Divisional Transfer Pricing

TRANSFER PRICING WITH ABC

Question 1: Wash Co assembles and sells two types of washing machines – the spin (S) and the rinse (R). The company has two divisions: the assembly division, and the retail division.

The company's policy is to transfer the machines from the assembly division to the retail division, at full cost plus 10%. This has resulted in internal transfer prices, when S and R are being transferred to the retail division, of $220,17 and $241.69 respectively. The retail division currently sells S to the general public for $320 per machine and R for $260 per machine. Assume it incurs no other costs except for the transfer price.

The retail division's manager is convinced that, if he could obtain R at a lower cost and therefore reduce the external selling price from $260 to $230 per unit, he could significantly increase sales of R, which would be beneficial to both divisions. He has questioned the fact that the overhead costs are allocated to the products on the basis of labour hours; he thinks it should be done using machine hours or even activity based costing.

You have obtained the following information for the last month from the assembly division:

	Product S	Product R
Production and sales (units)	3,200	5,450
Material cost	$117	$95
Labour cost (at $12 per hour)	$6	$9
Machine hours (per unit)	2	1
Total no. of production runs	30	12
Total no. of purchase orders	82	64
Total no. of deliveries to retail division	64	80

Overhead costs:	$
Machine set-up costs	306,435

Machine maintenance costs	415,105
Ordering costs	11,680
Delivery costs	144,400
Total	877,620

Required:

(a) Using traditional absorption costing, calculate new transfer prices for S and R if machine hours are used as a basis for absorption rather than labour hours.
Note: round all working to 2 decimal places.

(b) Using activity based costing to allocate the overheads, recalculate the transfer prices for S and R.
Note: round all working to 2 decimal places.

(c) Calculate last month's profit for each division, showing it both for each product and in total, if activity based costing is used.

Answer:

(i) Transfer price using machine hours Total overhead costs = $877,620

Total machine hours = (3,200 x 2) + (5,450) x 1 = 11,850 Overhead absorption rate = $877,620 ÷ 11,850 = $74.06

Overhead cost for S = 2 x $74.06 = $148.12 and for R = 1 x $74.06 = $74.06

	Product S	Product R
Material cost	117.00	95.00
Labour cost (at $12 per hour)	6.00	9.00
Overhead costs	148.12	74.06
Total cost	271.12	178.06
10% mark-up	27.11	17.81
Transfer price using machine hours	298.23	195.87

(ii) Transfer price using ABC

Machine set up costs: driver = number of production runs. 30 + 12 = 42

Therefore cost per set up = $306,435 ÷ 42 = $7,296.07

Machine maintenance costs: driver = machine hours: 11,850 (S = 6,400; R = 5,450)

$415,105 ÷11,850 = $35.03

Ordering costs: driver = number of purchase orders 82 + 64 = 146

Therefore cost per order = $11,680 ÷146 = $80

Delivery costs: driver = number of deliveries. 64 + 80
= 144
Therefore cost per delivery = $144,400 ÷144 = $1,002.78 Allocation
of overheads to each product

	Product S	Product R	Total
	$	$	$
Machine set-up costs	218,882	87,553	306,435
Machine maintenance costs	224,192	190,913	415,106
Ordering costs	6,560	5,120	11,680
Delivery costs	64,178	80,222	144,400
Total overheads allocated	513,812	363,808	877,620
Number of units produced	3,200	5,450	8,650

	$	$
Overhead cost per unit	160.57	
Transfer price per unit:		
Materials cost	117.00	95.00
Labour cost	6.00	9.00
Overhead costs	160.57	66.75
Total cost	283.57	170.75
Add 10% mark up	28.36	17.08
Transfer price under ABC	311.93	187.83

(iii) Profit allocation

Using ABC transfer price from part (b):

Assembly division	Product S	Product R	Total
Production and sales	3,200	5,450	
	$	$	
10% mark-up	28.36	17.08	
Profit	90,752	93,086	183,838

Retail division	Product S	Product R	Total
Production and sales	3,200	5,450	
	$	$	
Selling price	320	260	
Cost price	(311.93)	(187.83)	
Profit per unit	8.07	72.17	
Total profit	25,824	393,327	419,151

❖ ❖ ❖

Question 5: A company has a division A producing three products called X, Y, Z. Each product can be sold in the open market in the following manner.

Maximum external sales are X 800 units, Y 500 units, Z 300 units. All figures in

Particulars	X	Y	Z
Selling Price per unit	96	92	80
Variable Cost of Production in Division A	33	24	28
Labour Hours Required per unit in Division A	6	8	4

Product Y can be transferred to Division B, but the maximum quantity that might be required for transfer is 300 units of Y.

Division B could buy similar product in the open market at a price of 45 p.u.

(i) What should be the transfer price per unit for 300 units of Y, if the total labor hours available with Division A are:

(a) 13,000 hours (b) 8,000 hours and (c) 12,000 hours.

(ii) Indicate the transfer pricing range that can promote goal congruence.

Solution

Division A has two type of clientele, external customers and Division B. Capacity in Division A is defined by the number of labor hours available for production.

The total hours needed to meet external demand is 10,000 hours as explained below:

Statement of Hours Needed for External Sales

External Sales	Qty	Hours p.u.	Total Hours Needed
X	800	6	4,800
Y	500	8	4,000
Z	300	4	1,200
Hours Needed for External Sales			10,000

Case 1: When 13,000 hours are available, after meeting the external demand requiring 10,000 hours, Division A will have surplus capacity of 3,000 hours.

Hours needed to produce 300 units of Y = 300 × 8 hours = 2,400 hours. Since Division A has surplus capacity, it can meet the demand of Division B also without curtailing its external sales. Hence, there is no opportunity cost on account of lost contribution.

Transfer price range:

Minimum Transfer Price p.u.

= Marginal Cost of Production p.u. of Y = 24.

Maximum Transfer Price

= Lower of Net Marginal Revenue and the External Buy-in Price

The Maximum Transfer Price would be the External Procurement Price for Division B

= Rs.45

Note: Additional cost information related to Division B would be needed to calculate net marginal revenue.

Case 2: When 8,000 hours are available, Division A has limited capacity as explained below.

The total hours needed for external sales is 10,000 and those need for internal transfer is 2,400 hours. In all, 12,400 hours are needed, when only 8,000 hours are available. There is a shortfall of 4,400 hours. Capacity is hence limited.

Therefore, labor hours have to be utilized optimally. This is determined by calculating the contribution per hour from sale each product that is sold externally. It determines how valuable each hour is product wise.

Statement of Product Wise Contribution per hour

Sr. No.	Particulars	X	Y	Z
1	Selling Price p.u.	96	92	80
2	Less: Variable Cost p.u.	33	24	28
3 = 1 - 2	Contribution p.u.	63	68	52
4	Labour hours needed p.u.	6	8	4
5 = 3 / 4	Contribution per hour	10.50	8.50	13.00
6	Ranking high to low	II	III	I

Product Z gives the maximum contribution per hour, hence ranked 1. Product X and Y follow at rank 2 and 3 respectively. This is the basis to allocate limited hours for optimal production in Division A.

The entire demand of Product Z will be produced first. This requires 1,200 hours. Out of the balance 6,800 hours, Product X will require 4,800 hours. This leaves a balance of 2,000 hours for Product Y. Product Y requires 8 hours p.u. Hence maximum production of product Y = 2,000 hours / 8 = 250 units.

Statement of Optimum Mix

Total Hours Available 8,000					
Priority	External Sales	Qty	Hours p.u.	Total Hours Needed	Remaining Hours
1	Z	300	4	1,200	6,800
2	X	800	6	4,800	2,000
3	Y	250	8	2,000	-
Total Hours Needed for External Sales				8,000	

If Division A accepts to produce 300 units of Y for Division B, the total hours required for internal sales would be 2,400 hours. This can be catered to by curtailing its external sales. 2,000 hours from production of external sales of Product Y is first diverted and the balance 400 hours are diverted from production of Product X. Hence this results in lost contribution, an opportunity cost that has to be included in transfer pricing.

Contribution Lost from Reduced External Sales

= Product Y (2000 hours × contribution per hour of Rs. 8.5) + Product X (400 hours × contribution per hour of 10.5)
= Rs.17000 + Rs.4,200
=Rs. 21,000

On a per unit basis, lost contribution works out to 21,200 / 300 units = 70.66 Therefore, Transfer Price

= Marginal Cost p.u. + Contribution Lost from Reduced External Sales
= Rs.24 + Rs. 60.66
= Rs. 94.66

Since Division B can source at 45, it would be cheaper to purchase the component from outside. **Case 3: When 12,000 hours are available, Division A has limited capacity as explained below.**

The total hours needed for external sales is 10,000 and those need for internal transfer is 2,400 hours. In all, 12,400 hours are needed, when only 12,000 hours are available. There is a shortfall of 400 hours. Capacity is hence limited.
Therefore, labor hours have to be utilized optimally. Again, as explained in Case 2, this is determined by calculating the contribution per hour from sale each product that is sold externally. Referring to the table above, Contribution per hour is X: 10.5; Y: 8.5 and Z: 13. Accordingly, production wise

Z will be given first priority, followed by X and then Y.

The entire demand of Product Z will be produced first. This requires 1,200 hours. Out of the balance 10,800 hours, Product X will require 4,800 hours. This leaves a balance of 6,000 hours for Product Y. Product Y requires 8 hours p.u. External sales of product require 4,000 hours (500 units × 8 hours p.u.).

Statement of Optimum Mix

Total Hours Available 8,000					
Priority	External Sales	Qty	Hours p.u.	Total Hours Needed	Remaining Hours
1	Z	300	4	1,200	10,800
2	X	800	6	4,800	6,000
3	Y	500	8	4,000	2,000
Total Hours Needed for External Sales				10,000	

This leaves 2,000 hours available for production of 300 units of Y to be sold to Division B.

These

300 units will require 2,400 hours (300 units × 8 hours p.u.). Hence, there is a shortfall of 400 hours to meet this internal demand. This shortfall of 400 hours will be made up with diverting hours earmarked for external sale of Product Y (Rank 3 as explained in the table above). Loss of
contribution on account of curtailed sales would then be built into the transfer price. Contribution Lost by
Diverting 400 hours from Product Y for External Sales

= 400 hours × contribution per hour

= 400 hours × 8.5

= Rs.3,400

On a per unit basis,

= 3,400 / 300 units

= Rs. 11.33

Therefore, Transfer Price

= Marginal Cost p.u. + Contribution Lost from Reduced External Sales

= Rs.24 + 11.33

= Rs.35.33

Division B can source this at 45 p.u. from outside. Hence transfer price can be in the range
35.33 to 45.

❖ ❖ ❖

Question 6:A company has two divisions. Division A produces a Product which is used by division B in making a final product.

Division A has a capacity to produce 3,000 units and the whole quantity can be transferred to Division B. The transfer price for such component would be ` 250 per unit which division A would like to charge from division B. Davison B however, can purchase from the outside market at ` 220 each. The selling price of final product is ` 500. The variable costs Division A is ` 180 and fixed costs ` 10000. The variable costs of

Division B in manufacturing the final product by using the component is` 180 (excluding the component cost). Present statements indicating the position of each Division and the company as a whole taking each of the following situations separately:

(i) What transfer price would you fix for the component in each of the following three circumstances?

(ii) If there are no alternative uses for the production facilities of A, will the company benefit if division B buys from outside suppliers at ` 220 per component?

(iii) If internal facilities of A are not otherwise idle and the alternative use of the facilities will give an annual cash operating saving of ` 2,00,000 to Division A, should Division B purchase the component from outside suppliers?

(iv) If there are no alternative uses for the production facilities of Division A and the selling price for the component in the outside market drops by ` 50, should Division B purchase from outside suppliers?

Solution:

(ii) STATEMENT OF TRNASFER PRICE

		` per unit
Cost to be incurred		180
+ benefit to be lost		-
	Minimum Transfer Price	180
Transfer Price = ` 180 per unit to ` 220 per unit.		

STATEMENT OF PROFIT (WITH TRNASFER)

Deptt. A			**Deptt. B**	**Company**	
	`		`		
Transfer (Revenue)	180 × 3000	Sale	3000 × 500	Total Profit	`
Less: Cost	180 × 3000	Less: Own Cost	180 × 3000	A	(10000)
Fixed Cost	10000	Transfer Cost	180 × 3000	B	4,20,000
PROFIT	(10000)	PROFIT	4,20,000	**Total**	4,10,000

STATEMENT OF PROFIT (WITHOUT TRANSFER)

	B	**Company**
Sale	500 × 3000 = 1500000	
Less: Purchase	3000 × 220 = 660000	A Nil
Less Own cost	180 × 3000 =540000	B 3,00,000
Profit	3,00,000 **Total**	3,00,000

On the basis of above analysis we can say its better for the Co. if department B receives 3000(unit) from department "A".

(iii) STATEMENT OF TRANSFER PRICE

		` per unit
Cost to be incurred		180
+ benefit to be lost due to transfer (1,50,000/3,000)		50
	Minimum Transfer Price	230

STATEMENT OF RPOFIT (WITHOUT TRANSFER)

A Deptt "A"		**B Deptt "B"**		**Company**	
Cash saving	1,50,000	Rev.	15,00,000	A	1,50,000
Less cost	-	Less Purchase cost	3000 × 220	B	3,00,000
		Less Own Cost	3000 × 180		
Net Benefit	**1,50,000**	**3,00,000**		**Total 4,50,000**	

STATEMENT OF PROFIT (WITH TRANSFER)

	Deptt. 'A"		**B " `"**		**Co.**
Revenue	3000 × 230	Revenue	15,00,000		`
Less: own Cost	3000 × 180	Less Transfer Cost	3000 × 230	A	1,40,000
Fixed Cost	10000	Purchase Cost	3000 × 180	B	2,70,000
Profit	**1,40,000**	**Benefit**	**2,70,000**	**Total**	**4,10,000**

It's better to purchase the entire requirement of B from outside market due to higher benefit.

