)	2,400	2,592

The sales budget is based on the expectation of the company's estimate of market share of 12%. The entire industry's sales of the same product for the year 2012-13 is 2,40,000 units.

Further details are as follows:

Particulars	Standard (In `)	Actual (In `)
Material price per kg.	8.00	7.50
Labour rate per hour	6.00	6.40

You are required to:

(a) Prepare a statement reconciling the budgeted contribution with actual contribution on the basis of important material variances, labour variances, variable overhead variances and sales variances.

(b) Compute market size variance and market share variance also.

Solution:

COMPUTATION OF VARIANCES

Sales Variances - Turnover Based

Workings

Budgeted Sales	`6000
Budgeted Sales Quantity (units)	24.000
Budgeted Selling Price (` 6,000 / 24,000 units)	`0.25
Actual Industry Sales (units)	***2,40,000***
Budgeted Market Share	12%
Market Share Required (units) (2,40,000 units × 12%)	28,800
Varince	
Value variance	Actual Sales – Budgeted Sales
	= AP × AQ – BP × BQ

	= ` 6,784 – `6,000
	= ` 784 (F)
Price Variance	= Actual Sales – Standard Sales
	= AP × AQ – BP × AQ
	Or
	= AQ × (AP – BP)
	$=25,600\ units x\left\{\left(\frac{Rs.6,784}{25,600\ units}\right)-\left(\frac{Rs.6,000}{24,000\ units}\right)\right\}$
	= 384 (F)
Volume Variance	= Standard Sales – Budgeted Sales
	= BP × AQ – BP × BQ
	Or
	= BP × (AQ – BQ)
	$=\left(\frac{Rs.6,000}{24,000\ units}\right)X(25,600\ units-24,000\ units)$
	=`400 (f)
Market Size Variance	= (Required Sales Quantity *in units* –Total Budgeted Quantity *in units*) × Average Budgeted Price *per unit*
	= (28,800 units – 24,000 units) × ` 0.25
	= `1,200 (F)
Market Share Variance	= (Total Actual Quantity *in units* – Required Sales Quantity *in units*) × Average Budgeted Price *per unit*
	= (25,600 units – 28,800 units) × ` 0.25
	= `800 (A)
Sales Variances - Contribution Based	
Workings	
Budgeted Contribution:	
Sales	` 6,000
Less: Variable Costs	` 4,800
Contribution	` 1,200

Budgeted Units	24,000
Contribution / unit (`1,200 / 24,000 units)	` 0.05

Variances	
Sales Contribution Price Variance	
	= Sales Price Variance
	= 384 (F)
Sales Contribution Volume Variance	= Sales Volume Variance x Budgeted Profit Volume Ratio
	=400(F) X$\left(\frac{Rs.1,200}{Rs.6,000}X100\right)$
	= ` 80 (F)
Market Size Variance	= (Required Sales Quantity *in units* –Total Budgeted Quantity *in units*) × Average Budgeted Contribution *per unit*
	= (28,800 units – 24,000 units) × ` 0.05
	= `240 (F)
Market Share Variance	= (Total Actual Quantity *in units* – Required Sales Quantity *in units*) × Average Budgeted Contribution *per unit*
	= (25,600 units – 28,800 units) × ` 0.05
	= `160 (A)
Contribution Variance	= Sales Contribution Price Variance + Sales Contribution Volume Variance
	= `384 (F) + `80 (F)
	= `464 (F)
Direct Materials Variance	
Workings	
Budgeted Material Cost	` 960
Budgeted Units	24,000
Budgeted Material Cost per 100 units (`960 / 24,000units × 100)	` 4
Standard Price of Material *per Kg*	` 8
Standard Requirement of Materials per 100 units of output (`4 / `8)	0.50 Kg
Actual Output (units)	25,600
Standard Requirement for Actual Output	128 Kg

{(25,600 units × 0.50 Kg) / 100 units}	
Actual Material Cost	` 1,080
Actual Price *per Kg*	` 7.50
Actual Quantity of Materials Consumed (`1,080 / `7.50)	144 Kg
Variances	
Material Price Variance	= Standard Cost of Actual Quantity – Actual Cost
	Or
	= Actual Qty. × (Std. Price – Actual Price)
	= 144 Kg. × (` 8 – ` 7.50)
	= 72 (F)
Material Usage Variance	Standard Cost of Standard Quantity for Actual Production – Standard Cost of Actual Quantity
	Or
	= Std. Price × (Std. Qty. – Actual Qty.)
	= ` 8 × (128 Kg. – 144 Kg.)
	= ` 128 (A)
Direct Labour Variances	
Workings	
Budgeted Labour Cost	` 1,440
Budgeted Units	24,000
Budgeted Labour Cost per 100 units (`1,440 / 24,000 units ×100 units)	` 6
Standard Labour Rate *per hour*	` 6
Standard Requirement of Labour Hours per 100 units of output (`6 / `6)	1 hr
Actual Output (units)	25,600
Standard Hours Required for Actual Output (25,600 units × 1 hr /100 units)	256 hrs
Actual Labour Cost	` 1,664
Actual Direct Labour Rate *per hour*	` 6.40
Actual Hours Worked (`1,664 / `6.40)	260 hrs
Budgeted Direct Labour Hours (`1,440 /	240 hrs

`6)	
Variances	
Labour Rate Variance	= Standard Cost of Actual Time – Actual Cost
	Or
	= Actual Hours × (Std. Rate – Actual Rate)
	= 260 hours × (` 6.00 – ` 6.40)
	= `104 (A)
Labour Efficiency Variance	= Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time
	OR
	= Std. Rate × (Std. Hours – Actual Hours)
	= ` 6 × (256 hours – 260 hours)
	= ` 24 (A)
Variable Overheads Variances	
Workings	
Budgeted Variable Overheads	` 2,400
Budgeted Labour Hours	240
Standard Variable Overhead Rate per direct labour hour (` 2,400 / ` 240)	` 10
Actual Hours	260 hrs
Standard Hours Required for Actual Output	256 hrs
Variances	
Expenditure Variance	= Budgeted Variable Overheads for Actual Hours – Actual Variable Overheads
	= 260 hours × ` 10 – ` 2,592
	= ` 8 (F)
Efficiency Variances	= Standard Variable Overheads for Production – Budgeted Variable Overheads for Actual Hours
	= 256 hours × ` 10 – 260 hours × ` 10
	= 40 (A)

CONTRIBUTION ANALYSIS

	Budget	**Actual**

Sales	6,000	6,784
Variable Cost	4,800	5,336
Contribution	1,200	1,448

RECONCILIATION

Budgeted and Actual Contribution

	`
Budgeted Contribution	1,200
Add: Sales Contribution Volume Variance	80 (F)
Standard Contribution	1,280
Add: Sales Price Variance	384 (F)
Less: Material Usage Variance	128 (A)
Add: Material Price Variance	72 (F)
Less: Labour Efficiency Variance	24 (A)
Less: Labour Rate Variance	104 (A)
Less: Variable Overhead Efficiency Variance	40 (A)
Add: Variable Overhead Expense Variance	8 (F)
Actual Contribution	1,448

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Question 34:RST Ltd. has provided the following summarized results for two years:

	Year ended (` in lacs)	
	31-03-2013	**31-3-2014**
Sales	3,000	3,277.50
Material	2,000	2,357.50
	31-03-2013	**31-3-2014**
Variable Overheads	500	525.00
Fixed overheads	300	367.50
Profit	200	27.50

During the year ended 31-3-2014 sales price has increased by 15% whereas material and overhead prices have increased by 15% and 5% respectively. You are required to analyse the variances of revenue and each element of cost over the year in order to bring out the reasons for the change in profit. Present a profit reconciliation statement starting from profits in 2012-13 showing the factors responsible for the change in profits in 2013-14.

Solution:

Statement Showing "Reconciliation Between Budgeted Profit [F.Y. 2012-13] & Actual Profit [F.Y. 2013-14]"

Particulars	(` **in lacs**)	(` **in lacs**)
Budgeted Profit		200.00
Sales Margin Variances:		
Price	427.50 (F)	
Volume	10.00 (A)	417.50 (F)
Direct Material Variances:		
Price	307.50 (A)	
Usage	150.00 (A)	457.50 (A)
Variable Overheads Variances:		
Expenditure	25.00 (A)	
Efficiency	25.00 (A)	50.00 (A)
Fixed Overheads Variances:		
Expenditure	67.50 (A)	
Volume	15.00 (A)	82.50 (A)
Actual Profit		27.50

COMPUTATION OF VARIANCES (` In Lacs)

Sales Variances

Price Variance **:** Actual Sales – Standard Sales
: `3,277.50 – `2,850.00
: `427.50 (F)

Volume Variance **:** Standard Sales – Budgeted Sales
: `2,850.00 – `3,000.00
: `150 (A)

Sales Margin Price Variance **:** Sales Price Variance
: `427.50 (F)

Sales Margin Volume Variance : Sales Volume Variance × Budgeted Net Profit Ratio

$$= \text{`}150\ (A) \times \left(\frac{Rs.200}{Rs.3000}\right)$$

= `10 (A)

Material Variances

Material Price Variance **:** Standard Cost of Actual Quantity – Actual Cost
: `2,050.00 – `2,357.50
: `307.50 (A)

Material Usage Variance **:** Standard Cost of Standard Quantity for Actual Output – Standard Cost of Actual Quantity

= `1,900 – `2,050

= `150 (A)

Variable Overhead Variances Expenditure Variance

= Budgeted Variable Overheads for Actual Hours – Actual Variable Overheads

Or

= Std. Rate *per unit* × Expected Output for Actual Hours Worked – Actual Variable Overheads

= `500 – `525

= `25 (A)

Efficiency Variances = Standard Variable Overheads for Production – Budgeted Variable Overheads for Actual Hours

Or

= Std. Rate *per unit* × Actual Output – Std. Rate *per unit* × Expected Output for Actual Hours Worked

= `475 – `500

= `25 (A)

Fixed Overhead Variances

Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads.

= `300.00 – `367.50

= `67.50 (A)

Volume Variance **=** Absorbed Fixed Overheads – Budgeted Fixed Overheads

= `285 – `300

= `15 (A)

WORKING NOTES (` in lacs)

Note-1

Sales in F.Y. 2013-2014	3,277.50
Less: Increase due to *price rise* [`3,277.50 lacs × 15/115]	427.50
Sales in F.Y. 2013-2014 at F.Y. 2012-2013 Prices **[Standard Sales]**	2,850.00
Sales in F.Y. 2012-2013	3,000.00
Fall in Sales in F.Y. 2013-2014 [`3,000 lacs − `2,850 lacs]	150.00
Percentage fall	5%

Note-2

Material Cost In F.Y. 2012-2013	2,000.00
Less: 5% for Decrease in Volume	100.00

'Standard Material Usage' at F.Y. 2012-13 Prices **(Standard Cost of Standard Quantity for Actual output)**	1,900.00
Actual Material Cost F.Y. 2013-2014	2,357.50
Less: 15% Increase in Prices [`2,357.50 lakhs × 15/115]	307.50
Actual Materials Used, at F.Y. 2012-2013 Prices **(Standard Cost of Actual Quantity)**	2,050.00

Note-3

Variable Overheads Cost in F.Y. 2012-13	500.00
Less: 5% due to fall in Volume of Sales in F.Y. 2013-14	25.00
"Standard Overheads for Production" in F.Y. 2013-14	475.00
Actual Variable Overheads Incurred in F.Y. 2013-14	525.00
Less: 5% for Increase in Price [`525 lacs × 5 / 105]	25.00
Amount Spent in F.Y. 2013-14 at F.Y. 2012-13 Prices **(Budgeted Variable Overheads for Actual Hours)**	500.00

Note-4

Fixed Overheads Cost in F.Y. 2012-13	300.00
Less: 5% due to fall in Volume of Sales in F.Y. 2013-14	15.00
"Standard Overheads for Production" in F.Y. 2013-14. **(Absorbed Fixed Overheads)**	285.00

This problem can also be solve by 'Contribution'

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Question 35:A company manufacturers a product whose data for a period has been analysed as follows:

Standard Cost	`
Direct materials-5 units at ` 3	15
Direct labour 5 hr @ 5 per hour.	25
Production overheads-5 hours at ` 4	20
Total	**60**

Profit margin is at 25% on sale price. Budgeted sales for the period is` 39,200.

Actual Data	`
Sales	35,000
Direct Materials	8,000
Direct Wages	12,000

Analysis of variances

	Adverse `	Favorable `
Direct material		
Price	800	—
Usage	—	405
Direct Labour		
Rate	—	975
Efficiency	300	—
Production overhead		
Expenditure	200	—
Volume	—	340

Assume that there is no change in stock and that there are no other overheads.

Required:

To compute the following from the above details:

1. Sales price variance
2. Actual profit
3. Reconciliation between actual profit & budgeted profit.
4. Budgeted hours worked
5. Actual hours worked
6. Production overhead capacity variance
7. Actual production
8. Sales Volume profit variance
9. Production overhead efficiency variance

Answer:507 unit, ` 5000, 2595, 2450, 240A, 580F, 5560A, 340F, Budget profit= 9800, 490 unit.

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Question 37:The working results of a Jems Ltd. For two corresponding years are shown below:—

The working results of a Jems Ltd. For two corresponding years are shown below:—

Particulars	Amount (` in Lakhs)

	Year 2012	Year 2013
Sales	600	770
Cost of Sales:		
Direct materials	300	324
Direct wages and variable overheads	180	206
Fixed Overheads	80	150
Profit	40	90

In year 2013, there has been an increase in the selling price by 10 percent. Following are the details of material consumption and utilization off direct labour hours during the two years:

Particulars	Year 2012	Year 2013
Direct materials Consumption (M.tons)	5,00,000	5,40,000
Direct Labour Hours	75,00,000	80,00,000

Required:—

Taking year 2012 as base year, analyse the variances of year 2013 and also workout the amount which each variance has contributed to change in profit.

Find out the breakeven sales for both years.

Calculate the percentage increase in selling price in the year 2013 that would be needed over the sale value of year 2013 to earn margin of safety of 45 per cent.

Solution

COMPUTATION OF REQUIREMENTS

Reconciliation Statement Showing "Factors Contributed Change in Profit"

(` in lacs)

Particulars	Fav.	Adv.
Increase in Contribution Due to Increase in Volume (` *140 lacs* –`*120 lacs*) (*Refer to working note 3*)	20	—
Sales Price Variance (*Refer to working note 3*)	70	—
Material Usage Variance (*Refer to working note 4*)	26	—
Material Price Variance (*Refer to working note 4*)	—	—
Direct Labour Rate Variance (*Refer to working note 4*)	—	14
Direct Labour Efficiency Variance (*Refer to working note 4*)	18	—

Particulars	Fav.	Adv.
Fixed Overhead Expenditure Variance (*Refer to working note 3*)	—	70
Change in Profit	134	84
Change in Profit (Net)	50	

Break-Even Sales

Break-even Sales = $\frac{FixedCsot}{\frac{P}{v}Ratio}$

Year 2012 = $\frac{Rs.80lacs}{\left(\frac{Rs.120lacs}{Rs.600lacs}\right)}$ = $Rs.400lacs$

Year 2013 = $\frac{Rs.150lacs}{\left(\frac{Rs.240lacs}{Rs.770lacs}\right)} = Rs.481.25lacs$

Percentage Increase in Selling Price Needed Over the Sales Value of Year 2013 to Earn a Margin of Safety of 45% in Year 2013

Break-even Sales (%)= (100% – 45%) or 55% of Total Sales

Required Contribution = $\frac{150\ lacs}{55} \times 100 = Rs.272.73$

BEP(`) = $\frac{Fixedcost(Rs.)}{PVR\%}$

Or

$\frac{BEP(Rs.)}{Sales(Rs.)} = \frac{FixedCost(Rs.)}{PVR\% \times Sales(Rs.)}$

Or

$\frac{BEP\ (Rs.)}{Sales\ (Rs.)} \times 100 = \frac{Fixedcost\ (Rs.)}{PVR\%XSales\ (Rs.)} \times 100$

Or

BEP(%) = $\frac{Fixedcost\ (Rs.)}{Contribution\ (Rs.)} \times 100$

Or

Contribution (Rs.)= $\frac{Fixedcost\ (Rs.)}{BEP\ (\%)} \times 100$

Present Contribution = `240 lacs

Increase in Selling Price required = `32.75 lacs (`272.73 lacs - `240 lacs)

Percentage increase in Selling Price over the Sales Value of Year 2013

= $\frac{Rs.327.72\ lacs}{Rs.770\ lacs} \times 100 = 4.25\%$

WORKING NOTES

Budgeted Sales in Year 2013

If Actual Sales in Year 2013 is ` 110 then Budgeted Sales is ` 100.

