7. STANDARD COSTING

PROBLEM NO: 1

	Standard			Actuals		
Material	SQ	SP	SQ x SP	AQ	AP	AQ x AP
	50	1	50	45	0.8	36

M.C.V = SQ x SP – AQ x AP = 50 – 36 = 14(F)

PROBLEM NO: 2

	Standard (2,10,000 kg)			Actuals (2,10,000 kg)			
Material	SQ	SP	SQ x SP	AQ	AP	AQ x AP	AQ x SP
	For 70 kg output - 100 kg r/m For 2,10,000 kg output - ? 3,00,000 kg	1	3,00,000	2,80,000	0.9 (2,52,000 / 2,80,000)	2,52,000	2,80,000

M.U.V = SQ x SP – AQ x SP

= Rs.3,00,000 – (Rs.2,80,000 x 1)

= Rs.20,000 (F)

M.P.V = AQ x SP – AQ x AP

= Rs.2,80,000 – Rs.2,52,000 = Rs.28,000(F)

M.C.V = SQ x SP – AQ x AP

= Rs.3,00,000 – Rs.2,52,000 = Rs.48,000(F)

PROBLEM NO: 3

Calculation of material variances:

(1)	(2)	(3)	(4)
SP X SQ(w.n.1)	**SP X RSQ(w.n.2)**	**SP X AQ**	**AP X AQ**
X: 15 X 600	15 X 615	15 X 640	17.50 X 640
Y: 20 X 800	20 X 820	20 X 950	18 X 950
Z: 25 X 1,000	25 X 1,025	25 X 870	27.50 X 870
50,000	51,250	50,350	52,225

Standard quantity = Standard quantity for actual production

SQ of X = 600 kgs [1 unit – 60 kgs; 10 units – ?]

SQ of Y = 800 kgs [1 unit – 80 kgs; 10 units – ?]

SQ of Z = 1,000 kgs [1 unit – 100 kgs; 10 units – ?]

RSQ = AQ re written in standard mix

= 2,460(640+950+870)

	X	Y	Z
MIX	6	8	10
Quantity	615	820	1,025

Variances:

Material cost variance = (1)-(4) = 2,225(A)

Material price variance = (3)-(4) = 1,875(A)

Material usage variance = (1)-(3) = 350(A)

Material mix variance = (2) – (3) = 900(F)

Material yield variance = (1) – (2) = 1,250(A)

PROBLEM NO: 4

	Standards (365kg)				Actual (365kg)				
Particulars	**SQ**	**SP**	**SQ x SP**	**AQ**	**AP**	**AQ x AP**	**AQ x SP**	**RSQ**	**RSQ x SP**
Mat A (35%)	134	25	3350	125	27	3375	3125	140	3500
Mat B (65%	250	36	9000	275	34	9350	9900	260	9360
Input	**384 kg**		**12350**	**400 kg**		**12725**	**13025**	**400 kg**	**12860**
Loss (5%)	19		35						
Out put	365		365						

M.C.V = SQ x SP – AQ x AP

= Rs.12350 – Rs.12725 = Rs.375 (A)

M.P.V = AQ x SP – AQ x AP

= Rs.13025 – Rs.12725 = Rs.300 (F)

M.M.V = RSQ x SP – AQ x SP

= Rs.12860 – Rs.13025 = Rs.165 (A)

M.Y.V = SP x SQ – RSQ x SP

= Rs.12350 – Rs.12,860 = Rs.510 (A)

PROBLEM NO: 5

	Standards (1000kg)				Actual (1000kg)			
	SQ	**SP**	**SQ x SP**	**AQ**	**AP**	**AQ x AP**	**AQ x SP**	**RSQ**
R/M A	800 kg (for 10 kg – 8 kg; Out put R / q; for 1000 – ?)	6	4800	750	7	5250	4500	833
R/M B	400 kg (for 10 kg – 4 kg a R / M; for 1000 – ?)	4	1600	500	5	2500	2000	417
	1200 kg		6400	1250 kg		7750	6500	1250 kg

M.C.V. = SQ x SP – AQ x AP

= Rs.6400 – Rs.7750 = Rs.1350 (A)

M.P.V = AQ x SP – AQ x AP

= Rs.6500 – Rs.7750 = Rs.1250 (A)

M.U.V = SQ x SP – AQ x SP

= Rs.6400 – Rs.6500 = Rs.100 (A)

