PRICING DECISIONS

PRICING DECISIONS

Q.10. PQR Ltd. a manufacturer of tool kits….
Solution:

Statement Showing Permissible Cost per kit

Items of Cost	**(₹)**
Direct Material $\left(\frac{₹90,000}{100 \text{ kits}}\right)$	900
Direct Labour $\left(\frac{₹32,000}{100 \text{ kits}}\right)$	320
Consumables $\left(\frac{₹16,000-₹10,000}{100 \text{ kits}}\right)$	64
Variable Overheads $\left(\frac{₹9,600}{100 \text{ kits}}\right)$	96
Existing Variable Cost per kit	1,380
Add: Special Packing Cost per kit	20
Total Variable Cost per kit	1,400
Export Offer Price per kit	1,600
Less: Expected Profit (10% on Selling Price)	160
Total Permissible Cost per kit	1,400

Maximum Inspection Cost per kit for making export offer acceptable is ₹40

…(₹1,440 − ₹1,400)

As Total Cost excluding Inspection Cost is ₹1,400 so the Selling Price will be ₹1,555.56

$\ldots\left(₹1,400 \text{ x } \frac{100}{90}\right)$

Maximum Possible Discount on the Revised Selling Price is ₹ 44.44

…(₹1,600 − ₹1,555.56)

Percentage of Discount is 2.77%

$\ldots\left(\frac{₹44.44}{₹1,600} \text{ x } 100\right)$

Hence **Maximum Discount of 2.78 percent** can be offered to retain 10% Profit on the Revised Selling Price.

Allocated Fixed Overheads amounting to ₹ 25,000 and Reusable Special Tools amounting to ₹10,000 are irrelevant and hence ignored in the decision making process.

Q.19. Chum-Chum Ltd. is about to introduce a new product…..

Solution:

Chum–Chum Ltd. Statement for determining tentative price of the new product, from estimates, to earn maximum profit

Per unit (₹)	Demand (in lakhs of unit)	Sales revenue (in ₹ lakhs)	Variable costs (in ₹ lakhs) (₹ 18 p.u. + 10% of selling price)	Contriubtion (in ₹ lakhs)
(a)	(b)	(c)	(d)	(c-d)
30.00	4.00	120.00	84.00	36.00
31.50	3.80	119.70	80.37	39.33
33.00	3.60	118.80	76.68	42.12
34.50	3.40	117.30	72.93	44.37
36.00	3.15	113.40	68.04	**45.36**
37.50	2.80	105.00	60.90	44.10
39.00	2.40	93.60	52.56	41.04

The tentative price of the new product should be ₹ 36 per unit. At this price the profit of Chum Chum Ltd. is maximum, the maximum profit of the concern comes to ₹ 20,16,000

Working note:

Maximum profit

= Maximum contribution – {Fixed production overhead + Administration expenses}

= ₹ 45,36,000 – {₹ 14,40,000 + ₹ 10,80,000} = ₹ 20,16,000

Q.28. ABC Company has three products A,B & C…

Solution:

	Rs '000
Contribution = (5000 x 9) + (4000 X 12) + (5000 x 15)	168
Fixed Cost	88
Profit for Current year	80
Expected Profit for the next year (80 x 1.3)	104
Fixed Cost (next year) (88 + 37)	125
Contribution required	229
Contribution of B per unit will be (12 - 3 +1.5) = Rs 10.5	
Thus, Contribution of A & B : (5000 x 9) + (8000 X 10.5)	129
Contribution required by C	100
Contribution required per unit of C (Rs) = 1,00,000/5000	20
Variable cost per unit of C (Rs) (30+ 7.50)	37.5
Effective price of C per unit (Rs)	57.5
Considering export advantage of 15%, export price of C = Rs 57.5/1.15	Rs 50

Q.39. In your company, production manager has….

Solution:

Average cost for first 200 units = 0.90 x 200 = Rs 180

Average cost for first 400 units = 0.90 x 180 = Rs 162

Average cost for first 800 units = 0.90 x 162 = Rs 145.80

Average cost for first 1600 units = 0.90 x 145.80 = Rs 131.22

We know that learning curve equation :

Y= ax ^b

Where y = average time for producing x units

a = time spent on first unit / batch

b = co-efficient of learning curve

b= - log (1 - % decrease) / Log 2 = log (1 – 0.10) / log 2 = - 0.0458/0.3010 =- 0.15206

Thus, for 2000 units, batch = 2000/ 100 = 20

Y= 200 x 20 ^ -0.15206

Log y= log (200) - 0.15206(log 20) = 2.3010 - 0.15206 x 1.3010 = 2.103172

Thus y = antilog (2.103172) = 126.81

Thus, average labour cost for 2000 units = Rs 126.81

Thus, price to be quoted for different units are:

	First 800 units (₹)	First 1600 units (₹)	First 2000 units (₹)
Material @ ₹ 150	120000	240000	300000
Labour Cost	116640	209952	253620
Overheads	40000	80000	100000
Total Cost	276640	529952	653620
Profit	69160	132488	163405
Price to be quoted	345800	662440	817025

Q.45. Captain Clown Ltd. observes an 80% learning curve…..

Solution:

To solve this problem, we need to calculate three things:

(a) The cumulative total labour time needed so far to produce 230 units of ABC

(b) The cumulative total labour time needed to produce 285 units of ABC, that is adding on the extra 55 units for July

(c) The extra time needed to produce 55 units of ABC in July, as the difference between (b) and (a)

Calculation (a)

$Y_x = aX^b$ and we know that for 230 cumulative units, a = 120 hours (time for first unit), X = 230 (cumulative units) and b = –0.322 (80% learning curve) and so Y = (120) × (230–0.322) = 20.83.

So when X = 230 units, the cumulative average time per unit is 20.83 hours.

Calculation (b)

Now we do the same sort of calculation for X = 285.

If X = 285, Y = 120 × ($285^{-0.322}$) = 19.44

So when X = 285 units, the cumulative average time per unit is 19.44 hours.

Calculation (c)

Cumulative units	Average time per unit Hours	Total time Hours
230	20.83	4,791
285	19.44	5,540
Incremental time for 55 units		789

Average time per unit, between 230 and 285 units = 749/55 = 13.6 hours per unit approx..

Q.64. A Company operates at 50% capacity utilization…..

Solution:

Particulars	50 % Capacity (₹)	75 % Capacity (₹)
Sales	9,00,000	13,50,000
Prime cost 50 % of sales 75 % of sales	4,50,000	6,75,000
Factory overheads:		
Variable Cost	45,000	67,500
Fixed Cost	90,000	90,000
Factory Cost (Prime cost + Factory overheads)	**5,85,000**	**8,32,500**
Selling Cost: Variable Cost	1,35,000	2,02,500
Fixed Cost	90,000	90,000
Total Cost (Factory Cost + Selling Cost)	**8,10,000**	**11,25,000**
Profit (Sales - Total Cost)	**90.000**	**2,25,000**

Working Notes:
Sales at 50% = ₹ 9,00,000
Sales at 100% = ₹ 18,00,000

Profitability at 100% Capacity	₹	
Sales	18,00,000	
Prime Cost (10,80,000 - 1,80,000)	9,00,000	= 50% of sales
Factory Overhead	1,80,000	Given
Factory Cost	10,80,000	= 60% of sales
Selling Cost	3,60,000	= 20% of sales
Total Cost	**14,40,000**	
Profit (Sales - Total Cost)	3,60,000	
(18,00,000 - 1,44,0000)		

Evaluation of Government order (15 % Capacity)	₹
Sales	1,45,000
Prime Cost	1,35,000
Factory Overhead (Variable Cost)	13,500
Selling cost variable @ 2 %	2,900
Processing cost	8,000
Total Cost	**1,59,400**
Loss (Sales - Total cost) (1,45,000 - 1,59,400)	1,440

Hence it is not acceptable.

Q.66. A customer has asked your company to prepare a bid…..

Solution:

(a) Average cost decreases by 10 per cent every time when the cumulative production doubles. Therefore,

Average cost of first 200 units = 0.9 × Avg. cost of 100 units
Average cost of first 400 units = 0.9 × Avg. cost of 200 units
Average cost of first 800 units = 0.9 × Avg. cost of 400 units

Combining these, we find that average cost of the first 800 units
= 0.9 × 0.9 × 0.9 × Rs.100 = Rs. 72.90

Total cost = 800 × Rs. 72.90 = Rs. 58,320

(b) Because this increase will not increase cumulative production to twice of some figure we already have, formula has to be used :

$Y = ax^b$
where b = .0458 ÷ 0.301 = – 0.15216
log ax cost = log 10,000 – 0.15216 log 9
= 4 – 0.1452 = 3.8548
Average cost = Rs. 71.5833 per unit
Total cost = 900 × 71.5833 = Rs. 64,425
Incremental cost = Rs. 64,425 – Rs. 58,320 = Rs. 6,105 or Rs. 61.50 per unit.

(c) Average cost of the first 1,600 units = 0.9 × Rs. 72.9 = Rs. 65.61

∴ Total cost of 1,600 units = 1,600 × Rs. 65.61 = Rs. 1,04,976

Additional cost of 2nd 800 units = Rs. 1,04,976 – Rs. 58,320 = Rs. 46,656 or Rs. 58.32 per unit

Q.67. The Learning Curve model is $Y = ax^b$, where "y" is the average time per unit for X units, "a" is the time for first unit "x" is the cumulative number of units and "b" is the learning co-efficient. Taking "b" = (Log 0.8 ÷ Log 2) = - 0.322 for a learning rate is 80%, and "a" = 10 hours, calculate - (a) Average Time for 20 units, (b) Total Time for 30 units, and (c) Time for units 31 to 40.

