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Subject: Cost Accounting

Name of the Unit

Standard Costing and Variance Analysis

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1. Meaning of Standard Cost and Standard Costing

Standard Cost is 'The planned unit cost of the product, component or service produced in a period. The standard cost may be determined on a number of bases. The main use of standard costs is in performance measurement, control, stock valuation and in the establishment of selling prices.' (CIMA Official Terminology, 2005)

Standard Costing is a control technique that reports variances by comparing actual to pre-set standards, thereby facilitating action through management by exception (CIMA).

2. Advantages and Limitations of Standard Costing

Advantages:

    (a) It evaluates performance of a responsibility centre.
    (b) It controls costs
    (c) It helps inventory valuation when actual figures are reliably available.
    (d) It provides target to be achieved.
    (e) It helps predicting future cost for decision making
    (f) It provides reasons for off-standard performance
    (g) It helps management improve operations, correct errors and deploy resources more effectively to reduce costs.

Limitations:

    (a) It is not applicable to non-repetitive activities because of difficulty in determining a clear standard.
    (b) It is not compatible with marginal costing.

3. Standard Costing and Historical Costing

Standard costing uses predetermined future planned costs while historical costing uses past actual costs.

4. Steps Involved in Standard Costing

    (a) Setting standards for each operation
    (b) Comparing actual with standard performance
    (c) Analysing and reporting variances arising from the difference between actual and standard performance.
    (d) Investigating significant variances and taking appropriate competitive action.

5. Variance Analysis

Variance analysis involves breaking down the total variance to explain:

    (i) How much of it is caused by the usage of resources differing from the standard
    (ii) How much is caused by cost of resources differing from the standard

(iii)How much is caused by selling price in case of sales or profit variances.

Variance = [Standard – Actual]

(If negative, it is adverse for cost and input items, favourable for revenue or output items; if positive the vice versa)

Illustration 1: (Cost variances)

Budgeted: Output = 1000 units; Standard Cost per unit = ₹ 50.

Actual: Output = 1200 units; Actual cost per unit = ₹ 54

Compute cost variances.

Solution:

(a) Standard cost of actual production = 50*1200 = ₹ 60000

(b) Actual cost of actual production = 54*1200 =₹ 64800

Cost variance = (a – b) = 60000 – 64800 =₹ 4800 (Adv.)

6. Material Variance - Labour Variance - Overhead Variance

Material Cost variances: It is the difference between standard cost of materials for actual production and the actual cost of materials.

Illustration 2. Material Cost variances (Simple Problem)

Budgeted: Output = 10000 units; Standard Material Cost per unit = ₹ 50.

Actual: Output = 12000 units; Actual material cost per unit = ₹ 54

Compute material cost variances.

Solution:

(a) Standard material cost of actual production (Std. Cost x Actual Output: SC x AO) = 50*12000 = ₹600000

(b) Actual material cost of actual production (Actual Cost x Actual Output: AC X AO) = 54*12000 = ₹648000

Material Cost variance = (a – b) = 600000 – 648000 = ₹ 48000 (Adv.)

Illustration 3: Material Cost variances

Budgeted: Output = 1000 units; Standard quantity of Material per unit of output = 5 kg; Standard price per kg (SP) = ₹ 10

Actual: Output (AO) = 1200 units; Actual price per kg = ₹ 9; Actual quantity per unit of output (AQ) = 6 kg

Compute material cost variances.

Solution:

SQ (for AO) = Standard quantity of Material per unit of output X AO = 5*1200 = 6000

AQ (for AO) = Actual quantity per unit of output X AO = 6*1200 = 7200

(a) SP*SQ (for AO) = 10*6000 = ₹60000

(b) SP*AQ (for AO) = 10*7200 = ₹72000

(c) AP* AQ (for AO) = 9*7200 = ₹64800

Material cost variance = (a – c) = ₹4800 (Adv.)

Material Quantity/Yield variance = (a – b) = 60000 – 72000 = ₹12000 (Adv.)