PROBLEM NO: 6

Working Notes:

a) Standard input = Actual output / 90% = 2,250 kg / 90% = 2,500 kg.
Standard input of material- A 2,500 kg. x 40% = 1,000 kg.
Standard input of material- B 2,500 kg. x 60% = 1,500 kg.

b) Actual input = (Opening Stock + Purchases – Closing Stock)
Actual input of material- A (40 kg. + 800 kg. – 20 kg.) = 820 kg.
Actual input of material- B (50 kg. + 1,800 kg. – 15 kg.) = 1,835 kg.
Total actual input 2,655 kg.

c) Standard Cost
Material- A 1000 kg.@ Rs. 5.00 per kg = Rs. 5,000
Material- B 1500 kg.@ Rs. 4.00 per kg = Rs. 6,000
Rs.11,000

d) Actual Cost

Material- A 40 kg. @ Rs. 5.00 per kg	= Rs. 200	
780 kg. @ Rs. 6.00 per kg	= Rs. 4,680	= Rs. 4,880
Material- B 50 kg. @ Rs. 4.00 per kg	= Rs. 200	
1,785 kg. @ Rs. 4.20 per kg	= Rs. 7,497	= Rs. 7,697
		Rs. 12,577

i) Material Price Variance = Actual Quantity (Std. Rate – Actual Rate)
Material- A = 40 kg (Rs. 5.00 - Rs. 5.00) = Nil
780 kg (Rs. 5.00 - Rs. 6.00) = Rs. 780 (A)
Material- B = 50 kg. (Rs. 4.00 - Rs. 4.00) = Nil
1785 kg (Rs. 4.00 - Rs. 4.20) = Rs. 357 (A)
Rs. 1,137 (A)

ii) Material Usage Variance = Std. Rate (Standard Quantity – Actual Quantity)
Material- A = Rs. 5.00 (1,000 kg. – 820 kg) = Rs. 900 (F)
Material- B = Rs. 4.00 (1,500 kg. – 1835 kg.) = Rs.1,340 (A)
Rs. 440 (A)

iii) Material Yield Variance = Std. Rate (Std. Quantity – Revised Std. Quantity)
Material- A = Rs. 5.00 (1,000 kg. – 2,655 x 40%)
= Rs. 5.00 (1,000 kg. – 1,062 kg.) = Rs. 310 (A)
Material- B = Rs. 4.00 (1,500 kg – 2,655 x 60%)
= Rs. 4.00 (1,500 kg. – 1,593 kg.) = Rs. 372 (A)
Rs. 682 (A)

iv) Material Mix Variance = Std. Rate (Revised Std. Quantity – Actual Quantity)
Material- A = Rs. 5.00 (2,655 x 40% - 820 kg.)
= Rs. 5.00 (1,062 kg. – 820 kg) = Rs. 1,210 (F)
Material- B = Rs. 4.00 (2,655 x 60% - 1,835 kg.)
= Rs. 4.00 (1,593 kg. – 1,835 kg.) = Rs. 968 (A)
Rs. 242 (F)

v) Material Cost Variance = Std. Cost – Actual cost
= Rs. 11,000 - Rs. 12,577 = Rs. 1,577 (A)

PROBLEM NO: 7

i) Standard cost for Actual output:

Material X = 1,500 units × 2,000 kg. × Rs. 1	= 30,00,000	
Material Y = 1,500 units × 2,000 kg. × Rs. 1	= 30,00,000	Rs. 60,00,000

ii) Material Cost Variance:

= Standard Cost for actual output – Actual Cost

= (SQ × SP) – (AQ × AP)

Material X = {30,00,000 - (31,00,000 kg. × Rs. 1.10)}

= 30,00,000 – 34,10,000 = 4,10,000 (A)

Material Y = {30,00,000 - (31,00,000 kg. × Rs. 1.10)}

= 30,00,000 – 34,10,000 = 4,10,000 (A)

iii) Material Price Variance:

= AQ (SP – AP)

Material X = 31,00,000 kg. (Rs. 1.00 – Rs. 1.10)	= 3,10,000 (A)	
Material Y = 12,50,000 kg. (Rs. 1.00 – Rs. 1.60)	= 7,50,000 (A)	10,60,000 (A)

iv) Material Usage Variance:

= SP (SQ – AQ)

Material X = Rs. 1.00 {(1,500 × 2,000) – 31,00,000}

= 30,00,000 – 31,00,000 = 1,00,000 (A)