Given that Log 2 = 0.3010, antilog of 0.5811 = 3.812.

Log 3 = 0.4771, antilog of 0.5244 = 3.345.

Log 4 = 0.6021, antilog of 0.4841 = 3.049.

Solution:

(i) $Y = ax^{-0.322}$
$Y = 10.20^{-0.322}$
$\log Y = \log 10 + \log 20^{-0.322}$
$\log Y = 1.00 – 0.322 \log 20$
$\log Y = 1.00 – 0.322(1.3010)$
$\log Y = 1.00 – 4189$
$\log Y = 0.5811$

taking Antilog of both the sides, $Y = 3.812$
Average time for 20 units = 3.812 hours

(ii) $Y = ax^{-0.322}$
$Y = 10.30^{-0.322}$
$\log Y = \log 10 + \log 30^{-0.322}$
$\log Y = 1.00 – 0.322 \log 30$
$\log Y = 1.00 – 0.322(1.4771)$
$\log Y = 1.00 – 0.4756$
$\log Y = 0.5244$

taking Antilog of both the sides, $Y = 3.345$
Average time for 30 units = 3.345 hours
Total time for 30 units = 100.35 hours

(iii) Average time for 40 units : 3.812 x 0.80 = 3.0496 hours
Total time for 40 units :121.984 hours
Total time for 30 units : 100.35 hours
Time for 31 to 40 units : 121.984 – 100.35 = 21.634 hours

DIVISIONAL TRANSFER PRICING

DIVISIONAL TRANSFER PRICING

Q.13. PLUS-MINUS LTD, manufactures ……
Solution:

1. Where there is no excess capacity in division A, internal transfer will involve diversion from external sales. The benefit of transfer is evaluated below:

	Additional revenue from further processing =Rs.300-Rs.200	= Rs.100
Less:	Additional costs in B, for further processing	= Rs.150
	Net loss in further processing	= **Rs.50**

Hence, transfers should not be made if there is no excess capacity in division A. if at all transfer are made, the minimum transfer price will be variable costs + Opportunity costs =Rs.120 + (Rs.200 - Rs.120) = Rs.200 per unit. Hence, the market price is the correct transfer price in a case.

Maximum transfer price is also equal to the market price =Rs.200 per unit. At that price, the recipient divisional is indifferent between internal procurement and external purchase. However, due to the effect of behavioural reasons, the manager of division B may prefer to outsource at that price or refrain from buying. This will result in the correct decision from the company's viewpoint.

2. When spare capacity is available in divisional A, the benefit of internal transfer is evaluated:
Relevant total cost to company = variable costs only = Rs.120 (in A) + Rs.150 (in B)
= Rs.270 per unit.
Selling price of the final product = Rs.300 per unit
Net Benefit from further processing = **Rs.30 per unit**

Hence transfer may be made to an extent of the spare capacity i.e.200 units.
Here, Range of TP will be – minimum (var. costs only) = **Rs.120** and maximum (market price) = **Rs.200.**

3. When transfer are made at Rs.150 upto 200 units, the contribution to the company will be –
= From Div.A [(Rs.150 – Rs.120) x 200 units] + From Div.B [(Rs.300 – Rs.150 – Rs.150) x 200 units]
= Rs.6,000 + Nil = **Rs.6,000**

The manager of division B will be inclined to procure internally since it will not results in a negative contribution and also since the cost of the other alternative (i.e. purchase externally) is high.

4. Income from the option of reducing the external price to Rs.195 for 1,000 units.

= (Rs.195 – Rs.120) x 1,000 units = Rs. 75,00

If this income should be obtained from the transfer option also the Transfer price is calculated below:

	Required Total Income	= Rs.75,000
Less:	Contribution from external sales	= Rs. 64,000 [(Rs.200 – Rs.120)x 800 units]
	Balance contribution from transfer	= **Rs.11,000**
	Internal Transfer Quantity	= 200 units
	Contribution required p.u. of transfer	= Rs. 55
Add:	Variable costs of Internal Transfer	= Rs. 120
	Internal Transfer price	= **Rs. 175**

5. Minimum Transfer price (s) will be as under :
Upto 100 units (spare capacity) = Variable Costs only = **Rs. 120 per unit.**
101 to 200 units (when SP = Rs. 195) = Variable Costs + Opportunity costs
= Rs.120 + (Rs.195 – Rs.120) = **Rs. 195 per unit.**
Above 200 units (when SP = Rs. 200) = Rs.120 + (Rs. 200 – 120) = **Rs. 200 per unit**

Q.15. HEAVY DUTY MOTORS operates….
Solution:

1. **Minimum Transfer Price =**

= Variable Costs (upto point of transfer) + Fixed costs (if specific) + Opportunity costs (if any)

= Rs. 1,100 only. (since Airbag Division has sufficient spare capacity of 20%)

2. **Effect of Transfer price = Incremental costs, on various criteria**

Criteria	Goal congruence	Evaluation of Divisional Performance	Motivation of management Effort	Preserving Division Autonomy
Effect of TP = Incremental costs	Since Incremental Costs are relevant costs, goal congruence Will be Achieved.	There is no Contribution From internal transfer when TP = Incremental costs	There is no Incentive For cost reduction Since TP will stand reduced when cost is also reduced.	There is no Contribution / Profit from internal transfers and hence transfers at incremental costs will not be preferred when the transfers made , it will be a decision forced on the Transferring Division by top management.
Achieved?	**Yes**	**No**	**No**	**No**

3. **Negotiable range of Transfer price:** The managers can negotiate the TP as below–
   - **(a) Minimum Transfer price from airbag Division's viewpoint:** Minimum Transfer price = Relevant costs = variable costs (upto the point of Transfer) + Fixed Costs (if specific) + Opportunity Costs (if any) In the given case, only variable costs are relevant. Hence Minimum Transfer price = Rs. 1,100 per unit.
   - **(b) Minimum Transfer price from Rotor Division's viewpoint:** Maximum Transfer price = Market price of the product or Market price of its substitutes or the Recipient Division's ability to pay, whichever is less. In the given Case, Maximum Transfer price = Market price = Rs. 1,400 per unit.
   - **(c)** The Transfer price agreed to by both the managers within the negotiable range of **Rs. 1,100 to Rs.1,400** will meet all the criteria listed in (2) above.

Q.31. INDUSTRIAL DIAMONDS LTD has two divisions…..

Solution:

1. Computation of Transfer Prices

At 300% of Full costs = 300% x (4,000+8,000) ÷ 40 = **$900** At market price = 16,000÷40=**$400.**

2. Divisional and Company Profitability at different Transfer prices (In $)

	When Transfer prices = $900		**When Transfer prices = $400**	
Division	Philippines	US	Philippines	US
Forex Rate=1$ =	40 pesos	1 $	40 pesos	1 $
Product	Raw Diamonds	Polished Diamonds	Raw Diamonds	Polished Diamonds
Quantity	1,000 pounds	500 pounds	1,000 pounds	500 pounds
TP/SP per pound	900	4,000	400	4,000
Var. Costs per pound Own Transfer in	 100 -	 200 900 x 2 = 1,800	 100 -	 200 400 x 2 = 800
Contribution per pound	800	2,000	300	3,000
Less: Fixed costs	200	600	200	600
Profit Before Tax	600	1,400	100	2,400
Less: Tax	600 x 20% = 120	1,400 x 35% = 490	100 x 20% = 20	2,400 x 35% =840
Profit After Tax	480	910	80	1,560
Total profit	**4,80,000**	**4,55,000**	**80,000**	**7,80,000**
Company profits	**9,35,000**		**8,60,000**	

Observations: The company's overall PAT is maximized when Transfer price=300% of Full Costs.

3. Other Factors to be considered in choosing a transfer-pricing method: In transnational Transfer pricing, the following points should also be taken into account-

(a) Overall company Net PAT (not just of the Transferring and Recipient divisions).
(b) Income and Dividend repatriation restrictions in different countries.
(c) Transfer pricing laws in various countries.
(d) Competitive position of the subsidiaries in the respective countries.
(e) Impact of opportunity costs due to local competition faced by subsidiaries.
(f) Behavioural impact of the Transfer pricing decision on divisional managers and their sub-ordinate groups.

Q.41. GL Ltd. is a multiproduct manufacturing concern functioning with four divisions…
Solution:

(i) Electrical Division is operating at full capacity and selling its switches in the open market at ₹25 each. Therefore, it can transfer its production internally by giving up equal number of units saleable in the open market. In this situation, transfer price should be based on variable cost plus opportunity cost {₹16 + (₹25 - ₹16)} = ₹25/-.

As the price quoted by Household Division ₹18 is less than the transfer price based on opportunity cost, the Electrical Division should not accept internal transfer. Further, the company is measuring divisional performances based on ROI. Therefore, transferring for a price which is less than the minimum price would affect the return on investments and divisional performance severely.

(ii) In the total cost per night lamp, the Fixed Overheads being a fixed cost is not relevant for decision making. Similarly, the variable cost of switch (₹16 p.u.) included in the cost of night lamp is also irrelevant as it is common for both internal and external transfers. The only relevant cost is the loss of revenue when units are transferred internally.

Accordingly, the benefit from internal transfer would be {₹130 - (₹50 + ₹40) - ₹25) = ₹15/- on each unit sale on night lamp. Therefore, it is beneficial to the company as a whole to the extent of ₹15 per unit of night lamp sold.

Hence, internal transfer is profitable to the company as a whole. Further, Household Division is operating at 70% capacity and has experienced workers which may be utilized for other divisions requirements if any and based on contribution earned fixed cost could be minimized due to large scale of production.