Material Price Variance = (b – c) = 72000 – 64800 = ₹7200 (Fav.)

Material Qty variance is same as material yield variance.

Alternative process of analysis:

(a) Std. cost per unit*Actual Output = 50*1200 = 60000

(b) Std. cost per unit*Std. Output for actual quantity = 50*(6*1200/5) = 50*1440 = ₹72000

(c) AP* AQ (for AO) = 9*6*1200 = 64800

Material yield variance = Std. cost of Actual Output – Std. Cost of Std. Output =

 (a – b) = 60000 – 720000 = ₹12000 (Adv.)

Material Price Variance = (b – c) = 72000 – 64800 = ₹7200 (Fav.)

Material cost variance = (a – c) = ₹4800 (Adv.)

Illustration 4.

Compute material cost variances for actual output of 200 units from the following data:

Mat	SQ per unit (ton)	Std. Price Per ton (₹)	Actual Usage (ton)	Actual Price per ton (₹)
X	3	1200	550	1500
Y	2	800	550	1000

Solution:

1. SQ (for AO) = 200*5 = 1000 t; AQ = 550+550= 1100 t

Mat	SM	(i) SM*SQ	(ii) SM*AQ	(iii) AM*AQ	SP p/u	AP p/u
X	3	600	660	550	1200	1500
Y	2	400	440	550	800	1000
Total	5	1000	1100	1100	2000	2500
		SQ (AO)	AQ	AQ		

Mat	(a) = SP*(i)	(b) = SP*(ii) (₹)	(c) = SP*(iii) (₹)	(d) = AP*(iii) (₹)
X	720000	792000	660000	825000
Y	320000	352000	440000	550000
	1040000	1144000	1100000	1375000

Material Cost Variances   [Amount in ₹]

Mat	M. Qty V (a - b)	M. Mix V (b - c)	M. Usage V (a - c)	M. Price V (c - d)	M. Cost V (a - d)
A	-72000	+132000	+60000	-165000	-105000
B	-32000	-88000	-120000	-110000	-230000
	-104000	+44000	-60000	-275000	-335000

-ve = Adverse

+ve = Favourable

Labour Cost variances: It is the difference between standard labour cost and actual labour cost. Variance analysis of labour cost is similar to that of material cost variances.

Illustration 5: Labour Cost variances

Standard labour hour per unit of output = 5 hours; Standard wages rate per hour (SR) = ₹ 10

Actual: Output = 1200 units; Actual rate per hour (AR) = ₹ 9; Actual labour hours per unit of output = 6 hours

Solution:

(a) SR*SH (for AO) = 10*5*1200 = ₹60000

(b) SR*AH (for AO) = 10*6*1200 = ₹72000

(c) AR* AH (for AO) = 9*6*1200 = ₹64800

Labour cost variance = (a – c) = ₹4800 (Adv.)

Labour Efficiency variance = (a – b) = 60000 – 72000 = ₹12000 (Adv.)

Labour Rate Variance = (b – c) = 72000 – 64800 = ₹7200 (Fav.)

Illustration 6: Material and Labour Cost variances

	Budget	Actual
Output (units)	2000	2200
RM Qty per unit (kg)	8	9
Price per kg (₹)	10	12
Labour Rate per hour (₹)	6	7
Labour Hours per unit	10	11

Compute material and labour cost variances.

Solution:

Material cost variances

SP = ₹ 10; AP = ₹ 12; SQ = 8*2200 = 17600; AQ = 9*2200 = 19800

(a) SP*SQ = 10*17600 = ₹ 176000

(b) SP*AQ = 10*19800 = ₹ 198000

(c) AP*AQ = 12*19800 =237600

Material cost variance = (a – c) = 176000 – 237600 = ₹ 61600 (Adv.)

Material Usage (quantity/Yield) variance = (a – b) = 176000 – 198000 = ₹22000 (Adv.)