If Actual Sales in Year 2013 is ` 1 then Budgeted Sales = $\frac{Rs.100}{Rs.110}$

If Actual Sales in Year 2013 are ` 770,00,000 then Budgeted Sales are

$= \frac{Rs.100}{Rs.110} \times 7,70,00,000 =$ `700 lacs

Budgeted Figures of Direct Material; Direct Wages; and Variable Overhead Worked Out on the Basis of % of Sales in Year 2013

Direct Material % to Sales (in Year 2012) = $\frac{Directmaterial}{sales} \times 300/600 \times 100 = 50\%$

Budgeted figure of Direct Material (in Year 2013)

= 50% × ` 700 lacs = 350 lacs

Direct Wages and Variable Overhead (% to sales in Year 2012)

$= \frac{Direct\ wages\ and\ variable\ Overheads}{Sales}$

= 180/600 × 100 = 30%

Budgeted figure of Direct Wages and Variable Overhead (in Year 2013)

= 30% × 700 lacs = 210 lacs

Statement of Figures Extracted from Working Results of Company

(*Figure in lacs of*)

Particulars	**Year 2012 [Actual] (a)**	**Year 2013 [Budgeted] (b)**	**Year 2013 [Actual] (c)**	**Total [Variance] (d) = (c) – (b)**
Sales : (A) (**Refer to working note 1*)	600	700*	770	70 (F)
Direct Material...(a)* (*Refer to working note 2*)	300	350*	324	26 (F)
Direct Wages and Variable Overhead...(b)* (*Refer to working note 2*)	180	210 *	206	4 (F)
Total Variable Costs: (B) = (a + b)	480	560	530	30(F)
Contribution (C) = (A) – (B)	120	140	240	100 (F)
Less : Fixed Cost	80	80	150	70 (A)
Profit	40	60	90	30(F)

Data for Material Variances (i)

Standard Cost for Actual Output			Actual Cost		
Quantity of Material (m/t)	**Rate per m/t (`)**	**Amount (`)**	**Quantity of Material (m/t)**	**Rate per m/t (`)**	**Amount (`)**
5,83,333..	* 60	350 lacs	5,40,000	60	324 lacs

300 lacs / 5 lacs m/t

Material Price Variance = (Standard Rate – Actual Rate) × Actual Quantity
= Nil

Material Usage Variance = (Standard Quantity – Actual Quantity) × Standard Rate per m/t
= (5,83,333.. – 5,40,000) × ` 60
= `26 lacs (F)

Data for Labour Variances/Overhead Variances (ii)

Standard Cost for Actual Output			Actual Cost		
Labour Hours	**Rate per hour (`)**	**Amount (`)**	**Labour Hours**	**Rate per hour (`)**	**Amount (`)**
87,50,000 $\left(\frac{Rs.210\ lacs}{Rs.2.40}\right)$	2.40*	210 lacs	80,00,000	2.575	206 lacs

180 lacs / 75 lacs hours

Rate Variance = (Standard Rate – Actual Rate) × Actual Labour Hours
= (` 2.40 – ` 2.575) × 80,00,000
= `14 lacs (A)

Efficiency Variance = (Standard Labour Hours – Actual Labour Hours) × Standard Rate per Hour
= (87,50,000 – 80,00,000) × ` 2.40
= ` 18 lacs (F)

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Question 43: Managing Director of Petro –Kl Ltd. (PTKLL) thinks that Standard Costing has little to offer in the reporting of material variances due to frequently change in price of materials.

PTKLL can utilize one for two equally suitable raw materials and always plan to utilize the raw material which will lead to cheapest total production costs. However PTKLL is

frequently trapped by price changes and the material actually used often provides, after the event, to have been more expensive than the alternative which was originally rejected.

During Last accounting period, to produce a unit of "p" PTKLL could use either 2.50 Kf of "PG" or 2.50 Kg of "PD" PTKLL planned to use "PG" as it appeared it would be cheaper of the two and plans were based on a cost of "Pg" of ` 1.50 per Kg. Due to market movements the actual prices changed and if PTKLL had purchased efficiently the cost would have been:

"Pg" ` 2.25 per Kg.

"PD" ` 2.00 per Kg

Production of "P' was 1,000 units and usage of "PG" amounted to 2,700 Kg at a total cost of ` 6,480/-

You are required to analyze the material variance for "P' by:

Traditional Variances Analysis: and

An approach which distinguishes between Planning and Operational Variances.

Solution:

COMPUTATION OF VARIANCES

Traditional Variance (Actual Vs Original Budget)

Usage Variance	= (Standard Quantity – Actual Quantity) × Standard Price
	= (2,500 Kg – 2,700 Kg) × ` 1.50
	= ` 300 (A)
Price Variance	= (Standard Price – Actual Price) × Actual Quantity
	= (` 1.50 – ` 2.40) × 2,700 Kg
	= ` 2,430 (A)
Total Variance	` 300 (A) + ` 2,430 (A) = ` 2,730 (A)
Operational Variance (Actual Vs Revised)	
Usage Variance	= (2,500 Kg – 2,700 Kg) × ` 2.25
	= ` 450 (A)
Price Variance	= (` 2.25 – ` 2.40) × 2,700 Kg
	= ` 405 (A)
Total Variance	= ` 450 (A) + ` 405 (A) = ` 855 (A)
Planning Variance (Revised Vs Original Budget)	
Controllable Variance	= (` 2.00 – ` 2.25) × 2,500 Kg
	= 625 (A)
Uncontrollable Variance	= (` 1.50 – ` 2.00) × 2,500 kg
	= 1,250 (a)

Total Variance	= ` 625 (A) + ` 1,250 (A) = ` 1,875 (A)
Traditional Variance	**= Operational Variance + Planning Variance**
	= 855 (A) + 1,875 (A) = 2,730 (A)

A **Planning Variance** simply compares a revised standard to the original standard. An **Operational Variance** simply compares the actual results against the revised amount. **Controllable Variances** are those variances which arises due to inefficiency of a cost centre /department. **Uncontrollable Variances** are those variances which arises due to factors beyond the control of the management or concerned department of the organization.

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Question 44: Dimsek budgeted to make and sell 400 units of its product, the role, in the 4-week period no 8, as follows:

	£
Budgeted sales (100 units per week)	40,000
Variable costs (400 units × £60)	24,000
Contribution	16,000
Fixed costs	10,000
Profit	6,000

At the beginning of the second week, production came to a halt because inventories of raw materials ran out, and a new supply was not received until the beginning of week 3. As a consequence, the company lost one week's production and sales. Actual results in period 8 were as follows.

	£
Sales (320 units)	32,000
Variable costs (320 units x £60)	19,200
Contribution	12,800
Fixed costs	10,000
Profit	2,800

In retrospect, it is decided that the optimum budget, given the loss of production facilities in the third week, would have been to sell only 300 units in the period.

Required: Calculate appropriate planning and operational variances.

Solution: The planning variance compares the revised budget with the original budget.

Revised sales volume, given material shortage	300 units

Original budgeted sales volume	400 units
Planning variance in units of sales	100 units (A)
x standard contribution per unit	x £40
Planning variance in £	£4,000 (A)

Arguably, running out of raw materials is an operational error and so the loss of sales volume and contribution from the materials shortage is an opportunity cost that could have been avoided with better purchasing arrangements. The operational variances are variances calculated in the usual way, except that actual results are compared with the revised standard or budget. There is a sales volume contribution variance which is an operational variance, as follows:

Actual sales volume	320 units
Revised sales volume	300 units
Operational sales volume variance in units (possibly due to production efficiency or marketing efficiency)	20 units
x standard contribution per unit	x £40
	£800 (F)

These variances can be used as control information to reconcile budgeted and actual profit.

	£	£
Operating statement, period 8		
Budgeted profit		6,000
Planning variance	4,000 (A)	
Operational variance – sales volume contribution	800 (F)	
		3,200 (A)
Actual profit in period 8		2,800

You will have noticed that in this example sales volume variances were valued at contribution forgone, and there were no fixed cost volume variances. This is because contribution forgone, in terms of lost revenue or extra expenditure incurred, is the nearest equivalent to opportunity cost that is readily available to management accountants (who assume linearity of costs and revenues within a relevant range of activity).

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Question 47:Standard Costing – Reconciliation of Budgeted and Actual Profit
Osaka Manufacturing Co. (OMC) is a leading consumer goods company. The budgeted and actual data of OMC for the year 2013-14 are as follows:—

Particulars	Budget	Actual	Variance

Particulars	Budget	Actual	Variance
Sales/Production (units)	2,00,000	1,65,000	(35,000)
Sales (`)	21,00,000	16,92,900	(4,07,100)
Less: Variable Costs (`)	12,66,000	10,74,150	1,91,850
Less: Fixed Costs (`)	3,15,000	3,30,000	(15,000)
Profit	5,19,000	2,88,750	(2,30,250)

The budgeted data shown in the table is based on the assumption that total market size would be 4,00,000 units but it turned out to be 3,75,000 units. Prepare a statement showing reconciliation of budget profit to actual profit through marginal costing approach for the year 2013-14 in as much detail as possible.

Solution:-

STATEMENT OF RECONCILIATION - BUDGETED VS ACTUAL PROFIT

Particulars	Rs.
Budgeted Profit	5,19,000
Less: Sales Volume Contribution Planning Variance	52,125
Less: Sales Volume Contribution Operational Variance	93,825
Less: Sales Price Variance (Adverse)	39,600
Less: Variable Cost Variance (Adverse)	29,700
Less: Fixed Cost Variance (Adverse)	15,000
Actual Profit	2,88,750

WORKINGS

Basic Workings

$$\text{Budgeted Market Share (in \%)} = \frac{2,00,000 units}{4,00,000 units} = 50\%$$

$$\text{Actual Market Share (in \%)} = \frac{1,65,000 units}{3,75,000 units} = 44\%$$

Budgeted Contribution = Rs.21,00,000 - Rs.12,66,000

= Rs.8,34,000

$$\text{Average Budgeted Contribution (per unit)} = \frac{Rs.8,34,000}{Rs.2,00,000} = Rs.4.17\ ₹4.17$$

$$\text{Standard Sales Price per unit} = \frac{Rs.21,00,000}{Rs.2,00,000}$$

= ₹ 10.50

Actual Sales Price per unit = $\frac{Rs.16,92,900}{Rs.1,65,000}$ = ₹ 10.26

Standard Variable Cost per unit = $\frac{Rs.12,66,000}{Rs.2,00,000}$ = ₹ 6.33

Actual Variable Cost per unit = $\frac{Rs.10,74,150}{Rs.1,65,000} = Rs.6.51$

CALCULATION OF VARIANCES

Sales Variances:…….

Volume Contribution Planning* = Budgeted Market Share % × (Actual Industry Sales Quantity *In units*–Budgeted Industry Sales Quantity *inunits*) × (Average Budgeted Contribution *per unit*)

= 50% × (3,75,000 units – 4,00,000 units) × Rs.4.17

= 52,125 (A)

(*) *Market Size Variance*

Volume Contribution Operational** = (Actual Market Share % – Budgeted Market Share %) × (Actual Industry Sales Quantity *in units*) × (Average Budgeted Contribution *per unit*)
(44% – 50 %) × 3,75,000 units × Rs.4.17

93,825 (A) (**) *Market Share Variance*

Price = Actual Sales – Standard Sales

= Actual Sales Quantity × (Actual Price – Budgeted Price)

=1,65,000 units × (Rs.10.26 – Rs.10.50) = 39,600 (A)

Variable Cost Variances:……. Standard Cost for Production – Actual Cost

= Actual Production × (Standard Cost *per unit* – Actual Cost *per unit*)= 1,65,000 units × (Rs.6.33 – Rs.6.51) Rs.29,700(A) Cost

Fixed Cost Variances:……. Budgeted Fixed Cost – Actual
Fixed Cost Expenditure Rs.3,15,000 – Rs.3,30,000 =
Rs.15,000(A)

✓ Fixed Overhead Volume Variance ***does not*** arise in a Marginal Costingsystem

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Question 49: N & S Co. (NSC) is a multiple product manufacturer. NSC produces the unit and all overheads are associated with the delivery of units to its customers.

Particulars	Budget	Actual
Overheads ( )	4,000	3,900
Output (units)	2,000	2,100
Customer Deliveries (no.'s)	20	19

Required: CALCULATE Efficiency Variance and Expenditure Variance by adopting ABC approach.

Solution

Computation of Variances

Efficiency variance = Cost Impact of undertaking activities more/less than standard

= (21 deliveries* - 19 deliveries) x 200

= `400 F

(*) $\left(\frac{20{,}000 \text{ deliveries}}{2{,}000 \text{ units}}\right) \times 2{,}100$ units

Expenditure variance = cost impact of paying more/less than standard for actual activities undertaken

= 19 deliveries × `200 - `3,900

= `100 (A)

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Question 50: A company has prepared an activity-based budget for its stores department. One activity concerns inventory counts which has an activity based cost driver of $800 per inventory count (based on a budgeted activity of 50 counts per year).

During the year there were 52 counts and the actual cost for inventory counts was $40,560.

To the nearest $, the value of the variance for inventory counts in the year was $_____

Answer

Activity	Expected cost	Actual cost	Variance
	$	$	$

Inventory counts (based on 52 counts)	41,600	40,560	1,040 (F)

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Question 51: XX produces the Unit and all overheads are associated with the delivery of units to its customers. Budget details for the period include $8,000 overheads, 4000 units output and 40 customer deliveries. Actual results for the period are $7,800 overheads, 4,200 units output and 38 customer deliveries. Calculate overhead volume and exp variance.

Answer: the overhead cost variance for the period is

	$
Actual cost	7,800
Standard cost (4,200 units × $2 per unit)	8,400
Cost variance	600 (F)

Applying the traditional fixed overhead cost variance analysis gives the following result:

		$
Volume variance	($8,400 standard - $8,000 budget)	400 F
Expenditure variance	($8,000 buget - $7,800 actual)	200 F
Cost variance		600 F

Adopting an ABC approach gives the following result:

		$
Efficiency variance	(42 standard – 38 actual deliveries) × $200	800 F
Expenditure variance	[(38 deliveries x $200)] - $7,800	200 A
Cost variance		600 F

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Question 52: Assume the following information for the set-up activity for a period:

Budget	**Actual**
Activity level: 1600 set-ups	Total fixed costs: £70,000
Practical capacity supplied: 2000 set-ups	Total variable costs: £39,000

Total fixed costs: £80,000	
Total variable costs: £40,000	Number of set-ups 1500
Cost driver rates (variable): £25 per set-up (fixed): £40 per set-up	

Answer: better reflect the cause of resource consumption. Variance analysis, however cannot be used to manage all overheads costs. It is inappropriate for the control of facility-sustaining (infrastructure) costs because the costs of these resources do not fluctuate in the longer term according to the demand for them.

Mark and Roush (1994) and Kaplan (1994b) have considered low variance analysis can be applied to incorporate activity costs and cost drivers for those overheads that are fixed in the short term but variable in the long term. The data presented in example illustrate their idea relating to ABC overhead variance analysis for a setup activity. From this example budgeted fixed costs of £80 000 provide a practical capacity to perform 2000 set ups during the period. Assuming that the number of set-ups has been identified as the appropriate cost driver, a cost of £40 per set-up (£80,000/2000) will be charged to products. Since budgeted capacity usages is 1600 set-ups, not all of the capacity provided (2000 set ups) will be used, and a budgeted cost of unused capacity of £16,000 (400 × £40), will be highlighted during the budget process. The actual number of set-ups performed was 1500 compared with a budget of 1600 and an unexpected capacity utilization variance of £4000 (100 × £40) will be reported at the end of the period. The traditional spending (expenditure) variance is £10,000, being the difference between budgeted and actual fixed costs incurred. We can now reconcile the fixed set-up expenses charged to products with the actual expenses incurred that are recorded in the financial accounts:

	£
Set-up expenses charged to product (1500 x £40)	60,000
Budgeted unused capacity variance (400 x £40)	16,000A
Capacity utilization variance (100 x £40)	4,000A
Expenditure variance	10.000F
Total actual expanses	70.000

The above capacity variances highlighted for management attention the £20,000 unused capacity (£16,000 expected and £400 unexpected) and thus signals the opportunity for actions such as reducing the supply of resources to generate additional revenues.