(iii) Internal transfer pricing develops a competitive setting for managers of each division, it is possible that they may operate in the best interest of their individual performance. This can lead to sub-optimal utilization of resources. In such cases, transfer pricing policy may be established to promote goal congruence. The market price of ₹25 per switch leaves Electrical Division in an identical position to sale outside. Thus, ₹25 is top of the price range. Division Household will not pay to Electrical Division anything above (₹130 - ₹50 - ₹40) = ₹40/-. The net benefit from each unit of night lamp sold internally is Z15. Thus, any transfer price within the range of ₹25 to ₹40 per unit will benefit both divisions. Divisional Managers should accept the inter divisional transfers in principle when the transfer price is within the above range.

(iv) Transfer at marginal cost are unsuitable for performance evaluation since they do not provide an incentive for the supplying division to transfer goods and services internally. This is because they do not contain a profit margin for the supplying division. Chief Executive's intervention may be necessary to instruct the supplying division to meet the receiving division's demand at the marginal cost of the transfers. Thus, divisional autonomy will be undermined. Transferring at cost plus a mark-up creates the opposite conflict. Here the transfer price meets the performance evaluation requirement but will not induce managers to make optimal decisions.

To resolve the above conflicts the following transfer pricing methods have been suggested:

Dual Rate Transfer Pricing System

The supplying division records transfer price by including a normal profit margin thereby showing reasonable revenue. The purchasing division records transfer price at marginal cost thereby recording purchases at minimum cost. This allows for better evaluation of each division's performance. It also improves co-operation between divisions, promoting goal congruence and reduction of sub-optimization of resources.

Two Part Transfer Pricing System

This pricing system is again aimed at resolving problems related to distortions caused by the full cost based transfer price. Here,

transfer price = marginal cost of production + a lump-sum charge (two part to pricing).

While marginal cost ensures recovery of additional cost of production related to the goods transferred, lump-sum charge enables the recovery of some portion of the fixed cost of the supplying division. Therefore, while the supplying division can show better profitability, the purchasing division can purchase the goods at lower rate compared to the market price.

Q.48. BLACK and BROWN are two division in a group …..

Solution:

1. Computation of contribution from Blackballs and Brownalls

Particulars		Blackalls	Brownalls
	Quantity	200 units	300 units
	Selling price per unit	**Rs.45**	**Rs.54**
Less:	Variable costs per unit		
	Raw material Alpha	3 units x 6=Rs.18	2 units x6=Rs.12
	Raw material Beta	2 units x4=Rs.8	4 units x 4=Rs.16
	Processing cost	Rs.12	Rs.14
Contribution per units		Rs.7	Rs.12
Total contribution		**Rs.1,400**	**Rs.3,600**

Total company contribution = Rs.1,400 + Rs.3,600 = Rs.5,000.

2. **Transfer Price** = variable costs + Shadow price (i.e. Opportunity costs)
For Alpha TP = Rs.6.00 + Rs.0.50 = Rs.6.50 per units. For Beta TP = Rs.4.00 + Rs.75 = Rs.6.75 per units

3. **Contribution earned by various division, per units:**

(a) The Contribution per units of Black and Brown are –

Particulars		Blackalls	Brownalls
	Selling price per units	**Rs.45.00**	**Rs.54.00**
Less:	variable costs per units		
	Raw Material Alpha	3 units x 6.50 =Rs.19.50	2 units x 6.50 = Rs.13.00
	Raw Material Beta	2 units x 6.75 = 13.50	4 units x 6.75 = Rs.27.00
	Processing costs	Rs.12.00	Rs.14.00
	Contribution per units	**NIL**	**NIL**

(b) **Division A:** Contribution = Transfer price – variable price =shadow price = Rs.0.50 per units.

(c) **Division B:** Contribution =Transfer price – variable price = shadow price = Rs.2.75 per units

4. **Attitude of Division Managers to the above Transfer price:**

(a) **Division A and B:** since shadow prices constitute the opportunity costs, Managers of A & B will be satisfied with Transfer price at variable costs + shadow price. Their interests are well – protected since there will not be any opportunity loss due to internal transfer.

(b) **Division Black and Brown:** There is no incentive for processing the final product since the internal Transfer price results in Nil Contribution. These Managers will not be interested in the police of variable costs + shadow price since there is no extra monetary benefit further processing.

Q.55. City Instrument Company (CIC) consists…..

Solution:

1. Contribution per hour of Super-chips and Okay-chips:

	Super-chips	Okay-chips
Selling price per unit (Rs.)	600	120
Less : Variable cost per unit (Rs.)	300	80
Contribution per unit (Rs.)	300	40
Hours required per unit	2	0.5
Contribution per hour		150
	(Rs. 300/2 hrs.)	(Rs. 40/0.5 hrs.)

2. Details of hours utilised in meeting the demand of 15,000 units of Super-chips and utilising the eremaining hours for Okay-chips out of available hours of 50,000 per annum:

Hours utilised for manufacturing 15,000 units of Super-chips (15,000 units × 2 hours)	30,000
Hours utilised for manufacturing 40,000 units of Okay-chips (40,000 units × 0.5 hours)	20,000
	50,000

3. Contribution of a process control unit (using an imported complex circuit board):

	Rs.
Selling price per unit : (A)	1,400
Variable costs :	
Circuit board (Imported)	600
Other parts	80
Labour cost (5 hours × Rs. 100)	500
Total variable cost : (B)	1,180
Contribution per unit (Rs.) {(A) – (B)}	220

4. Contribution of a process control unit (using a Super chip) :

	Rs.
Selling price per unit : (A)	1,400
Variable costs :	
Super chip (Material + Labour costs)	300
Other parts	80
Labour cost (6 hours × Rs. 100)	600
Total variable cost : (B)	980
Contribution per unit : {(A) – (B)}	420

5. Incremental contribution per unit of a process control unit, when instead of using imported complex circuit board Super-chip is used :

Incremental contribution per unit (Rs.): 200
{Rs. 420 – Rs. 220}

(ii) Super-chip to be trasferred to Mini Computer Division to replace Circuit Boards :

Out of 50,000 available hours 30,000 hours are utilised for meeting the demand of 15,000 units of Super-chips, the rest 20,000 hours may be used for manufacturing 40,000 Okay-chips, which yields a contribution of Rs. 40 per unit for Rs. 80/- per hour (Refer to Working note 1) or a contribution of Rs. 160 per two-equivalent hours.

In case the company decides to forego the manufacturing of 20,000 units of Okay- chips in favour of 5,000 additional units of Super-chips to be used by Mini-Computer

Division (instead of complex imported Circuit Board) for manufacturing process control units. This decision would increase the existing contribution of Mini-Computer Division by Rs. 200/- per two-equivalent hours.

After taking into account the profit foregone of Okay-chips, the existing contribution of Mini-Computer Division of CIC would increase by Rs. 40 per two equivalent hours.

Hence the entire requirement of 5,000 units of Super-chips be produced and transferred to Mini-Computer Division.

(iii) Minimum transfer price of Super-chip to Mini Computer Division:

= Variable cost of a Super-chip + Opportunity cost of foregoing the production of an Okay-chip and using the craftman time for Super-chip