Material Price Variance = (b – c) = 198000 – 237600 = ₹39600 (Adv.)

Wages/labour cost variances

SH (for AO) = AO*SH per unit = 2200*10 = 22000

AH = AO*AH per unit = 2200*11 = 24200

(a) SR*SH = 6*22000 = ₹132000

(b) SR*AH = 6*24200 = ₹145200

(c) AR*AH = 7*24200 = ₹169400

Labour cost variance = (a – c) = 132000 – 169400 = ₹37400 (Adv.)

Labour efficiency variance = (a – b) = 132000 – 145200 = ₹13200 (Adv.)

Labour rate Variance = (b – c) = 145200 – 169400 = ₹24200 (Adv.)

When materials are used in a mix the analysis can be diagrammatically presented as follows:
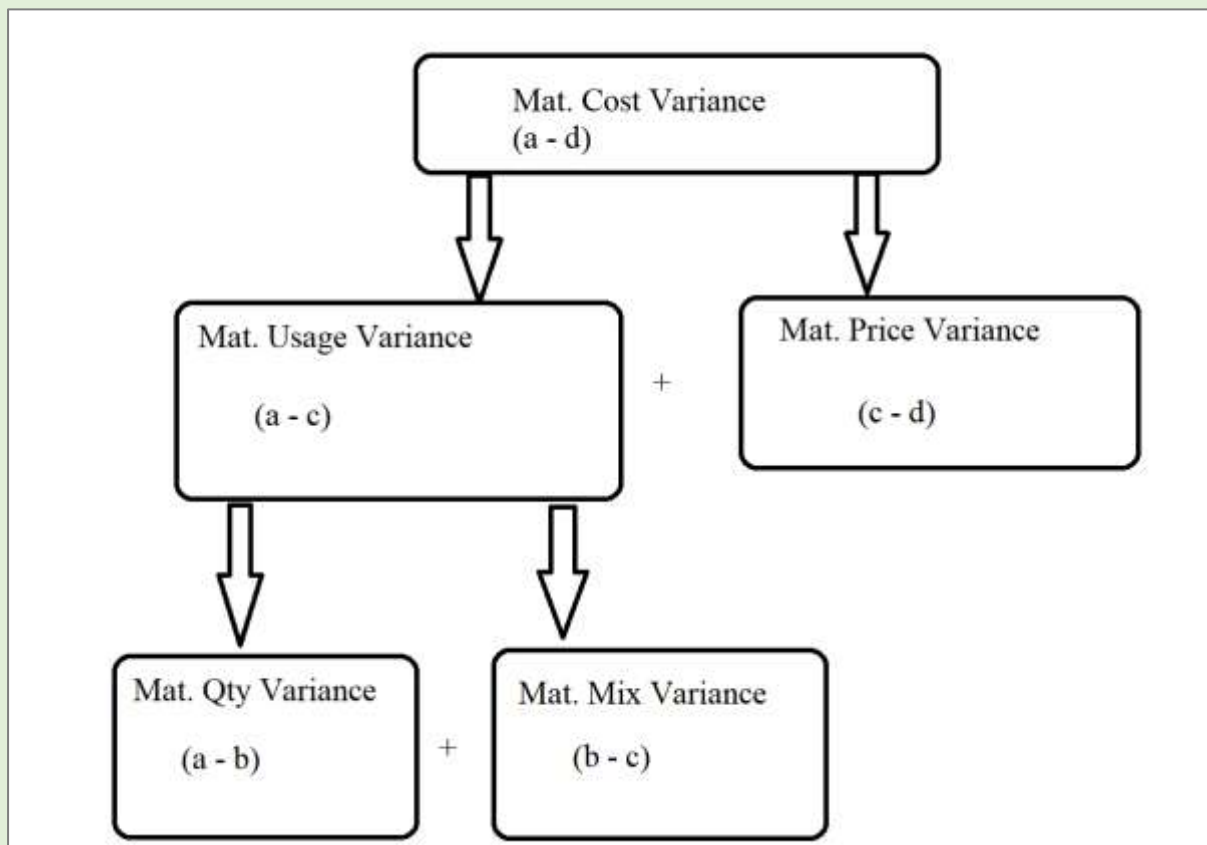
The labour may also be used in mix and variance analysis of labour cost is similar to that of material cost variances.

