Advanced Management accounting answer key

1a)

Statement Showing "Ranking for Manufacturing"

	A (₹)	B (₹)	C (₹)
Demand	1,200	1,200	1,500
Buy Price	280	xxx	161
Less: Variable Cost	187	215	111
Saving in Cost *per unit*	93	xxx	50
Hrs. Required -"Q"	3	3	1
Saving in Cost *per machine hour*	31	xxx	50
Ranking	III	I	II

Statement Showing "Optimum Production Plan"

Product	Units	Machine Hrs./ Unit	Machine Hrs. Required	Balance Hrs.
B	1,200	3	3,600	4,200
C	1,500	1	1,500	2,700
A (Balance)	900*	3	2,700	---

* $\left(\frac{2,700 \text{ hrs.}}{3 \text{hrs.}}\right)$

Balance quantity of A, 300 units to be purchased from outside.

Statement Showing "Conditions for Justification (i)"

	Product A	Product C
Buy Price	< 337 *Or*	> 142
Variable Cost	> 130 *Or*	< 130

1b)

Throughout Accounting ratio is highest for 'Machine 2'.

∴ 'Machine 2' is the bottleneck

Contribution per unit of bottleneck machine hour :

Total 'Machine 2' hours available = 6,000

		A	B	C
A.	Contribution per unit (₹)	30	25	15
B.	'Machine 2' hours	15	3	6
C.	Contribution per 'Machine 2' hours (A / B)	2	8.33	2.50
D.	Ranking	3	1	2
E.	Maximum Demand	500	500	500
	'Machine 2' hours required (B × E)	7,500	1,500	3,000
	'Machine 2' hours available	1,500	1,500	3,000
	Units	100	500	500

1c)

Working Notes

#	Data	Reasoning	Decision
i.	Similar Products Similar Production Resources	OH Cost based on production units is appropriate. ABC will also yield identical results	ABC system not required for OH allocation
ii	Present OH Cost = 10/u. Proposed Increase due to ABC system : 120000/20000 = 6/u	Current OH cost of 10/u will increase by 6 per unit due to installing ABC system (60% increase)	For allocation purpose, ABC not justified
iii.	Both have +ive contribution / u. Market demand determines the mix	OH allocation has no role in decision making	No need for ABC System
iv.	For the purpose of OH allocation, ABC need not be installed. However, if the fixed overheads of ₹ 2,00,000 are analysed by activity and thereby a saving of at least ₹ 1,20,000 be expected (which is the cost of installing ABC system), then, ABC system may be installed		
v.	For the non cash component of depn = 90,000 , FC that can be saved is a maximum of 1,10,000 (2,00,000 – 90,000). Hence, this is clearly less than ABC cost installation. Hence <u>do not install ABC System</u>		

1d)

R_1C_1 appears at the intersection of R_1 and C_1. Hence, it will have its zero replaced by minimum of a, b, c, or d in the next operation since the number of lines to cover zeros is less than 3.

In the next step, a or b or c or d will have one zero. Then, number of lines will be 3, the order of the matrix. Assignments will be made to the Zeros. Hence, R_1C_1 cannot figure in this.

Interpretation

An assignment of R_1C_1 will eliminate the use of other costs available on R_1 and C_1 entirely. The left over will be a, b, c, or d combinations which are more than zero. Hence, R_1C_1 taking on assignment will be non-optimal.

2A)

(i) Present Level:

Weighted average contribution per unit

(3,000 x 25 + 2,000 x 20)/(3,000+2,000) Or, (3 x 25 + 2x 20)/(2+3) = 23 ₹/unit.