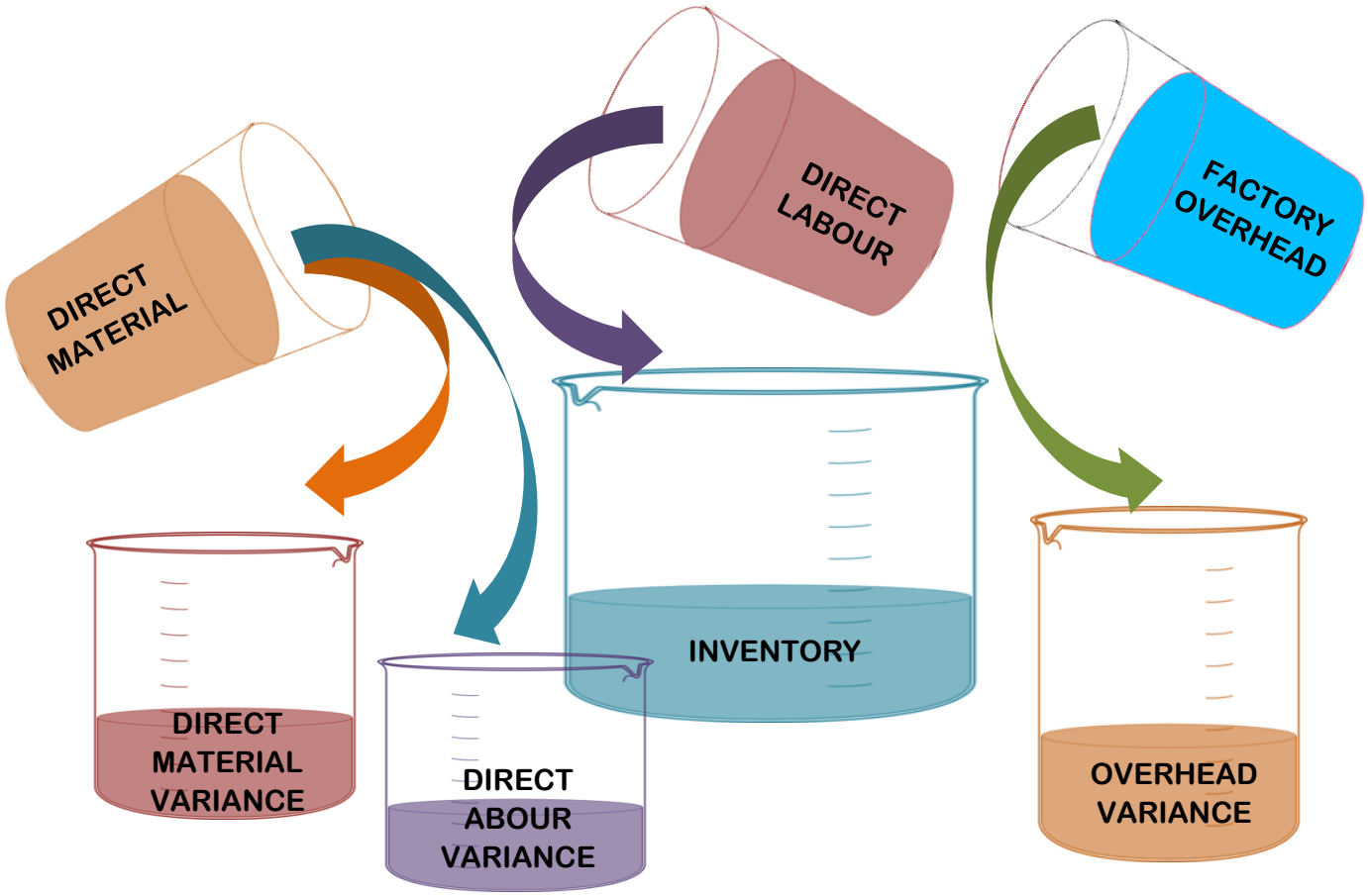
= Rs. 300 + 2 hours × Rs. 80

= Rs. 460

(iv) Super-chips to be produced for the production of 12,000 units of process control units:

After meeting out the order of 15,000 Super-chips per year, the concern is left out with 20,000 hours. Use of Super-chips for control units production would increase the existing contribution of Mini-Computer Division by Rs. 200/- per unit. Out of the remaining 20,000 craftmen hours, 10,000 units of Super-chips can be made, which may be used for the production of 10,000 process control units.

STANDARD COSTING



UNIT I: VARIANCES COMPUTATION

Q.12. A Company produces a finished product…..

Solution:

Variance Computation Table:

Particular	SQ x SR	AQ x AR		AQ x SR	RAQ x SR
		FIFO	LIFO		
Material A	3000 kgs x 25% x 4 = ₹3000	(200 x 4) + (450 x 4.5) = ₹2825	650 x 4.5 = ₹2925	650 x 4 = 2600	2800 x 25% x 4 = 2800
Material B	3000 kgs x 35% x 3 = ₹3150	(150 x 3) + (800 x 3.5) = ₹3250	950 x 3.5 =3325	950 x 3 = 2850	2800 x 35% x 3 = 2990
Material C	3000 kgs x 40% x 2 = ₹2400	(300 x 2) + (900 x 1.8) = ₹2200	(1100 x 11.8) + (100 x 2) = ₹2180	1200 x 2 = 2400	2800 x 40% x 2 = 2240
Total	₹8550	₹8295	₹8430	₹7850	₹7980

Furnished product = 2400 kgs = 80%

i.e. Total input = 2400/0.80 = 8000 kgs Material Cost Variance

Standard cost – actual cost

= SQ x SR – AQ x AR

FIFO = 8550 – 8295

= 255 (F)

Qty consumed = op + purchase

A = 200 + 800 – 350 = 650 kgs

B = 150 + 1000 – 200 = 950 kgs

C = 300 + 1100 – 200 = 1200 kgs

Actual Rate = Cost of purchase / purchase qty

A = ₹3600/800 = ₹4.5/kg

B = ₹3500/1000 = ₹3.5/kg

C = ₹1980/1000 = ₹1.8/kg

LIFO = 8550 – 8430

= 120 (F)

Material Price Variance

= (SR - AR) x AQ

= AQ x SR – AQ x AR

= 7850 – 8295

= 445 (A) – FIFO

= 7850 – 8430

= 580 (A) – LIFO

Material Usage Variance

= (SQ – AQ) x SR

= SQ x SR – AQ x SR

= 8550 – 7850

= 700 (F) – FIFO & LIFO

RAQ means raised actual QTY i.e. total actual QTY re-written in standard Proportion

Total QTY = 650 + 950 + 1200

= 2800 kgs.

Material Mix Variance

= (RAQ - AQ) x SR

= RAQ x SR – AQ x SR

= 7980 – 7850

= 130 (F)

Material Yield Variance

= (SQ - RAQ) x SR

= SQ x SR – RAQ - SR

= 8550 - 7980

= 570 (F)

Q.26. The following are the information regarding…..

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

$$\text{Actual hours for actual production} = \frac{\text{Actual Overheads}}{\text{Actual Overhead Recovery Rate Per Hour}}$$

$$= \frac{₹\ 12{,}800}{₹\ 8}$$

= 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

$$\text{Standard hours for actual output} = \frac{\text{Absorbed Overheads}}{\text{Standard Overhead Rate Per Hour}}$$

$$= \frac{₹\ 10{,}000}{₹\ 5}$$

= 2,000 hours

WORKING NOTE

Overhead Cost Variance = Absorbed Overheads (–) Actual Overheads
⇒ ₹ 2,800 (A) = Absorbed Overheads (–) ₹12,800
⇒ Absorbed Overheads = ₹10,000

$$\text{Standard Rate per hour} = \frac{\text{Budgeted Overheads}}{\text{Budgeted Hour}}$$

$$= \frac{₹\ 12{,}000}{2{,}400\ \text{hours}}$$

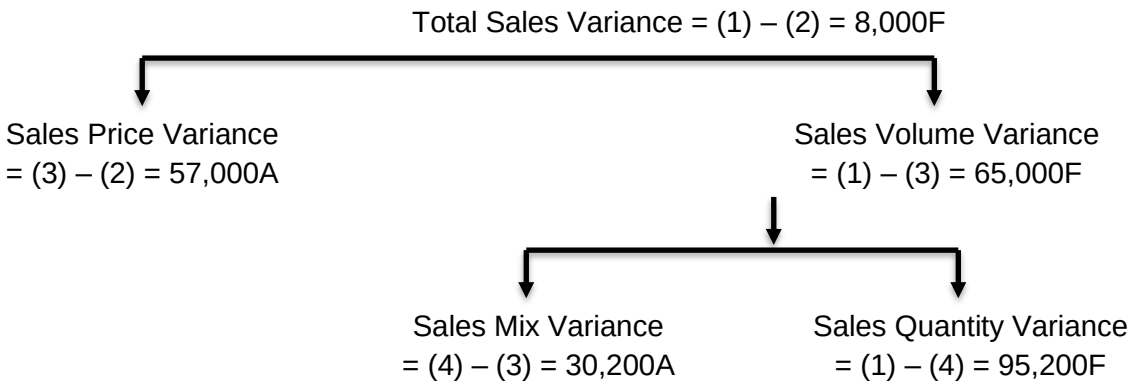
= ₹ 5

Q.28. China Toys Ltd. required you to compute….
Solution:

1. Total Approach or Turnover Approach (Impact on Turnover)

Particular	BQ x BP	AQ – AP	AQ x BP	RAQ x BP
	(1)	(2)	(3)	(4)
Bravo	5,000 x 100	5,750 x 120	5,750 x 100	5,200 x 100
Champ	4,000 x 200	4,850 x 180	4,850 x 200	4,160 x 200
Super	6,000 x 180	5,000 x 165	5,000 x 180	6,240 x 180
Total	**23,80,000**	**23,88,000**	**24,45,000**	**24,75,200**

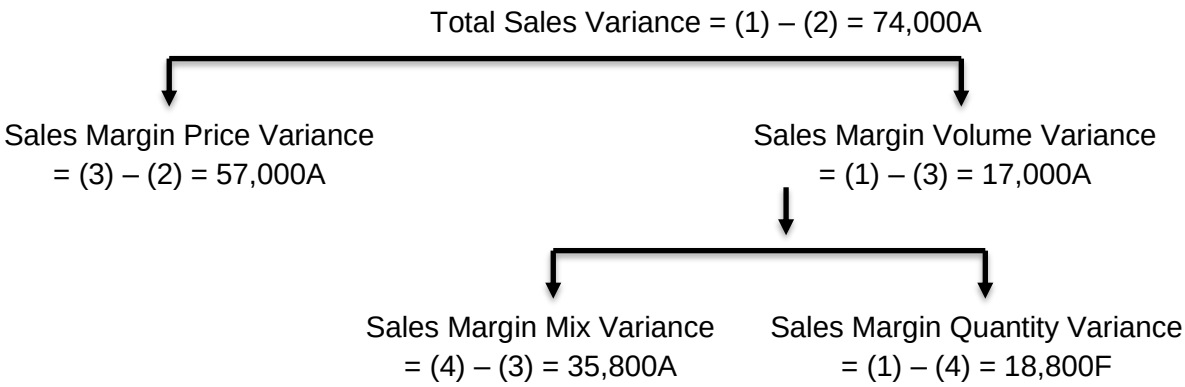
Variance



2. Margin Approach or Profit Approach (Impact on Profit)

Particular	BQ x BM	AQ – AM	AQ x BM	RAQ x BM
	(1)	(2)	(3)	(4)
Bravo	5,000 x 10	5,750 x 30	5,750 x 10	5,200 x 10
Champ	4,000 x 30	4,850 x10	4,850 x 30	4,160 x 30
Super	6,000 x 50	5,000 x 35	5,000 x 50	6,240 x 50
Total	**4,70,000**	**3,96,000**	**4,53,000**	**4,88,800**

Variances:



3. Working Notes:

(a) Computation of Revised Actual Quantity (RAQ): Total AQ sold = 5750 + 4850 + 5000 = 15600 units. This is apportioned in the ratio of budgeted quantity i.e. 5: 4: 6 for Bravo, Champ and Super toys. Hence the RAQ are 5200, 4160 and 6240 units respectively.