In example it is assumed that the variable set up costs, such as the cost of supplies used in the set –up activity, varies with the number of set-ups. The variable cost driver rate of £25 for all activity levels. Thus the estimated set up costs at the practical capacity of 2000 sets ups would be £50,000 (2500 × £25) but the cost per set-up would remain at £25. To calculate the set up variable cost variance, we must flex the budget. The actual number of sets-ups performed was 1500 and the flexible budget allowance is £37 500 (1500 × £25). Actual expenditure is £39000 and therefore an adverse variable cost variance of £1500 will be reported. The reconciliation between the variable set up expenses set up charge to products and the actual expenses incurred is as follows:

Variable set-up expenses charged to products (1500 × £25)	37,500

Variable overhead variance	1,500 A
Total actual expenses	39,000

In example we assumed that the number of set ups was the cost driver. If setups take varying amount of time they will not represent an homogeneous measure of output and thus may not provide a satisfactory measure of the cost of activity. To overcome this problem if may be preferable to use the number of setup hours as the cost driver let us now assume in example that the cost driver is setup hours and that the quantity of set up hours is the same throughout as a number of setups. Therefore the various analyses ways on set up hours will be identical to the variance that were computed when the number of set ups was the cost driver.

Where cost drivers that capture the duration of the activity are used Mak and Roush (1994) advocate the reporting of separate efficiency variance for each activity. Assume in example that the standard activity labour of set ups performed during the period was 1500 hours but the actual numbers of set ups hours required was 1660. The standard activity labour represent the number of set up of hours that should have been required for the actual number of set up . Difference between the standard.

And the actual set-up hours thus arises because of efficiencies/inefficiencies in performing the set-up activities. Assuming that variable cost vary with the number of set-up hours then inefficiency in performing set-up activities has resulted in an extra 160 set-up hours (1660 - 1500) being used, thus causing additional spending of £4000 (160 hours × £25). In addition, a favourable variable overhead expenditure variance of £2500 will be reported. This figure is derived in a manner similar to the traditional analysis by deducting the actual variable overhead expenditure of £39,000 from the flexible budget based on actual set-up hours (1660 x £25 = £41,500). Note that the sum of efficiency variance (£4000 A) and the expenditure variance (£2500F) is the same as the variable overhead variance of £1500 reported when the number of set-ups was used as the cost driver.

It is also possible to compute a capacity utilization and efficiency variance for fixed overheads. The efficiency variance is calculated by multiplying the 160 excess set-up hours by the fixed cost driver rate. Therefore an adverse efficiency variance of £6400 (160 × £40) and a favourable capacity utilization variance of £2400 (60 x £40) will be reported. The capacity utilization variance reflects the fact that the actual set-up capacity utilized was 60 hours in excess of the budget (assumed to be 1600 hours) but this was offset by the inefficiency in performing the activity which resulted in 160 hours in excess of requirements being utilized. The sum of the efficiency variance (£6400A) and the revised capacity utilization variance (£2400F) is identical to the capacity utilization variance reported when the number of set-ups was used as the cost driver.

The capacity utilization and efficiency variances relating to activity fixed costs are not particularly useful for short-term cost management. Mark and Roush conclude that they are more useful in a multi-period context whereby recurring adverse capacity variances (unused capacity) indicate the potential cost savings which can result from eliminating excess capacity.

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Question 53: Suppose that a company budgets to produce 1,000 units of product E during August. All overheads are associated with the number of production runs, and the expected number of production runs is 500. The Actual overhead=20450 & Budgeted Overhead=20000, and 1,100 units of product E were produced in 540 production runs.

Required:

Calculate the fixed overhead total variance and its sub-variance adopting the traditional approach and then calculate the efficiency and expenditure variances using a ABC approach.

Solution:

Applying the traditional fixed overhead cost variance analysis gives the following results.

A: Fixed overhead total variance

	$
Fixed overhead incurred	20,450
Standard Cost (1,100 units X ($20,000/	22,000
Fixed overhead total variance	1,550 (F)
(a) Fixed overhead expenditure varicne	
	$
Budgeted fixed overhead expenditure	20,000
Actual Fixed overhead expenditure	20,450
Fixed overhead Expenditure variance	450(A)
Fixed overhead volume variance	
	$
Actual production at Standard rate (1,100 × $20 pe r unit)	22,000
Budgeted production at standard rate (1,00 × $20 per unit)	20,000
Fixed overhead volume variance	2,000 (F)

Adopting an ABC approach gives the following results.

The efficiency variance highlight the impact of undertaking more or lower activities (production runs) than budget.

	$
Number of production runs should have been (1,100 × 0.5 per unit)	550
	540
	10 (F)
X Standard cost per run ($20,000/500)	40
Efficiency Variance	400 (F)

The expenditure variance highlights the effect of paying more or less than budget for the actual number of activities (production runs) undertaken.

	$
540 production runs should have cost (X $40 per run)	21,600
But dis cost	20,450
Expenditure variance	1,150 (F)

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Question 54: Toymaster Ltd. Produces a plastic toy car, TGC in batches. To manufacture a batch of TGCs, Toymaster must setup the machines. Setup costs are batch-level costs. A separate setup Department is responsible for setting up machines for TGC.

Setup overhead costs consist of some costs that are variable and some that are fixed with respect to the number of setup-hours. The following information pertains to 2007:

	Static budget amounts	Actual amounts
Units of TGC produced and sold	30,000	22,500
Batch size (number of units per batch)	250	225
Setup-hours per batch	5	5.25
Variable overhead cost per setup-hour	`250	`240
Total fixed setup overhead costs	`1,80,000	`1,75,350

Required:—

1. For variable setup overhead costs, compute the efficiency and spending variances. Comment on the results.
2. For fixed setup overhead costs, compute the spending and the production-volume variance. Comment on the results.

Solution:

Activity based costing, variance analysis.

1.

	Static budget amounts	Actual amounts
(a) Units of TGC produced and sold	30,000	22,500
(b) Batch size	250	225
(c) Number of batches (a ÷ b)	120	100
(d) Setup-hours per batch	5	5.25
(e) Total setup-hours (c × d)	600	525

	Static budget amounts	Actual amounts
(f) Variable overhead cost per setup-hour	`250	`240
(g) Variable setup overhead costs (e × f)	`1,50,000	`1,26,000
(h) Total fixed setup overhead costs	`1,80,000	`1,75,350
(i) Fixed overhead cost per setup-hour (h ÷ e)	`300	`334

The flexible –budget is based on the budgeted number of setups for the actual output achieved:

22,500 units ÷250 units per batch = 90 batches

Computation of variable overhead cost variances follows:

Actual costs incurred	Actual input × budgeted rate	Flexible budget: Budgeted input allowed for actual output × budgeted rate
(100 × 5.25 × `240)	(100 × 5.25 × `250)	(90 × 5.0 × `250)
`1,26,000	`1,31,250	`1,12,500

` 5,250 F `18,750 U

Price variance **Efficiency variance**

The favorable spending variance is due to the actual variable overhead cost per setup-hour declining from the budgeted `250 per hour to the actual rate of `240 per hour. The unfavorable efficiency variance is due to the actual output of 22,500 units (1) requiring more setup (100) than the budgeted amount (90), and (2) each setup taking longer time (5.25 hours) than the budgeted time (5.0 hours). The flexible-budget variance of `13,500 it reflects the larger unfavorable efficiency variance not being offset by the favorable spending variance.

2. Computation of the fixed setup overhead cost variance follows:

Actual costs incurred	Actual input X budgeted rate	Flexible budget: Budgeted input allowed for actual output X budgeted rate
(100 × 5.25 × `240)	(100 × 5.25 × `250)	(90 × 5.0 × `250)
`1,26,000	`1,31,250	`1,12,500

` 5,250 F `18,750 U

Spending variance **Production- volume variance**

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Question 57: Choc Co is a company which manufactures and sells three types of biscuit in packets. One of them is called 'Ooze' and contains three types of sweetener: honey, sugar and syrup. The standard materials usage and cost for one unit of Ooze (one packet) is as follows:

		$
Honey	20 grams at $0.02 per gram	0.40

Sugar	15 grams at $0.03 per gram	0.45
syrup	10 grams at $0.025 per gram	0.25
		1.10

In the three months ended 30 November, Choc Co, produced 101, 000 units of 'Ooze' using 2200 kg of honey, 1400 kg of sugar and 1050 kg of syrup. Note: there are 1000 grams in a kilogram (kg).

Choc Co has used activity based costing to allocate its overheads for a number of years. One of its main overheads is machine set-up costs. In the three months ended 30 November the following information was available in relation to set-up costs:

Budget

Total no. of units produced	264,000
Total no. of set-ups	330
Total set-up costs	$52,800

Actual

Total no. of units produced	320,000
Total no. of set-ups	360
Total set-up costs	$60,000

Required:

(a) Calculate the following variances for materials in ooze:
  (i) Total materials usage variance
  (ii) Total materials mix variance;
  (iii) Total materials quantity (yield) variance

(b) Calculate the following activity-based variance in relation to the set-up cost of the machines:
  (i) The expenditure variance;
  (ii) The efficiency variance

Solution: (a) (i) usage variance

	Std usage for actual output	Actual usage		Std cost	Variance
	kgs	kgs	variance	Per kg $	$
Honey	2020	2200	(180)	20	(3600)
Sugar	1515	1400	115	30	3450
Syrup	1010	1050	(40)	25	(1000)
					(1150)A

(ii) Mix variance

	Std usage for actual output	Actual usage		Std cost	Variance
	kgs	kgs	variance	Per kg $	$
Honey	2066.67	2200	(133.33)	20	(2666.60)
Sugar	1550	1400	150	30	4500
Syrup	1033.33	1050	(16.67)	25	(416.75)
					(1416.65)F

(i) Yieldvariance

	Std usage for actual output	Actual usage		Std cost	Variance
	kgs	kgs	variance	Per kg $	$
Honey	2020	2066.67	(46.67)	20	(933.40)
Sugar	1515	1550	(35)	30	(1050)
Syrup	1010	1033.33	(23.33)	25	(583.25)
					(2566.65)

The above usage and mix variance have been calculated following the approach described in section titled 'Direct Materials mix and yield variances'. For the actual output of 101,000 units the standard usage for actual output is 2020 kg of sugar (101,000 x 20/1000), 1515 kg of sugar (101,000 x 10/1000). To calculate the mix variance, it is necessary to ascertain the standard mix for the actual total quantity of inputs used (4650 kg). the standard mix for one unit of output is 20 grams of honey, 15 grams of sugar and 10 grams of syrup giving a standard mix of 20/45 honey, 15/45 sugar and 10/45 syrup. Therefore an actual input of (4650kg x 20/25), 1550kg of sugar (4650 x 15/45) and 1033 kg of syrup (4650 x 10/45).

The yield variance is calculated in a different way to the approach described in chapter 18. For the actual output (101,000 units), the standard quantities in the standard input mix are determined. They are compared with the actual quantities of inputs used based on the standard mix and the differences are multiplied by the standard input prices. This approach neutralizes the impact of the mix variance. For an actual input of 4650 kg an output of 103,333 units should result (4650kg/45 grams per unit of output). Therefore output was 2333 units fewer than it should have been for the input. This shortfall is multiplied by the standard cost of one unit of output ($1.10) giving an adverse variance of$2566.

(b) (i) expenditure variance

Cost driver rate = $52,800/330 = $160
Expected cost = 360x$160 $57,600 Actualcost $60,000
Variance $2,400A

(ii) Efficiencyvariance

Expected no. of units per set up 264,000/330 = 800
Expected no. of set-ups for 320,000 =320,000/800= 400
Actual no. ofset ups 360
Difference 40F
X standard rateperset-up $160
Variance $6400F.

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STANDARD COSTING WITH LEARNING CURVE

Question 58: A company needs to calculate a new standard cost for one of its products. When the product was first manufactured, the standard variable cost of the first unit was as follows.

		Cost per unit
		$
Direct material	10 kg @ $4 per kg	40
Direct labour	10 hours @ $9 per hour	90
Variable overhead	10 hours @$1 per hour	10
Total		140

During the following year, a 90% learning curve was observed in making the product. The cumulative production at the end of the third quarter was 50 units. After producing 50 units, the learning effect ended and all the subsequent units look the same time to make.

Required: What is the standard cost per unit for the fourth quarter assuming the learning curve had reached a **steady state** is peak efficiency was reached after the 50th unit was produced?

Solution

$y = ax^b$ where b = log0.9/log2.

b = - 0.0457575/0.30103 = -0.1520031

$y = ax^{-0.1520031}$

For **49 cumulative units** Y = 10 × ($49^{-0.1520031}$) = 10 × 0.55346 hours = 5.5346 hours.

Total time for first 49 units = 49 × 5.5346 hours = 271.2 hours.

For **50 cumulative units** Y = 10 × ($50^{-0.1520031}$) = 10 × 0.55176 hours = 5.5176 hours.

Total time for first 50 units = 50 × 5.5176 hours 271.2 hours = 275.88 hours.

Time for 50th unit = (275.88 – 271.2) = 4.68 hours

This is the standard time for the product when the steady state has been reached.

Standard cost		*Cost per unit*
		$
Direct material	10 kg @ $4 per kg	40.00
Direct labour	4.68 hours @ $9 per hour	42.12
Variable overhead	4.68 hours @$1 per hour	4.68

Total		86.80

In practice, the standard time may be rounded to a more convenient number, such as 4.5 hours or 5.0 hours.

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Question 59: City International Co. is a multiproduct firm and operates standard costing and budgetary control system. During the month of June firm launched a new product. An extract from performance report prepared by Sr. Accountant is as follows:

Particulars	Budget	Actual
Output	30 units	25 units
Direct Labour Hours	180.74 hrs.	118.08 hrs.
Direct Labour Cost	`1,19,288	` 79,704

Sr. Accountant prepared performance report for new product on certain assumptions but later on he realized that this new product has similarities with other existing product of the company.

Accordingly, the rate of learning should be 80% and that the learning would cease after 15 units.

Other budget assumptions for the new product remain valid.

The original budget figures are based on the assumption that the labour has learning rate of 90% and learning will cease after 20 units, and thereafter the time per unit will be the same as the time of the final unit during the learning period, i.e. the 20th unit. The time taken for 1st unit is 10 hours.

Required: Show the variances that reconcile the actual labour figures with revised budgeted figures in as much detail as possible.

Note: The learning index values for a 90% and a 80% learning curve are −0.152 and −0.322 respectively.

[log 2 = 0.3010, log 3 = 0.47712, log 5 = 0.69897, log 7 = 0.8451, antilog of 0.6213 = 4.181, antilog of 0.63096 = 4.275]

Solution:

Working Note

The usual learning curve model is

$y = ax_b$

Where,

y = average time per unit for x units

a = Time required for first unit

x = cumulative number of units produced

b = learning coefficient

W.N.1

Time required for first 15 units based on revised learning curve of 80% (when the time required for the first unit is 10 hours)

$y = 10 \times (15)^{-0.322}$

$\log y = \log 10 - 0.322 \times \log 15$

$\log y = \log 10 - 0.322 \times \log (5 \times 3)$

$\log y = \log 10 - 0.322 \times [\log 5 + \log 3]$

$\log y = 1 - 0.322 \times [0.69897 + 0.47712]$

$\log y = 0.6213$

y = antilog of 0.6213

y = 4.181 hours

Total time for 15 units = 15 units × 4.181 hours

= 62.72 hours

Time required for first 14 units based on revised learning curve of 80% (when the time required for the first unit is 10 hours)

$y = 10 \times (14)^{-0.322}$

$\log y = \log 10 - 0.322 \times \log 14$

$\log y = \log 10 - 0.322 \times \log (2 \times 7)$

$\log y = \log 10 - 0.322 \times [\log 2 + \log 7]$

$\log y = 1 - 0.322 \times [0.3010 + 0.8451]$

$\log y = 0.63096$

y = antilog of 0.63096

y = 4.275 hours

Total time for 14 units = 14 units × 4.275 hours

= 59.85 hours

Time required for 25 units based on revised learning curve of 80% (when the time required for the first unit is 10 hours) total time for first 15 units = 62.72 hrs

Total time for next 10 units = 28.70 hrs [(62.72 – 59.85) hours × 10 units]

Total time for 25 units = 62.72 hrs + 28.70 hrs

= 91.42 hrs

W.N.2

Computation of Standard and Actual Rate

Standard Rate = $\frac{\text{Rs. } 1,19,288}{180.74 \text{ hrs.}}$ = `660.00 per hr.