(iii) STATEMENT OF TRANSFER PRICE

Cost to be incurred		180
	Minimum Transfer price	180

STATEMENT OF PROFIT (WITHOUT TRANSFER)

A		**B** `		**Co.**	
Rev.	--	Revenue	15,00,000		`
		Less Purchase Cost	3000 × 170	A	(10000)
Fixed Cost	10000	Own Cost	3000 × 180	B	4,50,000
(10000)			**4,50,000**		**4,40,000**

STATEMENT OF PROFIT (WITH TRANSFER)

A	**B**	**Co.**

Revenue	3000 × 180	Revenue	15,00,000		`
Cost	3000 × 180	(-) Transfer	3000 × 180	A	(10000)
FIxed	(10000)	(-)Own Cost	3000 × 180	B	4,20,000
Benefit	**(10000)**	**Benefit**	**4,20,000**	**Total**	**4,10,000**

It's better to purchase the component from outside market because Purchase Cost is less than the variable cost which will increase the profit of Co. by 30,000.

❖ ❖ ❖

Question 7: ATLAS Cycles has two divisions A and B which manufacture expensive bicycles. Division A produces the bicycle frame, and Division B assembles the rest of the bicycle onto the frame. There is a market for both the sub-assembly and the final product. The following data are available for each division:

Selling price for final product		` 3,000
Ong run average selling price for intermediate product		2,000
Incremental costs for completion in Division B		1,500
Incremental costs in Division A		1,200
The manager of Division B has made the following calculation		
Selling price for final product		` 3,000
Transferred in costs (market)	` 2,000	
Incremental costs for completion	1,500	3,500
Contribution (loss) on product.		` (500)

Required:

1. Should transfers be made to division B if there is no unused capacity in Division A? Is the market price the correct transfer price ?
2. Assume that Division A's maximum capacity for this product is 1,000 units per month, and sales to the intermediate market are now 800 units. Should 200 units be transferred to Division B? At what transfer price? Assume that for a variety of reasons, Division A will maintain the ` 2,000 selling price indefinitely. That is, Division A is not considering about lowering the price to outsiders even if idle capacity exists.
3. Suppose Division A quoted a transfer price of ` 1,500 for up to 200 units. What would be the contribution to the company as a whole if a transfer were made? As a manager of Division B, would you be inclined to buy at ` 1,500? Explain.
4. Suppose the manager of Division A has the option of (a) cutting the external price to

`1,950 with the certainty that sales will rise to 1,000 units, or (b) maintaining the outside price of ` 2,000 for the 800 units and transferring the 200 units of Division B at a price that would produce the same as in (a) operating income for Division A. What transfer price would produce the same operating income for Division A?

5. Suppose that if the selling price for the intermediate product is dropped to `1,950, outside sales can be increased to 900 units. Division B wants to acquire as many as 200 units if the transfer price is acceptable. For simplicity assume that there is no outside market for the final 100 units of Division A's capacity. The minimum transfer prices that should lead to the correct economic decision?

Solution:

STATEMENT OF PROFIT (WITH TRANSFER)

Dept A		Dept. B		Co.	
Revenue	2000	Revenue	3000		
-Cost	1200	Transfer Cost	2000	A	800
		B's Cost	1500	B	(500)
	800		**(500)**		**300**

STATEMENT OF PROFIT (IF "A" does not transfer to "B")

	A	B	Co.
External Sale	2000	X	A 800
Less Cost	1200	X	B -
Benefit	**800**	X	**800**

Its better to produce bicycle frame in deptt. A & sold in external market instead of transfer to Division B.

(ii) A department has spare capacity 200 units & these 200 units can be produced and transfer to department B at minimum price (1200) it is variable Cost.

STATEMENT OF TRANSFER PRICE (200 units)

	Relevant Cost (`)
Cost to be incurred	1200
+ Contribution to be lost	-
Minimum Transfer Price	1200

Maximum Transfer Price would be equal to incremental profit for B.

3000 – 1500 = 1500

Selling Price – Own Cost

Transfer Price for 200 units — Transfer price

0-200 Unit — ` 1200 – ` 1500 per unit.

(iii) STATEMENT OF CONTRIBUTION

	A		B		Co.

	`		`		
External sale	800 × 2000	Sale	200 × 3000		
Transfer price	200 × 1500	Less Cost		A	7,00,000
Cost	1000 × 1200	Transfer	200 × 1500	B	-
		Own Cost	200 × 1500		
Contribution	**7,00,000**		---		**7,00,000**

Overall contribution to the Co. would be 7,00,000 due to transfer Management of division B would not be interested to receive 200 (units) at ` 1500.

(iv)

Selling Price (`)	**Quantity**
2000 Per unit	800
1950 per unit	1000
Quantity	**Price**
Sale 800	2000
200	?

Let X be the transfer price for 200 units.

Operating income from A_1 = Operating income from A_2.

1950 X 1000- 1200 × 1000 = 800 × 2000 + 200 X x-1000 × 1200

X = 1750 per unit

Minimum Transfer Price would be ` 1750 per unit.

(v)

Qty	Selling price	Variable Cost	Contribution
800	2000 ` per unit	1200	800 × 800
900	1950 ` per unit	1200	750 × 900
			3500

A department has spare capacity 100 units in any case. Hence Transfer price for these 100 units would be variable cost i.e. `1200 per unit.

For next 100 units Transfer Price would be variable cost + Contribution to be lost.

		`
Cont. (Without transfer)	900 × (1950 -1200)	6,75,000
Cont. (With transfer)	800 × (2000 -1200)	6,40,000
Contribution to be lost		**35,000**

STATEMENT OF TRANSFER PRICE For next 100 units

	` Per unit
Cost to be incurred	1200
+ Contribution to be lost	350
(35000/100)	**1550**

Level	Transfer price
100 units	` 1200 – 1500 per unit
Next 100 units	` 1550 per unit

❖ ❖ ❖

Question 10: SG Ltd. has two divisions Division X and Division Y. Division X produces product A, which it sells to external market and also to Division Y. Divisions in the SG Ltd. Are treated as profit centres and divisions are given autonomy to set transfer prices and to choose their supplier. Performance of each division measured on the basis of target profit given for each period.

Division X can produce 1,00,000 units of product A at full capacity. Demand for product A in the external market is for 70,000 units only at selling price of ` 2,500 per unit. To produce product A Division X incurs ` 1,600 as variable cost per unit and total fixed overhead of ` 4,00,00,000. Division X has employed ` 12,00,00,000 as working capital, working capital is financed by cash credit facility provided by its lender bank @ 11.50% p.a. Division X has been given a profit target of ` 2,50,00,000 for the year.

Division Y has found two other suppliers M Ltd and N Ltd. who are agreed to supply product A.

Division Y has requested a quotation for 40,000 units of product A from Division X.

Required: Calculate the transfer price per unit of product A that Division X should quote in order to meet target profit for the year.

Calculate the two prices Division X would have to quote to Division Y, if it became SG Ltd. policy to quote transfer prices based on opportunity costs.

(Same as Question No. 13)

Solution:

(i) Transfer price per unit of product A that Division X should quote in order to meet target profit for the year:

Quotation for the 40,000 units of product A should be such that meet Division

X's target profit and interest cost on working capital. Therefore the minimum quote for product A will be calculated as follows:

Particulars	Amount (`)
Target Profit (given for the year)	2,50,00,000

Add: Interest Cost on Working Capital (`12,00,00,000 @11.5%)	1,38,00,000
Required Profit	3,88,00,000
Add: Fixed Overhead	4,00,00,000
Target Contribution	7,88,00,000
Less: Contribution Earned from external sales {60,000 units × ` (2,500 – 1,600)}	5,40,00,000
Contribution Required from internal sales	2,48,00,000
Contribution per unit of Product A (`2,48,00,000 ÷ 40,000 units)	620
Transfer Price of Product A to Division Y (Variable Cost per unit + Contribution per unit)	2,220

(ii) The two transfer prices based on opportunity costs:

For the 30,000 units (i.e. maximum capacity – maximum external market demand) at variable cost of production i.e. `1,600 per unit.

For the next 10,000 units (i.e. external market demand – maximum possible sale) at market selling price i.e. `2,500 per unit.

❖ ❖ ❖

Question 13:Four products P, Q, R and S are produced by profit centre Division A. Each product is sold in the external market also. Data for the period are as follows:

	P	Q	R	S
Market price per unit (`)	70	69	56	46
Variable cost of production per unit (`)	66	59	36	37
Labour hours per unit	3	2	2	3
Specific fixed costs (`) per 10,000 units of product	2500	12600	15000	18000

Product S can be transferred to Division B but the maximum quantity that might be required for transfer is 20,000 units of S. The specific fixed costs given above are avoidable if a product is not made. They are incurred for every 10,000 units.

The maximum sales (units) in the external market are:

P	30,000
Q	31,000
R	28,000
S	18,000

Division B can purchase the same product at a slightly cheaper price of ` 45 per unit instated of receiving transfers of product S from Division A without any extra transport/inspection costs. B can also take partial supplies from A.

The total labour hours available in Division A is 192000 hours.

(i) What is A's optimal product mix and the corresponding contribution net of specific fixed costs?

(ii) How many units should A transfer to B and at what price?

(iii) It is in the company's interest to transfer 20,000 units of S to B?

Solution:

1. Optimal Production Mix in Division A

Particulars	P	Q	R	S	Total
(a) Maximum External Sales	30,000 units	31,000 units	28,000 units	18,000 units	
(b) DLH required pu	3 hours	2 hours	2 hours	3 hours	
(c) Total DLH required (a×b)	90,000 hours	62,000 hours	56,000 hours	54,000 hours	2,62,000
(d) Sale Price p.u.	70	69	56	46	
(e) Variable Cost p.u.	66	59	36	37	
(f) Gross Contribution pu (d – e)	4	10	20	9	
(g) Avg Specific Fixed Cost pu	0.40	1.26	1.50	1.80	
(h) Avg Net Contribution pu (f–g)	3.60	8.74	18.50	7.20	
(i) Avg Net Contribution ph (h÷b)	1.20	4.37	9.25	2.40	
(j) Avg Gross Contribution ph (f÷b)	1.33	5.00	10.00	3.00	
(k) Rank (based on j) (same for i)	**IV**	**II**	**I**	**III**	
(l) DLH Resource Allocation based on Rank (hours)	b/f 20,000	62,000	56,000	54,000	1,92,000
(m) Output Quantity (l÷b)	6,666 units	31,000 units	28,000 units	18,000 units	
(n) Gross Contribution (m×f)	` 26,664	` 3,10,000	` 5,60,000	` 1,62,000	10,58,664
(o) Specific Fixed Costs (for every 10,000 units as given)	` 2,500 × 1 = ` 2,500	` 12,600 × 4 = ` 50,400	` 15,000 × 3 = ` 45,000	` 18,000 × 2 = ` 36,000	1,33,900
(p) Net Contribution (n – o)	` 24,164	` 2,59,600	` 5,15,000	` 1,26,000	**9,24,764**

Note: Average Net Contribution per hour is computed to confirm possible change in Ranking Priority

due to the impact of Specific Fixed Costs. In this case, the Ranking is the same for both Gross and Net Contribution per hour.

2. Opportunity Costs for Internal Transfer of 20,000 units of S

Particulars	Result
(a) Time required for 20,000 units Internal Transfer of S	20,000 × 3 = 60,000 hours
(b) The above time will be diverted – (i) First from P for 20,000 hours, and (ii) Balance from External Sale of S, for 40,000 hours	(as per Line 'l' above)
(c) Opportunity Costs of first 20,000 hours = Contribution lost on P (from Line p above)	` 24,164
(d) Opportunity Costs of next 40,000 hours = Contribution lost on S Gross Contribution lost = [40,000 × ` 3 = ` 1,20,000] less Fixed Cost saved ` 18,000 **Note:** Fixed Cost will come down by ` 18,000, since output of S reduces from 18,000 units level to (54,000 – 40,000)÷3 = 4,666 units.	` 1,02,000

3. Transfer Prices and Decision from Company viewpoint

Particulars	First 20,000 hours	Next 40,000 hours	Total 60,000 hours
(a) Internal Transfer Quantity of S	$\frac{20,000}{3}$ = 6,667 units	$\frac{40,000}{3}$ = 13,333 units	20,000 units
(b) Opportunity Costs for above	` 24,164	` 1,02,000	` 1,26,164
(c) Specific Fixed Costs	` 18,000 × 1 = ` 18,000	` 18,000 × 1 **(Note)** = ` 18,000	` 36,000
(d) Variable Costs at ` 37 p.u.	` 2,46,679	` 4,93,321	` 7,40,000
(e) Total Costs (b+c+d)	` 2,88,843	` 6,13,321	` 9,02,164
(f) Average Relevant Costs = Minimum Transfer Price (e÷a)	**` 43.32**	**` 46.00**	**` 45.11**
(g) External Price of Product S	` 45.00	` 45.00	` 45.00
(h) Is Internal Transfer worthwhile?	**Yes**	**No**	**No**

Note: Even though Output Quantity is 13,333 units, Specific Fixed Costs is taken only for one lot of 10,000 units, by assuming continuous production after 20,000 hours, i.e. carry over effect from the previous lot of production. Alternatively, such Fixed Costs can be taken for 2 lots also.

❖ ❖ ❖

Question 14: Bajaj Ltd. consists of the X Division and the Y Division. X Division produce two different components, the new high performance ALFA and an older product called BETA. These two products have the following cost characteristics:

ALFA	BETA
Material Parts ` 20 Labour 2 hours × ` 140 = 280	Parts ` 10 ½ hours × ` 140 = 70

Annual overhead in X Division is `10,00,000 all fixed. The X Division capacity is set at 50,000 hours per year.

To date, only one customer has developed a product utilising ALFA, and this customer orders a maximum of 15,000 ALFA per year at a price of ` 600 per unit. If Bajaj Ltd. cannot meet his entire demand, the customer curtails his own production. The rest of the X's capacity is devoted to BETA, for which there is unlimited demand at ` 120 per unit.

The Y Division produces only one product, a GAMA, which requires a complex circuit board imported at a price of ` 600. The GAMA costs are:

	GAMA	
Material Labour	Circuit board Other parts 5 hours @ ` 100	` 600 80 500

The Y Division is composed of only a small assembly plant and all overhead is fixed at a total of ` 20,00,000 per year. The current market price for the GAMA is ` 2000 per unit.