BEP = Present level Fixed cost/ weighted average Contribution per unit

= 46,000/23 = 2000 units.

or (E 1200 units & Z 800 units)

(ii) Minimum units for incremental level:

next 1,000 units of E get contribution of 25 x 1000	=	25,000
next 1,000 units of E or Z get 20/unit as Contribution	=	20,000
next 125 units of E or Z get 20/unit as Contribution	=	2,500

Total 2,125 units are the minimum requirement for 47,500 incremental fixed cost

Minimum units required:

E	Z	Total
2,000	125	2,125
	or	
1,000	1,125	2,125

(iii) Optimal profit – best mix:

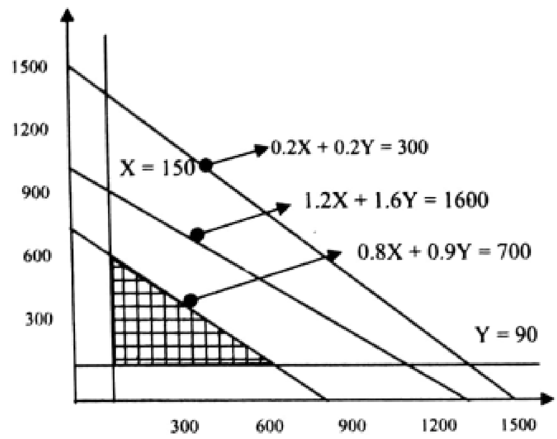
	Product E		Product Z		Total quantity
	Units	Contribution/u	Units	Contribution/u	
Present	3,000	25	2,000	20	5,000
Next	1,000	25			1,000
Next	1,000	20	1,000	20	2,000
Next	-	-	1,000	20	1,000
Total for best mix	5,000		4,000		
Contribution value (₹)	4,000 x 25 + 1,000 x20 = 1,20,000		4,000 x 20 = 80,000		2,00,000
Average Contribution per unit (₹) = 2,00,000 / 9,000 = 22.22					
Maximum profits (₹) = 2,00,000 – 93,500 = 1,06,500					

2B)

Solution: Let X and Y be the number of units of Products REGULAR and SUPER respectively. The LPP is –

Maximise Profit $Z = 50X + 75Y$, subject to
$1.2X + 1.6Y \leq 1,600$ (Assembly Time Constraint)........Equation 1
$0.8X + 0.9Y \leq 700$ (Paint Time Constraint)...............Equation 2
$0.2X + 0.2Y \leq 300$ (Inspection Time Constraint)......Equation 3
$X \geq 150$ and $Y \geq 90$ (Regular Customers Demand)......Equations 4 & 5

Note: Non–negativity assumption is not applicable due to the minimum demand condition as above.



From **Eqn.1,** we have $1.2X + 1.6Y = 1600$
When $X = 0$, $Y = 1000$, Also $X = 1333.33$ when $Y = 0$

From **Eqn.2,** we have $0.8X + 0.9Y = 700$
When $X = 0$, $Y = 777.78$, Also $X = 875$ when $Y = 0$

From **Eqn.3,** we have $0.2X + 0.2Y = 300$
When $X = 0$, $Y = 1500$, Also $X = 1500$ when $Y = 0$.

Also the lines $X = 150$ and $Y = 90$ are plotted on the graph to define the feasible region as indicated herein.

Solving $0.8X + 0.9Y = 700$ and $Y = 90$, we get
$X = 773.75$, $Y = 90$

Solving $0.8X + 0.9Y = 700$ and $X = 150$, we get
$X = 150$, $Y = 644.44$

The co–ordinates of the corners of the Feasible Region is evaluated for Maximum Profit as below –

Point	X = 150, Y = 90	X = 773.75, Y = 90	X = 150, Y = 644.44
Z = 50X + 75Y	14,250	45,438	**55,833 (maximum)**

The Maximum Profit is at the point X = 150, Y = 644.44. Hence, the Company should produce 150 units of REGULAR and 644.44 units of SUPER per week. Maximum Profit per week = ₹ 55,833.

Note: Graphical Method has been used here. Simplex Method can also be applied as under –

Since we have the constraints $X \geq 150$ and $Y \geq 90$, let $X = A + 150$, and $Y = B + 90$, where $A, B \geq 0$.

