ILLUSTRATIONS

1. Functional Budgets – Production, Materials & Labour

Illustration 1: Production, Material Usage and Purchase Budgets **M 93 (F)**

PYE Ltd produces and markets a very popular product called P. The Company is interested in presenting its budget for the second quarter of the year. The following information is made available for this purpose.

1. **It expects to sell 50,000 bags of P during the second quarter at a Selling Price of Rs.9 per bag.**
2. **Each bag of P requires 2.5 kgs of Raw Material Q and 7.5 kgs of Raw Material R.**
3. **Q costs Rs.1.20 per kg, R costs 20 paise per kg and Empty Bag costs 80 paise each.**
4. **It requires 9 minutes of direct labour time to produce and fill one bag of P. Labour Cost is Rs.5 per hour.**
5. **Variable Manufacturing Costs are Re.0.45 per bag. Fixed Manufacturing Costs are Rs.30,000 per quarter.**
6. **Variable Selling and Administration Expenses are 5% of Sales, and Fixed Administration and Selling Expenses are Rs.25,000 per quarter.**
7. **Stock levels are planned as follows:**

	Beginning of Quarter	End of Quarter
Finished Bags of P	15,000 nos.	11,000 nos.
Raw Material Q	32,000 kgs.	26,000 kgs.
Raw Material R	57,000 kgs.	47,000 kgs.
Empty bags	37,000 nos.	28,000 nos.

Required:

1. **Prepare a Production Budget for the quarter.**
2. **Prepare a Raw Materials Purchase Budget for Q, R and Empty Bags in quantity as well as in rupees.**
3. **Compute the Budgeted Variable Cost to produce one bag of P.**
4. **Prepare a statement of Budgeted Net Income for the quarter, and show both per unit and total cost data.**

Solution:

1. Production Budget for Product P: (in bags)

Budg. Production = Sales + Desired Closing Stock – Available Opening Stock = 50,000 + 11,000 – 15,000 = **46,000 bags**

2. Raw Materials Budget

Particulars		Material Q	Material R	Empty Bags
Raw Materials required		2.5 kgs per bag	7.5 kgs per bag	1 bag
	Budgeted Usage	46000×2.5=1,15,000 kg	46000 × 7.5 = 3,45,000 kg	46000×1= 46,000 bags
Add:	Desired Closing Stock	26,000 kg	47,000 kg	28,000 bags
	Sub–Total	1,41,000 kg	3,92,000 kg	74,000 bags
Less:	Opening Stock	32,000 kg	57,000 kg	37,000 bags
	Budgeted Purchase Quantity	**1,09,000 kg**	**3,35,000 kg**	**37,000 bags**
	Purchase Price	Rs.1.20 per kg	Re.0.20 per kg	Re.0.80 per bag
	Cost of Purchase	Rs.1,30,800	Rs.67,000	Rs.29,600
			Rs.2,27,400	

3. Computation of Variable Manufacturing Costs per bag

Particulars	Computation		Rs.
Direct Materials	Q – 2.5 kgs × Rs.1.20 per kg	Rs.3.00	
	R – 7.5 kgs × Re.0.20 per kg	Rs.1.50	4.50
Cost of Empty Bag	1 bag × Re.0.80		0.80
Direct Labour	9 minutes × Rs.5 per hour $= \frac{9}{60} \times$ Rs.5		0.75
Variable Manufacturing OH	Given		0.45
	Total Variable Manufacturing Costs per bag		**6.50**

4. Budgeted Net Income: (for 50,000 bags sold)

Particulars			Per Bag (Rs.)	Total (Rs.)
	Sales Revenue		9.00	4,50,000
Less:	Variable Costs:	Manufacturing	(as computed above) 6.50	3,25,000
		Selling & Administration	(5% of Sale Price) 0.45	22,500
	Contribution		2.05	1,02,500
Less:	Fixed Costs		Manufacturing + Selling & Admin	55,000
	Budgeted Net Profit			**47,500**

Note: Here, Profit has been computed using Marginal Costing principles. Profit under Absorption Costing would differ due to difference between Production and Sales quantity.

Illustration 2: Quarter–wise Production Budget, RM–related Budgets **M 95**

A single product Company estimated its sales (in units) for the next year quarter–wise as under –

Q–1	Q–2	Q–3	Q–4
30,000 units	37,500 units	41,250 units	45,000 units

The Opening Stock of Finished Goods is 10,000 units and the Company expects to maintain the Closing Stock of Finished Goods at 16,250 units at the end of the year. The production pattern in each quarter is based on 80% of the Sales of the current quarter and 20% of the Sales of the next quarter.

The Opening Stock of Raw Materials in the beginning of the year is 10,000 kg and the Closing Stock at the end of the year is required to be maintained at 5,000 kg. Each unit of finished output requires 2 kg of Raw Materials.

The Company proposes to purchase the entire annual requirement of Raw Materials in the first three quarters in the proportion and at the prices given below –

Quarter	Purchase of Raw Materials % to total annual requirement in quantity	Price per kg
I	30%	Rs.2
II	50%	Rs.3
III	20%	Rs.4

The value of the Opening Stock of Raw Materials in the beginning of the year is Rs.20,000.

Required: Present the following for the next year, quarter–wise –

1. **Production Budget in units.**
2. **Raw Material Consumption Budget in Quantity.**
3. **Raw Material Purchase Budget in Quantity and Value.**
4. **Priced Stores Ledger Card of the Raw Material using First in First Out method.**

Solution: **1. Production Budget (in units)**

Quarter		I	II	III	IV	Total
	Budg. Sales (given)	30,000	37,500	41,250	45,000	1,53,750
Add:	Closing Stock	(bal.fig) 11,500	(bal.fig) 12,250	(bal.fig) 13,000	(given) 16,250	16,250
	Sub–Total	41,500	49,750	54,250	61,250	1,70,000
Less:	Opening Stock	(given) 10,000	11,500	12,250	13,000	10,000
	Budg. Production	**31,500** (80% of 30,000 + 20% of 37,500)	**38,250** (80% of 37,500 + 20% of 41,250)	**42,000** (80% of 41,250 + 20% of 45,000)	**48,250**	**1,60,000**

Note: Opening and Closing Stock of FG for Quarters I, II and III are filled up as balancing figures by reverse working.
Closing Stock of Previous Quarter is carried over as Opening Stock of Next Quarter.
Quarter IV Production Quantity is calculated in the usual manner (by top–down calculations).