(b) Computation of Budgeted and Actual Margin

Particulars	Budgeted Margin (BM) = Budgeted Price (BP) – Standard Cost (SC)	Actual Margin (AM) = Actual Price (AP) – Standard Cost (SC)
Bravo	100 – 90 = 10	120 – 90 = 30
Champ	200 – 170 = 30	180 – 170 = 10
Super	180 – 130 = 50	165 – 130 = 35

4. Relationship between Total and Margin Approach

(a) Price Relationship: SMPV = SPV i.e. 57,000A. This relationship is applicable for individual products Bravo 1,15,000F + Champ 97,000A + Super 75,500A, and also for product combinations.

(b) Volume Relationship: SMVV = SVV x Budgeted Net Profit Ratio. This is applicable only for individual products and not their combinations. For example, in the case of Bravo, SVV = (1) – (3) = 75,000A. Budgeted Net Profit Ratio = 10/100 = 10%. Hence SMVV = 75,000 x 10% = 7,500A.

Q.29. A Company actually sold 8,000 units of A and ….

Solution:

Variances Computation Table

	BQ	RBQ	AQ	AP	BP	BC	BM	AM
A	6000	7200	8000	12	14	8	6	4
B	9000	10800	10000	16	13	10	3	6
	15000	18000						

Sales Margin Mix Variance:

(Actual Qty in Budgeted Mix – Actual Qty Actual Mix) x Budgeted Margin

A : (7,200 – 8,000) x 6 = - 4,800 (Fav)

B : (10,800 – 10,000) x 3 = 2,400 (Adv)

Total Mix Variance = - 2,400 (Fav)

Sales Margin Price variance = Actual Qty (Budgeted Margin – Actual Margin)

A 8,000 (6 - 4) = 16,000 (A)

B 10,000 (3 - 4) = 30,000 (F)

Total Price Variance 14,000 (F)

Q.30. A Company uses standard costing system….

Solution:

(a) Gross Margin Total Sales Variance = Actual Sales - Budgeted Sales
= AQ x MA – BQ x BM

A = 650 x 3 – 1280 x 40
= 3170 (A)
B = 3900 x 3 – 3200 x 2
= 5300 (F)
C = 1950 x 2 – 1920 x 3
= 1860 (A)
Total Sales Variance = 270 (F)

(b) Gross Margin Total Volume Variance = (AQ - BQ) x BM
= AQ – BM – BQ x BM
A = 650 x 4 – 1280 x 4
= 2520 (A)
B = 3900 x 2 – 3200 x 2
= 1400 (F)
C = 1950 x 3 – 1920 x 3
= 90 F
Total Seles Margin Volume Variance = 1030 (A)

(c) Gross Margin Sales Mix Variance = (AQ - RAQ) x BM
= AQ x BM – RAQ x BM
A = 650 x4 – 1300 x 4
= 2600 (A)
B = 3900 x 2 – 3250 x 2
= 1300 F
C = 1950 x 3 – 1950 x 3
= 0
Total sales margin mix variance = 1300 A

(d) Gross Margin Sales Qty. Variance = (RAQ - BQ) x BM
= AQ x BM – BQ x BM
A = 1300 x 4 – 1280 x 4
= 80 F
B = 3250 x 2 – 3200 x 2
= 1000 (F)
C = 1950 x 3 – 1920 x 3
= 90 F
Total Sales Margin Qty. Variance = 270 F

(e) Sales Price Variance = (AP - BP) x AQ
= AQ x AP – AQ x BP
A = 650 x 19 – 650 x 20
= 650 (A)
B = 3900 x 13 – 3900 x 12
= 3900 (F)
C = 1950 x 15 – 1950 x 16
= 1950 (A)
Total Sales Price Variance = 1300 (F)

(f) Total Cost Variance: Standard Cost – Actual Cost
= SC x AQ – AC x AQ
A = 650 x 16 – 650 x 18
= 1300 (A)
B = 3900 x 10 – 3900 x 12
= 7800 (A)
C = 1950 x 13 – 1950 x 13
= 0
Total Cost Variance = 9100 A

Q.36. The overhead expense budget for a cost centre is as follows:
Solution:

Expenses	Overhead Expenses Schedule			
	Budget: 120 Std. Hours		Actual: 156 Hours	
	Rate per hour Rs	Expenses Rs	Rate per hour Rs.	Expenses Rs
Indirect material	0.40	48	0.50	78
Indirect labour	0.60	72	0.60	94
Maintenance	0.40	48	0.45	70
Power	0.30	36	0.32	50
Sundries	0.30	36	0.29	45
Total variable overheads	2.00	240	2.16	337
Fixed overheads	2.00	240		250
Total overheads				
		480		587

Actual output = 12,160 units.

Hence standard hours produced or std. hours for actual production

$= \frac{120 \text{ Std. hours}}{9{,}600 \text{ units}}$ x 12,160 actual output = 152 hours.

Computation of variances: A. Fixed expenses

(a)	Charged to production (152 hours × Rs. 2 per hours)	Rs. 304
(b)	Fixed expenses as per budget	Rs. 240
(c)	Actual fixed overheads	Rs. 250

Volume variance = Fixed overhead recovery rate (Actual volume in std. hrs. – Budgeted volume in standard hrs.)
= Rs.2 (152 – 120) = Rs.64 (F)
Expenses variance = (Budgeted expenses – Actual expenses)
= Rs.240 – Rs.250 = Rs. 10 (A)
Total variance = (Fixed overheads absorbed – Actual fixed overheads)
= Rs.304 – Rs.250 = Rs.54 (F)

Volume variance: (a – b)	Rs.64 (F)
Expenses variance: (b – c)	Rs. 10 (A)
Total variance: (a – c)	Rs.54 (F)

B. Variable expenses

(a)	Charged to production: (152 hours × Rs.2)	Rs.304
(b)	Actual expenses	Rs.337
	Variable expenses variance (a – b)	Rs.33 (A)

Fixed expenses

(a) Charged to production 152 hours (Std.hours) at Rs.2 per hour	Rs.304
(b) Actual working hours × Std. rate: (156 hours × Rs. 2)	Rs.312
(c) Fixed expenses as per budget	Rs.240
(d) Actual fixed overheads	Rs.250

Efficiency variance = Std. fixed overhead rate per hr. (Std. hrs. for actual production – Actual hrs)
= Rs. 2 (152 hours – 156 hours) = Rs.8 (A)

Capacity variance = Std. fixed overhead rate per hour (Actual capacity – Budgeted capacity)
= Rs.2 (156 hours – 120 hours) = Rs.72 (F)

Volume variance = Fixed overhead recovery rate per hr. (Actual volume in Standard hrs. – Budgeted volume in standard hrs.)
= Rs. 2 (152 hours – 120 hours) = Rs. 64 (F)

Expense variance = Budgeted expenses – Actual expenses
= Rs. 240 – Rs.250 = Rs. 10 (A)

Total variance = Fixed overheads absorbed – Actual fixed overheads
= Rs. 304 – Rs. 250 = Rs. 54 (F)

OR

Efficiency variance	: (a – b)	Rs. 8 (A)
Capacity variance	: (b – c)	Rs. 72 (F)
Volume variance	: (a – c)	Rs.64 (F)
Expenses variance	: (c – d)	Rs.10 (A)
Total variance	: (a – d)	Rs.54 (F)

Q.56. Trident Toys Ltd. manufactures a single product and the standard cost system is followed.

Solution:

(i) COMPUTATION OF VARIANCES

Material Usage Variance	=	Standard Price x (Standard Quantity - Actual Quantity)
	=	₹4.00 x (18,000* Kgs. - 20,000 Kgs.)
	=	₹8,000 (A)
		* $\left(1{,}800 \text{ units x } \frac{20{,}000 \text{ kgs.}}{2{,}000 \text{ units}}\right)$
Labour Efficiency Variance	=	Standard Rate x (Standard Hours - Actual Hours)
	=	₹8.00 x (14,400* hrs. - 14,800 hrs.)
	=	₹3,200 (A)
		* $\left(1{,}800 \text{ units x } \frac{16{,}000 \text{ hrs.}}{2{,}000 \text{ units}}\right)$
Variable Overhead Efficiency Variance	=	= Standard Variable Overheads for Production - Budgeted Variable Overheads for Actual hours
	=	(14,400 hrs. x Rs.3.00) - (₹3.00 x 14,800 hrs.)
	=	₹1,200 (A)
Fixed Overhead Volume Variance	=	Absorbed Fixed Overheads - Budgeted Fixed Overheads
	=	(14,400 hrs. x Z3.00) - (16,000 hrs. x ₹3.00)
	=	₹4,800 (A)
Sales Margin Volume Variance	=	Standard Margin - Budgeted Margin
	=	(1,800 units x ₹56.00) - (2,000 units x ₹56.00
	=	₹11,200 (A)
Sales Contribution Volume Variance	=	Standard Contribution - Budgeted Contribution
	=	(1,800 units x ₹80.00) - (2,000 units x ₹80.00)
	=	₹16,000 (A)

Statement Showing "Reconciliation Between Budgeted Profit & Actual Profit"

Particulars	Conventional Method (₹)	Relevant Cost Method (₹)		
		Scarce Material	Scarce Labour	No Scarce Inputs
Budgeted Profit (2,000 units x ₹56)	1,12,000	1,12,000	1,12,000	1,12,000
Sales Volume Variance	11,200 (A)	NIL*	12,000$ (A)	16,000 (A)
Material Usage Variance	8,000 (A)	24,000 (A)	8,000 (A)	8,000 (A)
Labour Efficiency Variance	3,200 (A)	3,200 (A)	7,200 (A)	3,200 (A)
Variable Overhead Efficiency Variance	1,200 (A)	1,200 (A)	1,200 (A)	1,200 (A)
Fixed Overhead Volume Variance	4,800 (A)	N.A.#	N.A.#	N.A.#
Actual Profit	**83,600**	**83,600**	**83,600**	**83,600**

NOTES

Scarce Material

Based on conventional method, direct material usage variance is ₹8,000 (A) i.e. 2,000 Kg. x ₹4. In this situation material is scarce, and, therefore, material cost variance based on relevant cost method should also include contribution lost per unit of material. Excess usage of 2,000 Kg. leads to lost contribution of ₹16,000 i.e. 2,000 Kgs. x ₹8. **Total material usage variance based on relevant cost method, when material is scarce will be: ₹8,000 (A) + ₹16,000 (A) = ₹24,000 (A).** Since labour is not scarce, labour variances are identical to conventional method.