After introducing A and B, the LPP will be –
Maximise Profit $Z = 50(A+150) + 75(B+90)$,
$1.2(A+150) + 1.6(B+90) \leq 1,600$ (Assembly Time)
$0.8(A+150) + 0.9(B+90) \leq 700$ (Paint Time)
$0.2(A+150) + 0.2(B+90) \leq 300$ (Inspection Time)
$A, B \geq 0$. (Non–Negativity Assumption)

Multiplying Constraints by 10 (to remove decimals) we have –
So, Maximise Profit $Z = 50A + 75B + 14,250$, subject to
$12A + 16B \leq 12,760$
$8A + 9B \leq 4,990$
$2A + 2B \leq 2,520$
$A, B \geq 0$.

After introducing Slack Variables $S1_1$, S2 and S3, we have

Maximise Profit $Z = 50A + 75B + 14,250$.....becomes Maximise Profit $Z = 50A + 75B + 0S_1 + 0S_2 + 0S_3 + 14,250$
$12A + 16B \leq 12,760$..................................becomes $12A + 16B + S_1 = 12,760$
$8A + 9B \leq 4,990$...becomes $8A + 9B + S_2 = 4,990$
$2A + 2B \leq 2,520$..becomes $2A + 2B + S_3 = 2,520$
$A, B \geq 0$ ....becomes $A, B, S_1, S_2, S_3 \geq 0$

First Simplex Table:

Fixed Ratio	**Program**	**Profit**	**Quantity**	**A**	**B**	**S_1**	**S_2**	**S_3**	**Repl. Ratio**
16/9	S_1	0	12,760	12	16	1	0	0	797.50
NA	S_2	0	4,990	8	9	0	1	0	**554.44** Min non–ve
2/9	S_3	0	2,520	2	2	0	0	1	1260.00
Decision:		Z (Objective Value)		50	75	0	0	0	
In = Key Column = B		C (Computed Value)		0	0	0	0	0	
Out= Key Row = S_2		**Net Evaluation Row**		50	**75** Max. +ve	0	0	0	

Note: For Non–Key Rows, A = (Previous Table Corresponding Row Element) **Less** B = (Key Row Element × Fixed Ratio)

Computation for S_1 Row							Computation for S_3 Row						
A	12760	12	16	1	0	0	**A**	2520	2	2	0	0	1
– B	79840/9	128/9	16	0	16/9	0	**– B**	9980/9	16/9	2	0	2/9	0
A–B	35000/9	–20/9	0	1	–16/9	0	**A–B**	12700/9	2/9	0	0	–2/9	1

The above A–B values are carried over to the Second Simplex Table in **S_1 and S_3 Rows** (being Non–Key Rows of 1st Table).

Second Simplex Table:

Fixed Ratio	Program	Profit	Quantity	A	B	S_1	S_2	S_3	Repl. Ratio
	S_1	0	35,000/9	–20/9	0	1	–16/9	0	
	B	75	4,990/9	8/9	1	0	1/9	0	
	S_3	0	12,700/9	2/9	0	0	–2/9	1	
Decision: Since all NER ≤ 0 for max. objective, the Second Table is **optimal.**	Z (Objective Value)			50	75	0	0	0	
	C (Computed Value)			200/3	75	0	75/9	0	
	Net Evaluation Row			–50/3	0	0	–75/9	0	

Answer: A=0, B=4,990/9. Substituting these values in X=A + 150, and Y=B + 90, we have, **X=150**, Y=5,800/9 = 644.44,
Maximum Profit = ₹ 55,833

Note: As per Simplex Table above, Painting Time is fully used (and has an Opportunity Cost of **₹ 75/9** per hour), whereas Assembly and Inspection are idle to the extent of 35000/9 (i.e. 3,889) hours and 12,700/9 (i.e. 1411) hours respectively.

