MOCK TEST PAPER – 1

FINAL COURSE: GROUP – II

PAPER – 5: ADVANCED MANAGEMENT ACCOUNTING

SUGGESTED ANSWERS/HINTS

1. **(a)** Let C_x be the Contribution per unit of Product X.

   Therefore Contribution per unit of Product Y $= C_y = 4/5 C_x = 0.8 C_x$

   Given $F_1 + F_2 = 1,50,000$,

   $F_1 = 1,800 C_x$ (Break even volume × contribution per unit)

   Therefore $F_2 = 1,50,000 – 1,800 C_x$.

   $3,000 C_x – F_1 = 3,000 × 0.8 C_x – F_2$ or $3,000 C_x – F_1 = 2,400\ C_x - F_2$ (Indifference point)

   i.e., $3,000 C_x – 1,800 C_x = 2,400 C_x – 1,50,000 + 1,800 C_x$

   i.e., $3,000 C_x = 1,50,000$, Therefore $C_x = Rs.50/-$ (1,50,000 / 3,000)

   Therefore Contribution per unit of X = Rs.50

   Fixed Cost of X = F_1 = Rs.90,000 (1,800 × 50)

   Therefore Contribution per unit of Y is Rs.50 × 0.8 = Rs.40 and
   Fixed cost of Y = F_2 = Rs.60,000 (1,50,000 – 90,000)
   The value of F_1 = Rs.90,000, F_2 = Rs.60,000 and X = Rs.50 and Rs.40

   (b) Following acceptance by early innovators, conventional consumers start following

	Situation	Appropriate Pricing Policy
(i)	'A' is a new product for the company and the market and meant for large scale production and long term survival in the market. Demand is expected to be elastic.	Penetration Pricing
(ii)	'B' is a new product for the company, but not for the market. B's success is crucial for the company's survival in the long term.	Market Price or Price Just Below Market Price
(iii)	'C' is a new product to the company and the market. It has an inelastic market. There needs to be an assured profit to cover high initial costs and the unusual sources of capital have uncertainties blocking them.	Skimming Pricing
(iv)	'D' is a perishable item, with more than 80% of its shelf life over.	Any Cash Realizable Value[*]

   (*) this amount decreases every passing day.

   (c) Product A & B are joint products and produced in the ratio of 1:2 from the same direct material-C.

   Production of 40,000 additional units of B results in production of 20,000 units of A.

   Calculation of Contribution under *existing situation*

Particulars	Amount (Rs.)	Amount (Rs.)
Sales Value:		
A – 2,00,000 units @ Rs.25 per unit	50,00,000	
B – 4,00,000 units @ Rs.20 per unit	80,00,000	1,30,00,000

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Less: Material- C (12,00,000 units@ Rs.5 per unit)		60,00,000
Less: Other Variable Costs		
Contribution		42,00,000
		28,00,000

Let Minimum Average Selling Price *per unit* of A is Rs.X

Calculation of Contribution after *acceptance of additional order of 'B'*

Particulars	Amount (Rs.)	Amount (Rs.)
Sales Value:		
A – 2,20,000 units @ Rs. X per unit	2,20,000 X	
B – 4,00,000 units @ Rs.20 per unit	80,00,000	
40,000 units @ Rs.15 per unit	6,00,000	2,20,000 X + 86,00,000
Less: Material- C (12,00,000 units x 110%) @ Rs.5 per unit		66,00,000
Less: Other Variable Costs (Rs.42,00,000 x 110%)		46,20,000
Contribution		**2,20,000 X – 26,20,000**

Minimum Average Selling Price *per unit* of A

Contribution after additional order of B = Contribution under existing production

$$\Rightarrow \; 2,20,000\,X - 26,20,000 = 28,00,000$$

$$\Rightarrow \; 2,20,000\,X \qquad = 54,20,000$$

$$\Rightarrow \qquad X \qquad = \frac{54,20,000}{2,20,000} = \text{Rs.}24.64$$

Minimum Average Selling Price *per unit* of A is Rs.24.64

(d) *Primal*

Minimize

$$Z = 2x_1 - 3x_2 + 4x_3$$

Subject to the Constraints

$$3x_1 + 2x_2 + 4x_3 \geq 9$$
$$2x_1 + 3x_2 + 2x_3 \geq 5$$
$$-7x_1 + 2x_2 + 4x_3 \geq -10$$
$$6x_1 - 3x_2 + 4x_3 \geq 4$$
$$2x_1 + 5x_2 - 3x_3 \geq 3$$
$$-2x_1 - 5x_2 + 3x_3 \geq -3$$
$$x_1, x_2, x_3 \geq 0$$