Material Y = Rs. 1. 00 {(1,500 × 2,000) – 12,50,000}

= Rs. 1.00 (30,00,000 – 12,50,000)	= 17,50,000 (F)	= 16,50,000 (F)

PROBLEM NO: 8

Standard and actual costs of material for actual output:

Material	SQ	SP (.)	SQ × SP (.)	AQ	AQ × AP (.)	AQ × SP (.)
A	31,000*	20	6,20,000	32,500	6,59,750	6,50,000
B	69,000**	10	6,90,000	67,000	6,83,400	6,70,000
	1,00,000		13,10,000	99,500	13,43,150	13,20,000

*Material A- 11,000 × 2 + 9,000 × 1 = 31,000 units

**Material B- 11,000 × 3 + 9,000 × 4 = 69,000 units

i) Material Price Variance = Actual Quantity (Std. Price – Actual Price)

= AQ × SP – AQ × AP

= 13,20,000 – 13,43,150 = 23,150 (Adverse)

ii) Material Usage Variance = Std. Price (Std. Qty. – Actual Qty.)

= SP × SQ – SP × AQ

= 13,10,000 – 13,20,000 = 10,000 (Adverse)

iii) Material Cost Variance = Std. Qty. × Std. Price – Actual Qty. × Actual Price

= 13,10,000 – 13,43,150 = 33,150 (Adverse)

PROBLEM NO: 9

Standard			Actuals			
SH	SR	SH x SR	AH	AR	AH x AR	AH x SR
1000	0.5	500	900	0.4	360	450

L.C.V = SH x SR – AH x AR

= Rs.500 – Rs.360 = Rs.140 (F)

L.E.V = SH x SR – AH x SR

= Rs.500 – Rs.450 = Rs.50 (F)

L.R.V = AH x SR – AH x AR

= Rs.450 – Rs.360 = Rs.90 (F)

PROBLEM NO: 10

SR – Standard labour Rate per Hour

AR – Actual labour rate per hour

SH – Standard Hours

AH – Actual hours

i) Actual labour rate per hour:

Labour rate Variance = AH (SR – AR)

= 17,094 (Rs.8 – AR) = 68,376 (A) = - 68,376

= Rs. 8 – AR = - 4

Or, AR = Rs. 12

ii) Standard hour required for 6,000 units:

Labour Efficiency $= \frac{SH}{AH} x100 = 105.3$

$= SH = \frac{AHx105.3}{100} = \frac{17,094hoursx105.3}{100}$

= 17,999.982 or, SH = 18,000 hours

iii) Labour Efficiency Variance = SR (SH – AH)

= Rs. 8(18,000 – 17,094)

= 8 × 906 = Rs. 7,248 (F)

iv) Standard Labour Cost per Unit $= \frac{18,000hoursxRs8}{6,000units} = Rs24$

v) Actual Labour Cost per Unit $= \frac{17,094hoursxRs12}{6,000units} = Rs34.19$

NOTE: Actual hours required : 17,094 hours(it is omitted in problem. Students have to consider it, while solving this problem)

PROBLEM NO: 11

Abnormal idle time : 200 x ½ day = 100 men days

Actual time attended : 200 x 50 days = 10,000 men days

Actual time worked : 10,000 – 100 = 9,900 men days

Actual production : 9,00,000 units

Standard requirements for actual production:

Material : 9,00,000units / 1,00,000units = 9 tons or 9,000 kg.

Labour : 9,00,000 / 100 = 9,000 men days

Material Price Variance	(Rs.)
(Standard price – Actual price) × Actual quantity	
(Rs. 20 – Rs. 21) × 10,000 kg.	10,000 (A)
Material Usage Variance	
(Standard usage – Actual usage) × Standard price	
(9,000 kg. – 10,000 kg.) × Rs. 20	20,000 (A)
Total material variance	30,000 (A)
Labour rate variance	
(Standard rate – Actual rate) × Actual man days attended	
(Rs. 6 – Rs. 6.50) × 10,000 hours	5,000 (A)
Labour efficiency variance	
(Standard man days – Actual man days worked) × Standard rate	
(9,000 – 9,900) × Rs.6	5,400 (A)
Idle time variance	
Idle man days x Standard rate	
100 x Rs.6	600 (A)
Total labour variance	11,000 (A)