2. Raw Material Consumption Budget in quantity

Quarter	I	II	III	IV	Total
(a) Budgeted Production Quantity	31,500	38,250	42,000	48,250	1,60,000
(b) Raw Material Consumption p.u.	2 Kg	2 Kg	2 Kg	2 Kg	
(c) Budgeted RM Consumption (a × b)	**63,000 Kg**	**76,500 Kg**	**84,000 Kg**	**96,500 Kg**	**3,20,000 Kg**

3. Raw Material Purchase Budget (in quantity)

	Budgeted Raw Material Consumption	3,20,000 Kg
Add:	Closing Stock of Raw Material	5,000 Kg
	Sub–Total	3,25,000 Kg
Less:	Opening Stock of Raw Material	10,000 Kg
	Budgeted Raw Material Purchases	**3,15,000 Kg**

4. Raw Material Purchase Budget (in Quantities and Values)

Quarter	% of Annual Requirement (Qty.) for purchasing RM	Quantity of RM to be purchased	Rate per kg.	Cost of RM Purchase
I	30%	3,15,000 × 30% = 94,500 Kg	Rs.2	Rs.1,89,000
II	50%	3,15,000 × 50% = 1,57,500 Kg	Rs.3	Rs.4,72,500
III	20%	3,15,000 × 20% = 63,000 Kg	Rs.4	Rs.2,52,000
Total		**3,15,000 Kg**		**Rs.9,13,500**

5. Priced Stores Ledger Card of the Raw Material (using FIFO method)

Qtr	Opening Stock			Purchases			Consumption			Closing Stock		
	Kg.	Rate	Value	Kg.	Rate	Value	Kg.	Rate	Value	Kg.	Rate	Value
I	10,000	2	20,000	94,500	2	1,89,000	63,000	2	1,26,000	41,500	2	83,000
II	41,500	2	83,000	1,57,500	3	4,72,500	41,500	2	83,000			
							35,000	3	1,05,000	1,22,500	3	3,67,500
III	1,22,500	3	3,67,500	63,000	4	2,52,000	84,000	3	2,52,000	38,500	3	1,15,500
										63,000	4	2,52,000
IV	38,500	3	1,15,500	–	–	–	38,500	3	1,15,500			
	63,000	4	2,52,000				58,000	4	2,32,000	5,000	4	20,000

Illustration 3: Materials Purchase and Labour Cost Budget **N 95**

P Ltd manufactures two products using one type of material and one grade of labour. Shown below is an extract from the Company's working papers for the next period's budget –

Particulars	Product A	Product B
Budgeted Sales	3,600 units	4,800 units
Budgeted Material Consumption per product (Standard Cost = Rs.12 per kg)	5 kg.	3 kg.
Standard hours allowed per product (Standard Rate = Rs.8 per hour)	5 hours	4 hours

- Overtime Premium is 50% and is payable, if a worker works for more than 40 hours a week. There are 90 direct workers.
- Target Productivity Ratio (or Efficiency Ratio) for the productive hours worked by Direct Workers in actually manufacturing the products is 80%. In addition, non–productive downtime is budgeted at 20% of the productive hours worked.
- There are twelve 5 day weeks in the budget period and it is anticipated that sales and production will occur evenly throughout the whole period.
- It is anticipated that stock at the beginning of the period will be: Product A – 1,020 units, Product B – 2,400 units, Raw Material – 4,300 units. Also, the Target Closing Stock, expressed in terms of anticipated activity during the budget period are: Product A – 15 days Sales, Product B – 20 days Sales, Raw Material – 10 days consumption.

Prepare the Material Purchase Budget and the Wages Budget for the Direct Workers, for the Budget Period, showing the quantities and values.

Solution: **1. Production Budget**

Particulars		Product A	Product B
	Sales (for 12 × 5 = 60 days)	(Given) 3,600 units	(Given) 4,800 units
Add:	Closing Stock (for 15 and 20 days)	$3,600 \times \frac{15}{60}$ = 900 units	$4,800 \times \frac{20}{60}$ = 1,600 units
	Sub–Total	4,500 units	6,400 units
Less:	Opening Stock	(Given) 1,020 units	(Given) 2,400 units
	Budgeted Production	**3,480 units**	**4,000 units**

Particulars	Product A	Product B
Raw Materials required per unit	5 kg	3 kg
Budgeted Raw Materials usage	3,480 × 5 = 17,400 kg	4,000 × 3 = 12,000 kg
Direct Labour Hours required per unit	5 hrs	4 hrs
Std Hours for budgeted production	3,480 × 5 = 17,400 hrs	4,000 × 4 = 16,000 hrs

2. Material Purchase Budget

	Particulars	Computation	Result
	Budgeted Raw Materials Usage (for 60 days)	17,400 kg + 12,000 kg **(WN 1)**	29,400 kg
Add:	Closing Stock (for 10 days consumption)	$29,400 \times \frac{10}{60}$	4,900 kg
	Sub–Total		34,300 kg
Less:	Opening Stock of Raw Materials	Given	4,300 kg
	Budgeted Purchases		**30,000 kg**
	Cost of Materials to be purchased at Rs.12 per kg		**Rs.3,60,000**

3. Labour Hours and Cost Budget

	Particulars	Computation	Result
	Standard Hours for Budgeted Production	17,400 hrs + 16,000 hrs	33,400 hours
	Revised Hours for Production at 80% efficiency	$\frac{33,400}{80\%}$	41,750 hours
Add:	Non–Productive Downtime	20% of 41,750	8,350 hours
	Hours Required to be worked / paid for		50,100 hours
Less:	Normal Working Hours	(90 workers × 60 days × 8 hours)	43,200 hours
	Balance Overtime Hours required		**6,900 hours**
	Total Wages Payable	(43,200 hours × Rs.8)+(6,900 hours × Rs.12)	**Rs.4,28,400**

Illustration 4: Labour Cost and Operators Budget **M 96**

An article passes through five hand operations as follows –

Operation No.	Time per article	Grade of Worker	Wage Rate per hour
1	15 minutes	A	Rs.65
2	25 minutes	B	Rs.50
3	10 minutes	C	Rs.40
4	30 minutes	D	Rs.35
5	20 minutes	E	Rs.30

The Factory works 40 hours a week and the production target is 600 dozens per week. Prepare a statement showing for each operation and in total the number of operators required, Labour Cost per dozen and the Total Labour Cost per week to produce the total targeted output.

Solution:

Operation	Time required for production of 600 dozens, i.e. 7,200 units	Operators Required & Grade	Labour Cost of 600 dozens	Labour Cost per dozen
1	7,200 units × $\frac{15}{60}$ = 1,800 hours	$\frac{1,800}{40}$ = 45 persons (A)	45 × 40 × Rs.65 = Rs.1,17,000	$\frac{Rs.1,17,000}{600}$ = Rs.195
2	7,200 units × $\frac{25}{60}$ = 3,000 hours	$\frac{3,000}{40}$ = 75 persons (B)	75 × 40 × Rs.50 = Rs.1,50,000	$\frac{Rs.1,50,000}{600}$ = Rs.250
3	7,200 units × $\frac{10}{60}$ = 1,200 hours	$\frac{1,200}{40}$ = 30 persons (C)	30 × 40 × Rs.40 = Rs.48,000	$\frac{Rs.48,000}{600}$ = Rs.80
4	7,200 units × $\frac{30}{60}$ = 3,600 hours	$\frac{3,600}{40}$ = 90 persons (D)	90 × 40 × Rs.35 = Rs.1,26,000	$\frac{Rs.1,26,000}{600}$ = Rs.210
5	7,200 units × $\frac{20}{60}$ = 2,400 hours	$\frac{2,400}{40}$ = 60 persons (E)	60 × 40 × Rs.30 = Rs.72,000	$\frac{Rs.72,000}{600}$ = Rs.120
			Rs.5,13,000	**Rs.855**

Illustration 5: Weighted Contribution Ratio, Material and Labour related Budgets **M 04 (F)**

A Company manufactures three products namely A,B and C. The current pattern of sales of A, B and C is in the ratio of 8:2:1 respectively. The relevant data are as under –

Products	A	B	C
Selling price per unit	Rs.130	Rs.230	Rs.417
Raw Materials per unit	0.50 Kg.	1.2 Kg.	2.5 Kg.
Direct Materials per unit	0.25 Kg.	–	–
Skilled Labour Hours per unit	4	6	8
Semi–Skilled Labour Hours per unit	2	2	3
Variable Overheads per unit	Rs.20	Rs.40	Rs.80

Prices of Raw Materials and Direct Materials respectively are Rs.100 and Rs.40 per Kg. Wage Rates of Skilled and Semi–Skilled Labour respectively are Rs.6 and Rs.5. Each Operator works 8 hours a day for 25 days in a month.