Dual:

Maximize

$$Z = 9y_1 + 5y_2 - 10y_3 + 4y_4 + 3y_5 - 3y_6$$

Subject to the Constraints:

$$3y_1 + 2y_2 - 7y_3 + 6y_4 + 2y_5 - 2y_6 \leq 2$$

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$$2y_1 + 3y_2 + 2y_3 - 3y_4 + 5y_5 - 5y_6 \leq -3$$
$$4y_1 + 2y_2 + 4y_3 + 4y_4 - 3y_5 + 3y_6 \leq 4$$
$$y_1, y_2, y_3, y_4, y_5, y_6 \geq 0$$

By substituting $y_5 - y_6 = y_7$ the dual can alternatively be expressed as:

> Maximize
>
> $Z =$
>
> $9y_1 + 5y_2 - 10y_3 + 4y_4 + 3y_7$
>
> *Subject to the Constraints:*
>
> $3y_1 + 2y_2 - 7y_3 + 6y_4 + 2y_7 \leq 2$
>
> $-2y_1 - 3y_2 - 2y_3 + 3y_4 - 5y_7 \geq 3$
>
> $4y_1 + 2y_2 + 4y_3 + 4y_4 - 3y_7 \leq 4$
>
> $y_1, y_2, y_3, y_4 \geq 0, y_7$ unrestricted in sign.

2. (a) (i) **Calculation of 'Total Labour Hours' over the Life Time of the Product 'Kitchen Care'**

The average time per unit for 250 units is

$$Y_x = ax^b$$
$$Y_{250} = 30 \times 250^{-0.3219}$$
$$Y_{250} = 30 \times 0.1691$$
$$Y_{250} = 5.073 \text{ hours}$$

Total time for 250 units	=	5.073 hours × 250 units
	=	1,268.25 hours

The average time per unit for 249 units is

$$Y_{249} = 30 \times 249^{-0.3219}$$
$$Y_{249} = 30 \times 0.1693$$
$$Y_{249} = 5.079 \text{ hours}$$

Total time for 249 units	=	5.079 hours × 249 units
	=	1,264.67 hours
Time for 250th unit	=	1,268.25 hours – 1,264.67 hours
	=	3.58 hours
Total Time for 1,000 units	=	(750 units × 3.58 hours) + 1,268.25 hours
	=	3,953.25 hours

(ii) **Profitability of the Product 'Kitchen Care'**

Particulars	Amount (Rs.)	Amount (Rs.)
Sales (1,000 units)		50,00,000
Less: Direct Material	18,50,000	
Direct Labour (3,953.25 hours × Rs.80)	3,16,260	
Variable Overheads (1,000 units× Rs.1,000)	10,00,000	31,66,260

Contribution		18,33,740
Less: Packing Machine Cost		5,00,000
Profit		13,33,740

(iii) Average 'Target Labour Cost' *per unit*

Particulars	Amount (Rs.)
Expected Sales Value	50,00,000
Less: Desired Profit (1,000 units × Rs.800)	8,00,000
Target Cost	42,00,000
Less: Direct Material (1,000 units × Rs.1,850)	18,50,000
Variable Cost (1,000 units × Rs.1,000)	10,00,000
Packing Machine Cost	5,00,000
Target Labour Cost	8,50,000
Average Target Labour Cost *per unit* (Rs.8,50,000 ÷ 1,000 units)	850