Excess usage of 2,000 Kgs. leads to loss of contribution from 200 units i.e. ₹16,000 (200 units x ₹80). It is not the function of the sales manager to use material efficiently. Hence, loss of contribution from 200 units should be excluded while computing sales contribution volume variance.

(*).—> Therefore, sales contribution volume variance, when materials are scarce will be NIL i.e. ₹ 16,000 (A) - ₹ 16,000 (A).

Scarce Labour

Material is no longer scarce, and, therefore, the direct material variances are same as in conventional method. In conventional method, excess labour hours used are: 14,400 hrs. – 14,800 hrs. = 400 hrs. Contribution lost per hour = ₹10. Therefore, total contribution lost, when labour is scarce will be: 400 hrs. x ₹10 = ₹4,000. **Therefore, total labour efficiency variance, when labour hours are scarce will be ₹7,200 (A) i.e. ₹3,200 (A) + ₹4,000 (A).**

Excess usage of 400 hrs. leads to loss of contribution from 50 units i.e. ₹4,000 (50 units x 280). It is not the function of the sales manager to use labour hours efficiently. Hence, loss of contribution from 50 units should be excluded while computing sales contribution volume Variance.

($)—>

Therefore, sales contribution volume variance, when labour hours are Scarce will be ₹12,000 (A) i.e. ₹16,000 (A) - ₹4,000 (A).

Fixed Overhead Volume Variance

(#) —> The fixed overhead volume variance does not arise in marginal costing system. In absorption costing system, it represents the value of the under or over absorbed fixed overheads due to change in production volume. When marginal costing is in use there is no overhead volume variance, because marginal costing does not absorb fixed overheads.

(ii) Comment on Efficiency and Responsibility of the Sales Manager

In general, Gross Profit (or contribution margin) is the joint responsibility of sales managers as well as of production managers. On one hand the sales manager is responsible for the sales revenue part, on the other hand the production manager is accountable for the cost-of-goods-sold component. However, it is the top management who needs to ensure that the target profit is achieved by the organization. The sales manager is accountable for prices, volume, and mix of the product, whereas the production manager must control the costs of materials, labour, factory overheads and quantities of production. The purchase manager must purchase materials at budgeted prices. The personnel manager must employ right people at the right place with appropriate wage rates. The internal audit manager must ensure that the budgetary figures for sales and costs are being adhered by all departments which are directly or indirectly involved in contribution of making profit. Thus, sales manager is not responsible for contribution lost due to excess usage or inefficient usage of resources in case of scarce resources. Hence, such contribution lost must be excluded from the sales contribution volume variance.

Q64. Budget Ratios Calculation….

Solution:

(a)

Calendar Ratio:

= Actual No. of Days / Budgeted No. of Days
= 30 / 25
= 120%

Capacity Ratio:

= Actual hours worked / Budgeted Hours
= 80% (given)

Volume Ratio:

= 130% Since Company has produced Actual volume 30% more than budget

Using Inter-relationship

Volume Ratio = Calendar Ratio * Capacity Ratio * Efficiency Ratio

130% = 120% * 80% * Efficiency Ratio

Therefore, Efficiency Ratio = 135.42%

(b)

Particulars	**Standard Hours Produced**		
	Product X	**Product Y**	**Total**
Output (units)	1,000	600	
Hours per unit	5	10	
Standard Hours	5,000	6,000	11,000

Actual Hours Worked: (50 workers ×8 hours × 25 days) 10,000

Budgeted Hours per month: (1,02,000 / 12) 8,500

Capacity Ratio $= \frac{\text{Actual Hours}}{\text{Budgeted Hours}} \times 100 = \frac{10,000}{8,500} \times 100$ **117.65%**

Efficiency Ratio $= \frac{\text{Standard Hours Produced}}{\text{Actual Hours}} \times 100 = \frac{11,000}{10,000} \times 100$ **110.00%**

Activity Ratio $= \frac{\text{Standard Hours Produced}}{\text{Budget Hours}} \times 100 = \frac{11,000}{8,500} \times 100$ **129.41%**

Relationship

Activity Ratio = Efficiency Ratio × Capacity Ratio

$= \frac{110.00 \times 117.65}{100}$ **129.41%**

(c)

Efficiency Ratio:

=Standard Hours of Actual production/Actual Hours worked*100
= (750 units*10 hours)/6000*100
=125%

Activity Ratio:

= Standard Hours of Actual production/Budgeted Hours*100
= [(750 units*10 hours)/(880 units*10 hours)]*100
=85.23%

Capacity Ratio:

=Actual hours worked/Budgeted Hours*100
= [6000 hours/(880 units*10 hours)]*100
= 68.18%

UNIT II: RECONCILIATION STATEMENT

Q.74. ABC Ltd manufactures three types of products…

Solution: **1. Computation of Standard Margin (Contribution) and Sales Activity Variance**

Product	**1**	**2**	**3**
(a) Forecast (Budgeted) price	15.00	20.00	40.00
(b) Standard Budgeted cost			
Labour at Rs.20 per hour	0.2 x 20 = 4.00	0.25 x 20 = 5.00	0.4 x 20 = 8.00
Materials at Rs.4 per kg	1.0 x 4 = 4.00	1.1 x 4 = 4.40	1.3 x 4 = 5.20
Energy at Rs.4 per kwhr	0.5 x 6 = 3.00	0.6 x 6 = 3.60	0.8 x 6 = 4.80
Total variable costs	11.00	13.00	18.00
(c)standard contribution margin	**4.00**	**7.00**	**22.00**
(d)Budgeted sales Quantity	10,000 units	6,000 units	2,000 units
(e)Actual sales Quantity	12,000 units	5,500 units	1,800 units
(f)sales Activity variance =(d-e)xc	**8,000 F**	**3,500 A**	**4,400 A**

2. Computation of Price Recovery Variance

(a) Sales price variance for the Product

Product	**Budg Price**	**Actual price**	**Actual sale**	**SPV**
(a)	**(b)**	**(c)**	**(d)**	**(e) = (b - c) x d**
Product 1	Rs.15	Rs.16	12,000 units	12,000 F
Product 2	Rs.20	Rs.22	5,500 units	11,000 F
Product 3	Rs.40	Rs.40	1,800 units	Nil
Total				**23,000 F**

(b) Input Cost Variance for the Inputs

Input	**Budg Cost pu**	**Actual Cost pu**	**Actual Input**	**Cost Variance**
(a)	**(b)**	**(c)**	**(d)**	**(e) = (b - c) x d**
Labour	Rs.20.00	Rs.21.40	5,212 hours	5,212 A
Materials	Rs.4.00	Rs.4.40	21,920 kg	8,768 A
Energy	Rs.6.00	Rs.5.80	10,633 kwhr	2,127 F
Fixed Costs	Rs.84,000	Rs.80,000	Cost Variance	4,000 A
Total				**15,853 F**

(c) Price Recovery Variance = Sales Price Variance – Input Cost Variance =(a-b) = **7,147 F.**

3. Computation of Productivity (or Efficiency) Variance

Input	**Standard Consumption**	**Actual Consumption**	**Budg Cost p.u.**	**Productivity Variance**
(a)	**(b)**	**(c)**	**(d)**	**(e) = (b - c) x d**
Labour	4,495 hours	5,212 hours	Rs.20.00	14,340 A
Materials	20,390 kg	21,920 kg	Rs.4.00	6,120 A
Energy	10,740 kwhr	10,633 kwhr	Rs. 6.00	642 F
Total				**19,818 F**

Standard Consumption of Inputs = Expected Consumption for Actual Output, computed as under–

- Labour: (12,000 units x 0.2) + (5,500 units x 0.25) + (1,800 units x 0.40) = 4,495 hours.
- Materials: (12,000 units x 1.0) + (5,500 units x 1.1) + (1,800 units x 1.3) = 20,390 kg.
- Energy: (12,000 units x 0.5) + (5,500 units x 0.6) + (1,800 units x 0.8) = 10,740 kwhr.