Actual rate = $\frac{\text{Rs. } 79,704}{118.08 \text{ hrs.}}$ = `675.00 per hr.

W.N.3

Computation of Variances

Labour rate variance = actual hrs × (std. rate – actual rate)

= 118.08 hrs × (`660.00 - `675.00)

= `1,771.20 (A)

Labour efficiency variance = std. rate × (std hrs – actual hrs)

= `660 × (91.42 hrs – 118.08 hrs)

= `17,595.60 (A)

Statement of Reconciliation (Actual Figures Vs Budgeted Figures)

Particulars	`
Actual Cost	79,704.00
Less: Labour Rate Variance (Adverse)	1,771.20
Less: Labour Efficiency Variance (Adverse)	17,595.60
Budgeted Labour Cost (Revised)*	60,337.20

Budgeted labour cost (revised)*

= Std. Hrs. × Std. Rate

= 91,42 hrs. × `660

= `60,337.20

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Question 60: The direct labour efficiency variance in respect of a new product has been calculated as $14,700 favorable. The variance was calculated using standard cost data which showed that each unit of the product was expected to take 8 hours to produce, at a cost of $15 per hour.

The actual output was 560 units, and the actual time worked in the manufacture of the product totaled 3,500 hours, at a cost of $57,750. However, the production manager now realizes that the standard time of 8 hours per unit was the time taken to produce the first unit and that a learning curve rate of 90% should have been anticipated for the first 600 units.

Required: Calculate the planning and operational efficiency variance for labour efficiency, following the recognition of the learning curve effect (b = -0.1520 for a 90% learning curve).

Answer: The '8 hours' original standard does not take into account the presence of a learning curve effect, that affects the first 600 units. By the time we reach 560 units of production, we have been average time per unit of 3.0574 hours:

$Y = 8 \text{ hours} \times 560 \text{ units}^{-0.1520}$

Y = 3.0574 hours an average per unit (revised standard).

Therefore the first 560 units should have taken:

8 hours per unit × 560 units = 4,480 hours using the original, old standard labour hours per unit, and

3.0574 hours per unit × 560 units = 1,712 hours, using the revised standard labour hours per unit.

This is a favorable difference of 2,768 hours and therefore the planning variance for labour efficiency may be calculated as 2,768 hours x $15 = $41,520 Favorable.

To calculate the operational variance, we compare the standard number of labour hours for actual production (1,712 hours, using the revised standard) and the actual time of 3,5000 hours, giving 1,788 hours ADV × $15 = $26,820 ADV.

AH x SR	1,450 × $10	= $14,500	
		Operational variance	$500 F
RSH x SR	1,500 × $10	= $15,000	
		Planning variance	$2,500 A
SH x SR	1,250 × $10	= $12,500	
			$2,000 A

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Question 61: Bokco is a manufacturing company. It has a small permanent workforce but it is also reliant on temporary workers, whom it hires on three month contracts whenever production requirements increase. All buying of material is the responsibility of the company's purchasing department and the company's policy is to hold low levels of raw materials in order to minimize inventory holding costs. Bokco uses cost plus pricing to set the selling prices for its products ones an initial cost card has been drawn up. Prices are then reviewed on a quarterly basis. Detailed variance reports are produced each month for sales, material costs and labour costs. Departmental managers are then paid a monthly bonus depending on the performance of their department.

One month ago, Bokco began production of a new product. The standard cost card for one unit was drawn up to include a cost of $84 for labour., based on seven hours of labour at $12 per hour. Actual output of the product during the first month of production was 460 units and the actual time taken to manufacture the product totaled 1,860 hours at a total cost of $26,040.

After being presented with some initial variance calculations, the production manager has realized that the standard time per unit of seven hours was the time taken to produce the first unit and that a learning rate of 90% should have been anticipated for the first 1,000 units of production.

The production manager has been asked to recalculate the standard time for the first 460 units, based on a learning rate of 90%.

Note: the learning index b for a 90% learning curve is -0.1520.

1. What is the revised standard time for the first 460 units based on a learning rate of 90%.
   A. 2,757 hours
   B. 1,268 hours

C. 2,898 hours
D. 3,220 hours

2. An engineer has now informed the production manger that the learning rate should have been 85%. Based on this, he has correctly calculated that the revised standard time for the first 460 units is 765 hours.

What are the labour efficiency planning and labour efficiency operational variances?

	Planning	Operational
	$29,460 favorable	$16,320 adverse
	$29,460 adverse	$13,140 adverse
	$206,220 favorable	$91,980 adverse
	$29,460 favorable	$13,140 adverse

3. The following reasons were given by the engineer for changing the expected learning rate from 90% to 85%:
   (1) Staff turnover was lower than expected
   (2) Unexpected problems were encountered with production
   (3) Unexpected changes to Health and safety laws meant that the company had to increase the number of breaks for employees during production

   Which reasons could have caused the difference between the original and revised rate of learning?

   (a) 1, 2 and 3
   (b) 2 and 3 only
   (c) 1 only
   (d) None of the statements

4. The production manger has been criticized by other departmental managers for failing to take into account the learning rate in the original standard. They claim "he has no idea of all the problems this has caused".
   Which of the following might have been caused by the failure of the production manger to take into account the learning rate in the original standard?
   (1) Insufficient numbers of temporary staff would have been employed, leading to an inability to satisfy demand
   (2) Since the company uses the cost plus pricing, the price for the product will have been set too high leading to a fall in demand for the product
   (3) The sales manager will be held responsible for the poorer sales of the product, which will probably be reflected in an adverse sales volume variance. He will become demotivated
   (4) Since production is actually happening more quickly than anticipated, the company may well have run out of raw materials, leading to a stop in production.

   A. 1, 2 and 4 only
   B. 1 and 4 only

C. 2,3 and 4
D. 2 and 3 only

5. Which of the following statements concerning planning and operational variance are true?
   (1) If the variance calculated using the original standard is adverse, then the operational variance will always be adverse
   (2) Operational variance are generally a better reflection of the underlying performance of managers than traditional variances
   (3) Planning variances reflect factors outside of the control of operational managers.
   (4) 1, 2 and 3
   (5) 2 and 3 only
   (6) 1 only
   (7) None of the statements

Solution: Justification

1. **B.** Revised hours for actual production:

   Cumulative time per hour for 460 units is calculated by using the learning curve formula:

   $Y = ax^b$

   a=7

   x= 460

   b =-0.1520

   Therefore $y=7 \times 460^{-0.1520} = 2.7565054$

   Therefore revised time for 460 units = 1,268 hours (460 × 2.7565054).

2. **D.** Labour efficiency planning variance
   (Standard hours for actual production- revised hours for actual production) × Standard rate =([460 × 7] -765) × $12 = $29,460 F
   Labour efficiency operational variance
   (Revised hours for actual production – actual hours for actual production × standard rate (765 - 1,860) × $12 = $13,140A
3. **C.** The revised learning rate of 85% was actually better than the original expected rate of 90% and only (i) Cold cause it to improve.
4. **C**. (1) is incorrect. Bokco will have hired too many temporary staff because of the fact that the new product can actually be produced more quickly than originally thought.
   (2) Is correct. The budgeted cost, on which the price is based would be too high since it does not take account of the labour efficiencies as a result of the learning.
   (3) Since the price charged is too high (Statement 2), demand for the product will fall.
   (4) Production will occur more quickly since the time per unit is less than anticipated.
5. **B.** The Operational variance shows the difference between the revised standard and the actual performance. This could be adverse or favorable, even if the variance calculated using the original standard is adverse, so (1) is incorrect. The other two statements are correct.

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Question 63: Martin Co developed a new product. it set a standard labour cost based on the expected time to make the first unit of the product, which has 100 minutes. A 90%

learning rate is expected to apply, and the budgeted cost per hour of labour time is $12 per hour. This learning rate was not incorporated into the standard.

The actual time taken to make the first four units was 350 minutes and the cost was $80.

Required:

(a) Calculate traditional labour rate and efficiency variances.
(b) Re-calculate the labour efficiency variance to take account of the learning rate.

Solution:

(a) labour rate variance

	$
actual labour hours × actual rate	80
Actual labour hours × standard rate (350/60) × $12	70
Labou rate variance (adverse)	10

Labour efficiency variance

	$
actual labour hours × standard rate	70
standard hours for actual production x standard rate (working) 324 minutes × $12/60	65
Labour efficiency variance (adverse)	5

Working – standard hours for actual production taking into account the learning rate of 90%.

Output (units)	Cumulative average time	Total time
1	100	100
2	90	180
4	81	324

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Question 65: S uses a standard absorption costing system to control its production costs and monitors its performance using monthly variance reports.

S has recently launched a new product which is being manufactured in batches of 100 units. An extract from the standard cost details per unit for this new product is as follows:

5.3 hours of direct labour @ $10 per hour = $53.00

It is now realized that the standard cost details were based on an average learning period target of 5.3 hours per unit, and that a batch related period of learning was expected. The time expected for the initial batch was 1,000 hours and 90% learning rate was anticipated.

During August production commenced on the product, and 400 units were produced in four batches of 100 units using 2500 hours of direct labour at a cost of $26,000. The direct labour variances that were reported in respect of this product were:

Direct labour rate variance $1,000 Adverse

Direct labour efficiency variance $3,800 Adverse

Required:

(a) Calculate the expected length of the learning period in batches.
(b) Calculate planning and operating variances for August.

Answer: (a)

No. of batches completed	Average time per batch
1	1,000 hours
2	900 hours
4	810 hours
8	729 hours
16	656 hours
32	590 hours
64	531 hours

Note: with a 90% learning rate, the cumulative average time per unit of output will fall to 90% of what it was before, every time output is doubled.
Expected length of learning period = 64 batches
(average time of 5.3 hours per unit; 530 hours per batch of 100 after 64 batches have been completed).
(b) S produced 4 batches of the new product in August. The average time per batch should have been 810 hours

4 batches should have taken	(4 × 810 hours)	3,240 hours
4 batches did take		2,500 hours
		740 hours (F)
Standard rate		$10/hr
Operating efficiency variance		$7,400 (F)

The planning variance is calculated by comparing the standard target time with the revised target time:

Original standard	(5.3 hrs × 400 units)	2,120 hours
Revised standard	(4 x 810 hrs)	3,240 hours
		1,120 hours (A)
Standard rate		$10/hr

Planning efficiency variance		$11,200 (A)

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RECONCILATION

Question 66: Queensland Chemicals (QC) manufactures high-quality chemicals C-1, C-2 and C - 3. Extracts from the budget for last year are given below:

	C-1	C-2	C-3
Sales Quantity (kg)	1,000	3,250	750
	/ kg	/ kg	/ kg
Average Selling Price	17,600	2,560	22,400
Direct Material (C2H6O) Cost	8,000	1,280	9,600
Direct Labour Cost	3,200	480	4,800
Variable Overhead Cost	320	48	480

The budgeted direct labour cost per hour was 160.

Actual results for last year were as follows:

	C-1	C-2	C-3
Sales Quantity (units)	900	3,875	975
	/kg	/kg	/kg
Average Selling Price	19,200	2,480	20,000
Direct Material(C2H6O) Cost	8,800	1,200	10,400
Direct Labour Cost	3,600	480	4,800
Variable Overhead Cost	480	64	640

The actual direct labour cost per hour was 150. Actual variable overhead cost per direct labour hour was 20. QC follows just in time system for purchasing and production and does not hold any inventory.

Required: INTERPRET the Sales Mix Variance and Sales Quantity variance in terms of contribution.

Solution:-

Variance Interpretation

The sales quantity variance and the sales mix variance describe how the sales volume contribution variance has been affected by a change in the total quantity of sales and a change in the relative mix of products sold.

From the figures arrived for the sales quantity contribution variance, we can observe that the increase in

total quantity sold would have gained an additional contribution of 2,124,600, if the actual sales volume had been in the budgeted sales proportion.

The sales mix contribution variance shows that the variation in the sales mix resulted in a curtailment in profit by 570,600. The change in the sales mix has resulted in a relatively higher proportion of sales of C-2 which is the chemical that earns the lowest contribution and a lower proportion of C-1 which earn a contribution significantly higher. The relative increase in the sale of C-3 however, which has the highest unit contribution, has partially offset the switch in mix to C-2.

Workings

Statement Showing Standard Contribution

	C-1 ₹/ kg	C-2 ₹/ kg	C-3 ₹/ kg
Average Selling Price	17,600	2,560	22,400
Direct Material (C2H6O) Cost	8,000	1,280	9,600
Direct Labour Cost	3,200	480	4,800
Variable Overhead Cost	320	48	480
Contribution	6,080	752	7,520

Sales contribution mix variance

Products	Actual Quantity [AQ]	Actual Sales at Budgeted Proportion [RAQ]	Difference [AQ – RAQ]	Contribution [SC]	Mix Variance (' 000) SC × [AQ – RAQ]
C-1	900	1,150	250 (A)	6,080	1,520 (A)
C-2	3,875	3,737.50	137.50 (F)	752	103.40 (F)
C-3	975	862.50	112.50 (F)	7,520	846 (F)
	5,750	5,750			570.60 (A)

Sales contribution quantity variance

Products	Budget Sales Quantity [BQ]	Actual Sales at Budgeted Proportion [RAQ]	Difference [RAQ]	Contribution [SC]	Qty. Variance (' 000) SC × [RAQ – BQ]
C-1	1,000	1,150	150 (F)	6,080	912 (F)
C-2	3,250	3,737.50	487.50 (F)	752	366.60 (F)
C-3	750	862.50	112.50 (F)	7,520	846 (F)
	5,000	5,750			2,124.60 (F)

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Case Scenario

Question 67: Natural Spices manufactures and distributes high-quality spices to gourmet food shops and top quality restaurants. Gourmet and high-end restaurants pride themselves on using the freshest,highest-quality ingredients.

Natural Spices has set up five state of the art plants for meeting the ever- growing demand. The firm procures raw material directly from the centers of produce to maintain uniform taste and quality. The raw material is first cleaned, dried and tested with the help of special machines. It is then carefully grounded into the finished product passing through various stages and packagedat the firm's ultraclean factory before being dispatched to customers.

The following variances pertain to last week of operations, arose as a consequence ofmanagement's decision to lower prices to increase volume.

Sales Volume Variance	18,000 (F)
Sales Price Variance	14,000 (A)
Purchase Price Variance	10,000 (F)
Labour Efficiency Variance	11,200 (F)
Fixed Cost Expenditure Variance	4,400 (F)

Required:

(i) Identify the 'Critical Success Factors' for Natural Spices.
(ii) Evaluate the management's decision with the "Overall Corporate Strategy" and "critical Success Factors".

Solution:-

(i) Gourmet and high-end restaurants recognizes Natuarl spices on the basis of high quality of spices. Therefore, quality is most critical success factor of Natural spices. There are other factors which cannot be ignore such as price, delivery option, attractive packing etc. But all are secondary to the quality.
(ii) Deliberate action of cutting price to increase sales volume indicates that firm is intending to expand its market to retail market and street shops which is price sensitive.

Purchase Price Variance is clearly indicating that firm has purchased raw material at lower price which may be due to buying of lower quality of material. Similarly, positive Efficiency Variance is indicating cost cutting and stretching resources.