(b) Activities P and Q are called duplicate activities (or parallel activities) since they have the same head and tail events. The situation may be rectified by introducing a dummy either between P and S or between Q and S or before P or before Q (i.e. introduce the dummy before the tail event and after the duplicate activity or Introduce the dummy activity between the head event and the duplicate activity). Possible situations are given below:
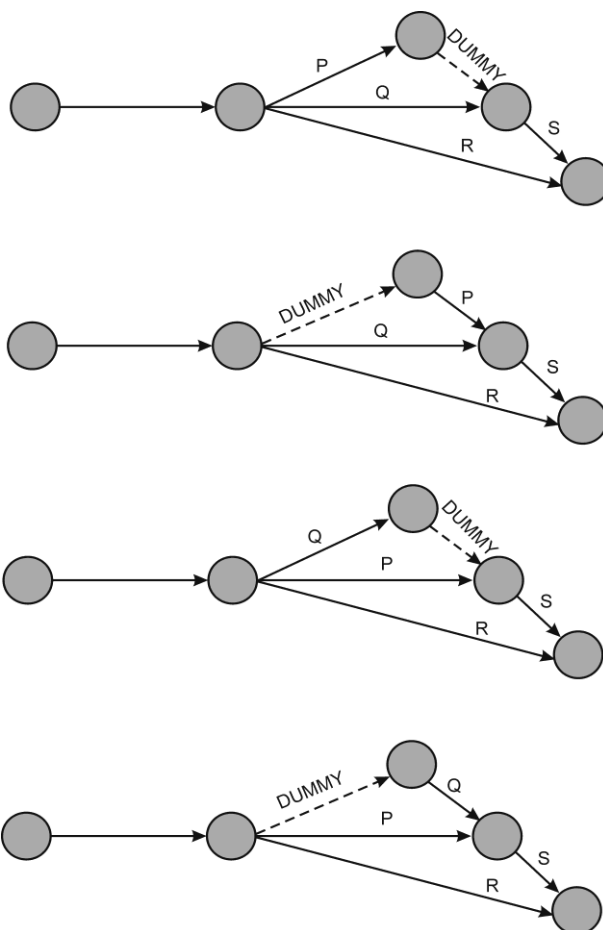
3. (a) The objective of the given problem is to identify the preferences of marriage parties about halls so that hotel management could maximize its profit.

To solve this problem first convert it to a minimization problem by subtracting all the elements of the given matrix from its highest element. The matrix so obtained which is known as loss matrix is given below-

Loss Matrix/Hall

Marriage Party	1	2	3	4
A	0	2,500	X	X
B	5,000	0	5,000	12,500
C	7,500	0	10,000	5,000
D	0	5,000	X	X

Now we can apply the assignment algorithm to find optimal solution. Subtracting the minimum element of each column from all elements of that column-

Loss Matrix/Hall

Marriage Party	1	2	3	4
A	0	2,500	X	X
B	5,000	0	0	7,500
C	7,500	0	5,000	0
D	0	5,000	X	X

The minimum number of lines to cover all zeros is 3 which is less than the order of the square matrix (i.e.4), the above matrix will not give the optimal solution.

Subtracting the minimum uncovered element (2,500) from all uncovered elements and add it to the elements lying on the intersection of two lines, we get the following matrix-

Loss Matrix/Hall

Marriage Party	1	2	3	4
A	0	0	X	X
B	7,500	0	0	7,500
C	10,000	0	5,000	0
D	0	2,500	X	X

Since the minimum number of lines to cover all zeros is 4 which is equal to the order of the matrix, the below matrix will give the optimal solution which is given below-

Loss Matrix/Hall

Marriage Party	1	2	3	4
A	0	0	X	X
B	7,500	0	0	7,500
C	10,000	0	5,000	0
D	0	2,500	X	X

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Optimal Schedule is-

Marriage Party	Hall	Revenue (Rs.)
A	2	22,500
B	3	20,000
C	4	20,000
D	1	25,000
Total		87,500

(b) Working Notes

1. No. of Customer = 1,900

(5,000 × 40% × 95%)

2. Consumption of Gas = 11,40,000 Metered units

(1,900 × 50 mt.× 12 months)

Gas Supply = 13,41,176 Metered units

{11,40,000 × (100 ÷ 85)}

3. Cash Inflow

	(₹)
Rent (1,900 × 4 Quarters × ₹10)	76,000
Add: Consumption Charge (11,40,000 × ₹0.4)	4,56,000
Less: Cost of Company (13,41,176 × ₹0.065)	87,176
Cash Inflow p.a.	4,44,824

One Time Connection Charge = ₹4,75,000

(₹250 × 1,900 customers)

Maximum Capital Project Cost

(Can be to allow the company to provide the service required)

By Following the Concept of Perpetuity

(Investment − ₹4,75,000) × 17% = ₹4,44,824

∴ Investment = ₹30,91,612

4. (a)   Statement of Reconciliation - Budgeted Vs Actual Profit

Particulars	Rs.
Budgeted Profit	5,19,000
Less: Sales Volume Contribution Planning Variance (Adverse)	52,125
Less: Sales Volume Contribution Operational Variance (Adverse)	93,825
Less: Sales Price Variance (Adverse)	39,600
Less: Variable Cost Variance (Adverse)	29,700
Less: Fixed Cost Variance (Adverse)	15,000
Actual Profit	2,88,750