3A)

Workings

Units	Average LabourHrs. /unit
1	2,000 (₹16,000 ÷ ₹8) [for first unit of production]
2	1,600 (80% of 2,000 hours)
4	1,280 (80% of 1,600 hours)
8	1,024 (80% of 1,280 hours)

Variable Cost *per unit* excluding Labour Cost:

		(₹)
Material Cost	=	20,000
Variable Overheads	=	4,000
Variable Cost	=	24,000

If both the orders came together, learning rate 80% applies and 8 units can be made, with average time of 1,024 hours per unit.

Cost to XY		(₹)
Variable Cost excluding Labour	=	24,000
Labour Cost (1,024 hrs. × ₹8/hr)	=	8,192
	=	32,192

Option-I

In this case,

Particulars	Q	P	Total
Selling Price p. u. (₹)	34,400	33,000	
Variable Cost p. u. (₹)	32,192	32,192	
Contribution p. u. (₹)	2,208	808	
No. of Units	4	4	
Contribution (₹)	8,832	3,232	12,064

Option- II

If P Ltd supplies its labour. 80% learning curve will apply to 4 units each of XY Ltd. & P Ltd. Hence: hrs / unit = 1,280 (as calculated in the working note)

Particulars	Q	P	Total
Selling Price p. u. (₹)	34,400	28,000	
Variable Cost p. u. (₹) (Excluding Labour cost)	24,000	24,000	
Labour Cost p. u. (₹)			
1,280 hrs. × ₹ 8	10,240	--	
1,280 hrs. × ₹ 2	--	2,560	
Total Variable Cost p. u. (₹)	34,240	26,560	
Contribution p. u. (₹)	160	1,440	
Units	4	4	
Contribution (₹)	640	5,760	6,400

Decision

XY Ltd. should not take labour from P Ltd. It should choose Option-I.

3B)

Solution: Initial Basic Feasible Solution is determined as under from the data given above.

Place	M – 1	M – 2	M – 3	M – 4	Requirement
A	5	2 [12]	4 [1]	3 [9]	22
B	4	8	1 [15]	6	15
C	4 [7]	6	7 [1]	5	8
Demand	7	12	17	9	**45**

In the above IBFS,

- Number of allocated cells is 6.
- m + n – 1 (i.e. Rows + Columns – 1) = 3 + 4 – 1 = 6.

Hence, there is no degeneracy. This can be tested for optimality.

Note: Cost Differences have not been computed since the Clerk's allocation is taken as the IBFS.

OPTIMALITY TEST: **Table 1 = U + V for allocated cells computed as below:**

U & V	4 – 7 = – 3	2 – 4 = – 2	0 (base)	3 – 4 = – 1
4 – 0 = 4	5	2 [12]	4 [1]	3 [9]
1 – 0 = 1	4	8	1 [15]	6
7 – 0 = 7	4 [7]	6	7 [1]	5

Table 2 = U + V for Unallocated Cells

4 + (–3) = 1			
1 + (–3) = –2	1 + (–2) = –1		1 + (–1) = 0
	7 + (–2) = 5		7 + (–1) = 6

Table 3 = Net Evaluation Table (NET)
= Table 1 – Table 2 for Unallocated Cells

5 – 1 = 4			
4 – (–2) = 6	8 – (–1) = 9		6 – 0 = 6
	6 – 5 = 1		5 – 6 = [–1]

There is one negative element in the NET, hence scheduling by the Clerk is not optimal. Selected Quantity = 1, being the least of the quantity allocated to the Negative Corners of the Loop

4		+ve	–ve
6	9		6
	1	–ve	+ve Corner –1

ABFS–1: The new U + V for Allocated Cells is computed from the above.