It appears that firm is intending to expand its market to retail market and street shops by not only reducing the price but also compromising its quality which is opposing its current strategy of high quality.

Management should monitor the trends of variances on regular basis and take appropriate action in case of evidence of permanent decline in quality. Here, customer feedback is also very important.

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Question 68: A company manufactures two types of fertilizers (FA and FB). The company uses a standard costing system for planning and control purposes. Standards are set annually but budgets and variance reports are prepared each period.

Chemicals

Three chemicals (C1, C2 and C3) are used to make the fertilizers. C2 and C3 can be input directly to the manufacturing process but C1 has to be treated before it can be used. The treatment results in a loss of 30% of the chemicals treated. There are no further losses in the manufacturing process.

Details of the standards for the chemicals are as follows:

	C1	C2	C3
Price per kg	$8	$15	$12
Treatment loss	30%		
Content of finished product:			
Per unit of FA	0.20 kg	0.15 kg	NIL
Per unit of FB	0.20 kg	NIL	0.25kg

Inventory policies

Chemicals: end of period holdings must be equal to 50% of the following period's requirements.

Treated C1 is used immediately. There are never any inventories of treated C1 at the start or end of any period.

Fertilizers: no finished products are to be held.

Period 1: output and sales

	Budgeted units	Actual units
FA	40,000	38,000
FB	24,000	25,000

Period 2 and 3: sales budgets

	Budgeted units	Actual units
FA	40,000	44,000
FB	24,000	33,000

Required:-

(a) During period 1, the quantity of C1 used was 17,740 kg. Calculate for period 1 for C1:
  (i) the materials usages variance for the whole process
  (ii) the treatment loss percentage

(b) In period 1, the company purchased and used 6,450 kg of C3. The cost of this purchase was $94,000. It has now been realized that the standard price of C3 should have been $14.50 per kg for period 1.

Calculate the planning variance, and the operational price and usages variance for C3 for period 1.

Solution:

(a)	(i)	FA 38,000 units should have used (0.2 kg/70%)	10,857.14
		FB 25,000 units should have used (0.2 kg/70%)	7,142.86
		But did use	17,740.00
		Variance in kg	260.00 (F)
		X standard cost per kg	x $8
			$2,080 (F)

(ii) content of output = (38,000 + 25,000) x 0.2 kg of x C1 = 12,600 kg of C1

Materials input = 17,740 kg of C1

Therefore, actual losses = 5,140 kg of C1

Therefore, actual loss percentage = $\frac{5,140\,kg}{17,740\,kg} = 29.0\%$

(b) Planning variance

	$
Revised standard cost (25,000 units × 0.25 kg × $14.50)	90,625
Original standard cost (25,000 units × 0.25 kg × $12)	75,000
	15,625(A)

Operational price variance

	$
6,450 should have cost (x $14.50)	93,525
But did cost	94,000
	475 (A)

Operational usages variance

25,000 units should have used (x 0.25kg)	6,250
But did use	6,450
Variance in kg	200 (A)
X revised standard cost per kg	x $14.50

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Standard with service sector

Question 69: Flexed budget for the cost of medical supplies in a hospital, based on a percentage of maximum bed occupancy, are shown below:

Bed occupancy	82%	94%
Medical supplies cost	$410,000	$429,200

During the period, the actual bed occupancy was 87% and the total cost of the medical supplies was $430,000.

Identify the medical supplies expenditure variance:

A. $5,000 adverse

B. $12,0000 adverse

C. $5,000 favorable

D. $12,000 favorable

Solution

Contribution margin	$= \frac{429,200-410,000}{94\%-82\%}$
	= $1,600 for every 1% chance
Budget for 87% occupancy	= $429,200 – (7 x 1600)
	= $418,000
Medical expenditure variance	= 418,000 – 430,000
	= $12,000 Adverse

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Question 70: Secure Net (SN) manufactures security cards that restrict access to government owned building around the world.

The standard cost for the plastic was $5.25 per kg and the production manager (who is responsible for all buying and production issues) was asked to explain the increase. He said 'World oil price increases pushed up plastic prices by 20% compared to our budget and I also decided to use a different supplier who promised better quality and increased reliability for a slightly higher price. I know we have overspent but not all the increase in plastic prices in my fault. The actual usage of plastic per card was 35 g per card and again the production manager had an explanation. He said 'the world-wide standard size for security cards increased by 5% due to a change in the card reader technology, however, our new supplier provided much better quality of plastic and this helped to cut down on the waste'.

SN operates a just in time (JIT) system and hence carries very little inventory.

Required:

(a) Discuss the behavioral problems that can arise from using standard costs and ways to prevent them.

(b) Analyse the above total variances into components parts for planning and operational variances in as much detail as the information allows.

(c) Assess the performance of the production manager.

Solution: (a) behavioral problems that may arise from using standard costs

Standard costing is principally used to value inventories, to prepare budgets and to act as a control device. The focus in using a standard cost system should not be to attribute blame, but to influence behavior through positive support and appropriate motivation.

The perception of a standard costing system can affect its success or failure. A negative perception is often the consequence of unreasonable standards, lack of transparency in setting standards, poor

communication or uneven reward systems. Such situation can make a good standard cost system a failure.

Ways to reduce negative perception/motivation

Organization should set understable and achievable standard, otherwise it neither motivates nor rewards employees. Complex financial measures and reports mean nothing to most employees.

Employees should be involved in setting standards and developing performance measures. This should result in realistic targets and increase employee motivation.

Standards should be well defined and communicated to all employees so that operational efficiency can be achieved. Management should ensure that any performance-related scheme does not reward behavior that goes against the best interest of the organization.

Finally, performance pay plans should be reviewed and update on a regular basis to meet the changing needs of employees and the business as a whole.

(b) Total material planning variance

		$
Original flexed budget cost	(100,000 × $4 × 0.04kgs)	16,000
Revised flexed budget cost	(100,000 × $4.80 × 0.042kgs)	20,160
		4,160(A)

Planning price variance

Actual units × revised standard usage × (original standard price – revised standard price)

= 100,000 units × 0.042kgs × ($4.00 - $4.80) = $3,360 (A)

Planning usage variance

Actual units × original standard price × (original standard usage – revised standard usage)'

= 100,000 units × $4.00 × (0.04 kgs – 0.042 kgs) = $800 (A)

Planning price variance + planning usage variance = toattl planning variance

$3,360 + $800 = $4,160 (A)

Total material operational variance

	$
Actual cost (for 100,000 units)	18,375
Revised standard cost (for 100,000 units) (0.042 kgs × $4.80)	20,160
Total operational variance	1,785 (F)

Operational price variance

	$
Actual price of actual material (3,500 kg)	18,375
Revised standard price of actual materials ($4.80 × 3500 kg)	16,800
Operational price variance	1,575 (A)

Operational usage variance

Actaula quantity should have benn	4,200 kgs
But was	3,500kgs
Operational usage variance in kgs	700 kgs (F)
X revised standard cost per kg	X $4.80
Operational usage variance in $	$3,360 (F)

(c) world wide standard size

The size of the security card has to fit the reader of that card and if the industry specification changes there is nothing that the production manager can do about it. This is beyond his control and therefore a planning error and should not be used to assess his performance.

Oil prices

Worldwide oil prices have increased which have increased plastic prices and again the production manager cannot control that. This is another planning error and should be ignored in an assessment of his performance.

New supplier

The decision to use a new supplier cost an extra $1,575 which is the operational price variance and could be regarded as poor performance by the production manager. However, the manager seems to have agreed to the higher price on the promise of better quality and reliability.

The operational usage variance is $3,360 favorable and this could be as a result of improved quality.

Increase in production and sales

Production level increased significantly from 60,000 to 100,000 which could potentially has caused problems for the production manger. However the ability to increase production suggests that the new supplier's reliability was good.

The total materials operational variance shows a favorable variance of $1,785 which reflects well on the performance of the production manager. The ability to react and be flexible can often form a part of a performance assessment.

In conclusion the manger could be said to have performed well.

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Question71: A company using a detailed system of standard costing finds that the cost of investigation or variances is `20,000. If after investigation an out of control situation is discovered, the cost of corrective action is ` 30,000. If no investigation is made, the present value of extra costs involved is `1,50,000.The probability of the process being in control is 0.82 and the probability of the process being in control is 0.82 and the probability of the process being out of control is 0.18

Advise(i) Whether Investigation of the variances should be undertaken or not (ii) the probability at which it is desirable to institute investigation in to the variances.

Answer: This is a problem relating to the cost of administration of standard costing system. Investigating into variances costs money, and taking corrective action, if necessary , also costs money . If investigation and corrective actions are not carried out, the adverse variances will be a drain on the profits. Hence it is necessary to strike a balance between the two.

Action	Costs it in control (`)	Cost if out of control(`)
(a) If investigated	20,000	20,000 +30,000 = 50,000
(b) If not investigated	0	1,50,000

Expected value:

(i) (a) If investigated the probability of process beig in control is 0.82. Hence the expected value of being in control is `20,000 × 0.82 = ` 16,400.

The probability of process being out of control is 0.18. Hence the expected value of being ou of control is `50,000 × 0.18 = `9,000. So, the total cost of investigation is ` 16,400 + ` 9,000 = ` 25,400.

(b) If not investigated, the cost of continued incurrence of variances is `1,50,000 × 0.18 = `27,000.

Since the total costs are lower when investigation is done and corrective action is carried out, it is advisable to investigate and take corrective action.

(ii) Put the probability of not investigating $=p_2$. Then the probability of investigation = $(1-p_2)$.

Put, cost of investigation of `20,000 = C.

Cost of corrective action of ` 30,000 =M

Cost of variances of `1,50,000 = L

The cost indifference point is as follows:

Investigate = $C (1-p_2) + (C+M)p_2 = Lp_2$

Solving the above equation, we get:
P_2= C(L-M)
Substituting the data, we get:
` 20,000 (`1,50,000- `30,000) = 0.17

The conclusion is if the probability of the variances being in control is greater than 0.17, investigation should be done. If it is less than 0.17, investigation should be done. If it is less than 0.17, investigation need not be done. At the probability value of 0.17, the company is indifferent to undertaking the investigations.

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Question 72: -Established in the year 1999, **FF Company** is the pioneer of fast food in Southampton. It delivers a truly fresh, affordable, made to order sandwiches, burger, and other meal in a friendly and relaxed environment. The popularity of the sandwiches, burger etc. continuedto grow over the decades but one thing remained the same and that was its core values andprinciples:

- Always provide exceptional service to valuedguests;
- Provide the highest quality menu items at a price everyone can afford and enjoy;and
- Keep operating costs low and ensure to have great systems in place and never stop improving.

It provides a comfortable place for people to unwind over interesting conversations. From the beginning, as it continues to grow, it is guided by

passion for delighting customers by serving fresh, delicious food right in front of customer.

The performance report* for FY 2018-19 was presented at the management committee meeting as follows:

Particulars	Budget	Actual	Variance
Sales / Production (no. of burgers)	2,00,000	1,65,000	(35,000)
Sales (£)	10,50,000	8,46,450	(2,03,550)
Less: Variable Costs (£)	6,33,000	5,37,075	95,925
Less: Fixed Costs (£)	1,57,500	1,65,000	(7,500)
Profit	2,59,500	1,44,375	(1,15,125)

** burger segment*

The Management Accountant of FF believed that the size of the fast-food market deriving the budget number of burgers to be sold is over-estimated. He has computedthe value of the sales volume contribution planning variance to be 26,062.50adverse.

Further, the report also included customer's feedback and the majority of comments were regarding delay in service time. One of feedback was as follows:

"I ordered two burgers at 2:10 pm. After half an hour (30 minutes) of waiting I called the waiter and asked him what happened? he told me that he will check with kitchen. I gotthe order after 45 minutes of waiting, this cafe is not good in deliverytime"

The budgeted data shown in the table is based on the assumption that total market size would be 4,00,000 units.

Required

(i) PREPARE a reconciliation statement of budgeted profit to actual profit through marginal costing approach in as much detail as possible.

(ii) EXPLAIN the implications of the reconciliation statement.

(iii) Management is worried about customer's feedback. ADVISE measures to improve delivery service time.

Solution:- Statement of Reconciliation:- Budgeted Vs Actual Profit

Particulars	$
Budgeted Profit	2,59,500
Less: Sales volume contribution -Planning Variance (Adverse)	26,062.50
Less: Sales Volume contribution-Operational Variance (Adverse)	46,912.50
Less: Sales Price Variance (Adverse)	19,800
Less: Variable Cost Variance (Adverse)	14,850

Less: Fixed Cost Variance (Adverse)	7,500
	1,44,375

Workings

Basic Working

$$\text{Budgets Market Share (in \%)} = \left(\frac{2,00,000 units}{4,00,000 units}\right) = 50\%$$

Budgeted Contribution = $ 10,50,000 - $ 6,33,000 = $ 4,17,000

Average Budgeted Contribution (Per unit)

$$= \frac{\$4,17,000}{2,00,000} = \$2.085$$

Volume Contribution Planning = Budgeted Market Share % X (Actual industry Sales Quantity in units - Budgeted Industry Sales Quantity in units) X (Average Budgeted Contribution per unit)

=$26,062.50(A) = 50% X (Actual Industry Sales Quantity in units - 4,00,000 units) X $2.085

= Actual Industy Sales Quantity = 3,75,000 units

Actual Market Share (In %) = $\frac{\$8,46,450}{3,75,000 units} = 44\%$ =44%

Standard Sales Price per unit = $\frac{\$10,50,000}{2,00,000} = \$5.25$

Actual Sales Price per unit = $\frac{\$8,46,450}{1,65,000} = \$5.13$

Standard Variable Cost per unit = $\frac{\$6,33,000}{2,00,000} = \$3.165$

Actual Variable Cost per unit = $\frac{\$5,37,075}{1,65,000} = \$3.255$

CALCULATION OF VARIANCES

Sales Variance

Volume Contribution Operational = (Actual Market Share % -Budgeted Market Share %) X (Actual Industry Sales Quantity in units) X (Average Budgeted Contribution per unit)

= (44% - 50%) X 3,75,000 units X $ 2,085

= $ 46,912.50(A)

Price = Actual Sales -Standard Sales

= Actual Sales Quantity X (Actual Price -Standard Price)

= 1,65,000 units X($5.13 - $ 5.25)

= $19,800 (A)

Variable Cost Variance
Cost = Standard Cost for Production - Actual Cost
= Actual Production X (Standard Cost per unit -Actual Cost per unit)
= 1,65,000 units X ($ 3.165 - $ 3,255)
= $14,850 (A)

Fixed Cost variance
Expenditure = Budgeted Fixed Cost -Actual Fixed Cost
= $1,57,500 - $ 1,65,000
= $ 7,500 (A)

(iii) Implication of Reconcilitation Statement

(iv) In the revised statement the sales volume variance has been detailed by the way of two variances I.e. planning and operational variances.THis kind of detailed information assists the company to check , which kind of variances are under the management control and which are not. FF has adverse volume contribution planning variance and the reason of could be the environmental/market changes, that was not anticipated at the time of budget preparation, so they are not under management control and hence, no one is responsible for this. On the other hand, the sales volume contribution operational variance was under control of the managers and they should be held responsible for the same.The reason of adverse sales volume contribution operational variance could be unsuccessful direct selling efforts/marketing efforts.FF has adverse sales price variance as well. It indicates that the budgets were sold for lower price than standard.The reason of this could be unforeseen market competitive price, tapping new market etc.

Further revised reconciliation statement delivers little information about the variable cost and fixed cost variances. They both are adverse, Fixed Cost consists of many items such as salaries, annual maintenance cost, rent and insurance etc.Often fixed cost items are not affected in short run in response to change in the level of activity , but they might change in response to other factors such as price.This may cause increase expenditure on fixed overheads.A meaningful analysis of fixed cost variance requires a line to line comparison of budgeted cost with actual cost.