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Workings

Basic Workings

Budgeted Market Share (in %)	=	$\dfrac{2,00,000\text{units}}{4,00,000\text{units}}$ = 50%
Actual Market Share (in %)	=	$\dfrac{1,65,000\text{units}}{3,75,000\text{units}}$ = 44%
Budgeted Contribution	=	Rs.21,00,000 − Rs.12,66,000
	=	Rs.8,34,000
Average Budgeted Contribution (*per unit*)	=	$\dfrac{\text{Rs.8,34,000}}{\text{Rs.2,00,000}}$ = Rs.4.17
Budgeted Sales Price *per unit*	=	$\dfrac{\text{Rs.21,00,000}}{\text{Rs.2,00,000}}$ = Rs.10.50
Actual Sales Price *per unit*	=	$\dfrac{\text{Rs.16,92,900}}{\text{Rs.1,65,000}}$ = Rs.10.26
Standard Variable Cost *per unit*	=	$\dfrac{\text{Rs.12,66,000}}{\text{Rs.2,00,000}}$ = Rs.6.33
Actual Variable Cost *per unit*	=	$\dfrac{\text{Rs.10,74,150}}{\text{Rs.1,65,000}}$ = Rs.6.51

Calculation of Variances

Sales Variances:

Volume Contribution Planning*	=	Budgeted Market Share % × (Actual Industry Sales Quantity *in units* – Budgeted Industry Sales Quantity *in units*) × (Average Budgeted Contribution *per unit*)
	=	50% × (3,75,000 units – 4,00,000 units) × Rs.4.17
	=	Rs. 52,125 (A)

(*) *Market Size Variance*

Volume Contribution Operational**	=	(Actual Market Share % – Budgeted Market Share %) × (Actual Industry Sales Quantity *in units*) × (Average Budgeted Contribution *per unit*)
	=	(44% – 50%) × 3,75,000 units × 4.17
	=	Rs. 93,825 (A)

(**) *Market Share Variance*

Price	=	Actual Sales – Standard Sales
	=	Actual Sales Quantity × (Actual Price – Budgeted Price)
	=	1,65,000 units × (Rs.10.26 – Rs.10.50)
	=	Rs.39,600 (A)

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Variable Cost Variances:..........

Cost	=	Standard Cost for Production – Actual Cost
	=	Actual Production × (Standard Cost *per unit* – Actual Cost *per unit*)
	=	1,65,000 units × (Rs.6.33 – Rs.6.51)
	=	Rs.29,700(A)

Fixed Cost Variances:

Expenditure	=	Budgeted Fixed Cost – Actual Fixed Cost
	=	Rs.3,15,000 – Rs.3,30,000
	=	Rs.15,000 (A)

☞ **Fixed Overhead Volume Variance** does not arise in a Marginal Costing system

(b) The Δ_{ij} matrix or $C_{ij} - (u_i + v_j)$ matrix, where C_{ij} is the cost matrix and $(u_i + v_j)$ is the cell evaluation matrix for unallocated cell.

The Δ_{ij} matrix has one or more 'Zero' elements, indicating that, if that cell is brought into the solution, the optional cost will not change though the allocation changes.

Thus, a 'Zero' element in the Δ_{ij} matrix reveals the possibility of an alternative solution.

5. (a) 1. Projected Raw Material Issues (Kg):

	'N'	'O'	'P'
'L' (48,000 units-Refer Note)	60,000	24,000	---
'M' (36,000 units-Refer Note)	72,000	-	54,000
Projected Raw Material Issues	1,32,000	24,000	54,000

Note:

- Based on this experience and the projected sales, the DTSML has budgeted production of 48,000 units of 'L' and 36,000 units of 'M' in the sixth period.

  = 52,500 x 40% + 45,000 – 18,000 = 48,000

  = 27,000 x 40% + 42,000 – 16,800 = 36,000

- Production is assumed to be uniform for both products within each four-week period.

2. and 3. Projected Inventory Activity and Ending Balance (Kg):

	'N'	'O'	'P'
Average Daily Usage	6,600	1,200	2,700
Beginning Inventory	96,000	54,000	84,000
Add: Orders Received:			
Ordered in 5th period	90,000	-	60,000
Ordered in 6th period	90,000	-	-
Sub Total	276,000	54,000	144,000
Less: Issues	132,000	24,000	54,000
Projected ending inventory balance	144,000	30,000	90,000

Note:

- Ordered 90,000 Kg of 'N' on fourth working day.
- Order for 90,000 Kg of 'N' ordered during fifth period received on tenth working day.
- Order for 90,000 Kg of 'N' ordered on fourth working day of sixth period received on fourteenth working day.
- Ordered 30,000 Kg of 'O' on eighth working day.
- Order for 60,000 Kg of 'P' ordered during fifth period received on fourth working day.
- No orders for 'P' would be placed during the sixth period.