The position of inventories are as under –

Particulars	Raw Materials (units)	Direct Materials (units)	A (units)	B (units)	C (units)
Opening	600	400	400	100	50
Closing	650	260	200	300	50

The Fixed OH amount to Rs.2,00,000 per month. The Company desires a profit of Rs.1,20,000 per month.

Prepare the following for the month –

1. **Sales Budget in quantity and value.**
2. **Production Budget showing the quantity to be manufactured.**
3. **Purchase Budget showing the quantity and value.**
4. **Direct Labour Budget showing the number of workers and wages.**

Solution: **1. Computation of Budgeted Sales Quantities**

Particulars	Product A	Product B	Product C
(a) Selling Price per unit (given)	Rs.130	Rs.230	Rs.417
(b) Variable Costs per unit			
Raw Materials at Rs.100 per kg	0.5 × 100 = Rs. 50	1.2× 100 = Rs.120	2.5 × 100 = Rs.250
Direct Materials at Rs.40 per kg	0.25 × 40 = Rs. 10	Nil	Nil
Skilled Labour at Rs.6 per hour	4 × 6 = Rs. 24	6 × 6 = Rs. 36	8 × 6 = Rs. 48
Unskilled Labour at Rs.5 per hour	2 × 5 = Rs. 10	2 × 5 = Rs. 10	3 × 5 = Rs. 15
Variable Overheads (given)	Rs. 20	Rs. 40	Rs. 80
Total Variable Costs per unit	Rs.114	Rs.206	Rs.393
(c) Contribution per unit (a – b)	**Rs. 16**	**Rs. 24**	**Rs. 24**
(d) Sales Mix Ratio (given)	8	2	1
(e) Total Weighted Contribution (c × d)	16 × 8 = Rs.128	24 × 2 = Rs.48	24 × 1 = Rs.24
(f) To earn Profit of Rs.1,20,000, Desired Contribution = Desired Profit + Fixed OH = Rs.1,20,000 + Rs.2,00,000 = Rs.3,20,000, to be apportioned in ratio of (e)	Rs.2,04,800	Rs.76,800	Rs.38,400
(g) Required Sales Quantity to earn above profit (f ÷ c)	**12,800 units**	**3,200 units**	**1,600 units**

2. Sales Budget

Particulars	Product A	Product B	Product C	Total
(a) Budgeted Quantity	12,800 units	3,200 units	1,600 units	17,600 units
(b) Budgeted Price	Rs.130	Rs.230	Rs.417	
(c) Budgeted Sales Value	Rs.16,64,000	Rs.7,36,000	Rs.6,67,200	Rs.30,67,200

3. Production Budget

Particulars		Product A	Product B	Product C
	Budgeted Sales Quantity **(WN 1)**	12,800 units	3,200 units	1,600 units
Add:	Closing Stock	200 units	300 units	50 units
	Sub–Total	13,000 units	3,500 units	1,650 units
Less:	Opening Stock	400 units	100 units	50 units
	Budgeted Production Quantity	12,600 units	3,400 units	1,600 units

4. Raw Material Usage Budget

Particulars	Product A	Product B	Product C	Total
(a) Budgeted Production **(WN 3)**	12,600 units	3,400 units	1,600 units	17,600 units
(b) Raw Material required per unit	0.50 kg	1.20 kg	2.50 kg	
(c) Total Raw Materials Required (a × b)	6,300 kg	4,080 kg	4,000 kg	14,380 kg
(d) Direct Materials required per unit	0.25 kg	–	–	
(e) Total Direct Materials Required (a × d)	3,150 kg	–	–	3,150 kg

5. Materials Purchase Budget

Particulars		Raw Materials	Direct Materials	Total
	Budgeted Material Usage **(WN 4)**	14,380 kg	3,150 kg	
Add:	Closing Stock	650 kg	260 kg	
	Sub–Total	15,030 kg	3,410 kg	
Less:	Opening Stock	600 kg	400 kg	
	Budgeted Purchase Quantity	**14,430 kg**	**3,010 kg**	
	Price of Materials	Rs.100 per kg	Rs.40 per kg	
	Cost of Material Purchase	Rs.14,43,000	Rs.1,20,400	Rs.15,63,400

6. Direct Labour Budget **(Note: Hours per worker = 25 × 8 = 200)**

Particulars	Product A	Product B	Product C	Total
(a) Budgeted Production	12,600 units	3,400 units	1,600 units	17,600 units
(b) Skilled Labour hours per unit	4	6	8	
(c) Total Skilled DLH required	50,400	20,400	12,800	83,600
(d) Cost of Skilled Labour at Rs.6 p.h	Rs.3,02,400	Rs.1,22,400	Rs.76,800	Rs.5,01,600
(e) Skilled Workers Required = (c) ÷ 200	252	102	64	418
(f) Semi – Skilled Labour hours per unit	2	2	3	
(g) Total Semi – Skilled DLH required	25,200	6,800	4,800	36,800
(h) Cost of Semi–Skilled Labour at Rs.5 p.h	Rs.1,26,000	Rs.34,000	Rs.24,000	Rs.1,84,000
(i) Semi–Skilled Workers Required=(g) ÷ 200	126	34	24	184
(j) Total Labour Cost = (d) + (h)	**Rs.4,28,400**	**Rs.1,56,400**	**Rs.1,00,800**	**Rs.6,85,600**
(k) Total Workforce = (e) + (i)	**378**	**136**	**88**	**602**

Illustration 6: Functional Budgets, Cost Sheet Preparation to compute Sale Price **N 85**

Solo Products Ltd manufactures and sells a single product and has estimated a sales revenue of Rs.126 Lakhs this year based on a 20% Profit on Selling Price. Each unit of the product requires 3 Kg of Material P and 1.5 Kg of Material Q for manufacture, as well as a processing time of 7 hours in the Machine Shop and 2.5 hours in the Assembly Section. Overheads are absorbed at a blanket rate of 1/3rd on Direct Labour. The Factory works 5 days of 8 hours a week in a normal 52 weeks a year. On an average statutory holidays, leave and absenteeism & idle time amount to 96 hours, 80 hours and 64 hours respectively in a year.