The alternative allocation is shown below:

20	18 **100**	18	17	17
16 **150 + 50 = 200**	16 **50 – 50 = 0**	16 **200**	15	16
15 **50 – 50 = 0**	15 **0 + 50 = 50**	15	13 **125**	14 **75**

The cost from the above alternative re–allocation is:

Particulars	P	Q	R	S	T
Private		100 × 18 = 18.00			
National	200 × 16 = 32.00		200 × 16=32.00		
Co–op		50 × 15 = 7.50		125 × 13=16.25	75 × 14=10.50

Minimum Cost = Total of above = **₹ 1,16,250**

Alternative Optimal Solution – 3:

Alternative Optimal Solution is obtained by drawing a loop from the "Zero" entry in the NET, as indicated here →

2		0	1	0
+ve		– ve 200	1	1
– ve 50	0	+ve (Origin)0		

→ Least Qtty of –ve corners = 50. So, Alternative Optimal Solution is obtained by adding 50 to +ve corners, subtracting 50 from –ve corners and leaving the other cells undisturbed.

The alternative allocation is shown below:

20	18 **100**	18	17	17
16 **150 + 50 = 200**	16 **50**	16 **200 – 50 = 150**	15	16
15 **50 – 50 = 0**	15	15 **0 + 50 = 50**	13 **125**	14 **75**

The cost from the above alternative re–allocation is:

Particulars	P	Q	R	S	T
Private		100 × 18 = 18.00			
National	200 × 16 = 32.00	50 × 16 = 8.00	150 × 16 = 24.00		
Co–op			50 × 15 = 7.50	125 × 13 = 16.25	75 × 14 = 10.50

Minimum Cost = Total of above = **₹ 1,16,250**

Alternative Optimal Solution – 4:

Alternative Optimal Solution is obtained by drawing a loop from the "Zero" entry in the NET, as indicated here →

2	–ve 100	0	1	+ve (Origin)0
+ve 150	+ve	200	1	1
+ ve	0	0		–ve 75

→ Least Qtty of –ve corners = 75. So, Alternative Optimal Solution is obtained by adding 75 to +ve corners, subtracting 75 from –ve corners & leaving the other cells undisturbed.

The alternative allocation is shown below:

20	18 **100 – 75 = 25**	18	17	17 **0 + 75 = 75**
16 **150 – 75 = 75**	16 **50 + 75 = 125**	16 **200**	15	16
15 **50 + 75 = 125**	15	15	13 **125**	14 **75 – 75 = 0**

The cost from the above alternative re–allocation is:

Particulars	P	Q	R	S	T
Private		25 × 18= 4.50			75 × 17=12.75
National	75 × 16 = 12.00	125 × 16=20.00	200 × 16=32.00		
Co–op	125 × 15 = 18.75			125 × 13=16.25	

Minimum Cost = Total of above = **₹ 1,16,250**

4A)

(i) **Production Budget May'17 (tons)**

Particulars	Super	Normal
Expected Sales	200	80
Add: Budgeted Inventory (31st May)	20	15
Total Requirements	220	95
Less: Actual Inventory (1st May)	40	20
Required Production	180	75

(ii) **Materials Purchase Budget May'17 (tons)**

Particulars	Grade A	Grade B	Grade C	Grade D
Requirement for Production	126.00 (180 × 70%)	54.00 (180 × 30%)	30.00 (75 × 40%)	45.00 (75 × 60%)
Add: Budgeted Inventory (31st May)	50.00	56.00	250.90	40.50
Total Requirements	176.00	110.00	280.90	85.50
Less: Actual Inventory (1st May)	40.00	25.00	150.00	60.00
Quantity *to be purchased*	136.00	85.00	130.90	25.50
Add: Lose of Weight* (Seasoning)	24.00	15.00	23.10	4.50
Quantity *to be purchased* (Gross)	160.00	100.00	154.00	30.00

(*) Quantity *to be purchased* × 15% / 85%

(b) (i) Direct Material Usage Variance

= Standard Cost of Standard Quantity for Actual Production – Standard Cost of Actual Quantity

$$= \left(\frac{₹\,28,80,000}{60,000\text{ units}} \times 66,000\text{ units}\right) - \left(\frac{₹\,36,30,000}{₹\,11} \times ₹\,12\right)$$