The Production manger discovered that with minor modifications, a single ALFA could be substituted for the circuit board, currently used by Y division, the modification would require an extra one hour of labour by Y's staff for a total of 6 hours per unit of GAMA. Y has, therefore asked X Division to declare a transfer price at which X Division would sell ALFA a internally.

Required:-

1. Y expects to sell 6,000 of GAMA this year. From the overall point of view Bajaj Ltd., how many X should be transferred to Y Division to replace circuit boards?
2. What should be the transfer Price for such 6000 units.
3. If demand for the GAMA rises to 12,000 units at a price of ` 2000 per unit, how many of 12,000 units should be built ALFA? (All other data unchanged).

Solution:

				Hours	Ranking
BAJAJ	X	Alpha	15000 × 2	30,000	I
		Beta	40,000 × 1/2	20,000	II
	Y	Board	Total	**50,000**	

X Division has no spare capacity, hence in order to produce extra unit of Alpha for transfer, X division will have to sacrifice the required labour hours from the product having least Contribution/hour.

STATEMENT OF RANKING		
	ALPHA	**BETA**
Selling Price	600	120
Variable Cost	300	80
Contribution per unit	**300**	**40**
	ALPHA	**BETA**
Hours per unit	2	1/2
Contribution per hour	150	80
Ranking	I	II

STATEMENT OF OPTIMUM PRODUCT MIX

	Unit	**Hour per unit**	**Hours**
ALPHA	15000	2	30,000
BETA	40,000	1/2	20,000 (B/F)
			50,000

The requirement of Y division is 6000 (u) of ALPHA to replace circuit board which can be produced by division X by releasing labour hour from BETA subject to the interest of Company.

STATEMENT OF COMPARATIVE COST (6000(unit))

Manufacture	**Per unit**	**Purchase**	**Per Unit**
ALPHA			
V.C	300	Purchase cost of Board	600
+ Contribution to be lost 2 hour X 40/½	160		
Total	460		
+ Extra Cost to be incurred by Y	100		
Total Relevant Cost	**560**	Purchase Cost	**600**

X division can produce extra units of Alpha as 6000(unit) for Y division but maximum unit would be 20,000/2 = 10,000 (unit).

(ii) Transfer Price would be 460 for each unit of ALPHA up to 6000 (unit)

TRNASFER PRICE = ` 460 to 500.

(iii) If the requirement of Y dept. increase to 12,000(unit) than X dept can produce of transfer 10,000(unit) of ALPHA by reducing it's product BETA. However in order to produce & transfer over and above 10,000(unit) X dept. will have to reduce existing demand of ALPHA which should be reduces subject to the interest of Co.

STATEMENT OF COMPARITION COST

Manufacture		**Purchase Cost**	
V.C.	300		
+ Contribution lost	300	Purchase Cost	600

	600		
+ Extra Cost	100		
Total	**700**	Total	**600**

X dept. should not produce & transfer over and above 10,000 (units) of ALPHA.

❖ ❖ ❖

Question 15: Maruti Ltd. which has a system of assessment of Divisional performance on the basis of Residual Income has two divisions: ALFA and BETA. ALFA has annual capacity to manufacture 15 lakhs nos. of a special component which it sells to outside customers; but has idle capacity. The budgeted residual income of BETA is ` 200 lakhs while that of ALFA is ` 100 lakhs. Other relevant details extracted from the Budget of ALFA for the year are: Sale (to outside customers) 12 Lakhs units @ ` 180 per unit.

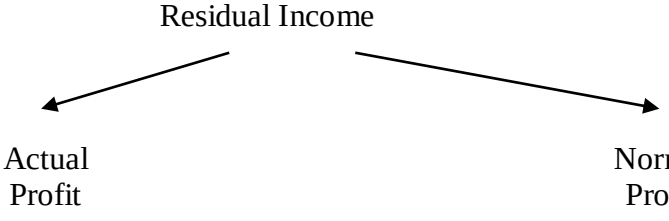
Variable Cost per unit	`160
Divisional fixed cost	` 80 Lakhs
Capital employed	` 750 Lakhs
Cost of Capital	12%

BETA has just received a special order for which it requires components similar to the ones made by ALFA. Fully aware of ALFA's unutilised capacity. BETA has asked ALFA to quote for manufacture and supply of 3,00,000 numbers of the components with a slight modification during final processing. ALFA and BETA agree that this will involve an extra variable cost of ` 8 per unit.

(i) Calculate the transfer price which ALFA should quote to BETA to achieve its budgeted residual income.

(ii) Indicate the circumstances in which the proposed transfer price may result in a sub-optimal decision for the group as a whole.

Solution:



STATEMENT OF PRESENT RESAIDUAL INCOME

		` Lakh
Sale	180 × 1200,000	2160

- Cost		
Variable Cost	160 × 1200,000	1920
	Contribution	240
- Fixed Cost		80
Business	Profit	160
- Normal Profit	750,00,000 × 12%	90
	Residual Income	70
Target		100
	Deficit	30

STATEMENT OF TRANSFER PRICE

		` Per unit
Cost to be incurred		160
+ Modification Cost		8
Relevant Cost		168
+Deficit to be recovered	30,00,000/3,00,000	10
	Transfer Price As suggested by Mgt.	**178**

(ii) If purchase cost of the component falls below its variable cost i.e. 168 then it's better to purchase from outside market. Its means in that case proposed transfer price (i.e.178) have no meaning & would result in suboptimal decision.

❖ ❖ ❖

Question 40: Great Vision manufactures a wide range of optical products including lenses and surveillance cameras. Division 'A' manufactures the lenses while Division 'B' manufactures surveillance cameras. The lenses that Division 'A' manufactures is of standard quality that has a number of applications. Due to huge demand in the market for its products Division 'A' is operating at full capacity. It sells its lenses in the open market for`140 per lens, the variable cost of production for each lens is`110, while the total cost of production is`125 per lens.

Other components purchased from external vendors	` 150
Cost of lens purchased from Division 'A'	` 120
Other variable costs	` 30
Fixed overheads	` 50

Total cost of a camera	`350

Each surveillance camera is sold for`410. The margin for each camera is low since competition in the market is high. Any increase in the price of a camera would reduce the market share. Therefore, Division 'B' cannot pay Division 'A' beyond`120 per lens procured.

Great vision's management uses Return on investments (ROI) as a scale to measure the divisional performance and marginal costing approach for decision making.

Required

(i) ANALYZE the behavioral consequences of each division when Division 'A' supplies lenses to Division 'B' at`120 per lens ? Substantiate your answer based on the information given in the problem.

(ii) ANALYZE if it would be beneficial to the company as a whole for Division 'A' to supply the lenses to Division 'B' at`120 per lens.

(iii) Do you feel that the divisional managers should accept the inter-divisional transfers in principal? If yes, CALCULATE the range of transfer price ?

(iv) ADVISE alternate transfer pricing models that the chief executive of the company can consider in order to change the attitude of the divisional heads if they are against the transfer pricing policy.

(v) CALCULATE the range of transfer price, if Division 'A' has excess capacity and can accommodate the internal requirement of 5,000 lens per month within the current operations.

❖ ❖ ❖

Category C: Question based on Best strategy

Question 19:Dabur Ltd has two divisions A and B, making products A and B respectively. One unit of A is an input for each unit of B. B has production capacity of 45,000 units and ready market for 45,000 units in both the years 2010 and 2011. Other information available:

Division A	Year	
	2010	2011
Capacity (production units)	50,000	50,000
Maximum demand in usual external market (units)	25,000	30,000
Special order (units) (to be fully accepted or fully rejected)	10,000	15,000
Fixed cost `/annum upto 30,000 units		
(Beyond 30,000 units, fixed cost increases by `1,00,000 for	4,30,000	4,30,000

Division A	Year	
	2010	2011
every additional 10,000 units for each year).		
Variable manufacturing cost `/unit	35	35
Variable selling cost `/unit (only for usual external sales)	10	10
Variable selling cost `/unit (only for special order and transfer to B)	5	5
Selling price (usual external market) `/unit	65	65
Selling price (only special order) `/unit	55	55

(B buys input A from outside at a slightly incomplete stage at ` 30 per unit and incurs sub-contract charges at ` 20 per unit to complete it to a stage to match the output of Division A. In 2011, subcontract charges will increase to ` 30 per unit. B is willing to pay A, the price if incurs viz` 50 and ` 60 per unit in 2010 and 2011 respectively, provided A supplies B's full requirement. For any lesser quantity, (B will accept any quantity), B is willing to pay A only ` 45 and ` 55 per unit in 2010 and 2011 respectively.)

Assume no changes in inventory levels in 2011. A may choose to avoid the variable selling overhead of ` 5 per unit on transfer to B or special order, by incurring a fixed overhead of ` 50,000 p.a. instead.

(i) What will be the maximum profits of A under its best strategy in 2011?

(ii) In view of the company's overall interest, calculate the customer wise units to be produced by A in 2010.

(iii) Assuming that A follows its best strategy between what values of transfer price will B be able to negotiate with A, so that A's best strategy is unchanged in 2011.

Solution:

For Department A

If transfer unit & special order unit become less than 10,000 unit better to incur variable selling cost ` 5 per unit.

Transfer unit/Order units are more than 10,000 (units) better to incur Fixed Cost ` 50,000.

Indifference Point = 50,000/5 = 10,000(unit)

STATEMENT OF RANKING

Option	External Sale Up to 30,000 unit	Special order 15000 units	Transfer to B < 45,000 unit	Transfer to B 45000 unit
Selling Price (`)	65	55	55	60
-Variable Cost (`)	35	35	35	35
- Selling & distribution (`)	10	-	-	-

Cont/unit(`)	**20**	**20**	**20**	**25**
Ranking	**II**	**X**	**X**	**I**

Selling & distribution Cost would be 50,000 instead of variable element because in option no. 2 & or Option No. III, Quantity exceeds 10,000 (unit)

The best strategy for Dept.A would be as under

(i) Transfer to B : 45000 unit

(ii) External Sale : 5000 unit

STATEMENT OF PROFIT (A)

		`
Contribution transfer to B	45000 × 25	11,25,000
External Sale	5000 × 20	1,00,000
Less: Fixed Cost		
30,000 unit	` 4,30,000	
10,000 unit	` 1,00,000	
10,000 unit	` 1,00,000	6,30,000
Less: Selling & Distribution		50,000
	Profit	**5,45,000**

In 2010 Best strategy for A

STATEMENT OF RANKING

Options	**External Sale up to 25000 unit**	**Special order 10,000 unit**	**Transfer to B < 45000 unit**	**Transfer to B 45000 unit**
Selling Price (`)	65	55	45	50
Variable cost (`)	35	35	35	35
Selling & Distribution (`)	10	-	-	-
Cont./unit (`)	20	20	10	15
Ranking	I	II	III	

The best strategy for A would be as under

(i) External sale = 25000

(ii) Special order = 10,000

(iii) Transfer to B = 15,000

(iv) B dept would like to pay maximum amount ` 60 to A = Purchase Cost & this would be the upper limit of negotiated range.

For any transfer price less than ` 60 will increase the profit of B, correspondingly decrease the

profit of A but overall profit remain unchanged but lower limit to be decided by dept. A on the basis of its relevant cost I.e. cost to be incurred due to transfer.

Minimum Transfer Price = 35 + 50,000/45,000 + Contribution to be lost is 20 = 56.11.

❖ ❖ ❖

Question 20: MRF Ltd. has three divisions – X, Y and Z, with make products X, Y, and Z respectively. For division Y, the only direct material is product X and for Z the only direct material is product Y. Division X purchases all its raw material from outside. Division Y additionally incurs `10 per unit and ` 8 per unit on units delivered to external customers and Z respectively, also ` 6 per unit picked up from X whereas external supply at Y's factory at the stated price of ` 85 per unit.

Additional information is given below:

	Figures `/unit		
	X	Y	Z
Production capacity (unit)	20,000	30,000	40,000 unit
Demand (unit)	14,000	26,000	42,000 unit
Direct materials (external supplier rate)	` 40	` 85	` 135
Direct labour	` 30	` 50	` 45
Selling price in external market	` 95	` 155	` 230

Required: To discuss the range of negotiation for Managers X, Y and Z, for the number of unit and the transfers price for internal transfers from company overall point of view.

Solution:

Negotiated Range between "X" & "Y",

Option No. 1

X dept has spare capacity 6000 units hence Transfer price would be at its variable cost only i.e. 40+30 = ` 70 which is acceptable by Y.

Option No. 2

	` per unit
"X" deptt. can reduce its market demand and transfer at its variable cost	= 70
+ Contribution to be lost	= 25
Transfer price	95

Not acceptable by Y.

Option no. I is acceptable but Y can offer maximum price to X.

i.e. 85 – 6 = 79

Transfer price =

Level (unit)	Negotiable Range
0 - 6000	` 70 to 79 per unit

Negotiate Range between

Y and Z Deptt.

Y dept has **following option.**

Option No. 1

By reducing its market sale in 26000 (unit)

Transfer Price = Selling Price = 155 – 10 + 8 = 153

Not acceptable by Z.

Option No. 2

By utilizing spare capacity upto 4000 at its Variable Cost

Variable Cost = 85 + 50 + 8 = 143 ` per unit

Also Not acceptable by Z.

Option No. 3

Y can transfer 4000(unit) to Z out of 6000 received from X at 79 Transfer Price = 79 + 6 + 50 + 8 = 143

Also Not acceptable by Z (because Z can purchase at 135 from outside market).

Option No. 4

Y can transfer 4000(u) to Z out of 6000 received from X.

Transfer price = 70 + 6 + 50 + 8 = 134

Which is acceptance subject to the interest of Co.