The other details are as under –

Purchase Cost	**Material P – Rs.6 per Kg**	**Material Q – Rs.4 per Kg**
Comprehensive Labour Rate	**Machine Shop – Rs. 4 per hour**	**Assembly – Rs.3.20 per hour**
No. of Employees	**Machine Shop – 600**	**Assembly – 180**

Particulars	Finished Goods	Material P	Material Q
Opening Stock	**20,000 units**	**54,000 Kgs**	**33,000 Kgs**
Closing Stock(Estimated)	**25,000 units**	**30,000 Kgs**	**66,000 Kgs**

Required: Determine –

1. **Number of units of the product proposed to be sold.**
2. **Purchases to be made of Materials P and Q during the year in Quantities and in Rupees.**
3. **Capacity Utilization of Machine Shop and Assembly Section, along with your comments.**

Solution: **1. Computation of Budgeted Sales Quantity**

Particulars	Computation	Result
Material Cost	P: 3 Kg × Rs.6 = Rs.18	
	Q: 1.5 Kg × Rs.4 = Rs. 6	Rs.24
Labour Cost	Machine Shop 7 hrs × Rs. 4 = Rs.28	
	Assembly Section 2.5 hrs × Rs. 3.20= Rs. 8	Rs.36
Overheads	1/3rd of Direct Labour Cost of Rs.36	Rs.12
Total Cost per unit		**Rs.72**
Add: Profit per unit	Profit 20% of Selling Price, i.e. 1/5th on Price = 1/4th on Cost	Rs.18
Sale Price per unit		**Rs.90**
Budgeted Sales Revenue	**Given**	Rs.1,26,00,000
Budgeted Sales Quantity	Rs.1,26,00,000 / Rs.90	**1,40,000 units**

2. Computation of Production Quantity:

Budgeted Production = Sales + Closing Stock of FG – Opening Stock of FG = 1,40,000 + 25,000 – 20,000 = **1,45,000 units.**

3. Materials Consumption and Purchase Budget

	Particulars	Material P	Material Q	Total
	Budgeted Material Usage	1,45,000 × 3 kg = 4,35,000 Kg	1,45,000 × 1.5 = 2,17,500 kg	
Add:	Closing Stock	30,000 Kg	66,000 kg	
	Sub–Total	4,65,000 kg	2,83,500 kg	
Less:	Opening Stock	54,000 kg	33,000 kg	
	Budgeted Purchase Quantity	**4,11,000 kg**	**2,50,500 kg**	
	Price of Materials	Rs.6 per kg	Rs.4 per kg	
	Cost of Material Purchase	**Rs.24,66,000**	**Rs.10,02,000**	**Rs.34,68,000**

4. Computation of effective hours available per worker

	Hours available during the year = 5 days × 8 hours × 52 weeks	2,080 hours
Less:	Statutory Holidays, Leave and Absenteeism & Idle Time (96 + 80 + 64)	240 hours
	Effective Hours available per worker	**1,840 hours**

5. Plant Capacity Utilisation Budget for Machine Shop and Assembly Section

Particulars	Machine Shop	Assembly Section
(a) Hours available during the year	600 persons × 1,840 hours = 11,04,000 hours	180 persons × 1,840 hours = 3,31,200 hours
(b) Hours required to manufacture 1,45,000 units	1,45,000 × 7 hours = 10,15,000 hours	1,45,000 × 2.5 hours = 3,62,500 hours
(c) Surplus / (Deficit) hours (A – B)	**Surplus** 89,000 hours	**(Deficit)** (31,300) hours
(d) Capacity utilization / Load in % (b ÷ a)	91.94%	109.45%

Comments on Plant Capacity Utilisation:

Machine Shop	Assembly Section
There is a surplus of 89,000 hours, which can be managed as under –	There is a shortage of 31,300 hours, which may be managed as under –
• Transfer $\frac{31,300}{1,840}$ = 18 workers to Assembly Section, to meet the shortage there.	• Transfer inward of 18 workers from Machine Shop, to meet the shortage here.
• Undertake job work (machining work) for outsiders, to utilize spare capacity.	• Recruit additional 18 skilled workers, if transfer is not possible.
• Hire out spare capacity to outsiders.	• Overtime work for 31,300 hours.
• Reduce redundant labour force, if possible.	• Sub–contracting assembly work in respect of $\frac{31,300}{2.5}$ = 12,520 units.

2. Flexible Budgets at different output levels

Illustration 7: Flexible Budget at different production levels M 77

For production of 10,000 Electrical Automatic Irons, the following are the budgeted expenses –

Particulars	Per unit Rs.
Direct Materials	60
Direct Labour	30
Variable Overheads	25
Fixed Overheads (Rs.1,50,000)	15
Variable Expenses (Direct)	5
Selling Expenses (10% Fixed)	15
Administration Expenses (Rs.50,000 rigid for all levels of production)	5
Distribution Expenses (20% Fixed)	5
Total Cost of Sale per unit	160

Prepare a budget for production of 6,000, 7,000 and 8,000 Irons, showing distinctly Marginal Cost and Total Cost.

Solution: **Flexible Budget (amounts in Rs.)**

	Production Quantity	6,000 Units		7,000 Units		8,000 Units	
A.	**Variable Cost:**	**Total**	**p.u.**	**Total**	**p.u.**	**Total**	**p.u.**
1.	**Direct Cost:**						
	Direct Materials	3,60,000	60.00	4,20,000	60.00	4,80,000	60.00
	Direct Labour	1,80,000	30.00	2,10,000	30.00	2,40,000	30.00
	Direct Variable Expenses	30,000	5.00	35,000	5.00	40,000	5.00
2.	**Variable Overheads:**						
	Production (given)	1,50,000	25.00	1,75,000	25.00	2,00,000	25.00
	Selling (90% of Rs.15 p.u.)	81,000	13.50	94,500	13.50	1,08,000	13.50
	Distribution (80% of Rs.5 p.u.)	24,000	4.00	28,000	4.00	32,000	4.00
	Total Variable Cost (1 + 2)	**8,25,000**	**137.50**	**9,62,500**	**137.50**	**11,00,000**	**137.50**
B.	**Fixed Overheads:**						
	Production (given)	1,50,000	25.00	1,50,000	21.43	1,50,000	18.75
	Administration (given)	50,000	8.33	50,000	7.14	50,000	6.25
	Selling (10% × Rs.15 × 10,000)	15,000	2.50	15,000	2.14	15,000	1.88
	Distribution (20% × Rs.5 × 10,000)	10,000	1.67	10,000	1.43	10,000	1.25
	Total Fixed Cost	**2,25,000**	**37.50**	**2,25,000**	**32.14**	**2,25,000**	**28.13**
	Total Cost (A+B)	**10,50,000**	**175.00**	**11,87,500**	**169.64**	**13,25,000**	**165.63**

Illustration 8: Flexible Budget by analysing Semi-Variable Costs into Fixed and Variable M 95 (F)

The budgets for activity and cost of XYZ Ltd for the first three quarters of operation are shown below: (in 000's)

Particulars	Quarter 1	Quarter 2	Quarter 3
Sales	9	17	15
Production	10	20	15
Costs: Direct Materials A	60	120	90
B	50	100	75
Production Labour	180	285	230
Manufacturing OH excluding Depreciation	90	12	105
Depreciation of Machinery	20	20	20
Administration Expenses	25	25	25
Selling & Distribution Expenses	38	54	50

The figures shown above represent the cost structure of XYZ Ltd, which have the following major features –

1. Fixed element of any cost is completely independent of activity levels.
2. Any variable element of each cost displays a linear relationship with activity level, except that the Variable Labour Cost become 50% higher for activity in excess of 19,000 units per quarter, due to the necessity for overtime working.