4. **Projected Payments for Raw Material Purchases:**

Raw Material	Day/Period Ordered	Day/Period Received	Quantity Ordered	Amount Due (Rs.)	Day/Period Due
'N'	20th/5th	10th /6th	90,000 Kg	90,000	20th/6th
'P'	4th/5th	4th /6th	60,000 Kg	60,000	14th/6th
'N'	4th/6th	14th /6th	90,000 Kg	90,000	4th/7th
'O'	8th/6th	13th /7th	30,000 Kg	60,000	3rd/8th

(b) <center>**Statement of Profitability**</center>

Product	Sales Value (Rs.)	P / V Ratio (%)	Contribution (Rs.)
A	2,50,000	50	1,25,000
B	4,00,000	40	1,60,000
C	6,00,000	30	1,80,000
Total	12,50,000		4,65,000
Less: Fixed Overheads			5,02,200
Profit / (Loss)			(37,200)

<center>**Additional Sale Value of each Product**</center>

Product	Sales Value (Rs.)
A	Rs. 74,400 (Rs.37,200 ÷ 0.5)
B	Rs. 93,000 (Rs.37,200 ÷ 0.4)
C	Rs.1,24,000 (Rs.37,200 ÷ 0.3)

Additional Total Sales Value maintaining the same Sale – Mix

$$= \text{Rs.}37,200 \div 0.372^*$$
$$= \text{Rs.}1,00,000$$

* Combined P / V Ratio $$= \frac{\text{Total Contribution}}{\text{Total Sales}} \times 100$$

$$= \frac{\text{Rs. }4,65,000}{\text{Rs. }12,50,000} \times 100$$

$$= 37.2\%$$

6. **(a)**

Cumulative Average Time for 256 parts		=	48.43 hrs.*
			$[112.50 \times (0.90^8)]$
Total Time for 256 parts		=	12,398.08 hrs.
			[48.43 hrs.× 256 parts]
Total Labour Cost of 256 parts		=	Rs.2,47,961.60
			[12,398.08 hrs.× Rs.20]
Revised Labour Cost for *zero profit*		=	Rs.3,22,961.60
			[Rs.2,47,961.60 + Rs.75,000]
Total Time for 256 parts (Revised)		=	16,148.08 hrs.
			[Rs.3,22,961.60/ Rs.20]
Cumulative Average Time for 256 parts (Rev.) =			63.08 hrs.
			[16,148.08/256]

The usual learning curve model is

$$y = ax^b$$

Where

y	=	Cumulative Average Time per part for x parts
a	=	Time required for first part
x	=	Cumulative number of parts
b	=	Learning coefficient (log r/log 2)

Accordingly

$\Rightarrow$ $63.08 = 112.50 \times (256)^b$

$\Rightarrow$ $0.5607 = 2^{8b}$

$\Rightarrow$ $\log 0.5607 = \log 2^{8b}$

$\Rightarrow$ $\log 0.5607 = 8 \times b \times \log 2$

$\Rightarrow$ $\log 0.5607 = 8 \times \dfrac{\log r}{\log 2} \times \log 2$

$\Rightarrow$ $\log 0.5607 = 8 \log r$

$\Rightarrow$ $\log 0.5607 = \log r^8$

$\Rightarrow$ $0.5607 = r^8$

$\Rightarrow$ $r = \sqrt[8]{0.5607}$

$\Rightarrow$ $r = 0.9302$

Learning Rate (r) = 93.02%.

Therefore

Sensitivity = 3.02/90

= 3.36%

☞ Students may also take 48.38 hrs. (112.50 × 0.43)

(b)

Calculation showing Rates for each Activity

Activity	Activity Cost [a] (Rs.)	Activity Driver	No. of Units of Activity Driver [b]	Activity Rate [a] / [b] (Rs.)
Providing ATM Service	1,00,000	No. of ATM Transactions	2,00,000	0.50
Computer Processing	10,00,000	No. of Computer Transactions	25,00,000	0.40
Issuing Statements	8,00,000	No. of Statements	5,00,000	1.60
Customer Inquiries	3,60,000	Telephone Minutes	6,00,000	0.60