In case of FF, the variable cost may be made up of large individual different items such as vegetables, gas, indirect labor, regular maintenance cost etc. Control of variable cost also required line by line analysis for each individual item. The adverse variable cost variance simply reveals that FF incurred more on variable cost than expected. However it is necessary to take into consideration the causes of this adverse variacne which is beyond the control of the management , for instance the unusual price hike in vegetables in case of unseasonal rainfall.`

(iii) Measures to improve Fast Food Delivery Service Time

Customers expect that their food order to be delivered quickly. From customers feedback in the question, it is evident that FF has a problem in food delivery , due to which , customers go unsatisfied.The reason of late delivery could be non-availability of raw material on time or employees not working properly etc. The reason of employees not working properly could be job dissatisfaction which may be due to improper working conditions, low salary, or no reward for overtime etc.

In order to reduce delivery time, raw material should be made available in stock based on daily requirement.FF may follow quantitative approach to inventory problems, which lay s down clear guidelines that when to re-order or alert the management in exceptional situations.

In addition , FF must also address the issues related to employees and involve them in a loop. FF could improve the employee satisfaction with proper working conditions, better pay, training and growth opportunities.

Moreover, It is important that customers should be informed about approximate delivery time since this

will reduce customers anxiety and will proactively reduce any complaints over long waits for delivery of food. If unexpected delays occur, it is important to communicate with customers, apologies for the delay and inform them about the new approximate delivery time along with valid reason.

In addition to this, FF can also introduce pages or install electronic board displaying ticket number or self-serve kiosk allowing customers to roam around or order in advance so that they do not have long waiting time.

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SOLVED PROBLEMS

Market Size and Share

Question 73: Hudson has a sales budget of 400,000 units for the coming year based on 20% of the total market. On each unit, Hudson makes a profit of $3. Actual sales for the year were 450,000, but industry reports showed that the total market volume had been 2.2 million.

(a) Find the traditional sales volume variance.
(b) Split this into planning and operational variances (market size and market share). Comment on your results.

Answer: (a) Traditional Sale Volume variance

=(Actual units sold- Budgeted Sales) × Standard profit per unit

=(450,000 -400,000) × $3 = $15,000 F.

(b) Planning and operational variances The revised (ex-post) budget would show that Hudson Ltd should expect to sell 20% of 2.2 million units =440,000 units

Original Sales × Standard margin = 400,000 × $3 = $1,200,000
Market Size = $120,000 F
Revised Sales × Standard margin = 440,000 × $3 = $1,320,000
Market Share = $30,000 F
Actual Sales × standard margin =450,000 × $ 1,350,000
Total Sales volume variance = $12,000 F + $30,000 F = $150,000 F

Comment:

Most of the favorable variance can be attributed to the increase in overall market size. However, some can be put down to effort by the sales force which has increased its share from 20% to 20.5% (450,000/2,200,000)
Managers should only be appraised on the operational variance i.e. the market share variance.

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Question 74: A Company sets its sales budget based on an average price of $14 per unit and sales volume of 250.000 units. Competition was more intense than expected and the company only achieved sales of 220,000 and had to sell at a discounted price of $12.50

per unit. The company was unable to reduce costs so profit per unit fell from $4 per unit. The company was unable to reduce costs so profit per unit fell from $4 per unit to $2.50 per unit. It was estimated that the total market volume grew by 10% from 1,000,000 units to 1,100,000 units.

Required:

(a) Calculate the sales price and volume variances.
(b) Analyse the volume variances into market share and market size.
(c) Discuss whether the price variances is a planning or operational variance.

Answer: (a) Sales price variance

= 220,000 × ($14 - $12.50) = $330,000A

Sales volume variance

= (250,000 -220,000) × $4 = $120,000 A

(b) Budgeted market share = 250,000/1,000,000 = 25%

The sales of 25% × 1,100,00 = 275,000 in the actual market conditions.

The market size variance

= (275,000 – 250,000) × $4 = $ 220,000 A

The increased market size is favorable as the company should sell more if market share can be maintained. The market share variance was adverse as market share fell from 25% to 220,000/1,100,000= 20%.

(c) It could be argued that the increased competition in the market was not foreseen when the budget was set and the variance is thus a planning variance. However , this line of reasoning would suggest that any unforeseen issues give rise just to planning variances. Perheps sales managers should have identified potential threats sooner? Also, once extra competition was experienced , managers had to decide how to respond . This could have involved additional advertising rather than price cuts. E.g. it could be argued that price cuts were made to try (unsuccessfully) to protect market share, in which case managers should be held (at least partly) responsible for such a decision.

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Question 75: The sale budget of Brunco was based on the following estimates:

Total size of market: 200,000 units

Expected market share: 25%

Standard contribution per unit $40

At the end of the year it was estimated that the actual size of the market during the year has been 260,000 units.

Actual sales in the year were 61,000 units.

Required:

Calculate for the year:

(a) The total sales volume variance
(b) The market size variance
(c) The market share variance.

Answer:

	Units
Budgeted Sales volume (25% × 200,000)	50,000
Actual Sales volume	61,000
Sales volume variance in units	11,000 (F)
Standard contribution per unit	X$40
Sales volume variance in $ contribution	**$440,000 (F)**
Market size variance	**Units**
Ex ante (budgeted) total market size	200,000
Ex post (Actual) total market size	260,000
Total Difference	60,000 (F)
Budgeted market share	X25%
Market size variance (in units)	15,000 (F)
Standard contribution per unit	X $40
Market size variance in $ contribution	**$600,000 (F)**
Market share variance	**Units**
Ex post (actual) total market size	260,000
Budgeted market share	X25%
Expected sales if budgeted market share achieved	65,000
Actual Sales	61,000
Market share variance (units)	4,000 (A)
Standard contribution per unit	X$40
Market share variance in $ contribution	**$160,000 (A)**
Summary	
	$
Market size variance	600,000 (F)
Market share variance	1,60,000 (A)
Total sales volume variance	440,000 (F)

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Question 76: T-tech is a Taiwan based firm, that designs, develops, and sells audio equipment. Founded in 1975 by Mr. Boss, firm sells its products throughout the world. T-tech is best known for its home audio systems and speakers, noise cancelling headphones, professional audio systems and automobile sound systems. Extracts from the budget are shown in the following table:

Home Audio System Division

Jan'2018

System	Sales (units)	Selling Price `	Standard Cost (per System)`
3,000 W PMPO	1,500	18,750	12,500
5,000 W PMPO	500	50,000	26,250

The Managing Director has sent you a copy of an email he received from the Sales Manager 'K'. The content of the email was as follows:

"We have had an outstanding month. There was an adverse Sales Price Variance on the 3,000 W PMPO Systems of `22,50,000 but I compensated for that by raising the price of 5,000 W PMPO Systems. Unit sales of 3,000 W PMPO Systems were as expected but sales of the 5,000 W PMPOs were exceptional and gave a Sales Margin Volume Variance of `23,75,000. I think I deserve a bonus!"

The managing Director has asked for your opinion on these figures. You got the following information:

Actual results for Jan' 2018 were:

System	Sales (units)	Selling Price`
3,000 W PMPO	1,500	`17,250
5,000 W PMPO	600	`53,750

The total market demand for 3,000 W PMPO Systems was as budgeted but as a result of suppliers reducing the price of supporting UHD TV System the total market for 5,000 W PMPO Systems raised by 50% in Jan'2018.

The company had sufficient capacity to meet the revised market demand for 750 units of its 5,000 W PMPO Systems and therefore maintained its market share.

Required

(i) CALCULATE the following Operational Variances based on the revised market details:
- Sales Margin Mix Variance

- Sales Margin Volume Variance

(ii) COMMENT briefly on the measurement of the K's performance.

Answer: (i) Statement Showing Sales Margin Mix Variance

System	Standard Margin *per unit* (`)	Actual Qty. (units)	Revised Actual Quantity(units)	Difference (`)	Variance (`)
3,000 W PMPO	`6,250	1,500	1,400	+100	+6,25,000 (F)
5,000 W PMPO	`23,750	600	700	-100	23,75,000 (A)
Total		**2,100**			**17,50,000 (A)**

Statement Showing Sales Margin Volume Variance

System	Standard Margin *per unit* (`)	Actual Qty. (units)	Budgeted Quantity (units)	Difference(`)	Variance (`)
3,000 W PMPO	`6,250	1,500	1,500	0	-
5,000 W PMPO	`23,750	600	750	-150	35,62,500 (A)
Total		**2,100**			**35,62,500 (A)**

(ii) A Planning Variance simply compares a revised standard (that should or would have been used if planners had known in advance what was going to happen) to the original standard. A planning variance is considered as not to be controllable by management.

The market size is not within the control of the sales manager and therefore variances caused by changes in the market size would be regarded as planning variances.

However, variances caused by changes in the selling prices and consequently the selling price variances and market shares would be within the control of the sales manager and treated as *operating variances*.

The *market size variance* compares the original and revised market sizes. This is unchanged for 3,000 W PMPO Systems so the only variance that occurs relates to the 5,000 W PMPO Systems and is ` 59,37,500 (F) [250 systems × `23,750].

It is vital to make this distinction because as can be seen from the scenario the measurement of the 'K''s performance is incomplete if the revised market size is ignored.

The favourable volume variance of `23,75,000 referred to in the 'K''s e-mail is made up of two elements, one of which, the market size, is a planning variance which is outside his control. It is this that has caused the overall volume variance to be favourable, and

thus 'K' is not responsible for the overall favourable performance.

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Question 77: - JPY Limited produces a single product. I thas recently automated part of its manufacturing plant and adopted Total Quality Management(TQM) and Just-In-Time manufacturing system. No inventories are held for material as well as for finished product.The company currently uses standard absorption costing system. Following are related to fourth quarter of 2018-19:

	Budget	**Actual**
Production and Sales	1,00,000 units	1,10,000 units
Direct Materials	2,00,000 Kg@Rs.30/Kg	2,50,000Kg@Rs.31.20/Kg.
Direct Labour Hours	25,000 hrs @Rs. 300/hr	23,000hrs@Rs. 300/hr.
Fixed Production overhead	Rs. 3,20,000	Rs. 3,60,000

Production overheads are absorbed on the basis of direct labour hours.

The CEO intends to introduce activity based costing system along with TQM and JIT for better cost management. A committee has been formed for this purpose.The committee has further analysed and classified the overhead of fourth quarter as follows:

	Budget	**Actual**
Costs:		
Materail Handling	Rs. 96,000	Rs. 1,24,000
Set UP	Rs. 2,24,000	Rs. 2,36,000
Activity:		
Material Handling (orders executed)	8,000	8,500
Set up (Production runs)	2,000	2,100

Revision of standards relating to fourth quarter were made as below:

	Original Standard	**Revised Standard**
Mateial Content per unit	2KG	2.25 Kg

Cost of Mateial	Rs. 30 per Kg	Rs. 31 per Kg
Direct Labour Hours	15 minutes	12 minutes

Requried

(i) Calculate Planning and Operational Varicnes relating to material Price, Material usage, Labour efficiency, and Labour rate.

(ii) Calculate Overehead expenditure and efficiency variance using Activity Based costing principles.

Solution

(i) Workings

Factor	**Original standards (ex-ante)**		**Revised Standards (Ex-Post)**		**Actual (1,10,000 units)**	
Material	1,10,00 units X 2 Kgs X Rs.30	Rs. 66,00,000	1,10,000 units X 2.25 Kgs X Rs. 31	Rs. 76,72,500	2,50,000 Kgs X Rs. 31.20	Rs. 78,00,000
Labour	1,10,000 X 15/60 hrs X Rs. 300	Rs. 82,50,000	1,10,000 X 12/60 hrs X Rs. 300	Rs. 66,00,000	23,000 hrs X Rs. 300	Rs. 69,00,000

Material

Traditional Varicances

Usage Varince	= (2,20,000 Kgs – 2,50,000 Kgs) X Rs. 30
	= Rs. 9,00,000 (A)
Price Varince	=(Rs. 30.00-Rs. 31.20) X2,50,000 Kgs
	= Rs. 3,00,000 (A)
Total Varince	= Rs. 9,00,000 (A) + Rs. 3,00,000 (A)
	= Rs. 12,00,000 (A)
Planning Variances	
Usage varicne	=(2,20,0000Kg – 2,47,500Kg) X Rs. 30
	= Rs. 8,25,000 (A)
Price Variance	=(Rs 30-Rs. 31) X 2,47,500 Kgs
	= Rs. 2,47,500 (A)

Total Variance	= Rs. 8,25,000 (A) + Rs. 2,47,5000 (A)
	= Rs. 10,72,500 (A)
Operational Variances	
Usage variacne	= (2,47,500 Kg. – 2,50,000 Kg.) X Rs. 31
	= Rs. 77,500 (A)
Price Variance	= (Rs. 31.00-Rs. 31.20) X 2,50,000 Kg.
	= Rs. 50,000 (A)
Total variance	= Rs. 77,500 (A) + Rs. 50,000 (A)
	= Rs. 1,27,500 (A)
Labour	
Traditional Varince	
Efficeincy Varince	= (27,500 hrs – 23,000 hrs) X Rs. 300
	= Rs. 13,50,000 (F)
Rate Variance	= (Rs. 300 – Rs. 300) X 23,000 hrs.
	=NIL
Total Variance	= Rs. 13,50,000 (F) + NIL
	= Rs. 13,50,000 (F)
Planning Variances	
Efficiency Variance	= (27,500 hrs – 22,000hrs) X Rs. 300
	= Rs. 16,50,000 (F)
Rate Variance	= (Rs. 300 – Rs. 300) X 22,000 hrs.
	= Nil
Total Variance	= Rs. 3,00,000 (A) +0
	= Rs. 3,00,000 (A)
(ii) Material Handling	
Efficiency Variance	= Cost impact of undertaking activities more/less than standard
	= (8,800 orders – 8,500 orders) X Rs. 12
	= Rs. 3,600 (F)
	(*) (8,000 orders/1,00,000 units) X 10,000 units
Expenditure Variance	=Cost impact of paying more/less than standard for

	actual activities undertaken
	=8,500 orders X Rs. 12 - Rs. 1,24,000
	= rs. 22,000 (A)
Setup	
Efficiency Variance	=Cost impact of undertaking activities more/less than standard
	=(2,200 runs -2,100 runs) X Rs. 112
	= Rs. 11,200 (F)
	(*) (2,000 runs/1,00,000 units) X 1,10,000 units
Expenditure Variance	=Cost impact of paying more/less than standard for actual activities undertaken
	=2,100 runs X Rs. 112 – Rs. 2,36,000
	= Rs. 800 (A)

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Question 78: 'HAL' is a manufacturer, retailer, and installer of Cassette Type Split AC for industrial buyers. It started business in 2001 and its market segment has been low to medium level groups. Until recently, its business model has been based on selling high volumes of a standard AC, brand name 'Summer', with every limited degree of customer choice, at low profit margins. 'HAL"s current control system is focused exclusively on the efficiency of its manufacturing process and it reports monthly on the following variances: material price, material usage and manufacturing labour efficiency. 'HAL' uses standard costing for its manufacturing operations. In 2018, 'HAL' employs 20 teams, each of which is required to install one of its 'Summer' AC per day for 350 days a year. The average revenue per 'Summer' AC installed is ` 36,000. 'HAL' would like to maintain this side of its business at the current level. The 'Summer' installation teams are paid a basic wage which is supplemented by a bonus for every AC they install over the yearly target of 350. The teams make their own arrangements for each installation and some teams work seven days a week and up to 12 hours a day, to increase their earnings. 'HAL' usually receives one minor complaint each time a 'Summer' AC is installed and a major complaint for 10% of the 'Summer' AC installations.

In 2016, 'HAL' had launched a new AC, brand name 'Summer-Cool'. This AC is aimed at high level corporates and it offers a very large degree of choice for the customer and the use of the highest standards of materials, appliances, and installation. 'HAL' would like to grow this side of its business. A 'Summer-Cool' AC retails for a minimum of `1,00,000 to a maximum of ` 5,00,000. The retail price includes installation. In 2017 the average revenue for each 'Summer-Cool' AC installed was ` 3,00,000. Currently, 'HAL' has 7 teams of 'Summer-Cool' AC installers and they can install up to 240 AC a year per

team. These teams are paid salaries without a bonus element. 'HAL' has never received a complaint about a 'Summer-Cool' AC installation. 'HAL"s business is generated from repeat orders, recommendations, and local press advertising. It employs three sales executive who earn an annual salary of ` 3,00,000 each. It offers a six-month money back guarantee and this has to be fulfilled for 1% of its installations. 'HAL' has always been in profits but was shocked to see that in its results in 2017 it only earned 0.2% net profit on its turnover.