STATEMENT OF PROFIT (if y does not transfer 4000 out of 6000)

	Y		**Z**
Ex. Sale	26,000 × 155	Sale	40,000 × 230
Cost			
Transfer Cost	6,000 × 70	Purchase Cost	40,000 × 135
Transportation Cost	6,000 × 6	Labour Cost	40,000 × 45
Purchase Cost	20,000 × 85		
Labour Cost	26,000 × 50		
Delivery	26,000 × 10		
Profit	3,14,000		20,00,000

Total Profit = 3,14,000 + 20,00,000 = 23,14,000

STATEMENT OF PROFIT (if Y transfer 4000 out of 6000)

	Y		**Z**
Ex.Sale	26,000 × 155	Sale	40,000 × 230
Transfer Rev.	4000 × 134	Transfer Cost	4,000 × 134
Transfer Cost	6,000 × 70	Purchase Cost	36,000 × 135
Transportation Cost	6,000 × 6	Labour Cost	40,000 × 45
Purchase Cost	24,000 × 85		
Labour Cost	30,000 × 50		

	Y		Z
Delivery to Z	4000 × 8		
Delivery	26,000 × 10		
Profit	**2,78,000**		**20,04,000**

Total Profit = 22,82,000

Decision: Y dept should not transfer 4000(u) to department Z due to reduction in profit 32,000 (23,14,000 – 2282,080)

❖ ❖ ❖

Question 21:X Ltd. has two divisions, A and B, which manufacture products A and B respectively. A and B are profit centres with the respective Divisional Managers being given full responsible and credit for their performance.

The following figures are presented:

	Division A ` Per Unit	Division B ` Per unit	
Direct material cost	50	24 *	(Other than A)
Material A, if transferred from Division A	-	144	
Material A, if purchased from outside	-	160	
Direct labour	25	14	
Variable production overhead	20	2	
Variable selling overhead	13	26	
Selling price in outside market	160	300	
Selling price to B	144	-	
Selling price to S Ltd.	-	250	

Other Information:

To make one unit of B, one unit of component A is needed. If transferred from A, B presently takes product A at ` 144 per unit, with A not incurring variable selling overheads on units transferred to B.

Product A is available in the outside market at ` 160 per unit for competitors.

B can sell its product B in the external market at ` 300 per unit, whereas, if it supplied to X Ltd.' subsidiary, S Ltd., it supplies at ` 250 per unit, and need not incur variable selling overhead on units transferred to S Ltd. S Ltd. requires 6,000 units and stipulates a condition that either all 6,000 units be taken from B or none at all.

	A (Units)	B Units

Manufacturing capacity	20,000	28,000
Demand in external market	18,000	26,000
S Ltd.'s demand	—	6,000 or zero

Assume that Division A and B will have to operate during the year.

What is the best strategy for:

(i) Department A?

(ii) Department B, given that A will use its best strategy?

Solution:

STATEMENT OF RANKING

Option	**External Sale**	**Transfer**
Selling Price (` Per unit)	160	144
Variable Cost (` Per unit)	95	95
Selling & Distribution (`)	13	-
Contribution/unit(` Per unit)	52	49
Ranking	I	II

The best strategy for Dept A would be as under:

(i) External sale 18,000 (u)

(ii) Transfer to B 2,000 (u)

The resulted Contribution for Department A = 18000 X 52 + 2000 X 49

Contribution = ` 10,34,000.

(ii) The best strategy for department B would be as under:

Department B would like to receive 2000 (unit) from dept. A

STATEMENT OF RANKING for more than 2000 units

	External Sale	**Transfer to S**
Selling Price (` Per unit)	300	250
Variable Cost (` Per unit)	66	40
Purchase cost (` Per unit)	160	160
Contribution/unit	74	50

Now we have two option:

OPTION I

External Sale 26,000 unit

Spare Capacity 2,000 unit

OPTION II

External sale 22,000 unit
Transfer to "S" 6,000 unit
Spare —

Contribution as per option 1

		`
Revenue	26,000 × 300	= 78,00,000
- Cost		
Transfer Cost	2000 × 144	=2,88,000
Purchase Cost	24,000 × 160	38,40,000
Variable Cost	26,000 × 66	17,16,000
		19,56,000

Contribution as per option 2

		`
Revenue	22000 × 300	66,00,000
	6000 × 250	15,00,000
- Transfer Cost	2000 × 144	2,88,000
- Purchase cost	26,000 × 160	41,60,000
- Own Cost	28,000 × 40	11,20,000
- Selling & Dist.	22,000 × 26	5,72,000
Contribution		19,60,000

We should select option no. 2 due to higher contribution.

❖ ❖ ❖

Question 22: SURYA Ltd. Makes Three Products A, B and C in Division A, B and C respectively:

	A	B	C
Direct Materials (excluding material A for Divisions B and C) (`/unit)	4	15	20
Direct Labour (`/unit)	2	3	4
Variable overhead (Re/unit)	1	1	1
Selling price to outside customers (`/unit)	15	40	50

	A	B	C
Existing Capacity (No. of units)	5,000	2,500	2,500
Maximum External demand (No. of units)	3,750	5,000	4,000
Additional fixed costs that would be incurred to install additional capacity	` 24,000	` 6,000	` 18,700
Maximum Additional units that can be produced by additional capacity	5,000	1,250	2,250

B and C need material A as their input. Material A is available outside at ` 15 per unit. Division A supplies the material free from defects. Each unit of B and C requires one unit of A as the input material.

If B purchases from outside, it has to pay ` 15 per unit. If B purchases from A, it has to incur in addition to the transfer price, ` 2 per unit as variable cost to modify it. B has sufficient idle capacity to inspect its inputs without additional costs.

If C gets material from A, it can use it directly, but if it gets material from outside, which is at ` 15, it has to incur ` 2 for inspection charges.

A has to fix a uniform transfer price for both B and C.

What is the best strategy for each division and the company as a whole?

Part I A B & C Rs. 13

Part II A expand B expand C not expand]

❖ ❖ ❖

Question 23:XYZ Ltd, has two division, A and B Division A makes and sells product A, which can be sold outside as well as be used by B. A has a limitation on production capacity, that only 1,200 units can pass through its machining operations in one month. On an average about 10% of the units that A produces are defective. It may be assumed that out of each lot that A supplied, 10% are defectives.

When A sells in the outside market, the defective are not returned, since the transportation costs make it uneconomical for the customer. Instead, A's customers sell the defectives in the outside market at a discount.

But when B buys product A, it has to fix it into its product, which is reputed for its quality. Therefore, B returns all the defective units to A. A can manually rework the defectives, incurring only variable labour cost and sell them outside at ` 150 and not having to incur any selling costs on reworked units. If A chooses not to rework, it can only scrap the material at ` 30 per unit. B can buy product A from outside at ` 200 per unit, but has to incur ` 10 per unit as variable transport cost. B can insists to its outside suppliers also that it will accept only good units.

A incurs a variable selling overhead only on units (other than reworked units) sold outside. The following figures are given for the month:

Variable cost of production – Dept. A (`/unit)	120
Variable selling overhead (`/unit)	20
Selling price per unit in the outside market (`/unit)	200
Current selling price to B (`/unit)	190
Additional variable labour cost of reworking defectives (`/unit)	100
Selling price of reworked defectives (`/unit)	150
Fixed costs for the month (`)	36,000
Maximum demand from B at present (no. of units)	630

The outside demand can be freely had up to 900 units.

Given the demand and supply conditions, you are required to present appropriate calculations for the following:

(i) Evaluation of the best strategy for A in the present condition.

(ii) If B can buy only up to 540 units and the outside demand is only 600 units, how much should A charge B to maintain the same level of profit as in (i) above?

Solution:

Working Note 1

Defective	Sale as it	` 30
	Sale after	150 – 100
	Rectifying	` 50

Option 2 is better

(I) Best strategy means how much quantity should be produced & utilized either for external sale and transfer so that the profit of department A be maximized.

STATEMENT OF RANKING

	External Sale	Transfer to B	With defective
Selling Price	200	190	150
- Variable Cost	120	120	120
- Selling & distribution expenses	20	X	100
	60	70	(70)

Let 100 unit be the base for computation.

Contribution/100 unit

A:- In external sale 60 × 100 = 6000

B:- From transfer to B

Revenue	100 × 190	= 19000
(-) Variable Cost	100 × 120	= 12000
Contribution	7,000	
(-) Return 10(u) × 190	1,900	
	5,100	
(+) Benefit on 10 (u)		
(150 – 100) 10	500	
Net Contribution	= 5600	

OR

Effective contribution = 70 X 0.9 - 70 X 0.1 = 56 Net Contribution = 56 X 100 = 5600.

On the basis of above calculation we can say it's better to produce and best strategy would be as under.

1200 (unit)

A:- External sale 900 (u)

B:- Transfer to B 300 (u)

Resulted Contribution from

A:- 900 X 60 +300 × 56 = ` **70,800**

STATEMENT OF CONTRIBUTION "A"

Revenue 900 × 200		1,80,000
Transfer 300 × 190		57,000
		2,37,000
Cost		
Variable Cost 1200 × 120		1,44,000
Selling & Distribution 900 × 20		18,000
Contribution		75,000
Return (190 × 30)		(5,700)
Benefit from defective units (150 – 100)30		1,500
	Present Benefit	70,800

(ii) Total desired units

Present Benefit	70,800
Contribution from external sale (600 × 60)	36,000
Balance	34,800
Loss on return (60 × 70)	4,200
	39,000
Qty	540

Desired Contribution Per unit	72.22
Variable Cost	120.00
	192.22

❖ ❖ ❖

Question 25:B Ltd. makes three products X, Y and Z in Divisions X, Y and Z respectively. The following information is given:

	X	Y	Z
Direct Material (`/Unit)			
(excluding material X for Division Y and Z)	8	22	40
Direct Labour (`/Unit)	4	6	8
Variable Overhead (`/Unit)	2	2	2
Selling price to outside customers (`/Unit)	25	65	90
Existing capacity (no. of units)	6000	3000	3000
	X	**Y**	**Z**
Maximum external Market demand (no. of units)	5000	5500	5000
Additional fixed cost that would be incurred to install additional capacity (`)	4500	9000	23100
Maximum additional units that can be produced by additional capacity	6000	2000	2250

Y and Z need material X as their input. Material X is available in the market at ` 23 per unit. Defectives can be returned to suppliers at their cost. Division X supplies the material free from defects and hence is able to sell at ` 25 per unit. Each unit of Y and Z require one unit of X as input with slight modification.

If Y purchases from outside at ` 23 per unit, it has to incur ` 3 per unit as modification and inspection cost. If Y purchases from Division X, it has to incur, in addition to the transfer price, ` 2 per unit to modify it.

If Z gets the material from Division X, it can use it after incurring a modification cost of ` 1 per unit. If Z buys material X from outside, it has to either inspect and modify it at its own shop floor at ` 5 per unit or use idle labour from Division X at ` 3 per unit. Division X will lend its idle labour as per Z's requirement even if Z purchases the material from outside.

The transfer prices are at the discretion of the Divisional Managers and will remain confidential. Assume no restriction on quantities of inter-division transfer or purchases.

Discuss with relevant figures the best strategy for each division and for the company as a whole.

Solution

Statement Showing "Contribution per unit"

Particulars	Division X			Division Y		Division Z
Particulars	Sale to	Internal Transfer to		Purchase from	Transfer from	Transfer from
Particulars	Outside	Y	Z	Outside	X	X
Selling Price	25.00	---	---	65.00	65.00	90.00
Transfer Price	---	*	#	---	---	---
Direct Material (Excluding Material 'X')	8.00	8.00	8.00	22.00	22.00	40.00
Direct Labour	4.00	4.00	4.00	6.00	6.00	8.00
Variable Overhead	2.00	2.00	2.00	2.00	2.00	2.00
Purchase Price 'X'	---	---	---	23.00	---	---
Transfer Price 'X'	---	---	---	---	24.00	25.00
Modification Cost	---	---	---	3.00	2.00	1.00
Contribution	11.00	10.00	11.00	9.00	9.00	14.00

(*) ****Division Y will not pay division X anything more than '22, because at 24 , it will incur additional cost of '2 per unit to modify it, Rs. 23 + Rs. 3 = Rs. 26, the outside cost.

(#) To purchase material X from outside is costly for Division 'Z' as after modification at own shop floor, cost of the same comes to Division 'Z' is Rs. 28 (Rs. 23 + Rs. 5).

If Division 'X' goes to utilize its full capacity in that case labour would not be available for modification to Department 'Z'. Accordingly Division 'Z' may purchase material X at Rs. 25 from Division 'X' i.e. market price to outsiders.

Statement Showing "Internal Transfer Decision (units)"

Particulars	X	Y	Z
Existing Capacity …(A)	6,000 units	3,000 units	3,000 units
Maximum Capacity that can be added …(B)	6,000 units	2,000 units	2,250 units
Total Maximum that can be produced …(C)=(A)+(B)	12,000 units	5,000 units	5,250 units

Maximum External Demand …(D)	5,000 units	5,500 units	5,000 units
Balance …(C) – (D)	7,000 units	---	250 units
Internal Transfer to Other Divisions	5,000 units to Z* 2,000 units to Y	N.A.	N.A.
Internal Transfer from Other Divisions	N.A.	2,000 units transfer from X (material X)	5,000 units transfer from X (material X)

(*) division X will supply its production to division Z (first after meeting its external requirement) as contribution from product Z is high

Statement Showing "Decision Whether to Expand or Not"

Particulars	X	Y	Z
Additional Fixed Cost on Expansion	45,000	9,000	23,100
Contribution that can be earned by expansion	64,000 (4,000 units × Rs. 11 +	18,000 (2,000 units × Rs. 9)	28,000 (2,000* units × Rs. 14)
Net Benefit from Expansion	19,000	9,000	4,900
Decision	Expansion	Expansion	Expansion

(*) as maximum demand of product Z is 5,000 units which division Z first complete with existing capacity of 3000 units . balance 2000 units are expansion.

Statement Showing "Net Revenue Addition"

Particulars	X	Y	Z	Total
Contribution – External Sales	55,000 (5,000 units ×Rs.11)	45,000 (5,000 units ×Rs.9)	70,000 (5,000 units xRs.14)	1,70,000
Contribution – Internal Transfer	75,000 (2,000 units × Rs.10 + 5,000 units ×	---	---	75,000
Additional Fixed Cost	45,000	9,000	23,100	77,100
Net Revenue Addition				1,67,900

Strategy for Company & Divisions

(i) Division 'X' will transfer maximum possible material to Division 'Z' as Division 'Z' is offering maximum transfer price to Division 'X'. At the same time Division 'Z' is fetching maximum contribution for the organisation so it is beneficial for both the Divisions as well as organization as a whole.

(ii) As shown above all the three Divisions are getting net benefit when they are taking decision to expand and hence, all the three Divisions should expand there activity by incurring additional fixed cost on expansion.