3. **The variable element of Selling and Distribution Expenses is a function of Sales. All other costs with a variable element are a function of production volume.**
4. **Activity for each quarter is spread evenly throughout the quarter.**

In Quarter IV production level will be set equal to sales level. Production and sales in this quarter is expected to range between 15,000 units and 21,000 units. The most likely volume is 18,000 units. In month 9, it will be possible to accurately estimate the sales for Quarter IV. Cost structure will remain the same as in Quarters I to III, except the following –

- **Labour Wage Rate will rise by 12.5%**
- **Variable Labour input per unit of output will decrease, due to learning curve effect, such that 80% of the previous Labour input per unit of output will be required in Quarter IV. The threshold for overtime working remains at 19,000 units per quarter.**
- **Fixed Factory Overheads and Fixed Selling and Distribution Costs will each rise by 20%. The variable element of Selling and Distribution Costs will be unaltered.**

Prepare a statement to show, under each cost classification given in the budgets, the Variable Costs p.u. and the Fixed Costs, which will be effective in Quarter IV. Also prepare a flexible budget of Production Costs for Quarter IV.

Solution:

1. Analysis of Material Costs

Analysis and Evaluation	Cost Analysis
Since Total Material Cost varies proportionately at various production levels, and Cost per unit remains constant at all production levels, it is a **Variable Cost** in nature.	**Material A**: Cost p.u. = $\frac{\text{Rs.60,000}}{\text{10,000 units}}$ = **Rs.6 pu** (from Q–1) **Material B**: Cost p.u. = $\frac{\text{Rs.50,000}}{\text{10,000 units}}$ = **Rs.5 pu** (from Q–1)

2. Analysis of Labour Costs

At different output levels, since Labour Cost is neither fully fixed nor fully proportional in nature, it is observed that Labour Cost is Semi–Variable in nature. Hence, it should be analysed into Fixed and Variable elements. For this purpose, Q–1 and Q–3 data are considered, since Q–2 production exceeds 19,000 units and would involve overtime premium.

(a) **Variable Labour Cost pu** = (using Level of Activity Method) $\frac{\text{Difference in Costs}}{\text{Difference in Prodn Quantity}} = \frac{\text{Rs.2,30,000} - \text{Rs.1,80,000}}{(15{,}000 - 10{,}000)\text{ units}}$ = **Rs.10 per unit.**

(b) **Fixed Labour Cost per quarter**= Total Costs **less** Variable Costs (estimated using Q–1 data)
= Rs.1,80,000 – (10,000 units × Rs.10) = **Rs.80,000**

(c) **Variable Labour Cost p.u. in Q–4** = Rs.10 × 112.5% (increase) × 80% (learning) = **Rs.9 p.u.**

Note: Reconciliation of Labour Costs of Q–2:

Total Labour Costs = Variable Costs + Fixed Costs + Overtime premium

Rs.2,85,000 = (Rs.10 × 20,000 units) + Rs.80,000 + (Rs.5 per unit × 1,000 units)

3. Analysis of Manufacturing Costs (excluding Depreciation)

At different production levels, since POH is neither fully fixed nor fully proportional in nature, it is observed that POH is Semi–Variable in nature. Hence, it should be analysed into Fixed and Variable elements. For this purpose, Q–1 and Q–3 data are considered.

(a) **Variable POH pu** = (using Level of Activity Method) $\frac{\text{Difference in Costs}}{\text{Difference in Prodn Quantity}} = \frac{\text{Rs.1,05,000} - \text{Rs.90,000}}{(15{,}000 - 10{,}000)\text{ units}}$ = **Rs.3 per unit.**

(b) **Fixed POH per quarter** = Total Costs **less** Variable Costs (estimated using Q–1 data)
= Rs.90,000 – (10,000 units × Rs.3) = **Rs.60,000**

4. Analysis of Selling and Distribution Costs

At different sales levels, since SOH is neither fully fixed nor fully proportional in nature, it is observed that SOH is Semi–Variable in nature. Hence, it should be analysed into Fixed and Variable elements. For this purpose, Q–1 and Q–3 data are considered.

(a) **Variable SOH pu** = (using Level of Activity Method) $\frac{\text{Difference in Costs}}{\text{Difference in Sales Quantity}} = \frac{\text{Rs.50,000} - \text{Rs.38,000}}{(15{,}000 - 9{,}000)\text{ units}}$ = **Rs.2 per unit.**

(b) **Fixed SOH per quarter** = Total Costs **less** Variable Costs (estimated using Q–1 data)
= Rs.38,000 – (9,000 units × Rs.2) **= Rs.20,000**

5. Cost Classification into Variable and Fixed Elements

Particulars	Variable	Fixed
Materials A	(WN 1) Rs.6 per unit	Nil
Materials B	(WN 1) Rs.5 per unit	Nil
Labour	(WN 2) Rs.9 per unit	Rs.80,000 + 12.5% = Rs.90,000
Manufacturing OH	(WN 3) Rs.3 per unit	Rs.60,000 + 20% = Rs.72,000
Depreciation of Machinery	Nil	Given = Rs.20,000
Administration	Nil	Given = Rs.25,000
Selling and Distribution	(WN 4) Rs.2 per unit	Rs.20,000 + 20% = Rs.24,000

Note: Learning Curve effect will have an impact on variable element of Labour Cost only.

6. Flexible Budget for Q–4 (amounts in Rs.)

Particulars	Minimum Quantity	Most Likely Quantity	Maximum Quantity
Quantity	**15,000 units**	**18,000 units**	**21,000 units**
Material A at Rs.6 per unit	15000 × 6 = 90,000	18000 × 6 = 1,08,000	21000 × 6 = 1,26,000
Material B at Rs.5 per unit	15000 × 5 = 75,000	18000 × 5 = 90,000	21000 × 5 = 1,05,000
Labour – Variable at Rs.9 per unit	15000 × 9 = 1,35,000	18000 × 9 = 1,62,000	21000 × 9 = 1,89,000
Labour – Fixed 80,000 + 12.5%	90,000	90,000	90,000
Labour – Overtime Premium	Nil	Nil	2000× 9× 50%= 9,000
POH – Variable at Rs.3 per unit	15000 × 3 = 45,000	18000 × 3 = 54,000	21000 × 3 = 63,000
POH – Fixed 60,000 + 20%	72,000	72,000	72,000
Depreciation – Fixed – given	20,000	20,000	20,000
Total Production Costs	**5,27,000**	**5,96,000**	**6,74,000**

Illustration 9: Flexible Budgets and Evaluation of Export Offer **RTP (F)**

The performance of a Company at two levels of operations during a financial year is as under –

Capacity Utilisation	50%	60%
Direct Materials	Rs.1,00,000	Rs.1,20,000
Direct Wages	Rs.1,60,000	Rs.1,92,000
Production Overheads	Rs.6,00,000	Rs.6,50,000
Administration Overheads	Rs.1,20,000	Rs.1,20,000
Selling Overheads	Rs.2,20,000	Rs.2,40,000

The Company produced 12,000 units at 60% capacity utilisation. The profit margin is 20% on Sales.