Required

(i) EVALUATE the appropriateness of 'HAL"s current control system.
(ii) RECOMMEND four Critical Success Factors (CSFs) which could assist 'HAL' in achieving future success.
(iii) ADVISE 'HAL' about the changes it could implement in its standard costing and reporting system to achieve improved control.

Solution:-

- **HAL's Control System:-**HAL's current control system is focused exclusive on manufacturing process and its efficiency even though HAL is also a retailer and industrial ACs.
- Only MPV , MUV , Leffv are considered while Other variances are ignored. LRV, MYU.
- A lack of product costs computation may be the reason that it was shocked about its 2017 profit margin.
- In the case of a Summer Cool AC where the highest standard of materials are used, It is pertinent that the quality of the finished product is not compromised. Therefore it might be proper to accept an unfavorable material price variance to maintain the products standard.
- Variance analysis should not be done in isolation but a holistic view needs to be taken about HAL's operations and the current control system may not lead to this.
- HAL is not currently controlling and monitoring aspects which are important for competitive success . HAL's critical success Factors have not been identified yet.
- There is monthly reporting of variances but in addition to this. There should also be follow-up actions for outcome resulting from reports. However a month is not inventing the relevant reporting period for all aspects of HAL's business.
- If there is a production problem leading to excessive materials wastage a month is too long time to wait before remedial action are taken. Therefore real time or coexistent reporting may be more relevant for manufacturing operations. A major deficiency of HAL's control systems is that they do not extend to retailing and installation activities.

- The summer installation teams are incentivized to complete AC's which could be good for their productivity. However there is a high level of complaints associated with their work.
- As there is no evident means of monitoring the installation team's work, the reason of the complaints cannot be identified.

Critical Success Factors (CSF) are elements tied to the strategy of business and they represent objectives that business is trying to achieve as a corporation, as a department or as business unit. Critical success factors may vary over time and may include items like employee attitudes, manufacturing flexibility etc. There are a range of CSF's which could be appropriate for HAL. They include:

1:- CSF: Installation Quality:-There are different quality expectation for the two ACs and there have been different levels of quality achieved can be seen in the historic pattern of complaints . This strongly implies that the quality of installation should be tracked as a separate CSF for each AC.

- This CSF is important for HAL due to cost implications of rectifications and guarantee claims.
- It is also important to consider that because of the defect that poor quality will have adverse effect on HAL's future business.

2:- CSF: Customer Satisfaction Like Quality, this CSF also will need to be monitored separately for each AC, Customer satisfaction encompass the complete life of a transaction beginning with the initial enquiry about a purchase and continuing after installation for the life of the machine. Customer satisfaction will have an influence on HAL's future business which is dependent, in part on repeat orders and recommendations .

- This CSF will also show the market view of HAL's brand.

3:- CSF: Brand Performance HAL has two distinct brands. They are directed at different market segments and have different associated attributes.

- "Summer" ACs offer limited choice to the customer and retail, on average for `36,000.
- HAL would like to maintain this business at its present level (7,000 Acs a year minimum) `252 million revenue.
- HAL needs to ascertain where this brand is situated in its life-cycle and what marketing activities may be required to support it.
- The summer –cool brand is aimed at a different market segments and Hal would like to grow this aspect of its business which produces revenue of `504 million. The success of both brands is important for the continual success of HAL and this CSF indicate a complete view of performance.

4:- CSF Manufacturing Excellence HAL manufactures all the ACs which it sells and installs

- Manufacturing must be a substantial part of HAL's total cost and a significant contributor to profitability .
- Currently , HAL monitors some limited aspects of manufacturing though its control system.
- However there are many other aspects which have not been reported upon , For example-innovation, labour abseentism, manufacturing in technology. This CSF is much broader than the current control system. It also assists in searching for competitiveness.

Standard Costing and Reporting System:- HAL May be required to abandon or modify its standard costing and reporting system.

- The rationale behind this is that the current control system might lead to an inappropriate emphasis being placed on certain aspects of performance .
- The installation for summer AC is causing a substantial level of complaints whereas there has never been a complaint made about a "Summer Cool AC. IT could be that the different remuneration arrangements for the ACs installation teams have led to this and as the complaint level is an important aspect of the CSF i.e. Customer Satisfaction, HAL may need to modify its remuneration arrangements.
- It should also reckon whether it would be benefited from a broader range of variable reporting, for example, it may find reporting useful to report on labour rates and material yield. For all CSFs HAL will need to determine the appropriate reporting intervals. Although it is useful to synchronize this with the accounting reporting cycle. CSFs and KPLs do not necessary coexist with accounting period ends. Some KPI_n real-time, for example material wastage, others may be of a longer duration like Customer Satisfaction.
- There is a strong argument for disassociation of the CSFs reporting from the financial reporting cycles.

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Question 79: Accountant at in Focus Corporation, maker of lenses for eye glasses. Your company sells generic-quality lenses for a moderate price. Your boss, the controller, has given you the latest month's report for the lens trade association. This report includes information related to operations for your firm and three of your competitors within the trade association. The report also includes information related to the industry benchmark for each line item in the report. You do no t know which firm is which, except that you know you are Firm A.

Unit Variable Costs

Member Firms

For the Month Ended September 30, 2015

	Firm A	Firm B	Firm C	Firm D	Industry	Benchmark

	Firm A	Firm B	Firm C	Firm D	Industry	Benchmark
Materials input	2.15	2.00	2.20	2.60	2.15	Oz. of glass
Materials price	`50	`52.5	`51	`45	`51	Per OZ.
Labour hour s used	0.75	1.00	0.65	0.70	0.70	Hours
Wage rate	`142	`140	`142.5	`152.5	`125	Per DLH
Variable overhead rate	`92.5	`140	`77.5	`117.5	`122.50	PER DLH

Required:

1: Calculate the total variable cost per unit for each firm in the trade association Computer the percent of total for the material, labour, and variable overhead components.

2: Using the trade association's industry benchmark, calculate direct materials and direct manufacturing labour price and efficiency variances for the firms. Calculate the percent over standard for each firm and each variance.

3: Write a brief memo to your boss outlining the advantages and disadvantages at belonging to this trade association for benchmarking purposes. Include a few ideas improve productivity that you want your boss to take to the department heads meaning.

Solution:

1: Unit Variable cost (rupees) and component percentage for each firm:

	Firm A		Firm B		Firm c		Firm D	
DM	`107.5	37.6%	`105	27.3%	`112.20	44.0%	`117.0	38.2%
DL	108.8	38.1%	140	36.3%	92.6	36.3%	106.8	34.9%
VOH	69.4	24.3%	140	36.4%	50.4	19.7%	82.3	26.9%
TOTAL	**`285.7**	**100.0%**	**`385**	**100.0%**	**`255.20**	**100.0%**	**`306.10**	**100.0%**

2: Variances and percentage over/under standard for each firm relative to the industry Benchmark:

Firm A		Firm B		Firm c		Firm D	
Variance	**% over Standard**	**Variance**	**% over Standard**	**Variance**	**% over Standard**	**Variance**	**% over Standard**
`2.2F	-1.96%	`3U	2.94%	-	-	`15.6F	-11.76%
-	-	`7.7F	-6.98%	`2.6U	2.33%	`23.0U	20.93%

`6.3U	7.14%	`37.5U	42.86%	`6.3F	-7.14%	-	-

We illustrate these calculations for Firm A.

The DM Price variance is computed as:

(Firm A Price –Benchmark price) × Firm A Usage

= (`50-`51) × 2.15oz.

= `2.2F

The DM Efficiency Variance is computed as follows:

(Firm A Usage-Benchmark Usage) × Benchmark Price

= (2.15oz – 2.15 oz) ×`51

= `0

The DL Price Variance is computed as:

(Firm A Rate –Benchmark Rate) × Firm A hours

= (`145 - `125) × 0.75

= ` 15U

The DL Efficiency Variance is computed as follows:

(Firm A Usage –Benchmark Usage) X Benchmark Rate

= (0.75hours – 0.70 Hours) ×`125

= ` 6.3U

The % over standard is the percentage difference in prices relatives to the industry Benchmark. Again using the DM Price Variance Calculation for Firm A, the % over standard is given by:

(Firm A Price –Benchmark Price)/Benchmark Price

= (`50 - `51)/`51

= 1.96% under standard.

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Question 80: Apollo Tyres Ltd. manufactures tires for large auto companies . It uses standard costing and allocates variable and fixed manufacturing overhead based on machine-hours. For each independent scenario given, indicate whether each of the manufacturing overhead based on machine-hours. For each independent scenario given, indicate whether each of the manufacturing variances will be favorable or unfavorable or, in case of insufficient information, indicate "CBD" (Cannot be determined).

Scenario	Variable Overhead Spending Variance	Variable overhead Efficiency variance	Fixed overhead spending variance	Fixed overhead production-volume variance
Production output is 6% less than budgeted, and				

Scenario	Variable Overhead Spending Variance	Variable overhead Efficiency variance	Fixed overhead spending variance	Fixed overhead production-volume variance
actual fixed manufacturing overhead costs are 5% more than budgeted				
Production output is 13% less than budgeted, actual machine hours are 7% more than budgeted				
Production output is 10% more than budgeted				
Actual machine-hours are 20% less than flexible –budget machine hours				
Relative to the flexible budget, actual machine-hours are 15% less, and actual variable manufacturing overhead costs are 20% greater.				

Solution:

Scenario	Variable Overhead Spending Variance	Variable overhead Efficiency variance	Fixed overhead spending variance	Fixed overhead production-volume variance
Production output is 6% less than budgeted, and actual fixed manufacturing overhead costs are 5% more than budgeted	Cannot be determined: no information on actual versus budgeted VOH rates.	Cannot be determined; no information on actual versus flexible budget machine-hours	Unfavorable; actual fixed costs are more than budgeted fixed costs.	Unfavorable output is less than budgeted causing FOH costs to be under allocated
Production output is 13% less than budgeted, actual machine hours are 7%	Cannot be determined; no information on actual versus	Unfavorable ;actual machine – hours more than flexible –budget	Cannot be determined; no information on actual versus	Unfavorable output is less than budgeted causing FOH

Scenario	Variable Overhead Spending Variance	Variable overhead Efficiency variance	Fixed overhead spending variance	Fixed overhead production-volume variance
more than budgeted	budgeted VOH rates.	machine hours	budgeted FOH costs.	costs to be under allocated
Production output is 10% more than budgeted	Cannot be determined; no information on actual versus budgeted VOH rates	Cannot be determined; no information on actual machine – hours versus flexible budget machine-hours	Cannot be determined; no information on actual versus budgeted FOH costs.	Favorable output more than budgeted will cause FOH costs to be over allocated
Actual machine-hours are 20% less than flexible –budget machine hours	Cannot be determined; no information on actual versus budgeted VOH rates.	Favorable ; less machine-hours used relative to flexible budget.	Cannot be determined; no information on actual versus budgeted FOH costs.	Cannot be determined no information on flexible budget on flexible budget machine hours relative to static budget machine-hours.
Relative to the flexible budget, actual machine-hours are 15% less, and actual variable manufacturing overhead costs are 20% greater.	Unfavorable actual VO H rate greater than budgeted VOH rate.	Favorable; actual machine-hours less than flexible budget machine hours.	Cannot be determined; no information on actual versus budgeted FOH costs.	Cannot be determined no information on actual output relative to budgeted output.

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Question 81: Modern Rice mill Ltd process and sells brown rice. It buys a unprocessed paddy and then, using a relatively simple process, removes the outer husk to produce the brown rice. This means that there is substantial loss of weight in the process. The market for the purchase of paddy and the sales of brown rice has been, and is expected to be, stable. Modern Rice Mill Ltd uses a variance analysis system to monitor its performance. There has been some concern about the interpretation of the variances that have been calculated in moth1.

1:- The purchasing manger is adamant, despite criticism from the production director that he has purchases wisely and saved the company thousands of rupees in purchase costs by buying the required quantity of paddy at a cheaper rate from a new supplier.

2:- The production director Is upset at being criticized for increasing the wage rates for month 1: he feels the decision was the right one, considering the implications of the increase. Morale was poor and he felt he had to do something about it.

3. The maintenance manager feels that saving `8,000 on fixed overhead has helped the profitability of the business. He argues that the machine annual maintenance can wait for another month without a problem as the machines have been running well.

The variances for moth 1 are as follows:		`
Material Price	48,000	(Favorable)
Material Usage	52,000	(Adverse)
Labour rate	15,000	(Adverse)
Labour efficiency	18,000	(Favorable)
Labour idle time	12,000	(Favorable)
Variable overhead expenditure	18,000	(Adverse)
Variable Overhead efficiency	30,000	(Favorable)
Fixed overhead expenditure	8,000	(Favorable)
Sales price	85,000	(Adverse)
Sales volume	21,000	(Adverse)

Modern Rice Mill Ltd users labour hours to absorb the variable overhead.

Required

Comment on the performance of the purchasing manager, the production director and the maintenance manager using the variances and other information above and reach a conclusion as to whether or not they have each performed well.

Solution:Modern Rice Mill Ltd.

Re: Comment on the performance of the Purchasing Manager, Production Director & the Maintenance Manager At the time of evaluation of performance of different managers, it is very important to consider all the variances and the inter relationship of the variances.

It is true that favorable variances are appreciated and adverse variances are criticized. However, it is not always right to come to a conclusion on the basis of one ”Favourable” or one adverse variance.

Purchase Manager’s performance: Material variance is ` 48,000 (Favorable). It indicates apparently that the purchase manager was successful in buying paddy at a cheaper rate. However, it may be due to purchase of lower grade paddy. The materials usage variance ` 52,000 (Adverse) is indicating strongly the wastage was more than expected. The excessive wastage may be due to poor quality of paddy purchased by purchase manager at a lower price.

Again sales price variance is ` 85,000 (Adverse) and sales volume variance is ` 21,000 (Adverse).These indicate that the rice quality was not good, as a result the actual

selling price was less than budgeted selling price and expected quantity if rice could not be sold.

It may be concluded that the purchasing manager was responsible for loss of `1,10,000 taking all four variances (e.g. material price and usage as well as sales price and quantity)into consideration.

Total loss has been calculated as follows:

Material price variance	48,000 (favorable)
Material usage variance	52,000 (Adverse)
Sales price variance	85,000 (Adverse)
Sales volume variance	21,000 (Adverse)
	1,10,000 (Adverse)

Production Director's Performance: Labour rate variance is ` 15,000 (Adverse) The wages was paid at a higher rate to boost the workers motivation. It is very clear that the production manager's decision was right because the efficiency variance and idle time variance are favorable ` 18,000 and ` 12,000 respectively.

The effect of adverse wages rate variance is ` 15,000 was compensated by ` 30,000 favorable variance `18,000efficeincy - `12,000 idle time).Therefore net gain of the organization is ` 15,000.

In conclusion, the production manager's performance was praise worthy.

Maintenance Manager's Performance:- Maintenance managers claim of saving` 8,000 fixed cost by delaying annual maintenance is not acceptable. He has not saved but delayed the maintenance cost. Ultimately today or tomorrow the maintenance cost must be incurred. Main danger is the loss of output and sales if there is break-down. In case of work-down the expenses for repairing may be much more than that of annual maintenance.

In conclusion, maintenance manager's performance is not appreciable.

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Question82:-Aquatic Feed (AF) is the leading manufacturer of Fish and other sea animal feed .AF ha smade its credit pioneering effort and service fo rover one decade in development of culture, processing and exports with its state-of-art fish feed and processing plants. Hallmarks of AF is constant upgrdation of aquaculture technology bringing latest developments in the field to the doorstep of the Indian aquaculture farmer. It stands as a leading provider of high quality feed, best technical support to the farmer and caters to the quality standards of global customers.

One of its fish product is "B" which is produced by mixing and heating three ingredients B1, B2 and B3. It uses a standard costing system to monitor its costs.