PROPOSALS FOR RESOLVING TRANSFER PRICING CONFLICT

Conflict of interest between interests of individual divisions and the company can also be addressed by following the following systems for transfer pricing:

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.

Drawbacks of Dual Pricing include:

(i) It can complicate the records, thereby may result in errors in the company's overall records.

(ii) Profits shown by the divisions are artificial and need to be used only for internal evaluations.

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 a lower rate compared to the market price.

❖❖❖

Category D: Transfer Price with Decision Making

Question 26: DLF Company has two divisions whose activities and related cost are given below:

Division A:

Products	X	Y	Z
Selling price (`)	480	460	400
Variable cost/unit (`)	330	240	280
Capacity of production (units)	8000	5000	3000
Machine hour/Unit	3 Hr.	4 Hr.	2 Hr.

Division B has a capacity to produce 3000 units of product KX taking input as product Y from division A. It has also option to buy a similar product as Y from the market. The cost and selling price per unit are as given below:

	Material	Direct	Variable	Variable	Selling

	cost	wages	production overhead	selling overheads	price
If Processed with product Y from Division A	At transfer price	200	` 150	`100	` 1200
If processed with similar product from the market	` 400	180	`150	` 110	` 1100

There is capacity constraints of Division A in terms of machine hour of 38000 hours. Fixed cost of Division A is ` 5 lakhs and that of division B is ` 2 lakhs each.

Required:-

(a) Calculate profitability of the company if the transfer price of Y from Division A to Division B is fixed at ` 400 on the basis of market price of similar product.

(b) Give comments of fixing the transfer price based on market price.

(c) Calculate the impact on profitability if capacity of Division B is enhanced to 5,000 units by making capital expenditure of ` 10 lakhs at 10% cost of capital and transfer price is true market price, i.e. `460.

Solution:

Division A has 38,000 machine hours but requirement of machine hours to meet 100% capacity would be 8000 X 3 + 5000 X 4 +3000X2 = 50,000 Hrs. which means 38,000 represents limiting factor.

STATEMENT OF RANKING

	X	Y	Z
Contribution/unit (`)	150	220	120
Hours per unit	3	4	2
Contribution per hour (`)	50	55	60
Ranking	III	II	I

STATEMENT OF PRESENT OPTIMUM MIX

		Unit	Hours per unit	M. Hours	
X	III	4000	3	12000 (b/f)	
Y	II	5000 (3000 + 2000)	4	12000	20,000
				+8000	
Z	I	3000	2	6000	
				38,000	

(i) STATEMENT OF PROFIT

A		B		C	
Contribution	`	Rev.	3000 × 1200		
X Sale	150 × 4000	Cost		A	13,80,000
Y Extra Sale Transfer	220 × 2000 160 × 3000	Transfer Cost Own Cost	3000 × 400 3000 × 450	B	8,50,000
Z Sale	120 × 3000	Fixed cost	2,00,000		
- Fixed cost	5,00,000				
Profit	**13,80,000**	**Profit**	**8,50,000**	**Profit**	**22,30,000**

STATEMENT OF NET COST BENEFIT TO CO. **` Per unit**

Loss due to transfer in department A (400 – 460)	60
Benefit due to transfer price in department B	
Benefit with transfer – 1200 – 400 = 350	
Benefit with purchase = 1100 – 400 -440 = 260	90
Net benefit	**30**

Incremental benefit 30 × 3000 to the Co. if division A transfer 3000 (u) to division B.

(ii) STATEMENT OF PROFIT

A		B		Co.	
Contribution		Revision cost	5000 × 1200		
X	4000 × 150	Transfer Cost	5000 × 460	A	15,60,000
Y	5000 (460 - 240)	Own Cost	5000 × 450		
Z	3000 (120)	Factory Cost	2,00,000	B	11,50,000
Factory Cost	5,00,000	Opp. Cost	1,00,000		
	15,60,000		**11,50,000**		**27,10,000**

Change in Profit = 27,10,000 - 22,30,000 = 4,80,000.

❖ ❖ ❖

Question 27:Division X and Y are two divisions of XY Ltd., which operates as profit centres. Division X makes and sells product X. The budgeted Income statement of Division X, based on a sales volume of 30,000 units, is given below:

Budgeted Income Statement of Division X

Particulars	` In '000
Sales Revenue	6,000

Component purchase costs	1,050
Other variable costs	1,680
Fixed costs	480
Variable marketing costs	270
Fixed marketing overheads	855
Operating profit	1,665

The manager of Division X suggests that sales can be increased by 9,600 units, if the selling price is reduced by` 20 per unit from the present price of` 200 per unit and that for this additional volume, no additional fixed costs will be incurred. Division Y makes a component Y which is sold outside at a price of` 50 per unit.

Division X presently uses a component which is purchased from outside at` 35 per unit. This component is similar to component made by Division Y. Division Y can make this component for Division X with a minor modification in specification which would cause reduction in direct material cost for the Division Y by` 1.5 per unit and would require extra labour hour of 1 per unit at the rate of` 1.5 per hour.

Further the Division Y will not incur variable selling marketing cost on units transferred to the Division X. Division X's manager has offered to buy the component from Division Y at ` 25.00 per unit. Division Y has the capacity to produce 85,000 units.

The current budgeted information of Division Y are as follows:

Number of units sold outside 60,000 units @` 50 per unit, variable cost including material and labour` 15 per unit, variable marketing cost` 3 per unit, operating profit ` 12,00,000 and fixed overheads` 7,20,000.

Advise

(i) Should the Division X reduce the selling price by` 20 per unit even if it is not able to procure the component from Division Y at` 25 per unit?

(ii) Should the Division Y be willing to supply 39,600 units to Division X at ` 25 per unit?

Support each of your conclusions with appropriate calculations.

Solution:

(i) Should the Division X reduce the selling price by ` 20 per unit…?

Statement Showing 'Impact of Selling Price Reduction'

Particulars	`
Incremental Revenue	
Additional Sales Revenue (9,600 units × ` 180)	17,28,000
Loss of Revenue (30,000 units × ` 20)	(6,00,000)

Particulars	`
Total (A)	11,28,000
Incremental Cost	
Component Purchase Costs (9,600 units × ` 35)	3,36,000
Other Variable Costs $\left(\frac{9,600 \text{ units} \times ` 16,80,000}{30,000 \text{ units}}\right)$	5,37,600
Variable Marketing Costs $\left(\frac{9,600 \text{ units} \times ` 2,70,000}{30,000 \text{ units}}\right)$	86,400
Total (B)	9,60,000
Savings/(Loss) **…(A) – (**	1,68,000

Advice

Above incremental analysis clearly indicates that the reduction of Selling Price by ` 20 per unit shall be accepted as it increases the Profit of the concern by ` 1,68,000.

(ii) Should the Division Y be willing to supply 39,600 units to Division X…?

Statement Showing 'Minimum Average Transfer Price' *per component* (39,600)

Particulars	`
Variable Cost	15.00
Loss of Contribution* [14,600 units × (` 50 - ` 15 - ` 3)/ 39,600 units]	11.80
Transfer Price	26.80

(*) Division Y has surplus capacity to the extent of 25,000 units, for additional 14,600 units the Transfer Price must consider the Division Y's Variable Costs of Manufacturing the Component plus the Lost Contribution Margin (that will result from losing outside sales).

Company's Perspective

Particulars	`
Market Price per component	35.00
Relevant Cost for Transfer per component (from above)	26.80
Saving per component	8.20
Units	39,600
Total Savings	3,24,720

Advice

It is not in the interest of the Division Y to transfer 39,600 units to Division X at Price below the Minimum Average Transfer Price based on Opportunity Cost. However, from the Concern's Perspective, internal transfer between Divisions is beneficial as each unit to be transferred is offering a saving of ` 8.20.

❖ ❖ ❖

Transfer Price with Application of Calculus (Derivatives)

(Linear Pricing Model)

Question 29: Eastern Company Ltd. Has two Divisions namely Casnub Bogie Division (CBD) and Wagon Division (WD). CBD manufactures Casnub Bogies and WD manufactures BOBN type of Wagons. To manufacture a Wagon WD needs four Casnub Bogies. CBD is the only manufacturer of the Casnub Bogies and supplies both WD and outside customers. Details of CBD and WD for the coming financial year 2014-15 are as follows:

	CBD	WD
Fixed Costs (`)	9,20,20,000	16,45,36,000
Variable Cost per unit (`)	2,20,000	4,80,000*
Capacity per month (units)	320	12

* excluding transfer costs

Market research has indicated that the demands in the market for Eastern Company Ltd. 's products at different quotations are as follows:

For Casnub Bogies: Quotation price of ` 3,20,000 no tender will be awarded, but demand will increase by 30 Casnub Bogies with every ` 10,000 reduction in the unit quotation price below ` 3,20,000.

For Wagons: Quotation price of ` 17,10,000 no tender will be awarded, but the demand for Wagons will be increased by two Wagons with every ` 50,000 reduction in the unit quotation price below ` 17,10,000.

Required:

(i) Calculate the unit quotation price of the Wagon that will maximize Eastern Company Ltd.'s profit for the financial year 2014-15.

(ii) Calculate the unit quotation price of the Wagon that is likely to emerge if the divisional managers of CBD and WD both set quotation prices calculated to maximize divisional profit from sales to outside customers and the transfer price is set at market selling (quotation) price.

[**Note:** If P = a – bQ then MR = a – 2bQ]

Solution:

(i) Assumed Quotation Price 'P', Quantity 'Q'

The Marginal Cost of a 'Wagon' is `13,60,000

(`2,20,000 × 4 Casnub Bogies + `4,80,000)

Demand Function for a 'Wagon'

P	=	`17,10,000 – (`50,000 / 2) × Q
Revenue (R)	=	Q x [17,10,000 – 25,000 × Q]
	=	17,10,000 Q – 25,000 Q^2
Marginal Revenue (MR)	=	17,10,000 – 50,000 Q
Marginal Cost (MC)	=	13,60,000

Profit is Maximum where Marginal Revenue (MR) equals to Marginal Cost (MC)

17,10,000 – 50,000 Q	=	13,60,000
Q	=	7.00 units

By putting the value of 'Q' in *Demand Function*, value of 'P' is obtained.

P	=	17,10,000 – (50,000/ 2) × Q
	=	17,10,000 – 25,000 × 7.00
	=	`15,35,000

At `15,35,000 unit Quotation Price of a Wagon the Eastern Company Ltd.'s Profit will be Maximum.

(ii) At CBD the Divisional Manager would ensure that Divisional Marginal Revenue should be ***equal to*** Division's Marginal Cost so that Profit can be Maximum.

MR of a Casnub Bogies	=	MC of Manufacturing a Casnub Bogies
3,20,000 – 2(10,000/ 30) × Q	=	2,20,000
Q	=	150 units

Selling Price of a Casnub Bogie 'P' is

P	=	3,20,000 – (10,000/ 30) × 150
	=	`2,70,000

CBD will earn Maximum Profit when it will Quote `2,70,000 to the Outside Market. Since, Outside Market Quotation is *Transfer Price* as well, so Transfer Price to WD will be `2,70,000 and it forms part of WD's Marginal Cost.

At WD, Division Manager would ensure that Divisional Marginal Revenue should be ***equal to*** Division's Marginal Cost so that Profit can be Maximum.

MR of a Wagon	=	MC of Manufacturing a Wagon
17,10,000 – 50,000 × Q	=	(`2,70,000 × 4 Casnub Bogies) + `4,80,000
Q		= 3.00 units

Quotation Price of a Wagon 'P' should be:

P	=	`17,10,000 – 25,000 × 3.00
	=	`16,35,000

The unit Quotation Price of Wagon that emerges as a result of Market Based Transfer Pricing is `16,35,000.

❖ ❖ ❖

Question 30:Advanced: Calculation of optimal selling price using calculus and the impact of using the imperfect market price as the transfer price

ABC Ltd has two Divisions- A and B. Division A manufactures a product called the aye and Division B manufactures a product called the bee. Each bee uses a single aye as a

component. A is the only manufacturer of the aye and supplies both B and outside customers.

Details of A's and B's operations for the coming period are as follows:

	Division A	Division B
Fixed Costs	$7,500,000	$18,000,000
Variable Costs per unit	`280	`590*
Capacity units	30,000	18,000

* **Note:** Excludes transfer costs

Market research has indicated that demand for AB LTd's products from outside customers will be as follows in the coming period:

- **The aye:** at unit price £1000 no ayes will be demanded but demand will increase by 25 ayes with every £1 that the unit price is reduced below £ 1000;
- **The bee:** at unit price £ 4000 no bees will be demanded, but demand will increase by 10 bees with every £ 1 that the unit price is reduced below £ 4000.

Requirements:

(a) Calculate the unit selling price of the bee (accurate to the nearest £) that will maximize AB Ltd's profit in the coming period.

(b) Calculate the unit selling price of the bee (accurate to the nearest £) that is likely to emerge if the Divisional Managers of A and B both set selling price calculated to maximize Divisional profit from sales to outside customers and the transfer price of ayes going from A to B is set at 'market selling price.'

[**Note:** If P = a – bQ then MR = a – 2bQ]

Solution:- The starting point to answering this question is to ascertain whether the capacity of the supplying division is sufficient to meet the demand from both th external market and the receiving division. To increase demand by one unit of Aye the selling price must be reduced by $0.04($1/25 units). Thus the maximum selling price for an output of X units is:-

SP= $1,000 - $0.04x

Total revenue for an output of x units = $1,000x - 0.0x^2$

Marginal revenue- dTR/dx = $1,000- $0.08x

Marginal cost = variable cost = $280

At the optimum output level where MR= MC:

$1000 - 0.08x = $280

X = 9000 units

The highest selling price at which the optimum output can be sol;d is: SP = $1,000 - $0.04 (9,000) = $640. This leaves 21000 units spare capacity for Division A.

Therefore Division A can sheet the maximum output for Bee of 18000 units without restricting sales and a forgone contribution from Aye. The maximum selling price for Bee for output of X units is:

SP = $4,000 - $ 0.10x

Total revenue for an output of X units

=$4,000x - 0.10x^2$

Marginal revenue = dTR/dx= $4,000- $0.20x

Marginal costs = $280 + $590= $870

At the optimum output level where MR = MC.