Illustration 7: Material and Labour Cost variances

	Budget	Actual
Output (units)	2000	2200
RM Qty per unit (kg): Mat A	4	5

Mat B	6	6
Price per kg (₹)		
Mat A	8	9
Mat B	5	6
Labour Rate per hour (₹)		
Skilled	10	12
Unskilled	5	5
Labour Hours per unit (₹)		
Skilled	4	3
Unskilled	8	10

Compute material and labour cost variances.

Solution:

Material cost variances:

SM implies Std. Mix

AM implies Actual Mix

(a) $SP*(SM*SQ) = SP*(x)$

(b) $SP*(SM*AQ) = SP*(y)$

(c) $SP*(AM*AQ) = SP*(z)$

(d) $AP*(AM*AQ) = AP*(z)$

Material Qty variance = (a – b)

Material Mix variance = (b – c)

Material Usage variance = (a – c) = (a – b) + (b – c)

Material Price Variance = (c – d)

Material cost variance = (a – d)

SQ for AO = 10*2200 = 22000 kg

AQ = 11*2200 = 24200 kg

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Mat	SQ pu(kg)	AQ pu (kg)	A. Output	(x) SM. SQ	(y) SM.AQ	(z) AM.AQ
A	4	5	2200	8800	9680#	11000
B	6	6	2200	13200	14520#	13200
	10	11		22000	24200	24200

A:24200*4/10 = 9680; B: 24200*6/10 = 14520

[Amount in (₹)]

Mat		a = SP*(x)	b= SP*(y)	c= SP*(z)		d = AP*(z)
	SP				AP	
A	8	70400	77440	88000	9	99000
B	5	66000	72600	66000	6	79200
		136400	150040	154000		178200

Material Cost Variances   [Amount in (₹)]

Mat	M. Qty V	M. Mix V	M. U. V	M. P. V	M. C. V
	(a - b)	(b - c)	(a - c)	(c - d)	(a - d)
A	-7040	-10560	-17600	-11000	-28600
B	-6600	6600	0	-13200	-13200
	-13640	-3960	-17600	-24200	-41800

-ve = Adverse

+ve = Favourable

Labour cost variances:

(a) SR*SM*SH

(b) SR*SM*AH

(c) SR*AM*AH

(d) AR*AM*AH

Labour cost variance = (a – d)

Labour Efficiency variance = (a – b)

Labour Mix variance = (b – c)

Labour Rate Variance = (c – d)

	2200		(i)	(ii)	(iii)
	SH pu	AH pu	SM. SH	SM.AH	AM. AH
Skilled	4	6	8800	11733.33	13200
Unskilled	8	10	17600	23466.67	22000
	12	16	26400	35200	35200
			SH for AO	AH	

	SR ph	AR ph	(a)=(i)*SR	(b) = (ii)*SR	(c)= (iii)*SR	(d)=(iii)*AR
Skilled	10	12	88000	117333.33	132000	158400
Unskilled	5	5	88000	117333.33	110000	110000
			176000	234666.67	242000	268400

Labour Cost Variances   [amount in (₹)]

	(a - b)	(b - c)	(c - d)	(a - d)
	Eff. V	M. V	Rate Var	Cost V
Skilled	-29333.3	-14666.7	-26400	-70400
Unskilled	-29333.3	7333.333	0	-22000
Total	58666.7 (Adv)	7333.33(Adv)	26400(Adv)	92400(Adv)