The standard material cost for 100Kg. of "B" is as follows:

ingredients	Standard Qty (kg)	Cost per Kg. (Rs.)	Cost per 100 Kg. of "B"
B_1	42	3	126
B_2	62	6	372
B_3	21	2	42
	125		540

Notes:-

- B_1,B_2 and B_3 are agricultural products.Their quality and price change significantly every year. Stadnard prices are determined at the average market price over the last three years.AF has a purchasing manager responsible for purchasing and pricing.
- The standard mix is decided by the Managing Partner having 15 years rich experience in aquaculture field. The last time this was done at time of launching the "B" that was six years back.The standard mix has not been changed since.
- Mixing and heating process are subject to some evaporation loss.

In current month 4,605Kg. of "B" was produced, using the following ingredients:

Ingredients	Actual Qty.	Cost per Kg.	Total Cost of "B"
B_1	2,202	2.8	6,165.60
B_2	2,502	7	17,514
B_3	921	2	1,842
	5,625		25,521.60

At every month end, the production manager receives a statement from the Managing Partner.This statement contains material price and usage variances for the month and no other feedback on the efficiency of the processes is provided.

Requried:

EVALUATE the performance measurement system in AF.

Solution:-The statement reported, Rs. 2,062 favourable material price variance. The responsibility for controlling the material price variance is usually the purchasing manager's Undoubtedly, in current scenario the price of materials is largely beyond his or her control; however, the price variance can be influenced by such factors as quality ,

quantity discounts, distance of suppliers location, and so on.These factors are often under the control of the purchase manager.The production manager is responsible for material usage and cannot be held responsible for the material price variance.

Since total usage variance reported Rs. 1,406 favourable, production manager could assume good performance. However, if usage variance is considered in more detail, though the mix and yield calculations, it can be observed that variance was driven by a change in the mix and by using a mix of ingredients which was different from standard, it has resulted in a saving of Rs. 840; similarly it has led to a favourable yield, It is worthwhile to note that changing the mix could impact the product quality and sales as well, however, no information has been given about this.

Prices and quality of three agriculture ingredients are changing significantly every year. Using ex ante prices and usage standards can implicit an outdated view of variances.Failing to separate variances caused by uncontrollable factors and planning errors from variances caused by controllable factors can be demoralizing for the managers.

In addition, managers are not involved in setting the standard mix and the same has not been changed for six years despite conituous changes in the quality and prices of the ingredients.This can also mislead the managers i.e. to carryout control activities which are based on the outdated standards.

Furthermore, a true image is missing in relation to managers performance as statement does not include any feedback or comments on the varicnes.Even no follow up is being taken on the same.

Overall, it appears that AF is not having comprehensive performance measurement system and this could adversely impact the firm in long run.

Workings

Price varaicne

Input	Actual Qty (kg)	Std.Qty (Rs.)	Actual Cost (Rs.)	Std. Cost (Rs.)	Varicne (Rs.)
B_1	2,202	3	2.8	0.20	440 (F)
B_2	2,502	6	7	1(A)	2,502 (A)
B_3	921	2	2	-	-

	5,625				**2,062 (F)**

Usage Varicne

Input	**Std. Qty (Kg)**	**Actual Qty (kg)**	**Differnce (Kg)**	**Std Cost (Rs.)**	Variance (Rs.)
B_1	1,934	2,202	268 (A)	3	804 (A)
B_2	2,855	2,502	353 (F)	6	2,118 (F)
B_3	967	921	46 (F)	2	92 (F)
	5,756	**5,625**	**131 (F)**		**1,406 (F)**

MIX Variance

Input	**Rev. Actual Qty (kg)**	**Actual Qty (kg)**	**Differance (Kg)**	**Std Cost (Rs.)**	**Variance (Rs.)**
B_1	1,890	2,202	312 (A)	3	936 (A)
B_2	2,790	2,502	288 (F)	6	1,728 (F)
B_3	945	921	24 (F)	2	48 (F)
		5,625	**NIL**		**840 (F)**

Yield variance

Input	**Standard Qty. (Kg)**	**Rev. Actual Qty. (Kg)**	**Differance (Kg)**	**Std Cost**	**variance**
B_1	1,934	1,890	44 (F)	3	132 (F)
B_2	2,855	2,790	65 (F)	6	390 (F)
B_3	967	945	22 (F)	2	44 (F)
	5,756	**5,625**	**131 (F)**		**566 (F)**

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Question 85: GDR Limited produces a single product. It has recently automated part of its manufacturing plant and adopted Total Quality Management (**TQM**) and Just-In-Time (**JIT**) manufacturing system. No inventories are held for material as well as for finished product. The company currently uses standard absorption costing system.Following are related to fourth quarter of 2018-19:

	Budget	**Actual**
Production and Sales	1,00,000 units	1,10,000 units

Direct Materials	2,00,000 Kg @ Rs.15/Kg	2,50,000 Kg @ Rs. 15.60/Kg
Direct Labour Hours	25,000 hours @ Rs. 150/ hour	23,000 hours @ Rs. 150 /hour
Fixed Production Overhead	Rs.1,60,000	Rs. 1,80,000

Production overheads are absorbed on the basis of direct labour hours.

The CEO intends to introduce activity based costing system along with TQM and JIT for better cost management. A committee has been formed for this purpose. The committee has further analysed and classified the production overhead of fourth quarter as follows:

	Budget	**Actual**
Costs:		
Mateial Handling	Rs. 48,000	Rs. 62,000
Set Up	Rs. 1,12,000	Rs. 1,18,000
Activity:		
Material Handling (Orders executed)	8,000	8,500
Set Up (Production Runs)	2,000	2,100

Revision of standards relating to fourth quarter were made as below:

	Original Standard	**Revised Standard**
Material content per unit	2 Kg	2.25 Kg
Cost of material	Rs. 15 per Kg	Rs. 15.50 per Kg
Direct Labuor Hours	15 minutes	12 minutes

Required:

(i) Calculate Planning and Operational Varinces relating to material price, material usage, labuor efficiency and labour rate.

(ii) Calculate overhead expenditure and efficiency variance using activity based costing principles.

Solution:-

Part 1:

WN 1: Computation of Planning Variances - Material

SP X SQ	SP X AQ	AP X AQ
15 x 2,20,000	15 x 2,47,500	15.50 x 2,47,500
33,00,000	**37,12,500**	**38,36,250**

Note 1: Computation of SQ:

(b) SQ = AO x (Input/Output) (original standard)

(c) SQ = 1,10,000 x (2/1) = 2,20,000 KG

Note 2: Computation of AQ:

AQ = AO x (Input/Output) (revised standard)

SQ = 1,10,000 x (2.25/1) = 2,47,500 KG

Note3:- Computation of Variances:

Material cost variance = (SP x SQ) – (AP x AQ) = 33,00,000 – 38,36,250 = Rs.5,36,250 (A)

Material Price Variance = (SP x AQ) – (AP x AQ) = 37,12,500 – 38,36,250 = Rs.1,23,750 (A)

Material Usage Variance = (SP x SQ) – (SP x AQ) = 33,00,000 – 37,12,500 = Rs.4,12,500 (A)

Working Note 2:- Computation of Operating Variacnes - Material

SPXSQ SP X AQ AP X AQ

15.50 x 2,47,500	15,50 x 2,50,000	15.60 x 2,50,000
38,36,250	**38,75,000**	**39,00,000**

Note 1: Computation of variances:

Material cost variance = (SP x SQ) – (AP x AQ) = 38,36,250 – 39,00,000 = Rs.63,750 (A)

Material Price Variance = (SP x AQ) – (AP x AQ) = 38,75,000 – 39,00,000 = Rs.25,000 (A)

Material Usage Variance = (SP x SQ) – (SP x AQ) = 38,36,250 – 38,75,000 = Rs.38,750 (A)

Working Note3:- Computation of Planning Variances- Labour

SR x SH	SR x AH	AR x AH
150 x 27,500	150 x 22,000	150 x 22,000
41,25,000	**33,00,000**	**33,00,000**

Note 1: Computation of SH:

SH = AO x (Input/output) (original standard)

SH = 1,10,000 x (15 mins/1) = 16,50,000 minutes (or) 27,500 hours

Note 2: Computation of AH:

AH = AO x (Input/output) (revised standard)

AH = 1,10,000 x (12 mins/1) = 13,20,000 minutes (or) 22,000 hours

Note 3: Computation of Varainces:

Labour rate variance = 0

Labour efficiency variance = (SR x SH) – (SR x AH) = 41,25,000 – 33,00,000 = 8,25,000 F

Labour cost variance = (SR x SH) – (AR x AH) = 41,25,000 – 33,00,000 = 8,25,000 F

Working Note3:- Computation of Operating Variances:

SR x SH	SR x AH	AR x AH
150 x 22,000	150 x 23,000	150 x 23,000
33,00,000	**34,50,000**	**34,50,000**

Variance Calculation:

Labour rate variance = 0

Labour efficiency variance = (SR x SH) – (SR x AH) = 33,00,000 – 34,50,000 = 1,50,000 (A)

Labour cost variance = (SR x SH) – (AR x AH) = 33,00,000 – 34,50,000 = 1,50,000 (A)

Part2:-

Material Handling variances:

Standard Rate x Standard Orders	Standard Rate x Actual Orders	Actual Rate x Actual Orders
6 x 8,800	6 x 8,500	62,000
52,800	51,000	62,000

Note:

Computation of standard orders:

- 1,00,000 units = 8,000 orders
- 1,10,000 units = ?
- 1,10,000 units = 8,800 orders

Computation of standard rate per order:
Standard rate per order = (Budgeted cost /budgeted orders)
Standard rate per order = (48,000/8,000) = Rs.6 per order
Expenditure variance = (SR x Actual orders) – (AR x Actual orders)
Expenditure variance = (51,000 – 62,000) = 11,000 (A)
Efficiency variance = (SR x standard orders) – (SR x Actual orders)
Efficiency variance = 52,800 – 51,000 = 1,800 (F)

Set-up cost variances:

Standard Rate x Standard production runs	Standard Rate x Actual production runs	Actual Rate x Actual production runs
56 x 2,200	56 x 2,100	1,18,000
1,23,200	1,17,600	1,18,000

Note:

Computation of standard production runs:
❖ 1,00,000 units = 2,000 production runs ❖ 1,10,000 units = ? ❖ 1,10,000 units = 2,200 production runs
Computation of standard rate per production runs:
Standard rate per production run = (Budgeted cost /budgeted production runs)
Standard rate per production run = (1,12,000/2,000) = Rs.56 per production run
Expenditure variance = (SR x Actual production runs) – (AR x Actual production run)
Expenditure variance = (1,17,600 – 1,18,000) = 400 (A)
Efficiency variance = (SR x standard production runs) – (SR x Actual production runs)
Efficiency variance = 1,23,200 – 1,17,600 = 5,600 (F)

Overall variances:

Expenditure variance = 11,000 (A) + 400 (A) = 11,400 (A)

Efficiency variance = 1,800 (F) + 5,600 (F) = 7,400 (F)

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Question 87:- Britania is a manufacturer of fruit cakes. One of its plants produces five different cake products. Each cake product differs in terms of material inputs. They are identical in terms of the cooking and changeover processes.

The changeover process entrails switching the production line from the manufacturing of one product to another product.The costs of a changeover are a batch cost. They comprise the labor cost of the workers who clean the equipment so that the contents of each different product are not mixed together. The following information pertains to March 2019.

	Static-Budget Amounts	Actual Amounts
Units of cakes produced and sold	240,000	330,000
Average batch size (cakes per batch)	6,000	10,000
Changeover labor-hours per batch	20	24
Changeover labor cost per hour	Rs. 200	Rs. 210

1. Compute the flexible –budget variance for total changeover labor costs in March 2019. Comment on the results.
2. Compute the price and efficiency variances for total changeover labor costs in March 2007. Comment on the results.
3. Provide two explanations for each of the price and efficiency variances in requirement 2.

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Question 88:- SPS Limited uses activity based costing to allocate variable manufacturing overhead costs to products. The company identified three activities with the following information for last quarter:

Activity	Standard Rate	Standard Quantity per unit produced	Actual Costs	Actual Quality
Indirect Materials	Rs. 20 per Kilogram	0.5 kilogram per unit	Rs. 9,40,000	48,000 Kilogram
Product Testing	Rs. 3 per test minute	10 minutes per unit	Rs. 22,50,000	7,40,000 test minutes
Energy	Rs. 0.20 per minute of machine time	4 minutes of machine time per unit	Rs. 70,000	3,60,000 minutes of machine time

The Company produced 80,000 units in the last quarter Company policy is to investigate all variances above 5% of the flexible budget amount for each activity.

Required:-

(i) Calculate variable overhead expenditure variance and variable overhead efficiency variance for each of the activities using activity based costing. Clearly indicate each variance as favorable or unfavorable /adverse.

(ii) Interpret the results of variable overhead efficiency variances as calculated in (i) above in respect of indirect materials and product testing activity.
(iii) Identify the variances that should be investigated according to company policy. Show calculations to support your answer.

Solution:-

Indirect Materials

Efficiency Variance = Cost impact of undertaking activities more/less than standard

= (0.5 Kg X 80,000 units - 48,000Kg.) X ₹ 20

= ₹ 1,60,000 (A)

Expenditure Variance = Cost impact of paying more/less than standard for actual activities undertaken

= 48,000 Kg X ₹ 20 - ₹9,40,000

= ₹20,000 (F)

Product Testing

Efficiency Variance = Cost impact of undertaking activities more/less than standard

= (10 mins X 80,000 units - 7,40,000 mins) X ₹3

= ₹1,80,000 (F)

Expenditure Variance = Cost impact of paying more/less than standard for actual activities undertaken

= 7,40,000 mins X ₹ 3 - ₹ 22,50,000

= ₹30,000 (A)

Energy

Efficiency Variance = Cost impact of undertaking activities more/less than standard

= (4 mins X 80,000 units - 3,60,000 mins) X ₹ 0.20

= ₹8,000 (A)

Expenditure Variance= Cost impact of paying more /less than standard for actual activities undertaken

= 3,60,000 mins X ₹ 0.20 - ₹ 70,000

= ₹2,000 (F)

(iii) Indirect Materials

SPS actually spent 48,000 Kg. Or 8,000 Kg more than the standard allows. At a predetermined rate of ₹ 20 per Kg. Efficiency variances is 1,60,000 (A). Since actual quantity were higher than the standard , the variance is unfavourable. This adverse varicne, could have been caused by the inferior quality result of carelessness handling of materials by production workers or could as a result of change in methods of production, product specification or the way in which quality of the product is checked or controlled.

Product Testing

Favourable efficiency variance amounting to ₹1,80,000 indicates that fewer testing minutes were expended during the quarter than the standard minutes required for the level of actual output. This may be due to employment of a higher skilled labor or improvement of skills of existing workforce through training and development leading to improved productivity etc.

(iv) Flexible Budget

Indirect Materials	=(0.50Kg X 80,000 units) X₹20 = ₹ 8,00,00	= ₹8,00,000X 5% = ₹40,000
Product Testing	=(10 mins X 80,000 units) X ₹ 3 = ₹24,00,000	=₹ 24,00,000 X 5% = ₹1,20,000
Energy	= (4 mins X 80,000) X ₹ 0.20 = ₹64,000	= ₹ 64,000 5% = ₹3,200

Efficiency Variance for all the three activities are more than 5% of their flexible budget amount. So, according to the company policy, efficiency variances should be investigated.

Alternative

Statement Showing identification of variances to be investigated

	Calculation	Varince % of Flexible Budget	Criteria	Investigate y or N
Indirect Materials				
Efficiency variance	$\left(\frac{1,60,000}{8,00,00} X 100\right)$	20%	5%	Y

Expenditure Variance	$\left(\frac{20,000}{8,00,000} X100\right)$	2.5%	5%	N
Product Testing				
Efficiency Variance	$\left(\frac{1,80,000}{24,00,00} X100\right)$	7.5%	5%	Y
Expenditure Variance	$\left(\frac{30,000}{24,00,000} X100\right)$	1.25%	5%	N
Energy				
Efficiency Vari nce a	$\left(\frac{8,000}{64,000} X100\right)$	12.5%	5%	Y
Expenditure Variance	$\left(\frac{2,000}{64,000} X100\right)$	3.125%	5%	N

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