PROBLEM NO: 12

Efficiency Ratio can be obtained by dividing the activity ratio by capacity ratio as follows:-

$$\text{Efficiency Ratio} = \frac{\text{Activity ratio}}{\text{Capacity ratio}} \times 100$$

$$= \frac{104\%}{96\%} \times 100 = 108.33\%$$

The inter – relationship is shown below:

$$\text{Activity Ratio} = \frac{\text{Std.hours for actualproduction}}{\text{BudgetedHours}} \times 100$$

$$\text{Capacity ratio} = \frac{\text{Actual Working hours}}{\text{BudgetedHours}} \times 100$$

$$\text{Efficiency ratio} = \frac{\text{Std.hours for actualproduction}}{\text{Actualhours worked}} \times 100$$

$$\text{i.e. Efficiency Ratio} = \frac{\text{Activity ratio}}{\text{Capacity ratio}}$$

$$= \frac{\text{Std.hours for actualproduction}}{\text{BudgetedHours}} \times \frac{\text{Budgeted Hours}}{\text{Actual hours worked}} \times 100$$

$$= \frac{\text{Std.hours for actualproduction}}{\text{Actualhours worked}} \times 100$$

Activity Ratio = Capacity Ratio × Efficiency Ratio

PROBLEM NO: 13

$$\text{Efficiency Ratio} = \frac{\text{Actual output in terms of standard hours}}{\text{Actual hour worked}} \times 100$$

$$\text{or,} \frac{60\text{ units} \times 8\text{ hours}}{500\text{ hours}} \times 100 \qquad \text{or,} \frac{480\text{ hours}}{500\text{ hours}} \times 100 = 96\%$$

$$\text{Capacity Ratio} = \frac{\text{Actual hours worked}}{\text{Budgeted Hours}} \times 100$$

$$\text{or,} \frac{500\text{ hours}}{80\text{ units} \times 8\text{ hours}} \times 100 \qquad \text{or,} \frac{500\text{ hours}}{640\text{ hours}} \times 100 = 78.12\%$$

PROBLEM NO: 14

Calculation of Fixed OH Variance:

(1)	(2)	(3)	(4)	(5)
SR X SH	**SR X AH**	**SR X RBH**	**SR X BH**	**AR X AH**
1.50 X 22,000	-	-	1.50 X 20,000	31,000 (given)
33,000			30,000	

WORKING:

(1) SR = Fixed OHRR per unit

$= \frac{30,000}{20,000}$ = Rs. 1.50 per unit

Variances:

(i) FOH Volume Variance = (1) – (4) = 3,000 (F)

(ii) FOH Expenditure Variance= (4) – (5) = 1,000 (A)

(iii) FOH Cost Variance = (1) – (5) = 2,000 (F)

PROBLEM NO: 15

FOH Variances

SH x SR	AHW x SR (or) AHW x BR	RBH x SR (or) RBH x BR	BH x SR (or) BH x BR	AHW x AR
21,000 x 0.5	22,000 x 0.5	20,000 x 0.5	20,000 x 0.5	22,000 x 0.54
Rs.10,500	Rs.11,000	Rs.10,000	Rs.10,000	Rs.12,000

$$\textbf{SR = BR} = \frac{\text{BOH}}{\text{BH}} = \frac{10,000}{20,000} = \text{Rs.0.5}$$

BH = 2000 x 10 = 20,000 hrs

SH = 2,100 x 10 = 21,000 hrs

$$\begin{pmatrix} 1\text{unit} & - & 10\text{hr} \\ 2,100 & - & ? \end{pmatrix}$$

$$\text{AR} = \frac{\text{AOH}}{\text{AH}} = \frac{12,000}{22,000} = \text{Rs.0.54}$$

RBH = BH = 20,000 hrs

1. FOH cost variance = SH x SR – AH x AR = 10,500 – 12,000 = Rs.1,500 (A)

2. FOH exp. variance = BH x SR - AH x AR = 10,000 – 12,000 = Rs.2,000 (A)
3. FOH volume variance = SH x SR – BH x SR = 10,500 – 10,000 = Rs.500 (F)
4. FOH Capacity variance = AH x SR – RBH x SR = 11,000 – 10,000 = Rs.1,000 (F)
5. FOH efficiency variance = SH x SR – AH x SR = 10,500 – 11,000 = Rs.500 (A)

PROBLEM NO: 16

Calculation of FOH Variances:

(1)	(2)	(3)	(4)	(5)
SR X SH	**SR X AH**	**SR X RBH**	**SR X BH**	**AR X AH**
1 X 1,53,090	1 X 1,70,100	1 X 1,62,000	1,50,000 (Given)	1,56,000 (Given)
= 1,53,090	1,70,100	1,62,000		