= ₹ 31,68,000 – ₹ 39,60,000

= ₹ 7,92,000 (A)

(ii) Direct Material Price Variance

= Standard Cost of Actual Quantity – Actual Cost

= ₹ 39,60,000 – ₹ 36,30,000

= ₹ 3,30,000 (F)

(iii) Direct Labour Efficiency Variance

= Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time

$$= \left(\frac{₹\ 43,20,000}{60,000\ \text{units}} \times 66,000\ \text{units}\right) - \left(\frac{₹\ 52,80,000}{₹\ 10} \times ₹\ 9\right)$$

= ₹ 47,52,000 – ₹ 47,52,000

= NIL

(iv) Direct Labour Rate Variance

= Standard Cost of Actual Time – Actual Cost

= ₹ 47,52,000 – ₹ 52,80,000

= ₹ 5,28,000 (A)

(v) Variable Overhead Cost Variance

= Standard Variable Overheads for Production – Actual Variable Overheads

$$= \left(\frac{₹\ 72,00,000}{60,000\ \text{units}} \times 66,000\ \text{units}\right) - ₹\ 81,84,000$$

= ₹ 2,64,000 (A)

(vi) Sales Margin Volume Variance

= Standard Margin – Budgeted Margin*

$$= \left(\frac{₹\ 36,00,000}{60,000\ \text{units}} \times 66,000\ \text{units}\right) - ₹\ 36,00,000$$

= ₹ 3,60,000 (F)

(*) Budgeted Margin

= ₹ 1,80,00,000 – ₹ 1,44,00,000

= ₹ 36,00,000

5A)

(i) Comparative Statement of cost for purchasing from Y Co Ltd under current policy & JIT

Particulars	Current Policy	JIT
	₹	₹
Purchasing cost	18,20,000 (13,000 × 140)	18,20,260 (13,000 × 140.02)
Ordering cost	26.00(2×13 orders)	260.00(2×130 orders)
Opportunity carrying cost	10,500.00 (1/2×1000×140×15%)	1,050.15 (1/2×100×140.02×15%)
Other carrying cost (Insurance, material handling etc)	1,550.00(1/2×1000×3.10)	155.00
Stock out cost		200(4 × 50)
Total relevant cost	18,32,076	18,21,925.15

Comments: As may be seen from above, the relevant cost under the JIT purchasing policy is lower than the cost incurred under the existing system. Hence, a JIT purchasing policy should be adopted by the company.

(ii) Statement of cost for purchasing from Z Co Ltd.

Particulars	₹
Purchasing cost	1,76,800 (13,000x13.60)
Ordering Cost	260.00 (2x130 orders)
Opportunity Carrying Cost	102.00 (1/2×100×13.60× 15%)
Other Carrying Cost	150.00 (1/2×100×3.00)
Stock out Cost	2,880 (8x360)
Inspection Cost	650.00 (13,000 x .05)
Customer Return Cost	6,500.00 (13,000 x 2% x 25)
Total Relevant Cost	1,87,342

5B)

Sl. No	Description	Recommend ABC Yes/No	Reason
i)	**K produces one product. Overhead is mainly depreciation**	**No**	• One product situation. For allocation of overhead, ABC is not required. • ABC for cost reduction not beneficial since most of the overhead is depreciation.
ii)	**L produces 5 different products with different facilities.**	**Yes**	• Multi product situation. ABC is required for allocation of overhead. • ABC is necessary for pricing. • Cost drivers are likely to be different. • Cost reduction may be possible. • Production facilities are different.
iii)	**Professional services – lawyers/ accountants/ computer engineers**	**Yes**	• Variety of services. Hence ABC is required for cost allocation. • Services are very different. • ABC is necessary for pricing. • Cost reduction possible.
iv)	**S produces 2 different labour intensive products. High unit contribution and efficient operations.**	**No**	• Different products, but labour intensive. Hence, overhead allocation based on readily traceable direct labour cost will be accurate. Hence, ABC not required for cost allocation. • Low BEP level implies low level of fixed cost as a % of sale price or as a % of total cost. • Many fixed cost activity drivers are likely to align with the direct labour costs. Hence not required for cost allocation. • Efficient operation. Hence ABC not required even for cost reduction or ABC management.