$4,000 - $0.20x = $870

X + 15,650 units

The highest selling price at which the optimum output can be sold is : SP = $4000- 0.10 (15,650) = $2435. The contributions at the optimal selling prices are:

Division A= $ 3240000 {9000 X ($640- $280)}

Division B= $24492250 (15650 X ($2435- $870)}

Group = $ 27732250

(b) If Division A sets the transfer price at the optimum selling price of $640 the variable cost per unit output for producing Bee will be $1230($640 +$590).

MR of Division B = $4000 - $0.20x (see part (a))

The optimum output level is where :

$4000 - $0.20x = $ 1230

X = 13850 units

The optimum selling price is :

$4,000 - $0.10 (13850) = $2615

(c) The revised contributions if the transfer price is set at $640 will be as follows:-

		($)
Division A:	External sales (9000 X ($640 - $280))	3240000
	Internal transfers (13850 X ($640 - $280))	4986000
Division B:	External sales (13850 X ($2615 - $1230))	19182250
Total Contribution		27408250

Setting the transfer price at the market price results in an increase in total contribution of Division A and a decline in the total contribution of Division B. The contribution for the group as a whole declines by $324000.

As a result of the increase in the transfer price.

Division B's marginal cost increases and it will therefore restrict output and set a higher selling price. Where the market for the intermediate product is imperfect, the optimal

transfer price is the marginal cost of producing the intermediate product at the optimum output level for the group as a whole. Since marginal cost per unit is constant and equal to variable cost, the optimum transfer price is variable cost. If the transfer price is set at variable cost the receiving division will have a cost function identical to that specified in (a) and will set the selling price at the optimum output for the group as a whole.

❖ ❖ ❖

Multinational Transfer Pricing

Question 31:Celestial Electronics and Consumer Durables Corporation (CECDC), is a Taiwan (a state, Republic of China) based consumer electronics manufacturer. To expand its market share in South Asia it has formed CECDC India Pvt. Ltd. (CIPL) in India. For the purpose of performance evaluation, the Indian part is treated as responsibility centre. CIPL imports components from the CECDC and assembles these components into a LED TV to make it saleable in the Indian market. To manufacture an LED TV two units of component 'LX' are required. The following cost is incurred by the CECDC to manufacture a unit of component 'LX':

	Amount (TWD)
Direct Material*	440.00
Direct Labour (3 hours)	120.00
Variable Overheads	40.00
	600

(*) purchased from domestic market.

CECDC incurs TWD 30 per unit as Wharfage Charges.

CECDC has a normal manufacturing capacity of 5,00,000 units of component 'LX' per annum, 70% of its production is exported to CIPL and rest are sold to other South-east Asian countries at TWD 750 per component(where demand exist 1,50,000 unit). The tax authorities both in Taiwan and India, consider TWD 750 (= `1,500) per component 'LX' as arm's length price for all transfers to CIPL. CIPL incurs `10 per unit as shipment charges.

The cost data relevant to the LED TVs are as follows:

	Amount (`)
Variable Costs per unit:	

Direct Material (excluding component 'LX')	6,200
Direct Labour	115
Fixed Cost:	
Office and Administrative Overheads	1,18,00,000
Selling & Distribution Overheads	2,58,00,000

CIPL can sell 1,75,000 units of LED TV at `11,000 per unit.

There is a dispute on the transfer pricing of component 'LX' between the CECDC and CIPL. CECDC is in favour of charging TWD 750 per component to CIPL as it is the arm's length price and it has to pay tax on this. On the other hand CIPL in its argument saying that the substitute of component 'LX' can be purchased from the Indian market at `1,490 only and moreover it has to pay import duty on import of component 'Lx' so the transfer price suggested by CECDC is not acceptable.

The following are the direct/indirect tax structure in India and Taiwan:

Type of Tax/Duty	India	Taiwan
Corporate Tax Rate	30%	25%
Import (Custom) Duty	10%	15%
Export Duty	Nil	Nil

From the above information, Calculate:

(i) Minimum Price at which CECDC can transfer component 'LX' to CIPL.

(ii) Maximum Price that can be paid by CIPL to CECDC for each component 'LX'.

(iii) Profitability Statement for the group in TWD.

Note:

(i) For Duty and Tax calculation, consider arm's length price only.

(ii) Ignore the DTAA and other tax provisions.

(iii) Conversion Rate 1 INR = 0.50 TWD

Solution:—

(i) The minimum price at which CECDC can transfer component 'L_x' to CIPL is variable Cost per unit plus Corporate Tax attributable to per unit of component 'L_x'

Minimum Transfer Price per unit of component 'L_x'

	Amount (TWD)
Direct Material	440.00
Direct Labour	120.00

Variable Overheads	40.00
Wharfage Charges	30.00
Corporate Tax attributable to per unit of component 'L_x' (W.N.1)	30.00
Total	**660.00**

Minimum Transfer Price per unit of component 'L_x' is 660 TWD or `1,320

(ii) Maximum Transfer Price that CIPL can pay to CECDC for every unit of component 'L_x' is the market price of component 'L_x' in domestic market minus cost of import (if any).

Maximum Transfer Price per unit of Component 'L_x'

	Amount (`)
Market Price of component 'L_x' (India Market)	1,490.00
Less: Import Duty (750 TWD × 2 ×10%)	150.00
Less: Shipment Cost	10.00
Total	1,330.00

Maximum Transfer Price that CIPL can pay to CECDC for every unit of component 'L_x' is `1,330 or 665 TWD.

(iii) Profitability Statement for the Group (TWD'000)

Particulars	**LED TV**	**Component 'L_x'**	**Total**
Sales Revenue	9,62,500 (1,75,000 units × `11,000 × 0.50)	1,12,500 (1,50,000 units × 750TWD)	10,75,000
Total Revenue	**(A)**		**10,75,000**
Variable Manufacturing Cost (Component 'L_x')	2,10,000 (3,50,000 units × 600 TWD)	90,000 (1,50,000 units × 600 TWD)	3,00,000
Wharfage Charges	10,500 (3,50,000 units × 30 TWD)	4,500 (1,50,000 units × 30 TWD)	15,000
Other Variable Manufacturing	5,52,562.50	---	5,52,562.50
Cost (excluding 'L_x')	(1,75,000 units × `6,315 × 0.50)		
Import Duty	26,250 (10% × 3,50,000 units × 750TWD)	---	26,250
Shipment Cost	1,750 (3,50,000 units × `10 × 0.50)	---	1,750
Office and	5,900	---	5,900

Admin. Overheads	(`1,18,00,000 ×0.50)		
Selling & Dist. Overheads	12,900 (`2,58,00,000 × 0.50)	---	12,900
Corp. Taxes (W.N.2 &3)	30,191.25 (`60,382.50 × 0.50)	15,000	45,191.25
Total Cost		**(B)**	**9,59,553.75**
Profit		(A)- (B)	1,15,446.25

Working Notes:

W.N.-1

Corporate Tax Attributable to per unit of component 'Lx' (TWD)

	Amount
Profit per unit (750 TWD -1440TWD -20 TWD – 40 TWD -30 TWD)	120
Corporate tax per unit (25% on 120 TWD)	30

W.N.-2

Calculation of Corporate Tax paid by CIPL (`'000)

	Amount
Sales Revenue (1,75,000 units × `11,000)	19,25,000
Less: Variable Costs:	
Component 'Lx' (3,50,000 units × 750 TWD ×`2)	5,25,000
Other Variable Costs (1,75,000 units × `6,315)	11,05,125
Less: Import Duty 10% of (3,50,000 units × 750 TWD × `2	52,500
Less: Shipment Cost (3,50,000 units × `10)	3,500
Less: Fixed Overheads	
Office and Administrative Overheads	11,800
Selling and Distribution Overheads	25,800
Taxable Profit	2,01,275
Tax Payable @30%	60,382.50

W.N.-3

Calculation of Corporate Tax paid by CECDC (TWD)

	Amount
Profit per unit (750 TWD – 440 TWD -120 TWD – 40 TWD – 30 TWD)	120

No. of units to be sold	5,00,000
Total Profit (120 TWD × 5,00,000 units)	6,00,00,000
Corporate Tax @25%	1,50,00,000

❖ ❖ ❖

Question32: Standard Corporation Inc. (SCI) is a US based multinational company engaged in manufacturing and marketing of Printers and Scanners. It has subsidiaries spreading across the world which either manufactures or sales Printers and Scanners using the brand name of SCI.

The Indian subsidiary of the SCI buys an important component for the Printers and Scanners from the Chinese subsidiary ofthe same MNC group. The Indian subsidiary buys1,50,000 units of components per annum from the Chinese subsidiary at CNY ¥ 30 per unit and pays a total custom duty of 29.5% of value ofthe components purchased.

A Japanese MNC which manufactures thes amecomponent which is used in the Printer and Scanners of SCI, has a manufacturing unit in India and is ready to supply the same component to the Indian subsidiary of SCI at ¥ 320 per unit.

The SCI is examining the proposal of the Japanese manufacturer and asked its Chines subsidiary to presents its views on this issue. The Chinese subsidiary ofthe SCI has informed that it will be ableto sell 1,20,000 units of the components to the local Chinese manufactures at the same price i.e.¥ 30 per unit but it will incur an excise duty @10% on sales value.Variable cost per unit of manufacturing the component is ¥ 20 per unit.

The Fixed Costs of the subsidiaries will remain unchanged.

The Corporation tax rates and currency exchange rates are as follows:

Corporation Tax rates		Currency Exchange Rates
China	25%	1Us Dollar ($) = ` 61.50
India	34%	I US Dollar ($) = 6.25¥
USA	40%	I CNY (¥) = ` 9.80

Required:

(i) PREPARE a financial appraisal forthe impact ofthe proposal by the Japanese manufacturer to supply components for Printers and Scanners to Indian subsidiary of SCI. [Present yoursolution in Indian Currency andits equivalent.]

(ii) IDENTIFY other issues that would be considered by the SCI in relation to this proposal.

(Note: While doing this problem use the only information provided in the question itself and ignore the actual taxation rules or treaties prevails in the above mentioned countries)

Solution:

(i) Impact of the Proposal by the Japanese Manufacturer to Supply Components for Printers and Scanners to the Indian Subsidiary of the SCI.

On Indian Subsidiary of SCI

Particulars	**Amount (`)**
Cost of Purchase from the Chinese Manufacturer :	
Invoiced Amount {(1,50,000 units × ¥ 30) × `9.80}	4,41,00,000
Add: Total Custom Duty (` 4,41,00,000 × 29.5%)	1,30,09,500
Total Cost of Purchase from the Chinese Manufacturer (A)	5,71,09,500
Cost of Purchase from Japanese Manufacturer in India:	
Invoice Amount (1,50,000 units × ` 320)	4,80,00,000
Total Cost of Purchase from Japanese Manufacturer in India (B)	4,80,00,000
Savings on Purchase Cost Before Corporate Taxes (A) – (B)	91,09,500
Less: Corporate Tax @34%	30,97,230
Savings after Corporate Taxes	60,12,270

On Chinese Subsidiary of SCI

Particulars	**Amount (`)**
Loss of Contribution [{(1,50,000 – 1,20,000 units) × ¥ (30 – 20)} × ` 9.80]	29,40,000
Add: Excise Duty on Local Sale - Chinese Manufacturer [{(1,20,000 units × ¥ 30) × 10%} × ` 9.80]	35,28,000
Total Loss Before Corporate Taxes	64,68,000
Less: Tax Savings on the Losses (` 64,68,000 × 25%)	16,17,000
Net Loss after Corporate taxes	48,51,000

On SCI Group

Particulars	**Amount (`)**
Saving from Indian Subsidiary	60,12,270
Loss from Chinese Subsidiary	48,17,000
Net Benefit to SCI Group	11,61,270

From the above analysis it can be seen that the proposal from the Japanese manufacturer in India is beneficial for the SCI as it give a net benefit of ` 11,61,270.

(ii) The SCI need to consider various other issues before reaching at a final decision of accepting the proposal of the Japanese manufacturer in India. The few suggestive issues that should be considered are as follows:

The longevity of the proposal of the Japanese manufacturer Whether Japanese manufacturer will supply the components in the future also. For this purpose a long term agreement between the Indian Subsidiary of SCI and Japanese manufacturer in India needs to be entered.

- *Certainty of the fiscal policy in India:* The Japanese manufacturer will not be able to supply the component at the present price if the fiscal policy of India will change in the future.
- *Repatriation of Profit earned in India:* Though the Indian subsidiary is making profit but it depends on the Government policy on the repatriation of profit from India to USA.
- *Operating Conditions in China:* The SCI has to make sure that the Chinese subsidiary is operating profitably and able to use the spare capacity in the future as well.
- *The fiscal policy in China:* If the Government of China liberalize its fiscal policies in China in future then the manufacturing cost will be cheaper than the today's cost.

Apart from above suggestive points the foreign relations and other tax treaties and accords should also be kept in consideration.

❖ ❖ ❖

Question 34: LL Multinational transferred 4,000 units of product S From its manufacturing division in the US to the selling division in the UK in the year to 31 December.

Each unit of S cost $350 to manufacture, the variable cost production being 75% and was sold for £600. The UK division incurred marketing and distribution costs of $8 per unit. The UK tax rate was 30% and the exchange rate £ = $1.5

If the transfers were at variable cost. What was the UK division's profit after tax?

Solution

Effect of the industry-market-size factor on operating income Of the 3,000-unit increase in sales from 8,000 to 11,000 units, 10% or 800 (10% Rs. 8,000) units are due to growth in market size, and 22,000 (3,000 – 800) units are due to an increase in market share. The change in Sony's operating income e industry-market size factor rather than from specific strategic actions is:

`82,50,000 (the growth component in Exercise 12-29) ` from u

22,

: 800 / 3,000 ₹

00,000 F Effect of product differentiation on operating income

The change in operating income due to:

Increase in price of inputs (cost effect of price recovery) `

1,35,000 U Effect of cost leadership on operating income

The change in operating income from cost leadership is:

Productivity component ` 54,00,000 F

Decrease in selling price (revenue effect of price recover y)

82,5

0,000 U Growth in market share due to cost leadership

` 82,50,000 (the growth component in exercise 12-29) `. 2,200 / 3,000 60,50,000 F

Change in operating income due to cost leadership `.