For Labour Cost Variance Analysis, Idle time may be an additional factor for the difference between standard and actual cost. Accordingly, the diagrammatic presentation can be made as below:
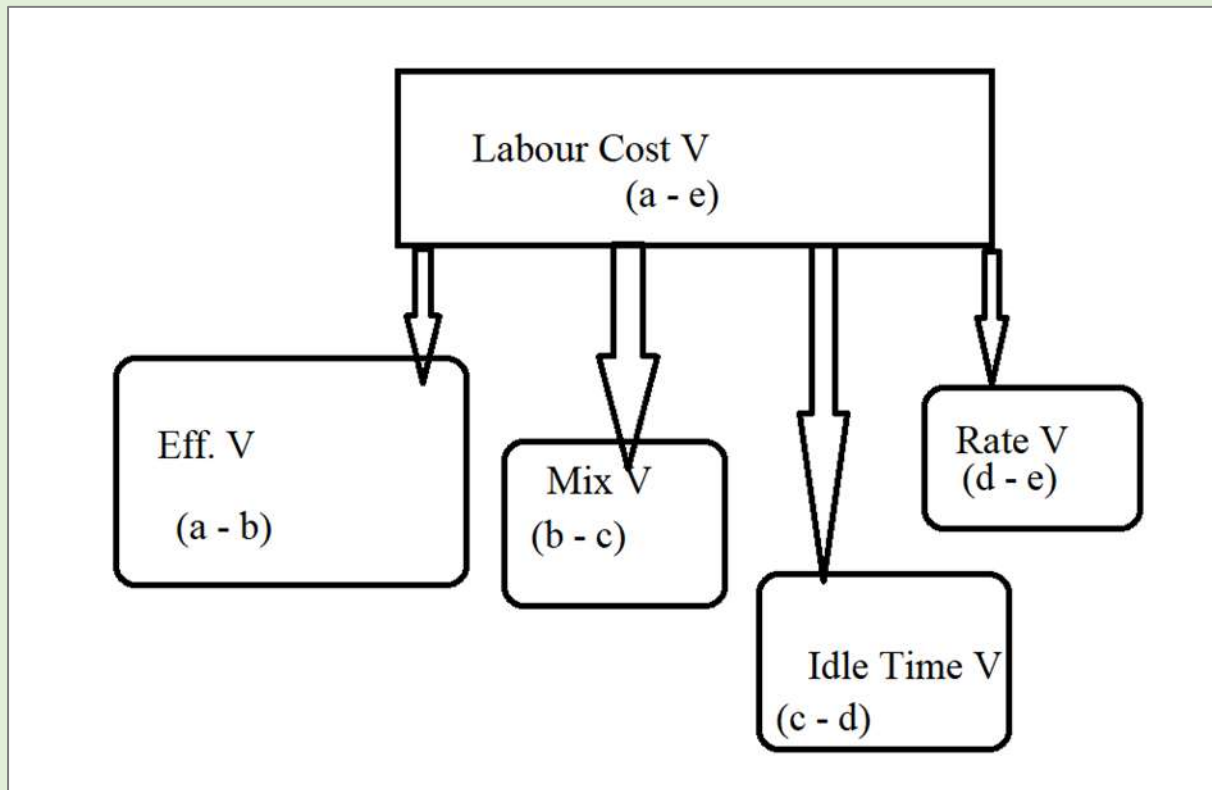
Labour cost variances:

(a) SR*SM*SH

(b) SR*SM*AH (produced)

(c) SR*AM*AH (produced)

(d) SR*AM*AH paid (including idle time)

(e) AR*AM*AH paid

Idle Time = AH (paid) - AH (produced)

Labour Efficiency variance = (a – b)

Labour Mix variance = (b – c)

Labour Idle Time Variance = (c – d)

Labour Rate Variance = (d – e)

Labour cost variance = (a – e)

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Illustration 8. Labour Cost Variances with Idle Time.

	SH pu	AH pu	SR ph (₹)	AR ph (₹)
Men	6	8	12	11
Women	8	10	9	10
	14	18		

Actual Output 300 units

Idle Time = 140 hou₹

Compute labour Cost Variances.