Working note:

(1) SR $= \frac{\text{Budgeted OH}}{\text{Budgeted hrs}} = \frac{1,50,000}{(25 \text{ days X } 6,000)}$ = Rs. 1 per hour

(2) RBH = BH for actual days worked

$$= 1,62,000 \begin{bmatrix} 25 \text{ days} & - & 1,50,000 \\ 27 \text{ days} & - & ? \end{bmatrix}$$

Variances:

FOH Expenditure Variance = (4) – (5) = 6,000 (A)
FOH Volume Variance = (1) – (4) = 3,090 (F)
FOH Cost Variance = (1) – (5) = 2,910 (A)

PROBLEM NO: 17

Basic calculation:

Product	BQ x BP	AQ x AP	AQ x BP
A	2,000 x 2.50 = Rs.5,000	2,400 x 3.00 = Rs. 7,200	2,400 x 2.50 = Rs. 6,000
B	1,500 x 5.00 = Rs.7,500	1,400 x 4.50 = Rs. 6,300	1,400 x 5.00 = Rs. 7,000
C	1,000 x 7.50 = Rs. 7,500	1,200 x 7.00 = Rs. 8,400	1,200 x 7.50 = Rs. 9,000
D	500 x 10.00 = Rs. 5,000	400 x 10.50 = Rs. 4,200	400 x 10.00 = Rs. 4,000
Total	**Rs. 25,000**	**Rs. 26,100**	**Rs. 26,000**

Computation of Variances

Sales Price Variance = Actual quantity (Actual price – Budgeted price)
= (AQ x AP) – (AQ x BP)
= Rs. 26,100 – Rs. 26,000 = Rs. 100(F)

Sales Volume Variance = Budgeted price (Actual quantity – Budgeted quantity)
= (BP x AQ) – (BP x BQ)
= Rs. 26,000 – Rs. 25,000 = Rs. 1,000 (F)

Total variance = Actual sales – Budgeted sales
= Rs. 26,100 – Rs. 25,000 = Rs.1,100 (F)

PROBLEM NO:18

FOH Variance :- (HOURS BASIS)

SH × BR (1)	AHW × BR (2)	RBH × BR (3)	BH × BR (4)	AHW × AR (5)
1000 × 5	800 × 5	1200 × 5	1200 × 5	800 × 8
5000	4000	6000	6000	6400

$BR = \frac{BOH}{BH} = \frac{6000}{1200} = Rs.5.$

OH Volume Variances = 1 - 4 = 1000 (A)

SH x BR – 6000 = -1000

SH × BR = 5000

SH × 5 = 5000

SH = 1000 hr.

OH Cost Variances = 1- 5 = 1400 (A)

SH x SR – AH x AR = -1400

1000 x 5 – AH x AR = - 1400

AH x AR = 6400

AH x 8 = 6400

AH = 800 hrs.

1. OH Exp Var = 4 – 5 = RS.400 (A)
2. Act OH = RS.6400
3. AHW = 800 hr.
4. OH Capacity Variance = 2 – 3 = 2000(A)
5. OH Eff.Variance = 1 – 2 = 1000 (F)
6. SH = 1000 hr.

PROBLEM NO:19

1. **Material Cost Variance:**

SP = 10

SQ = 48,000 Kg $\begin{bmatrix} 1ut & -10\ kgs \\ 4,800 & - \ ? \end{bmatrix}$

a) SP X SQ = 10 X 48,000 = 4,80,000

b) AP X AQ = (given) = 5,25,000

c) Material Cost Variance (a - b) = 45,000 (A)

2. **Labour Cost Variance:**

SR = 5.50

SH = 28,800 hrs $\begin{bmatrix} 1ut & -6\ hrs \\ 4,800 & - \ ? \end{bmatrix}$

a) SR X SH = 5.50 X 28,800 = 1,58,400

b) AR X AH = 1,55,000

c) Labour Cost Variance (a – b) = 3,400 (F)

3. **FOH Cost Variance:**

SR = $\frac{\text{Rs. } 4,50,000}{30,000 \text{ hrs}}$ = Rs. 15 per hour

a) SR X SH = 15 X 28,800 = 4,32,000

b) AR X AH = 4,70,000

c) FOH Cost Variance (a – b) = 38,000 (A)

4. **VOH Cost Variance:**

VOH Cost Variance = (SR X SH) – (AR X AH)

= (10 X 28,800) – (2,93,000)

= 5,000 (A)

THE END