Q.77. A Company, which uses standard marginal costing, furnishes….
Solution:

1. Basic Computations

(a) Budgeted Margin = (Budgeted Sales — Budgeted Costs) + No. of Units
= (Rs. 15,00,000 — Rs. 12,00,000) ÷ 6,000 Units = **Rs.50 per unit.**

(b) Actual Quantity of Material Consumed = Rs. 2,70,000 ÷ Rs. 7.50 = **36,000 Kgs.**

(c) Standard Quantity of Material Per Unit = (Rs.2,40,000 ÷ Rs. 8 per unit) ÷ 6,000 units = **5 Kgs.**

(d) Standard Quantity of Material for Actual Output = Standard Quantity of Material Per Unit x Actual Output = 5 Kgs per unit x 6,400 Units = **32,000 Kgs.**

(e) Actual Labour Hours = Rs.4,16,000 ÷ Rs. 6.40 = **65,000 Hours.**

(f) Standard Labour Hour per unit of Output = (Rs.3,60,000 = Rs.6 per unit) ÷ 6,000 Units.= **10 Hours.**

(g) Standard Labour Hours for Actual Output = Standard Labour Hour Per Unit x Actual Output = 10 Hours per unit x 6,400 Units = **64,000 Hours.**

(h) Budgeted Labour Hours = Rs. 6,00,000 ÷ Rs. 6 = **60,000 Hours.**

(i) Standard VOH Per Hour Rate = Budgeted VOH ÷ Budgeted Hours = Rs.Y,60,0000÷ 60,000 Hrs = **Rs.10 ph.**

2. Sales Variances

BQ x BP (1)	AQ x AP (2)	AQ x BP (3)	Sales Variances Total (1) - (2) = 1,96,000F	
			Price (3) - (2)	Volume (1) - (3)
6,000 x **250** = 15,00,000	6,400 x **265** = 16,96,000	6,400 x 250 = 16,00,000	= 96,000F	= 1,00,000F

Market Size Variance = Budgeted Market Share % x (Budgeted Industry Sale Qty Actual Industry Sale Qty x Budgeted Average Contribution p.u.

= 12% x [(6,000 Units + 12%) - 60,000 Units)] x Rs. 50

= 12% x (50,000 Units — 60,000 Units) x Rs. 50 = **Rs. 60,000 (F)**

Market Share Variance = Actual Industry Sale Quantity x (Budgeted Market Share % — Actual Market Share %) x Budgeted Average Contribution p.u.)

= 60,000 Units x [12% — (6,400 + 60,000)] x Rs. 50

= 60,000 Units x 0.0133 x Rs. 50 = Rs. **40,000 (A)**

Note: Market Size Variance + Market Share Variance = Total Sales Margin Volume Variance (see below)

Gross Margin Sales Volume Variance = Sales Margin Volume Variance x PV Ratio
= Rs.1,00,000 F x 50/250 = **Rs.20,000F**

3. Materials Variances

SQ x SP (1)	AQ x AP (2)	AQ x SP (3)	Material Variances Cost (1) - (2) = 14,000A	
			Price (3) - (2)	Usage (1) - (3)
(6,000 x 5) x 8 = 2,56,000	**3,600** x 7.50 = 2,70,000	36,000 x 8 = 2,88,000	= 18,000F	= 32,000A

4. Labour Variances

SH x SR (1)	AH x AR (2)	AH x SR (3)	Labour Variances Cost (1) - (2) = 32,000A	
			Rate (3) - (2)	Efficiency (1) - (3)
(6,000 x 10) x 6 = 3,84,000	**65,000** x 6.40 = 4,16,000	65,000 x 6 = 3,90,000	= 26,000A	= 6,000A

5. VOH Variances

SH x SR (1)	AVOH (2)	AH x SR (3)	VOH Variances Cost (1) - (2) = 8,000A	
			Exp. (3) - (2)	Efficiency (1) - (3)
(6,400 x 10) x 10 = 6,40,000	6,48,000 (Given)	65,000 x 10 = 6,50,000	= 2,000F	= 10,000A

6. Statement Reconciling Budgeted Contribution with Actual Contribution:

Particulars		Rs.
	Budgeted Contribution	**3,00,000**
Effect of Variances	Material Price	18,000
	Material Usage	(32,000)
	Labour Rate	(26,000)
	Labour Efficiency	(6,000)
	VOH Expenditure	2,000
	VOH Efficiency	(10,000)
	Sales Margin Price (SMPV = SPV)	96,000
	Sales Margin Volume (SMVV = SVV x PVR)	20,000
Actual Contribution		**3,62,000**

Q.88. Budgetary Control and Standard Costing are used within a Life Insurance…

Solution:

(i) Control Report

Code		Fixed Budget	Flexed Budget	Actual	Variances
		7,500 units	6,750 units	6750	
301	Sales salaries	Rs. 30,000	Rs. 30,000	33,750	Rs. 3750 (A)
302	Staff Commission	30,000	27,000	28,500	1,500 (A)
303	Staff expenses	15,000	13,500	13,000	500 (F)
431	Underwriting Staff	45,000	40,500	50,000	9,500 (A)
599	Other Admin Costs	30,000	30,000	33,000	3,000 (A)
		1,50,000	1,41,000	158,250	17,250 (A)

(ii) Sales Salaries. Rs. 3,750 (A) Rate Variance is due to unanticipated pay award.
Sales Commission – Rs. 3000 (F) is due to drop in activity and Rs. 1500 (A) may be due to increasing sales commission on selected policies or due to inefficiency.
Sales Expenses – Rs. 1500 reduction due to drop in activity and Rs. 500 (F) for improved control.
Underwriting Salaries – Rs. 4,500 (F) due to drop in activity, Rs. 5062 (A) due to unbudgeted salaries increases and Rs. 4,438 (A) due to inefficiency. .
Other Administration – Rs. 3,000 (A) seem to have been caused by changes due to high cost suppliers or hiring temporary office staff

Q.94. A single product Company operates a system of standard costing……

Solution:

Since actual cost figures & variance are given, therefore, standard cost can be found easily, SC found will be for 18000 units & we would need to express it for Bo of 2000 units.

(1) Budgetary statement:

Particular	Computation	Amt.(Per unit)	Amt
No. of units sold	65x2000 [WN#1]	65	$\frac{20000}{1300000}$
Less: Costs Direct Material	(204750 – 15750 - 27000) x $\frac{20000}{18000}$	9	180000
Direct Labour	(212040 – 6840 +10800) x $\frac{20000}{18000}$	12	240000
VOH	(277020 + 14400 - 3420) x $\frac{20000}{18000}$	16	320000
FOH	$\frac{(32500-25000)}{20000}$	15	300000
Budgeted Profit		13	260000

(2) Since, FOH volume variance needs to be calculated, therefore SMVV will note be calculated based on profit margin not contribution margin.

SMVV = (AO - BO) x BM

= (18000 - 20000) x 13

= 26000A

FOH volume variance = (AO - BO) x SRpu
= (18000 - 20000) x 15
=30000A

Operating statement [Absorption costing]

Particular	**Amt**
Budgeted profit	260000
Add less: effect of variance	
SMVV	26000A
SPV	45000F
MPV	15750A
MUV	27000A
LRV	6840A
LEV	10800F
VOH .Eff. V	14400F
VOH Exp. V	3420A
FOH Exp.	25000A
FOH Vol. V	30000A
Actual profit	196190

Q.95. The following is the Operating Statement of a Company for April….

Solution:

1.

(a) Budgeted Fixed Overhead (per unit): $= \frac{\text{Budgeted Fixed Overheads p.a.}}{\text{Budgeted Output for the year}}$

$= \frac{₹4,80,000}{1,20,000 \text{ units}}$

= ₹ 4 (per unit)

(c) Budgeted Fixed Overhead Hour: $= \frac{\text{Budgeted Fixed Overheads per unit}}{\text{Standard Labour Hours per unit}}$

$= \frac{₹4}{2 \text{ hours}}$

= ₹2 per hour

2. Statement showing Standard Cost and Budged Selling Price

(a) Standard Cost (per unit)	(₹)
Direct Material (5 kg. × ₹ 4/- per kg.)	20
Direct Labour (2 hours × ₹ 3/- per hour)	6
Fixed Overhead (2 hours × ₹ 2)	4
Total Standard Cost (per unit)	30

(b) Budgeted Selling Price (per unit)

Standard Cost (per unit)		30
Standard Profit (per unit)	10	
(25% on Sales or 33-1/3% of Standard Cost)		
Budgeted Selling Price (per unit)	40	

3. (a) Actual Output (units) for April, 2013

Fixed Overhead Volume Variance = Efficiency Variance + Capacity Variance
= ₹2,400 (F) + ₹4,000 (A)
= ₹1,600 (A)

Fixed Overhead Volume Variance = Absorbed Overheads – Budgeted Overheads
= (Standard Hrs for Actual Output – Budgeted Hrs) × Standard Fixed Overhead Rate per hour

(–) ₹ 1,600 = (2 hrs × Actual Output – 10,000 units × 2 hrs) × ₹ 2
Actual Output = 9,600 units

(b) Actual Fixed Overhead Expenses

Fixed Overhead Expenses Variance = Budgeted Fixed Overheads – Actual Fixed Overheads
₹ 1,400 (F) = ₹40,000 – Actual Fixed Overheads
Actual Fixed Overheads = ₹38,600

4. (a) Actual Sales Quantity (units)

Sales Margin Volume Variance = Budgeted Margin per unit × $\left(\begin{matrix}\text{Actual Sales}\\ \text{Quantity units}\end{matrix} - \begin{matrix}\text{Budgeted}\\ \text{Quantity units}\end{matrix}\right)$

₹ 4,000 (A) = ₹10 × (Actual Sales Quantity – 10,000 units)
Actual Sales Quantity = 9,600 units

(b) Actual Selling Price (per unit)

Sales Price Variance = $\left(\begin{matrix}\text{Actual Selling}\\ \text{Price per unit}\end{matrix} - \begin{matrix}\text{Budgeted Selling}\\ \text{Price per unit}\end{matrix}\right)$ x Actual Sales units

₹ 9,600 (F) = (Actual Selling Price per unit – ₹40) × 9,600 units
Actual Selling Price per unit = ₹41

5. (a) Actual Quantity of Material Consumed

Material Usage Variance = $\left(\begin{matrix}\text{Standard}\\ \text{Quantity}\end{matrix} - \begin{matrix}\text{Actual}\\ \text{Quantity}\end{matrix}\right)$ x $\frac{\text{Standard Price}}{\text{per unit}}$

₹ 6,400 (A) = (9,600 units × 5 kg. – Actual Quantity) × ₹4
Actual Quantity = 49,600 Kg.