52,65,000 F

The change in operating income between 2014 and 2015 can be summarized as follows:

Change due to industry market-size	` 22,00,000 F
Change due to product differentiation	1,35,000 U
Change due to cost leadership	52,65,000 F

Sony has been successful in implementing its cost leadership strategy. The increase in operating income during 2015 was due to cost leadership through quality improvements and sales growth. It cuts its prices significantly to gain market share that might also benefit it in future periods.

Sony's operating income increase in 2015 was also helped by a growth in the overall market size.

❖ ❖ ❖

Transfer Price with International Taxation

Question 35: Division W, which is part of the XYZ group, is based in country A and has the capacity to manufacture 1,00,000 units of product B each year, the variable cost of producing a unit of B is £ 15 and the division can sell 85,000 units eternally per annum at £25 per unit. Division D is part of the same group and in based in country L. Division D purchases 40,000 units of product B each year from O (which is not part of XYZ group), which is also based in country L. D pays a sterling equivalent of £ 20 per unit.

If Division D were to purchase all unit of product B from division W, division W would set a transfer price of £22. Given that there are no selling costs involved in transferring units to division D, this would give division W the same contribution on internal and external sales.

Division W would give priority to division D and so the order from some external customers would not be met.

Required: Determine from whom division D should purchase product B in each of the following circumstances if the aim is to maximize group profit.

The tax rate in country A is 30% and the tax rate in country L is 50%.

The tax rate in country A is 50% and the tax rate in country L is 20%.

You may assume that changes in contribution can be used as a basis of calculating changes in tax charges and that division D is able to absorb any tax benefits from the profit it generates on other activities.

(Ignore corporate Tax on arms length Price.)

Solution:

A- 30% L-50%

A-W – 1,00,000 Capacity 85000 Sale

B 15,000 Spare Capacity

L- D : 40,000 (u 20

22

Working Note 1:

"W"	Variable Cost	Selling Price.	Contribution
External sale	15	25	10
Transfer	12	22	10

STATEMENT OF NET COST BENEFIT

If D purchases from W		
D excess cost (20 – 22)	40,000	80,000
Tax saving 50%		40,000
Net benefit	A	(40,000)
Incremental benefit to W		1,50,000
Tax Burden@ 30% p.a.		45,000
	B	1,05,000

Overall profit for the Co. (A +B) is 65,000 if D purchased 40,000 from W instead of purchasing from market.

Working Note:

	No transfer	Transfer
Capacity	1,00,000	1,00,000
Ex. Sale	85,000	60,000
Transfer	-	40,000
Spare	**15,000**	**-**

Out of total transfer unit 40,000, 25,000 represents existing sale. Cont/unit remain same.

15000 represents spare capacity utilization which realize contribution 15000 X 10 = 15000

(ii) **STATEMENT OF NET COST BENEFIT**

If D purchase from W, D excess Cost (22 – 20) 40,000	(80,000)
Tax Saving @ 20%	16,000
	(64,000)
Incremental benefit to W (15000 × 10)	1,50,000
Tax burden @ 50%	75,000
	75,000

Overall profit for the Co. (A +B) i.e. 11,000 if D purchase 40,000 u from W limited of purchasing from outside.

❖ ❖ ❖

Transfer prices and exchange rate losses
Transfer Pricing – Optimum Decision Making

Question 38: Bright Furniture Company has two divisions division FXR and Division FQR. Both divisions are independent. Each division serves a different

market in the furniture industry.

Division "FXR" manufactures furniture that is used by the canteens/coffee bars. The division plans to introduce cushioned seat for the counter chairs. A cushioned seat currently made by the Division "FQR" for use on its stylish stool could be modified for use on the new counter chair. Division "FQR" can make the necessary modifications to the cushioned seat easily.

The raw materials used in Division "FXR" seat are slightly different and should cost about 20 percent more than those used in Division "FQR" stylish stool. However, the labour time should be the same because the seat fabrication operation is basically the same.

Division "FQR" is operating at full capacity. By making the cushion seats for division "FXR" Division "FQR" have to cut its production of stylish stools. However, Division "FQR" can increase its production of normal stools. The labour time freed by not having to fabricates the frame or assemble the stylish stool can be shifted to the frame fabrication and assembly of the normal stool. Division "FQR" can switch its labour force between these two models of stools without any loss of efficiency. Labour hours cannot be increase. Division "FQR" has excess demand for both products. Following are Division "FQR" a standard costs for the two stools and a schedule of Division "FQR"s manufacturing overhead.

"FQR" Division

Standard Selling price and Cost

	Stylish Stool		Normal Stool	
	`	`	`	`
Selling price		225.00		160.00
Less: Raw Materials				
Framing	32.60		39.04	
Cushioned seat				
-padding	9.60		-	
-Vinyl	16.00		-	
Moulded Seat (purchased)	-	58.20	24.00	63.04
Less: Direct labour				
Frame Fabrication				
-(0.5 × ` 30.00/DLH#)	15.00		-	
- (0.5 × ` 30.00/DLH)	-		15.00	

	Stylish Stool		Normal Stool	
	`	`	`	`
Cushion Fabrication				
-(0.5 × ` 30.00/DLH)	15.00		-	
Assembly				
-(0.5 × ` 30.00/DLH)	15.00		-	
- (0.3 × ` 30.00/DLH)	-	45.00	9.00	24.00
Less: Manufacturing overhead				
-(1.5 DLH × ` 51.20/DLH)		76.80		-
-(0.8DLH × ` 51.20/DLH)		-		40.96
Profit/(Loss)		45.00		32.00

(*) Attaching seats to frames and attaching rubber feet

(#) DLH refers to Direct Labour Hours

"FQR" Division

Manufacturing Overhead Budget

Overhead item	**(`)**
Indirect Material (Variable-at Current Market prices)	16,80,000
Indirect Labour (Variable)	15,00,000
Supervision (Non variable)	10,00,000
Power (use varies with Activity: Rates are fixed)	7,20,000
Heat and Light (non variable-Same Regardless of production)	5,60,000
Miscellaneous Overheads (Non variable-Any change in Amounts or rates is independent of production)	8,00,000
Depreciation (Fixed)	68,00,000
Employee Benefits (20% of supervision, Direct and indirect Labour)	23,00,000
Total Overhead	1,53,60,000

Overhead item	(`)
Capacity in DLH	3,00,000
Overhead Rate/DLH	` 51.20

Required: Assume that you are the corporate controller. What transfer price would you recommended for a 200 unit lot of seats?

Solution:

Working note:

(1) Statement Showing Variable Cost per 200 unit lot

	(`)	(`)
Cushion Material:		
-Padding	9.60	
-Vinyl	16.00	
Total cushion Material	25.60	
Cost Increase by 20%	5.12	
Cost of Cushioned Seat		30.72
Cushion Fabrication Labour (`30 × 0.5)		15.00
Variable Overhead (W.N.-2) (` 20 × 0.5)		10.00
Variable Cost per Cushioned Seat		55.72
Total Variable Cost per 200 unit lot (`55.72 × 200)		11,144

(2) Statement Showing Fixed Overhead & Variable Overhead Rate per Direct Labour Hour

	Variable Amount		Fixed Amount	
	(`)	(`)	(`)	(`)
	Total	Per DLH	Total	Per DLH
Indirect Material	16,80,000	5.60	—	—
Indirect labour	15,00,000	5.00	—	—
Supervision	—	—	10,00,000	3.33

Power	7,20,000	2.40	—	—
Heat & Light	—	—	5,60,000	1.87
Miscellaneous Overheads	—	—	8,00,000	2.67
Depreciation	—	—	68,00,000	22.67
Employee Benefits:				
- 20% Direct Labour*	18,00,000	6.00	—	—
- 20% Supervision	—	—	2,00,000	0.68
- 20% indirect Labout	3,00,000	1.00	—	—
	60,00,000	20.00	93,60,000	31.20

Variable Overhead Rate	= ` 60,00,000/3,00,000
	= ` 20.00/DLH
Fixed Overhead Rate	= ` 92,60,000/3,00,000
	= ` 31.20/DLH

*Direct Labour Cost	
0.2(`10,00,000 +DL+ ` 15,00,000)	= ` 23,00,000
0.2 DL	= ` 18,00,000
DL	= ` 90,00,000

(3) Statement Showing Loss of Contribution Margin from Outside Sales

	Stylish Stool	Normal Stool
	(`)	(`)
Selling Price	225.00	160.00
Less: Material	58.20	63.04
Less: Labour	45.00 (`30.00 × 1.5)	24.00 (` 30.00 × 0.8)
Less: Variable Overhead	30.00 (`20.00 × 1.5)	16.00 (`20.00 × 0.8)
Contribution Margin per unit	91.80	56.96
Units Produced (units)	200	250 (W.N.-4)
	18,360	***14,240***

Amount of Contribution Margin Lost as a result of shifting production to the Normal Stool ` 4,120 (` 18,360 - ` 14,240).

(4) Number of Economy Office Stool that can be produced

Labour Hours to make a 200-unit lot of Stylish Stools (1.50 × 200)	300 hours
Less: Labour Hours to make a 200-unit lot of Cushioned Seats (0.50 × 200)	100 Hours
Labour Hours available for Normal Stool	***200 Hours***
Labour hours required to make one Normal Stool	0.8 Hours/Stool
Use of Extra Labour devoted to Normal Stool Production (200/0.8)	250 Stools

Since the "FQR" Division is operating at full Capacity the Transfer Price must consider the Division's Variable Costs of Manufacturing the Seat plus the Lost Contribution Margin that will result from losing outside sales. Thus, the Transfer Price (W.N.-1 & 3) equals to ` 15,265(`11,144 + ` 4,120)

❖ ❖ ❖

Question 39:Tycoon Ltd has two manufacturing departments organized into separate profit centres known as Textile unit and Process house. The textile unit has a production capacity of 5 lacs meters cloth per month, but at present its sales as limited to 50% to outside market and 30% to process house.

The transfer price for the year 2014 was agreed at ` 6 per meter. This price has been fixed in line with the external wholesale trade price on 1st January, 2014. However, the price of yarn declined, which was the raw material of textile unit, with effect, that wholesale trade price reduced to ` 5.60 per meter with effect from 1st June 2014. This price was however not made applicable to the sales made to the processing house of the company. The textile unit turned down the processing house request for revision of price.

The process house refines the cloth and packs the output known as brand Rayon in bundles of 100 meters each. The selling price of the Rayon is ` 825 per bundle. The process house has a potential of selling a further quantity of 1,000 bundles of rayon provided the overall prices is reduced to ` 725 per bundle. In that event it can buy the additional 1,00,000 meters of cloth from textile unit, whose capacity can be fully utilized. The outside market has no further scope.

The cost data relevant to the operations are:

	Textile unit `	**Process House** `
Raw Material (per meter) on 1st June 2014	3.00	Transfer Price
Variable Cost	1.20 (per meter)	80 (per bundle)
Fixed Cost (per month)	4,12,000	1,00,000

You are required to:

1:- Prepare statement showing the estimated profitability for June, 2014 for Textile unit and Process house and company as a whole on the following basis:—

(a) At 80% and 100% capacity utilization of the textile unit at the market price (external wholesale trade price on 1st January, 2014) and the transfer price to the processing house of ` 6 per meter.

(b) At 80% capacity utilization of the Textile unit at the market price of ` 5.60 per meter and the transfer price to the processing house of ` 6 per meter.

(c) At 100% capacity utilization of the textile unit at the market price of ` 5.60 per meter and the transfer price to the Processing house of ` 5.60 per meter.

2. Comment on the effect of the company's transfer pricing policy on the profitability of processing house.

Solution:

1: (a) At 80% level

Textile unit	(`)	Process House	(`)
Sales (4,00,000 Mtr. × ` 6)	24,00,000	Sales (1,50,000 mtr/100mtr × ` 825)	12,37,500
Less: Raw Material (4,00,000 Mtr × ` 3)	12,00,000	Less: Transfer Price (1,50,000Mtr. × ` 6)	9,00,000
Less: Variable Cost (4,00,000 Mtr. × ` 1.2)	4,80,000	Less: Variable Cost (1,500 Bundles × ` 80)	1,20,000
Less: Fixed Cost	4,12,000	Less: Fixed Cost	1,00,000
Profit	3,08,000	Profit	1,17,500

Overall Profit equals to ` 4,25,000(` 3,08,000 + ` 1,17,500).

At 100% level

Textile unit	(`)	Process House	(`)
Sales (5,00,000 Mtr. × ` 6)	30,00,000	Sales (2,50,000 mtr/100mtr × ` 725)	18,12,500
Less: Raw Material (5,00,000 Mtr × `3)	15,00,000	Less: Transfer Price (2,50,000Mtr. × ` 6)	15,00,000
Less: Variable Cost (5,00,000 Mtr. × ` 1.2)	6,00,000	Less: Variable Cost (2,500 Bundles × ` 80)	2,00,000
Less: Fixed Cost	4,12,000	Less: Fixed Cost	1,00,000
Profit	4,88,000	Profit	12,500

Overall Profit equals to ` 5,00,500 (` 4,88,000 + ` 12,500)

(b) At 80 Level (Market Price ` 5.60 and Transfer Price ` 6)

Textile unit	(`)	Process House	(`)
Sales (2,50,000 Mtr. × ` 5.6) + (1,50,000 Mtr. × ` 6.0)	23.00.000	Sales (1,50,000 mtr/100mtr × ` 825)	12,37,500

Less: Raw Material (4,00,000 Mtr × `3)	12.00.000	Less: Transfer Price (1,50,000Mtr. × ` 6)	9,00,000
Less: Variable Cost (4,00,000 Mtr. × ` 1.2)	4,80,000	Less: Variable Cost (1,500 Bundles × ` 80)	1,20,000
Less: Fixed Cost	4,12,000	Less: Fixed Cost	1,00,000
Profit	2,08,000	Profit	1,17,500

Overall Profit equals to ` 3,25,000 (` 2,08,000 + `1,17,500).