6A)

Working Notes:

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

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

2. **Details of hours utilised in meeting the demand of 15,000 units of Super-chips and utilising the remaining 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):**

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

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

	(₹)
Selling price per unit : (A)	1,400
Variable costs :	
Super chip	300
(Material + Labour costs)	
Other parts	80
Labour cost	600
(6 hours × ₹ 100)	
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 (₹) : 200

{₹ 420 – ₹ 220} {Refer to working notes 3 & 4}

(i) Super-chip to be transferred 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 ₹ 40 per unit for ₹ 80/- per hour (*Refer to Working note 1*) or a contribution of ₹ 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 ₹ 200/- per two-equivalent hours (*Refer to Working note 5*).

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

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

(ii) 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 craftsman time for Super-chip

= ₹ 300 + 2 hours × ₹ 80

= ₹ 460

(iii) 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 ₹ 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.

6B)

(i) Customer Wise "Profitability Statement"

Particulars	A (₹)	B (₹)	C (₹)	D (₹)
No. of Pizzas	**1,500**	**2,500**	**4,800**	**4,000**
Contribution	1,08,000 (1,500 × ₹ 72)	1,67,500 (2,500 × ₹67)	3,12,000 (4,800 × ₹65)	2,40,000 (4,000 × ₹60)
Less: Normal Delivery Cost	40,000 (₹20 × 20km × 100)	75,000 (₹20 × 30km × 125)	3,20,000 (₹20 × 40km × 400)	1,00,000 (₹20 × 25km × 200)
Less: Rush Delivery Cost	---	8,000 (₹200 × 40)	4,000 (₹200 × 20)	6,000 (₹200 × 30)
Operating Income	68,000	84,500	(-) 12,000	1,34,000

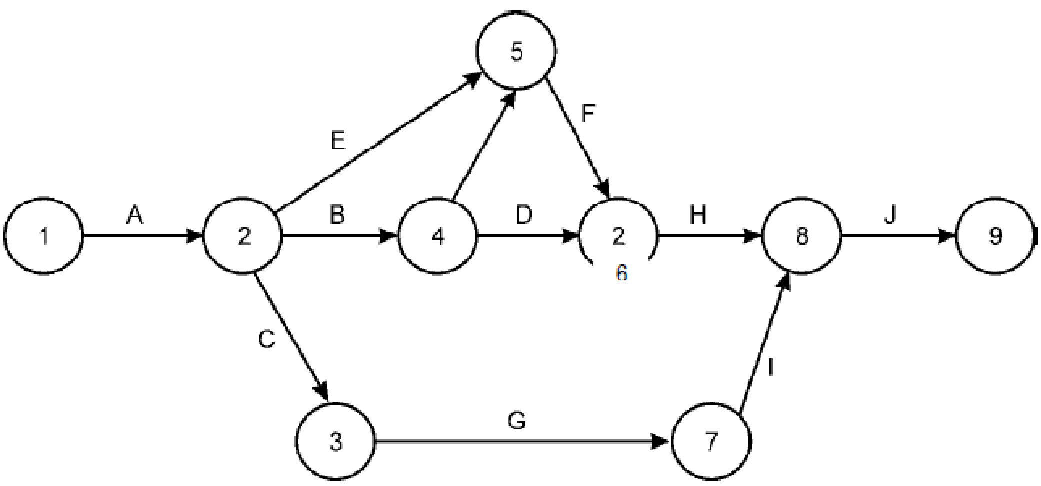
(ii) Statement Showing – Revised Price *per unit* "A"

Particulars	₹
Existing Operating Income from 'A'	68,000
Revised – Normal Delivery Costs (₹20 × 20km × 165)	66,000
Revised – Rush Delivery Costs (₹200 × 20)	4,000
Total Contribution to be earned from Sales to "A" ...(A)	1,38,000
Revised No. of Pizzas (1,500 + 800) ...(B)	2,300
Reduced Contribution p.u. ...(A)/ (B)	60.00

PH cannot reduce the price by more than **₹ 12** *per unit*.