Solution:

	SH pu	AH pu	SR ph	AR ph	(i) SM*SH	(ii) SM*AH	(iii) AM*AH	(iv) AM*AH paid
Men	6	8	12	11	1800	2314.3	2400	2462.22
Women	8	10	9	10	2400	3085.7	3000	3077.78
	14	18			4200	5400	5400	5540
					SH(AO)	AH	AH	AH

	(a) = (i)*SR	(b) = (ii)*SR	(c) = (iii)*SR	(d) = (iv)*SR	(e) = (iv)*AR
Men	21600	27771.43	28800	29546.7	27084
Women	21600	27771.43	27000	27700	30778
	43200	55542.86	55800	57246.7	57862

Labour Cost Variances   [amount in (₹)]

|	(a - b) Eff. V	(b - c) M. V	(c - d) Idle time V	(d – e) Rate Var	(a - e) Cost V
Skilled	-6171	-1029	-746.7	2462.7	-5484
Unskilled	-6171	771.43	-700	-3078	-9178
Total	-12343	-257.1	-1447	-615.3	-14662

-ve = Adverse

+ve = Favourable

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Fixed overhead cost variances

Fixed overhead cost variances are divided into two components: volume and expenditure. Volume is again divided into three components: Efficiency, Capacity and Calendar as presented below:
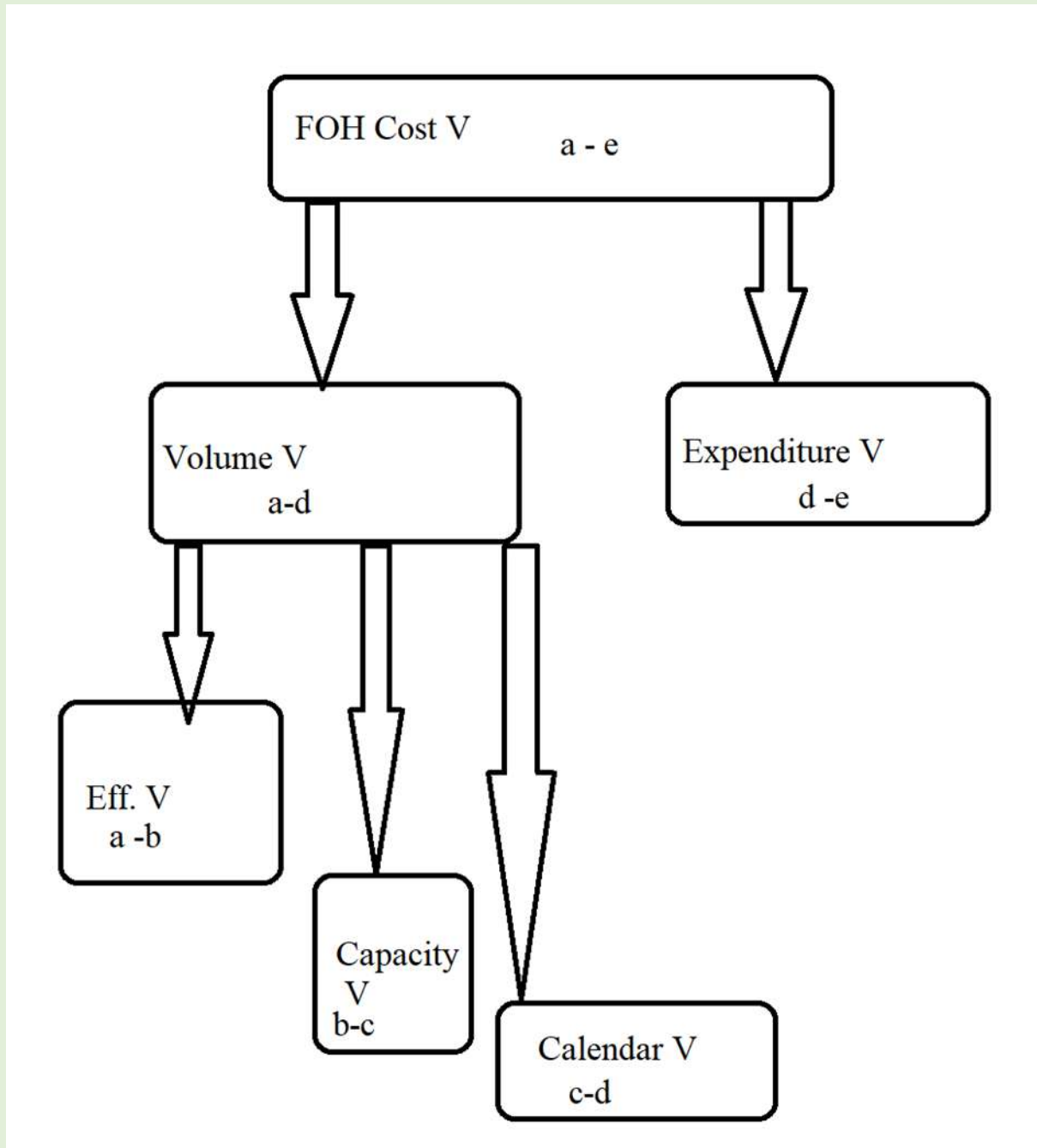
Where, a, b, c, d and e are defined as:

 a) Std FOH Cost per unit*Actual Output (AO)
 b) Std FOH Cost per hour*Actual Hours (AH)

c) Std FOH Cost per day*Actual Days (AD)

d) Budgeted FOH Costs

e) Actual FOH Costs

(a – b) = FOH Efficiency V

(b – c) = FOH Capacity V

(c – d) = FOH Calendar V

(a – d) = FOH Volume V

(d – e) = FOH Exp V

(a – e) = FOH Cost V

Variable Overhead Cost Variances:

Variable overhead cost variances are divided into two components: Efficiency and Expenditure.

(a – b) = VOH Efficiency V

(b – c) = VOH Exp V

(a – c) = VOH Cost V

Where, a, b and c are defined as:

a) Std VOH Cost per unit*AO

b) Std VOH Cost per hour*AH

c) Actual VOH Costs

Illustration 9. Fixed and Variable Overhead Cost Variances

	Budgeted	Actual
Output (units)	2000	2200
Hours	20000	24000
Days in the month	25	24
FOH Costs (₹)	140000	184000
VOH Costs (₹)	180000	200000

Compute Fixed and Variable Overhead Cost variances.

Solution:

Fixed overhead cost variances (in rupees)

a) Std FOH Cost per unit (=140000/2000) *AO (2200) = 70*2200 = ₹154000

b) Std FOH Cost per hour*AH = (140000/20000) *24000 = ₹168000

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   c) Std FOH Cost per day*AD = (140000/25) *24 = ₹ 134400

   d) Budgeted FOH Costs = ₹ 140000

   e) Actual FOH Costs = ₹ 184000

(a – b) = FOH Efficiency V = ₹ 14000 (adv)

(b – c) = FOH Capacity V = ₹ 33600 (fav)

(c – d) = FOH Calendar V = ₹ 5600 (adv)

(a – d) = FOH Volume V = ₹14000 (fav)

(d – e) = FOH Exp V = ₹ 44000 (adv)

(a – e) = FOH Cost V = ₹ 30000 (adv)

Variable overhead cost variances:

   a) Std VOH Cost per unit*AO = (180000/2000) *2200 = 90*2200 = ₹ 198000
   b) Std VOH Cost per hour*AH = 10*24000 = ₹ 240000
   c) Actual VOH Costs = ₹ 200000

(a – b) = VOH Efficiency V = ₹ 42000 (adv)

(b – c) = VOH Exp V = ₹ 40000 (fav)

(a – c) = VOH Cost V = ₹ 2000 (adv)

Suggested Readings:

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