(b) Actual Price per kg

Material Price Variance = (Standard Price per kg. – Actual Price per kg.) × Actual Quantity of Material Consumed
4,960 (A) = (₹4 – Actual Price per kg.) × 49,600 Kg.
Actual Price per kg = ₹ 4.10

6. (a) Actual Direct Labour Hours Used

Labour Efficiency Variance = (Standard Hours – Actual Hours) × Standard Rate per hour

₹ 3,600 (F) = (9,600 units × 2 hrs – Actual Hours) × ₹3

Actual Direct Labour Hours = 18,000 hours

(b) Actual Direct Labour Hour Rate

Labour Rate Variance = $\left(\begin{matrix}\text{Standard}\\ \text{Rate per hour}\end{matrix}\ \begin{matrix}\text{Actual}\\ \text{Rate per hour}\end{matrix}\right)$ x Actual Direct Labour Hours

₹3,600 (A) = (₹3 per hour – Actual Rate per hour) × 18,000 hours

Actual Direct Labour Hour = ₹3.20 per hour Rate

ANNUAL FINANCIAL PROFIT /LOSS STATEMENT

(FOR APRIL, 2013)

Particulars	Qty./ Hours	Rate/Price (₹)	Actual Value (₹)
(a)	(b)	(c)	(d)=(b)×(c)
Sales: (A)	9,600 units	41	3,93,600
Direct Materials:	49,600 kgs.	4.10 per kg.	2,03,360
Direct Labour:	18,000 hours	3.20 per hour	57,600
Fixed Overheads:	18,000 hours	2.144. per hour	38,600
Total Costs: (B)			2,99,560
Profit: [(A) – (B)]			94,040

Q.97. A Company making a single product, presents the accounts…..
Solution:

1. Computational notes

(b) Adverse cost variance leads to additional cost whie favourable cost variance means savings in cost. Hence standard cost + adverse cost variances less favourable cost variances = actual cost. So **standard costs for actual output =** Actual cost + Favourable cost variances less adverse cost variances

(c) Fixed OH expenditure variance = Budgeted FOH less Actual FOH.

(d) Sales Price variance is the same under total and margin approach i.e Impact on turnover = Impact on Profit. Hence standard sales value for actual output = Actual sales value+- Sales Price variance.

2. Profit Statement (in Rs)

Particulars	Actuals(given)	Standards for actual output	Original budget
Quantity	For 960 units	For 960 units	For 1000 units
1.Sales	29700	**(Note 1c)** 29700 – 900f = **28800**	**30000**
Materials cost	3960	3960 – Price 40A – Usage 80A = 3840	3840/960 units * 1000 units = 4000
Labour cost	5690	5960+100F – efficiency 300A = 5760	5760/960*1000 = 6000 units
VOH costs	9700	9700+ Price 400F – Efficiency 500A = 9600	9600/960*1000 = 10000 units
FOH cost	5200	5000/1000 * 960 = 4800	**(Note 1b)** 5200-200 A = 5000
2. Total Cost	24820	24000	25000
3.Profit	4880 (Actual Profit)	4800 (Standard Profit)	5000 (Budgeted Profit)

1. Sales variance

Col (1) BQ* BP	**Col (2) AQ*BP**	**Col(3): AQ*AP**
BQ = given , BP from Col 2 1000 units * 30 = ₹ 30000	AQ = given BP = bal.fig 960 units * 30 = ₹ 28800 (i.e actual cost * 29700 less SPV ₹ 900F	AQ = given AP = bal fig 960 units * 30.94 =₹ 29700 (gn)

Volume variance = ₹ 30,000 – 28800 = ₹ 1200A + Price variance = SPV = 900F
Total Sales variance = SVV ₹ 1200A+SPV ₹ 900F = 300A

2. Material Variance

Col (1) SQ* SP	**Col (2) AQ*SP**	**Col(3): AQ*AP**
SQ = bal fig, SP = given 768 kgs * ₹ 5 = ₹3840 (i.e Actual cost ₹3960 less MCV Rs.120A	AQ = given SP = given 784 kgs * ₹ 5 = ₹3920 (i.e actual cost * ₹3960 less MPV Rs.40A	AQ from col 2, AP = gn 784 kgs * 5.05 =₹.3960 (gn)

Usage variance (given) =₹ 80A + Price variance = ₹ 40A
Total material cost variance = 120A

3. Labour variance

Col (1) SH* SR	Col (2) AH*SR	Col(3): AH*AR
SH= bal fig SR = given 960hrs * ₹ 6 = ₹ 5760 (Actual cost ₹ 5960 less LCV ₹ 200A	AH = Bal fig SR = giv 1010 hrs * ₹ 6 = ₹6060 (i.e Std cost * ₹ 5760 + LEV ₹ 300A	AH form col 2 AR= bal fig 1010 hrs * ₹ 5.90 = ₹ 5960 (gn)

Efficiency variance = ₹300 A + Rate variance = ₹100F
Total labour variance = LEV ₹300A + LRV ₹100F = ₹200A

4. VOH variance

Col (1) SH* SR	Col (2) AH*SR	Col(3): AVOH
SH from labour SR = given 960 hrs * ₹ 10 = ₹ 9600	AH from labour SR given 1010* ₹ 10 = ₹ 10100	Given ₹ 9700

Efficiency variance (given) = ₹ 500A Expenditure variance (given) = ₹ 400F
Total VOH cost variance = 100A

5. FOH variance

Col (1) SH* SR	Col (2) AH*SR	Col(3): AVOH	AFOh
AO= given , SR from Col 3 960 unts * ₹ 5 = ₹ 4800	AH from loabour, SR See note 1010 hrs * ₹5 = ₹5050	BQ = given SR = bal fig 1000 units * ₹5 = ₹5000 (i.e AFOH* ₹5200 less exp variance ₹200A	Given 5200

Efficiency variance = ₹ 4800-5050= ₹250A capacity variance = ₹ 5050-5000 = ₹50F
Expenditure variance = ₹ 200A
Total FOH variance = ₹ 550A+ ₹ 50F + ₹ 200A = 700A

6. Profit Statement

Particulars	Actual	Standard for actual output	Original budget
Quantity	960 units	960 units	1000 units
Note	Last columns of variable chart ₹	From col 1 of variable chart ₹	Proportionate computation ₹
Sales	29700	28800	30000
Material cost	3960	3840	4000
Labour cost	5960	5760	6000
VOH Cost	9700	9600	10000
FOH cost	5200	4800	5000
Total cost	24820	24000	25000
Profit	4880 (Actual profit)	4800 (Standard profit)	5000 (Budgeted profit)

FOH standard rate per hour = ₹ 5/1hr = ₹ 5 p.h

Q.99. On 1st April, ZED…..

Solution:

Since Material Price Variance applies to material purchased during April, Material Purchase Price Variance should be considered first. **MPPV = PQ x SP – PQ x AP.**

1. Material Variances

SQ x SP (1)	AQ x AP (2)	AQ x SP (3)	Material Variances
(4,000 x 3) x 5 = 60,000	12,500 x 5.25 = 65,625	**12,500** x 5 = 62,500	Cost (1) – (2) = 5,625A Price (3) – (2) = 3,125A Usage (1) – (3) = 2,500A

2. Labour Variances

SH x SR (1)	AH x AR (2)	AH x SR (3)	Labour Variances
(4,000 x $^1/_2$) x 20 = 40,000	1,900 X **21** = 39,900	**1,900** x 20 = 38,000	Cost (1) – (2) = 100F Price (3) – (2) = 1900A Efficiency (1) – (3) = 2000F

Working Notes:

a. Material Purchased = Sundry Creditors = Rs.68,250. Hence PQ x AP = 68,250

b. Material Purchased Price Variance = PQ x SP - PQ x AP = 3250A
(PQx5) - 68,250 = - 3,250. Hence, 5PQ = 65,000. On solving, **PQ = 13,000 kgs.**

c. Since PQ x AP = 68,250, AP = 68,250 ÷ 13,000 = **Rs.5.25 per kg.**

d. Material Usage Variance = (1) – (3) = 2,500A
60,000 – (3) = - 2,500. Hence, **(3) = 62,500.** On balancing, **AQ = 12,500 kgs.**

e. Labour Efficiency Variance = (1) – (3) = 2,000F
40,000 –(3) = 2,000 Hence, **(3) = 38,000.** On balancing, **AH = 1,900 hours.**

f. Labour Rate Variance = (3) – (2) = 1,900A
38,000 – (2) = - 1,900. Hence, **(2) = 39,900.** On balancing, **AR = Rs.21 per hour.**

Answers:

• Standard Direct Labour Hours allowed for the actual output achieved = 2000 hours. • Actual Hours worked = 1,900 hours. • Actual Direct Labour Rate = 21 per hour. • Actual Direct Labour cost = Rs. 39,900	• Std Quantity of Direct material allowed = 12,000 kgs. • Actual Qty of Direct materials used = 12,500 kgs. • Actual Qty of Direct materials purchased = 13,000 kgs. • Actual Direct materials price per kg. = Rs.5.25