During the next financial year, the Company is poised for increasing the capacity utilisation to 75%. The Company desires to have the same profit margin as in the last financial year. The following percentage changes in costs are expected to be applicable in the next year.

- **Direct Material Prices will increase by 5%**
- **Direct Wage Rates will increase by 3%. Direct Labour Efficiency will fall by 4%.**
- **Variable Production Overheads will increase by 6%.**
- **Fixed Production Overheads will increase by 10% upto 80% capacity utilization, and by 22% thereafter.**
- **Variable Selling Expenses will increase by 10%. Fixed Selling Expenses will increase by 8%.**
- **Administrative Overheads will increase by 15%.**

The Company expects to receive an export order for 3,000 units while operating at 75% capacity utilisation. The anticipated Export Price Offer is Rs.92 per unit.

1. **Prepare a Flexible Budget for the next year, and determine the cost per unit at the capacity levels of 75% and 90%.**
2. **Calculate the Sales Value and Profit for the next year at 75% capacity.**
3. **Advise Management as to whether or not the export order at the price of Rs.92 per unit should be accepted.**

Solution: **1. Analysis of Costs into Fixed and Variable elements**

Item	At 50% Cap.	At 60% Cap.	Analysis and Evaluation	Cost Analysis
Output	10,000 units	12,000 units		
(a) Materials	Rs.1,00,000	Rs.1,20,000	Since Total Cost varies proportionately at various capacity levels, and Cost per unit remains same at all levels, it is a **Variable Cost** in nature.	$\frac{\text{Rs.1,00,000}}{\text{10,000 units}}$ = **Rs.10 pu**
(b) Wages	Rs.1,60,000	Rs.1,92,000	Since Total Cost varies proportionately at various capacity levels, and Cost per unit remains same at all levels, it is a **Variable Cost** in nature.	$\frac{\text{Rs.1,60,000}}{\text{10,000 units}}$ = **Rs.16 pu**
(c) AOH	Rs.1,20,000	Rs.1,20,000	Since total amount is constant at different output levels, AOH is a **Fixed Cost** in nature.	Fixed Cost **Rs.1,20,000**
(d) POH	Rs.6,00,000	Rs.6,50,000	At different capacity levels, since POH and SOH are neither fully fixed nor fully proportional in nature, it is observed that these are Semi-Variable OH. Hence, they are analysed into Fixed and Variable elements as given below.	See calculations below for Cost-breakup of Fixed and Variable elements.
(e) SOH	Rs.2,20,000	Rs.2,40,000		

Note: Analysis of POH and SOH

(a) **Variable POH per unit=** (using Level of Activity Method) $\frac{\text{Difference in Costs}}{\text{Difference in Prodn Quantity}} = \frac{\text{Rs.6,50,000} - \text{Rs.6,00,000}}{(12{,}000 - 10{,}000)\text{ units}}$ = **Rs.25 per unit.**

(b) **Fixed POH** = Total Costs **less** Variable Costs (estimated using 10,000 units output level data)
= Rs.6,00,000 – (10,000 units × Rs.25) **= Rs.3,50,000**

(c) **Variable SOH per unit=** (using Level of Activity Method) $\frac{\text{Difference in Costs}}{\text{Difference in Sales Quantity}} = \frac{\text{Rs.2,40,000} - \text{Rs.2,20,000}}{(12{,}000 - 10{,}000)\text{ units}}$ = **Rs.10 per unit.**

(d) **Fixed SOH** = Total Costs **less** Variable Costs (estimated using 12,000 units output level data)
= Rs.2,40,000 – (12,000 units × Rs.10) **= Rs.1,20,000**

2. Flexible Budget for next year (amounts in Rs.)

Particulars		Cost at 60%	Revised at 60%	75%	90%
Sale Quantity		**12,000 units**	**12,000 units**	**15,000 units**	**18,000 units**
Materials		Given = 1,20,000	1,20,000 + 5% = 1,26,000	1,26,000 × 75%/60% = 1,57,500	1,26,000 × 90%/60% = 1,89,000
Labour		Given = 1,92,000	See Note below = 2,06,000	2,06,000 × 75%/60% = 2,57,500	2,06,000 × 90%/60% = 3,09,000
POH	Variable	Given = 3,00,000	3,00,000 + 6% = 3,18,000	3,18,000 × 75%/60% = 3,97,500	3,18,000 × 90%/60% = 4,77,000
	Fixed	Given = 3,50,000	3,50,000 + 10% = 3,85,000	3,50,000 + 10% = 3,85,000	3,50,000 + 22% = 4,27,000
AOH	Fixed	Given = 1,20,000	1,20,000 + 15% = 1,38,000	1,20,000 + 15% = 1,38,000	1,20,000 + 15% = 1,38,000
SOH	Variable	Given = 1,20,000	1,20,000 + 10,% = 1,32,000	1,32,000 × 75%/60% =1,65,000	1,32,000 × 90%/60% = 1,98,000
	Fixed	Given = 1,20,000	1,20,000 + 8% = 1,29,600	1,20,000 + 8% = 1,29,600	1,20,000 + 8% = 1,29,600
Total Costs				**16,30,100**	**18,67,600**
Cost per unit				**108.67**	**103.75**

Note: Revised Labour Cost at 60% capacity = Rs.1,92,000 × $\frac{\text{103\% (for rate increase)}}{\text{96\% (for efficiency fall)}}$ = **Rs.2,06,000.**

3. Computation of Sales Value at 75% Capacity

(a) Cost at 75% Capacity Level **(WN 2)**	Rs.16,30,100
(b) Profit = 20% on Sales = 1/5th on Sales = ¼ on Cost of Rs.16,30,100	Rs. 4,07,525
(c) Sales Value at 75% Capacity Level (a + b)	**Rs.20,37,625**

4. Evaluation of Export Offer

(a) Incremental Revenue from 3,000 units Export Offer, at Rs.92 per unit	Rs.2,76,000
(b) Incremental Costs of 3,000 units, i.e. 75% to 90% Capacity = (18,67,600 – 16,30,100)	Rs.2,37,500
(c) Incremental Profit from Export Offer (a – b)	**Rs.38,500**

Conclusion: The Export Offer may be accepted, as there is additional profit of Rs.38,500.