Calculation showing Cost of each Product

Activity	Checking Accounts (Rs.)	Personal Loans (Rs.)	Gold Visa (Rs.)
Providing ATM Service	90,000 (1,80,000 tr. x 0.50)	---	10,000 (20,000 tr. x 0.50)
Computer Processing	8,00,000 (20,00,000 tr. x 0.40)	80,000 (2,00,000 tr. x 0.40)	1,20,000 (3,00,000 tr. x 0.40)
Issuing Statements	4,80,000 (3,00,000 st. x 1.60)	80,000 (50,000 st. x 1.60)	2,40,000 (1,50,000 st. x 1.60)
Customer Inquiries	2,10,000 (3,50,000 min. x 0.60)	54,000 (90,000 min. x 0.60)	96,000 (1,60,000 min. x 0.60)
Total Cost [a]	Rs.15,80,000	Rs.2,14,000	Rs.4,66,000
Units of Product [b]	30,000	5,000	10,000
Cost of each Product [a] / [b]	52.67	42.80	46.60

7. **(a)** Target cost is the difference between the estimated selling price of a proposed product with specified functionality and quality and target margin. This is a cost management technique that aims to produce and sell products that will ensure the target margin. It is an integral part of the product design. While designing the product the company allocates value and cost to different attributes and quality. Therefore, they use the technique of value engineering and value analysis. The target cost is achieved by assigning cost reduction targets to different operations that are involved in the production process. Eventually, all operations do not achieve the cost reduction targets, but the overall cost reduction target is achieved through team work. Therefore, it is said that target costing fosters team work.

(b) (i) The company has done extensive exercise in year-I that can be used as a basis for budgeting in year-II by incorporating increase in costs / revenue at expected activity level. Hence, **Traditional Budgeting** would be more appropriate for the company in year-II.

(ii) In Traditional Budgeting system budgets are prepared on the basis of previous year's budget figures with expected change in activity level and corresponding adjustment in the cost and prices. But under Zero Base Budgeting (ZBB) the estimations or projections are converted into figures. Since, sales manager is unable to substantiate his expectations into figures so **Traditional Budgeting** would be preferred against Zero Base Budgeting.

(iii) **Zero Base Budgeting** would be appropriate as ZBB allows top-level strategic goals to be implemented into the budgeting process by tying them to specific functional areas of the organization, where costs can be first grouped, then measured against previous results and current expectations.

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(iv) Zero Base Budgeting allocates resources based on order of priority up to the spending cut-off level (maximum level upto which spending can be made). In an organisation where resources are constrained and budget is allocated on requirement basis, **Zero Base Budgeting** is more appropriate method of budgeting.

(c) If unit variable cost and unit selling price are not constant then the main problem that would arise while fixing the transfer price of a product would be as follows:

There is an optimum level of output for a firm as a whole. This is so because there is a certain level of output beyond which its net revenue will not rise. The ideal transfer price under these circumstances will be that which will motivate these managers to produce at this level of output.

Essentially, it means that some division in a business house might have to produce its output at a level less than its full capacity and in all such cases a transfer price may be imposed centrally.

(d) Direct Product Profitability (DPP) is 'Used primarily within the retail sector, and involves the attribution of both the purchase price and other indirect costs *such as distribution, warehousing, retailing* to each product line. Thus a net profit, as opposed to a gross profit, can be identified for each product. The cost attribution process utilises a variety of measures *such as warehousing space, transport time* to reflect the resource consumption of individual products.'

Benefits of Direct Product Profitability:

(i) Better Cost Analysis - Cost *per product* is analysed to know the profitability of a particular product.

(ii) Better Pricing Decision- It helps in price determination as desired margin can be added with the actual cost.

(iii) Better Management of Store and Warehouse Space- Space Cost and Benefit from a product can be analysed and it helps in management of store and warehouse in profitable way.

(iv) The Rationalisation of Product Ranges etc.

(e) **Random Number Assignment**

Daily Demand	Days	Probability	Cumulative Probability	Random No. Assigned
4	4	0.08	0.08	00 − 07
5	10	0.20	0.28	08 − 27
6	16	0.32	0.60	28 − 59
7	14	0.28	0.88	60 − 87
8	6	0.12	1.00	88 − 99

Simulation Table

Day	Random No.	Demand	No. of Cars on Rent	Rent Lost
1	15	5	5	---
2	48	6	6	---
3	71	7	6	1
4	56	6	6	---
5	90	8	6	2
		Total	29	3

Average no. of Cars Rented are 5.8 $\left(\dfrac{29\,\text{Cars}}{5}\right)$

Rental Lost equals to 3 Cars