7A)

Solution: The required network is given below:



7B)

Statement Showing "Pareto Analysis of Defects"

Defect Type	No. of Items	% of Total Items	Cumulative Total
Scratches on the surface	110	36.67%	36.67%
Rough edges of lenses	70	23.33%	60.00%
Non-uniform grinding of lenses	60	20.00%	80.00%
Frame colours-shade differences	25	8.33%	88.33%
Power mismatches	20	6.67%	95.00%
End frame not equidistant from the centre	10	3.33%	98.33%
Spots/ Strain on lenses	5	1.67%	100.00%
	300	100.00%	

The company should focus on eliminating *scratches on the surface*, *rough edges of lenses* and *grinding of lenses* related defects which constitute **80% portion**, according to Pareto Theory.

7c)

Particulars	**Product 'A' 12,500 units**		**Product 'F' 12,500 units**		**Incremental Revenue/ Cost (₹)**
	Per unit (₹)	**Total (₹)**	**Per unit (₹)**	**Total (₹)**	
Sales revenue	7.00	87,500	10.00	1,25,000	37,500
Less: Commission @ 10%	0.70	8,750	1.00	12,500	3,750
Net revenue : (i)	6.30	78,750	9.00	1,12,500	33,750
Raw materials	1.50	18,750	2.00	25,000	6,250
Labour& overheads	2.10	26,250	3.50	43,750	17,500
Additional fixed expenses			0.32	4,000	4,000
Total cost : (ii)	3.60	45,000	5.82	72,750	27,750
Profit : (i) – (ii)	2.70	33,750	3.18	39,750	6,000

The above table shows that by resorting to further processing of 12,500 units the company can earn an additional profit of ₹6,000 per month and hence the proposal is recommended.

Note: In the above problem it is likely that the company, instead of utilising its capacity to make product 'F' may go in for a further increase in production of product 'A' to the extent possible. In such circumstances, the incremental profit of the second alternative should be compared with the incremental profit as obtained above.

7D)

(i) **Invalid:** Kaizen Costing is the system of cost reduction procedures which involves making small and continuous improvements to the production processes rather than innovations or large-scale investment.

(ii) **Valid:** The training of employees is very much a long-term and ongoing process in the Kaizen costing approach. Training enhances the abilities of employees.

(iii) **Invalid:** Kaizen costing approach involves everyone from top management level to the shop floor employees. Every employee's active participation is a must requirement.

(iv) **Invalid:** Though the aim of Kaizen Costing is to reduce the cost but at the same time it also aims to maintain the quality. Kaizen costing also aims to bring the clarity in roles and responsibilities for all employees.

7e)

Primary activities are the activities that are directly involved in transforming inputs into outputs and delivery and after-sales support to output. Following are the primary activities in the value chain of Sinopec Ltd:

(i) **Inbound Logistics**: These activities are related to the material handling and warehousing. It also covers transporting raw material from the supplier to the place of processing inside the factory.

(ii) **Operations:** These activities are directly responsible for the transformation of raw material into final product for the delivery to the consumers.

(iii) **Outbound Logistics:** These activities are involved in movement of finished goods to the point of sales. Order processing and distribution are major part of these activities.

(iv) **Marketing and Sales:** These activities are performed for demand creation and customer solicitation. Communication, pricing and channel management are major part of these activities.

(v) **Service:** These activities are performed after selling the goods to the consumers. Installation, repair and parts replacement are some examples of these activities.