3. Original and Revised Budgets & Misc. Illustrations

Illustration 10: Original and Revised Budgets – Percentage Interpretation and New Order Evaluation **N 79**

AB Ltd has prepared the following budget for a financial year –

Item	Percentage
Materials	40%
Labour	25%
Variable Factory OH	10%
Fixed Factory OH	5%
Variable SOH & AOH	6%
Fixed SOH & AOH	12%
Profit	2%
Sales Price	100%

After considering the half-yearly performance, it was felt that the budgeted volume of sales would not be obtained but the Company expected to achieve 80% equivalent to a Sales Value of Rs.160 Lakhs. At this stage, the Company has received an export order for its usual line of products. The Prime Cost of the Export Order is Rs.13 Lakhs and special export expenses are estimated at Rs.40,000.

Required:

1. **Present the Original & Revised Budget based on 80% achievement, showing the quantum of Profit or Loss.**
2. **Prepare a statement of Budgeted Cost for establishing percentages of Overhead Recovery Rates.**
3. **Calculate the lowest quotation for the Export Order and offer your comments.**

Solution: **1. Original and Revised Budgets for the financial year**

	Original Budget		Revised Budget	
Item	**%**	**Rs. Lakhs**	**%**	**Rs. Lakhs**
Raw Materials	40%	80.00	40.00%	64.00
Direct Wages	25%	50.00	25.00%	40.00
Factory Overheads (Variable)	10%	20.00	10.00%	16.00
Factory Overheads (Fixed)	5%	10.00	6.25%	10.00
Administration & Selling Overheads (Variable)	6%	12.00	6.00%	9.60
Administration & Selling Overheads (Fixed)	12%	24.00	15.00%	24.00
Profit /(Loss)	2%	4.00	(2.25)%	(3.60)
Sales Value	**100%**	(160 ÷ 80%) = **200.00**	**100.00%**	(given) **160.00**

Note:

1. All amounts in the Original Budget Column are calculated as percentage of Sales of Rs.200.00 Lakhs.
2. Amounts in the Revised Budget are calculated as under –
   (a) Variable Items, i.e. Materials, Wages and Variable Overheads – based on original budgeted **percentage**.
   (b) Fixed items – based on **Amount** as per Original Budget. The percentage is re-calculated based on the revised Sales Value of Rs.160 Lakhs.

2. Statement of Budgeted Cost for calculating Overhead Recovery Rates

Particulars	Original Budget (Rs. Lakhs)	Overhead Recovery Rates
Raw Materials	80.00	
Direct Wages	50.00	
Prime Cost	**130.00**	

Particulars	Original Budget (Rs. Lakhs)	Overhead Recovery Rates
Factory Overheads (Variable)	20.00	$\frac{20}{50}$ = 40% of Direct Wages
Factory Overheads (Fixed)	10.00	$\frac{10}{50}$ = 20% of Direct Wages
Works Cost	**160.00**	
Administration & Selling OH (Variable)	12.00	$\frac{12}{160}$ = 7.5% of Works Cost
Administration & Selling OH (Fixed)	24.00	$\frac{24}{160}$ = 15% of Works Cost
Total Cost	**196.00**	

Note: If Administration and Selling OH are recovered as a percentage of Sales Value, the recovery rates will be 6% and 12% of Sales Value for Variable and Fixed Administration and Selling Overheads respectively.

3. Lowest Quotation for Export Order = Specific Incremental Cost thereof

Particulars		Rs.
Raw Materials (See **Note**)	Rs.13,00,000 × $\frac{\text{Rs.80 Lakhs}}{\text{Rs.130 Lakhs}}$	8,00,000
Direct Wages (See **Note**)	Rs.13,00,000 × $\frac{\text{Rs.50 Lakhs}}{\text{Rs.130 Lakhs}}$	5,00,000
Factory Overheads (Variable)	(40% of Direct Wages of Rs.5,00,000)	2,00,000
Factory Overheads (Fixed)		NA
Works Cost		15,00,000
Administration & Selling OH (Variable)(7.5% of Variable Works Cost of Rs.15,00,000)		1,12,500
Administration & Selling OH (Fixed)		NA
Special Export Expenses		40,000
Total Additional Cost for the Export Order = Minimum Price for Export Order		**16,52,500**

Note: Budgeted Prime Cost for the year is Rs.130 Lakhs made up of Rs.80 Lakhs Raw Materials and Rs.50 Lakhs Direct Wages. Using this ratio, Materials and Labour for the Export Order is calculated.

Conclusion: Any price above Rs.16,52,500 will yield a Contribution towards Unrecovered Fixed Costs. Even though the Company is incurring a loss at 80% of budgeted activity, the Export Price may be quoted on Marginal Cost basis, with a view to establishing the products in the foreign markets, and to take advantage of future favourable market conditions.

Illustration 11: Original and Revised Budgets – Sensitivity Analysis and Break – Even Sales **M 80**

SM Ltd produces two products and the Budget for 60% level of activity for the year gives the following information.

Particulars	Product A	Product B
Raw Material Cost per unit	**Rs. 7.50**	**Rs. 3.50**
Direct Labour Cost per unit	**Rs. 4.00**	**Rs. 3.00**
Variable Overheads per unit	**Rs. 2.00**	**Rs. 1.50**
Fixed Overheads per unit	**Rs. 6.00**	**Rs. 4.50**
Selling Price per unit	**Rs.20.00**	**Rs.15.00**
Production and Sales Quantity	**4,000 units**	**6,000 units**

The Managing Director, not being satisfied with the projected results as stated above, referred the Budget to the Marketing Director for improvement of the performance. The Marketing Director proposed that the sales quantities of Products A and B could be increased by 50%, provided the Selling Prices were reduced by 5% in the case of Product A and 10% in the case of Product B. The price reduction should be made applicable to the entire quantity of sales of each of the two products.

Required:

1. **Present the overall profitability under the Original Budget and the Revised Budget after taking the increased sales into consideration.**
2. **Find the Overall Break–Even Sales under the original Budget and the Revised Budget.**

Solution: **Budgeted Profit Statement**

	Original Budget			Revised Budget		
Product	**A**	**B**	**Total**	**A**	**B**	**Total**
Quantity	4,000 units	6,000 units		4000 + 50% = 6,000 units	6000 + 50% = 9,000 units	
	Rs.	**Rs.**	**Rs.**	**Rs.**	**Rs.**	**Rs.**
1. **Sales** at Rs.20 & Rs.15 p.u. at Rs.19 & Rs.13.50 p.u.	80,000	90,000	1,70,000	1,14,000	1,21,500	2,35,500
2. **Variable Costs:**						
Materials at Rs.7.50 & Rs.3.50 p.u.	30,000	21,000	51,000	45,000	31,500	76,500
Direct Wages at Rs.4.00 & Rs.3.00 p.u.	16,000	18,000	34,000	24,000	27,000	51,000
Variable OH at Rs.2.00 & Rs.3.00 p.u.	8,000	9,000	17,000	12,000	13,500	25,500
Sub–Total Variable Cost	54,000	48,000	1,02,000	81,000	72,000	1,53,000
3. **Contribution** (1 – 2)	**26,000**	**42,000**	**68,000**	**33,000**	**49,500**	**82,500**
4. **Fixed Overheads**	24,000	27,000	**51,000**	24,000	27,000	**51,000**
5. **Profit** (3 – 4)	2,000	15,000	**17,000**	9,000	22,500	**31,500**
6. **Overall PVR**	$\frac{68,000}{1,70,000} \times 100 =$ **40%**			= $\frac{82,500}{2,35,500} \times 100 =$ **35%**		
7. **Overall BEP**	$\frac{51,000}{40\%} =$ **1,27,500**			$\frac{51,000}{35\%} =$ **1,45,715**		

Note: Overall PVR = $\frac{\text{Total Contribution}}{\text{Total Sales Value}} \times 100$ Overall BEP = $\frac{\text{Total Fixed Costs}}{\text{Overall PV Ratio}}$

Illustration 12: Budgetary Control and Standard Costing **M.09**

Following is the sales budget for the first six months of a calendar year in respect of PQR Ltd –

Month	Jan	Feb	March	April	May	June
Sales (units)	10,000	12,000	14,000	15,000	15,000	16,000

Finished Goods inventory at the end of each month is expected to be 20% of Budgeted Sales Quantity for the following month. Finished Goods inventory was 2,700 units on 1st January. There would be no WIP at the end of any month.

Each unit of Finished Product requires Material X: 4 kgs at Rs.10/kg and Material Y: 6 kgs at Rs.15/kg

Material on hand on 1st January was 19,000 kgs of Material X and 29,000 kgs of Material Y. Monthly Closing Stocks of Material is budgeted to be equal to half of the requirements of next month's production.

Budgeted Direct Labour Hour per unit of finished product is ¾ hour.

Budgeted Direct Labour Cost for the first quarter of the year is Rs.10,89,000

Actual data for the 1st quarter ended on 31st March is as under –

- **Actual Production Quantity: 40,000 units**
- **Direct Material Cost (Purchase Cost based on Materials actually issued to production)**
  Material X: 1,65,000 kgs at Rs.10.20 per kg
  Material Y: 2,38,000 kgs at Rs.15.10 per kg
- **Actual Direct Labour Hours worked: 32,000 hours**
- **Actual Direct Labour Cost: Rs.13,12,000**

Required:

1. Prepare the following Budgets –	2. Compute the following Variances –
(a) Monthly Production Quantity Budget for the 1st Quarter (b) Monthly Raw Material Consumption Quantity Budget from January to April (c) Materials Purchase Quantity Budget for the 1st Quarter	(a) Material Cost Variance, Material Price Variance, and Material Usage Variance (b) Direct Labour Cost Variance, Direct Labour Rate Variance, & Direct Labour Efficiency Variance

Solution: **1. Production Quantity Budget (in units)**

Particulars	Jan	Feb	Mar	Apr
Budgeted Sales (given)	10,000	12,000	14,000	15,000
Add: Closing Stock of FG = 20% of next month Sales	12,000 × 20% = 2,400	14,000 × 20% = 2,800	15,000 × 20% = 3,000	15,000 × 20% = 3,000
Sub–Total	12,400	14,800	17,000	18,000
Less: Opening Stock of FG	(given) 2,700	2,400	2,800	3,000
Budgeted Prodn	**9,700**	**12,400**	**14,200**	**15,000**

Note: Since Material Consumption is to be calculated till April, Production Budget is also prepared for April.

2. Raw Material Consumption Quantity Budget

Particulars	Jan	Feb	Mar	Apr
(a) Budgeted Production (**WN 1**)	9,700 units	12,400 units	14,200 units	15,000 units
(b) Material X required at 4 kg pu [(a) × 4 kg]	38,800 kg	49,600 kg	56,800 kg	60,000 kg
(c) Material Y required at 6 kg pu [(a) × 6 kg]	58,200 kg	74,400 kg	85,200 kg	90,000 kg

3. Raw Materials Purchase Quantity Budget

Particulars	Raw Material X			Raw Material Y		
	Jan	Feb	Mar	Jan	Feb	Mar
Budgeted RM Usage	38,800 kg	49,600 kg	56,800 kg	58,200 kg	74,400 kg	85,200 kg
Add: Closing Stock of RM = 50% of next mth usage	49,600÷2= 24,800 kg	56,800÷2= 28,400 kg	60,000÷2= 30,000 kg	74,400÷2= 37,200 kg	85,200÷2= 42,600 kg	90,000÷2= 45,000 kg
Sub–Total	63,600 kg	78,000 kg	86,800 kg	95,400 kg	1,17,000 kg	1,30,200 kg
Less: Opening Stock of RM	19,000 kg	24,800 kg	28,400 kg	29,000 kg	37,200 kg	42,600 kg
Budgeted Purchase	**44,600 kg**	**53,200 kg**	**58,400 kg**	**66,400 kg**	**79,800 kg**	**87,600 kg**

4. Material Cost Variances

Matl	SQ × SP (1)	AQ × AP (2)	AQ × SP (3)	RAQ × SP (4)
X	(40,000 uts × 4 kg)× Rs.10 = Rs.16,00,000	1,65,000 kg × Rs.10.20 = Rs.16,83,000	1,65,000 kg × Rs.10 = Rs.16,50,000	1,61,200 kg × Rs.10 = Rs.16,12,000
Y	(40,000 uts × 6 kg)× Rs.15 = Rs.36,00,000	2,38,000 kg × Rs.15.10 = Rs.35,93,800	2,38,000 kg × Rs.15 = Rs.35,70,000	2,41,800 kg × Rs.15 = Rs.36,27,000
Total	**Rs.52,00,000**	**Rs.52,76,800**	**Rs.52,20,000**	**Rs.52,39,000**

Note:

- The requirement in the question is only towards Material Cost, Price and Usage Variances. However, Mix and Yield Variances are also shown here for benefit of learning.
- Total AQ = 1,65,000 kg + 2,38,000 kg = 4,03,000 kg. To get RAQ, this should be distributed to X and Y in the std mix of 4 : 6. Hence, RAQ for X = 4,03,000 × 4/10 = **1,61,200 kg**, and for Y = 4,03,000 × 6/10 = **2,41,800 kg**.

Material Variances

Cost (1) – (2) = 76,800 A

- Price (3) – (2) = 56,800 A
- Usage (1) – (3) = 20,000 A
  - Mix = (4) – (3) = 19,000 F
  - Yield = (1) – (4) = 39,000 A

5. Labour Variances:

Note:

- Budgeted Labour Cost for the quarter = Given = Rs.10,89,000.
- Budgeted Production for the quarter = 9,700 + 12,400 + 14,200 = 36,300 units.
- 36,300 units × 3/4th hours per unit × Rs.R per hour (wage rate) = Rs.10,89,000 (Labour Cost)
- On solving, we have R = 40. So, Standard Wage Rate per hour = Rs.40.

SH × SR (1)	AH × AR (2)	AH × SR (3)	Labour Variances
(40,000 uts× 3/4th hr) × Rs.40 ph = Rs.12,00,000	32,000 hrs× **Rs.41** = Rs.13,12,000 (given)	32,000 hrs× Rs.40 = Rs.12,80,000	Cost (1) – (2) = Rs.1,12,000 A Rate (3) – (2) = Rs.32,000 A Efficiency (1) – (3) = Rs.80,000 A