(c) Sales 100% Level at (` 5.60)

Textile unit	(`)	Process House	(`)
Sales (5,00,000 Mtr. × ` 5.6)	28,00,000	Sales (2,50,000 mtr/100mtr × ` 725)	18,12,500
Less: Raw Material (5,00,000 Mtr × `3)	15,00,000	Less: Transfer Price (2,50,000Mtr. × ` 5.6)	14,00,000
Less: Variable Cost (5,00,000 Mtr. × ` 1.20)	6,00,000	Less: Variable Cost (2,500 Bundles × ` 80)	2,00,000
Less: Fixed Cost	4,12,000	Less: Fixed Cost	1,00,000
Profit	2,88,000	Profit	1,12,500

Overall Profit equals to ` 4,00,500 (` 2,88,000 + ` 1,12,500).

(ii) Comments on the Profitability of "Processing House"

	Transfer Price (`)	Profit (`)
(a) 80% capacity	6.00	1,17,500
100 % capacity	6.00	12,500
(b) 80% capacity	6.00	1,17,500
(c) 100 % capacity	5.60	1,12,500

Processing House will not be interested to buy more than 1,50,000 meters from textile units.

❖ ❖ ❖

COST RATIO METHOD (Decided by management)

This method is to be applied where the output of department A is not marketable due to specialized product and it is not possible for B department to purchase from outside market.

NOTE: "If TP is given & Decision is for Make or Buy, then purchase Cost should be Compared with Relevant Cost".

Relevant Cost = Variable Cost: Spare Capacity

Relevant Cost = Variable Cost + Contribution to be lost:- Busy

Step 1:- Calculate total profit in the hands of Company.

Sales Value	20	XX
A's Cost (total)	3	XX
B's Cost (total)	12	XX
Total Profit	**5**	**XX**

Step 2: Distribute the total profit to each division on the basis of their total cost i.e.

5 L/15L × 3 L = 1L

= Total profit/total cost X A's cost (supply department).

Step 3: Transfer value = A's total cost + A's share of profit.

- Demand means Demand Exist for furnished product (Good unit) but Demand does not correlate the demand of scrap/Rework unit.

❖ ❖ ❖

Type of Questions

Project is maximized when MR=MC

MR = Marginal Revenue = dr/dq.

Price function = a-bx

A = Price with no qty sold

B = Reduction in price for 1 unit

X = qty

Revenue function = Price X qty

= (a-bx)x

❖ ❖ ❖

Question 42: -AEG has two Divisions 'E' and 'G' with full profit responsibility. The Division 'E' produces Component 'e' which it sells to 'outside' customers only. The Division 'G' produces a product called the 'g' which incorporates Component 'e' in its design. 'G' Division is currently purchasing required units of Component'e'peryear

from an outside supplier at market price.

New CEO for Indian Operations has explored that 'E' Division has enough capacity to meet entire requirements of Division 'G' and accordingly he requires internal transfer between the divisions at marginal cost from the overall company's perspective.

Manager of Division 'E' claims that transfer at marginal cost are unsuitable for performance evaluation since they don't provide an incentive to the division to transfer goods internally. He stressed that transfer price should be 'Cost plus a Mark-Up'.

New CEO worries that transfer price suggested by the manager of Division ' E' will not induce managers of both Divisions to make optimum decisions.

Required

DISCUSS transfer pricing methods to overcome performance evaluation conflicts.

Solution:-To overcome the optimum decision making and performance evaluation conflicts that can occur with marginal cost based transfer pricing following methods has been proposed:

Dual Rate transfer Pricing system

"With a "Dual Raate Transfer Pricing system; the Receiving Division is charged with marginal cost of the intermediate product and "Supplying Division; is credited with full cost per unit plus a profit margin".

Accordingly Division E should be allowed to record the transactions at full cost per unti plus a profit margin. On the other hand Division G may be charged only marginal cost. Any inter divisional profits can be eliminated by accounting adjustment.

Impact:

- Division E will earn a profit on inter-division transfers.

-Division G can chose the output level at which the marginal cost of the component "e" is equal to the net marginal revenue of the product "g".

Two part Transfer Pricing system

"The Two part transfer Pricing system' involved transfers being made at the marginal cost per unit of output of the "Supplying Division" plus a lump-sum fixed fee charged by the "Supplying Division' to the "Receiving Division' for the use of the capacity allocated to the intermediate product".

Accordingly Division "E" can transfer its products to Division "G" at marginal cost per unit and a lump-sum fixed fee.

Impact:

- Two part Transfer Pricing System will inspire the Division "G" to choose the optimal output level.

This pricing system also enable the Division "E" to obtain a profit on inter-division transfer.

❖ ❖ ❖

Case study of Six Sigma & Transfer Price

Question 44: -CPT Limited manufactures furniture made of MDF Board for domestic use and plywood for commercial use. It has three divisions-Furniture Division, Plywood Division and Retial Division.

The furniture division purchases raw materials from external suppliers and performs all manufacturing and packaging operations.All sales of furniture are made through the retail division which has 120 retail stores in India as well as through its own website. Furniture is sold in boxes for customers to assemble themselves. About 20% of the furniture sold by CPT Limited is purchased already packaged from other manufacturers. All deliveries are outsources through a third party distribution company.

CPT Limited's objective is to maximize shareholders wealth by producing new model fuctional furniture and plywood board at low cost. The CEO is concerned about increasing levels of returns of furniture made by the customers and increasing number of customers complaining on online forums about furniture purchased from CPT Limited. Not a single case of return of plywood board was reported in past three years.

Considering the impact of return of its products, the CEO has approached you as a performance management expert to help the company in implementation of Six Sigma technique to reduce the number of products returned and define customer's requirements and measure exisiting performance of the company.

A team of managers has been recently trained in Six Sigma.The returns data are complied every six months along with the Key Performance Indicators (KPIs) for customer satisfaction.The last compilation indicates that 92% of customers were satisfied with the manufacturing quality of furniture.

The Following reasons are given by customers while quality of furniture:

Category	Reasons for return of furniture	% Responses
1	Difficult to assemble or parts missing	48%
2	Goods arrived damaged	13%
3	Goods were not as described or were defective	27%
4	Goods were of poor quality or no longer wanted	10%
5	Arrived late	2%
	Total	100%

Since last year the plywood division has also started to manufacture MDF Board on pilot project basis in small quantity.Based on the feedback from the market the management of CPT limited decided to manufacture MDF board at large scale in the plywood division in the forthcoming year. CEO has also decided that for manufacture of furniture, MDF boards should be purchased from the plywood division.

Details of furniture and plywood divisions are given below:

Furniture Division

35,000 MDF boards for standard size will be needed in the next year. External suppliers could supply at `800 each.

Plywood Division

It has the capacity to produce a total of 60,000 MDF boards of standard size per year. Budgeted details for the forthcoming year are as follows:

Budgeted Saled volume	60,000 units
Selling price per unit for external sale	`850
Varaible cost per unit for external sale	` 770

The variable cost per unit will be ` 20 per unit lower in case of internal sale, due to cost savings on distribution and packaging.

Maximum external demand for MDF boards is 30,000 units per year.

Requried:

(i) Advise the CEO how six sigma technique could be implemented using DMAIC methodology so as to reduce the sales retuns from customers.

(ii) Advise with the help of suitable calculations. The number of MDF boards that plywood division shuld internally supply to furniture division in order to maximize the group profit.

(iii) Recommend the transfer price at which these internal sales be made.

Solution:-

Part 1:

The DMAIC process is a technique used to implement six-sigma to improve existing processes and is split into five phases as described below.

- **Define the process:** The CEO is concerned that the increase in returns from customers is increasing costs and threatens to affect the company's brand. **Six sigma focuses closely on the requirements of the customer and it is important to be clear exactly what customers' requirements are and, in this case, specifically why products are returned**. The objective of the project needs to be clear, in this case to reduce the number of customer returns. Customers will expect certain minimum requirements from the manufacturing and packaging process. Customers' perceptions of quality should correspond to the price paid, though different customers will have different expectations of this. Customers may be particularly pleased with furniture which is delivered early or at a time especially convenient to them, or which is robust, durable and 'well-made'. While products which

significantly exceed customers' expectations will enhance the company's brand, it may also indicate a quality of manufacture which is too high and allow company to reduce manufacturing costs while still having mainly satisfied customers.

- **Measure the existing process:** The **current returns figures do give some data to as to why products are returned, but its usefulness is limited as it is unclear which of the categories relates to defective manufacture, and which relate to activities of other divisions**. The ambiguity of the data and category definitions will need addressing to enable the process to be measured effectively. Returns in Category 1 could be because the goods were not manufactured or packed properly in the manufacturing division, but could also be due to poor design, customers losing components or simply being unable to assemble furniture. Damaged goods in Category 2 probably do not arise because of defective manufacturing either, though customers may wrongly categorise defective goods as damaged. For the other categories it is less clear. Though goods may become damaged by the distribution company, it seems that only a small number of returns relate directly to them. Returns in Categories 3 and 4 could be due to defective manufacture or if the customer had simply changed their minds and no longer wanted the product. In Category 3, the identification of 'defective' items is too broad. Returns in Category 5 which arrived late are clearly not due to manufacturing defects and as this causes only 2% of returns, is relatively insignificant. Currently 20% of company's sales are of products from other manufacturers. There is no indication from the data given how many of the returns relate to these products, nor of the total number of returns relative to the number of items sold. Therefore, the existing data are insufficient to reliably measure existing performance and take no account of inputs such as raw materials. Only items which customers value should be measured. The CEO has suggested more detailed data are required, for example, on overall customer satisfaction with the manufacturing, but this is at 92% which already seems high and there is little point in incurring costs to measure what customers are already satisfied with. In the context of

the six-sigma project, there is little that can be done to improve this particular area and such items should not be measured.

- **Analyze the process: This stage is where the root causes of the problems are identified**. Additional information may be needed, for example, to analyse customer returns by type of product, by country of sale or with a clearer definition of what is meant by 'defective'. By doing so, company may identify areas of the business where customer returns are particularly high and so be able to focus on these.
- **Improve the process: At this stage the proposals for improving the process are implemented and availability of resources and likely costs of making the improvements need to be carefully considered**. Company may need to consider which aspects of the production or packaging process could be improved, for example, by better maintenance or calibration of machinery. Additional training of staff may also be required.
- **Control: This is the on-going monitoring that the reduction in customer returns due to defective manufacturing is being maintained**. Reporting on the number of returns may be done by exception if they reach a particular level. In CPT Limited, it seems likely that the data on customer returns used to manage this process will need to be redesigned to make it clearer in which responsibility centre the problems arise. The ongoing monitoring may indicate that some of the earlier stages in the DMAIC process need to be revisited.

Part 2 and Part 3: Decision on number of MDF boards to be transferred and fixation of transfer price:

Minimum Transfer Price	Variable cost + opportunity cost
Maximum Transfer Price	External purchase price ± change in cost

Calculation of Minimum Transfer Price:

- Plywood division currently has capacity of 60,000 MDF boards and it has external demand for 30,000 boards. Therefore, it has idle capacity of 30,000 boards
- **Transfer price for first 30,000 boards = Variable cost = Rs.750** [There will be no opportunity cost; Additionally, variable cost per unit is Rs.20 lower and hence the same would be Rs.750 per unit]
- Transfer price for balance 5,000 boards = Variable cost + Opportunity cost = Rs.750 + Rs.80 = Rs.830 per unit

Calculation of Maximum Transfer Price:

- External suppliers are currently supplying at prices of Rs.800 per unit and hence the maximum transfer price by Furniture Division would be Rs.800 per unit

Decision:

- **Comparing the minimum and maximum transfer price, we can conclude that the company should go for transfer of 30,000 boards. The transfer price for 30,000 boards can be fixed between Rs.750 per unit to Rs.800 per unit**
- Balance 5,000 boards cannot be transferred as minimum transfer price of Rs.830 per unit exceed maximum transfer price of Rs.800 per unit. This would indicate that a transfer is not feasible

❖ ❖ ❖

Q45:- Question 45: - Specialises in servers for e-commerce and **ERP** applications. The company's original job costing system has two direct cost categories – direct materials and direct labour. Overhead is allocated to jobs at the single rate of Rs. 90 per direct labour hour. Recnetly, the company designed an activity based costing (**ABC**) system with five activities.

The **ABC** system retians the current system's two direct cost categories.The budgeted overhead costs for each activity are as follows:

Activity	Allocation base	Cost driver rate (Rs.)

Material handling	No. of parts	3.40
Machine set up	No. of Setup	2000.00
Assembling	Assembly hours	320.00
Quality Control	Tests run	250.00
Shipping	No. of Shipments	6000.00

PCL Limited has been awarded two new contracts earmarked as job 201 and job 202. Budgeted data relating to these two jobs are as follows:

	Job 201	**Job 202**
No. of Parts	15000	2000
No. of setups	6	4
No. of assembling hours	1500	200
Quality control test runs	210	25
No. of Shipments	1	1
No. of output units	100	10
Total direct labour hours	8000	600
Direct materials cost	Rs. 8,60,000	Rs. 1,30,000
Direct Labour cost	Rs. 6,40,000	Rs. 50,000

Required:

(i) Calculate the product cost per unti for each job under traditional job costing system.

(ii) Calculate the product cost per unit for each job under ABC system.

(iii) State which costing system more accurately assigns to job the costs of the resources consumed to produce them.

(iv) A company has offered to PCL Limited to produce both jobs for Rs. 21600 per output unit. PCL Limited may buy from the outside company job 201 only, job 202 only or both jobs.

Advise the course of action that the managers will take to get more income if they base their decision on-

I. Traditional costing system.
II. ABC System.

Solution:-

Particulars	Job No.201	Job No.202
No. of parts	15,000	2,000
No. of setups	6	4
No of assembling hours	1,500	200
Quality control test runs	210	25
No of shipments	1	1
No of output units	100	10
Total direct labour hours	8000	600
Direct material cost	8,60,000	1,30,000
Direct Labour cost	6,40,000	50,000

Required:

i. Calculate the product cost per unit for each job under traditional job costing system
ii. Calculate the product cost per unit for each job under ABC
iii. State which costing system more accurately assigns to job the costs of the resources consumed to produce them
iv. A company has offered to PCL Limited to produce both jobs for Rs.21,600 per output unit. PCL Limited may buy from the outside company Job 201 only, Job 202 only or both jobs. Advise the course of action that the mangers will take to get more income if they base their decision on:
    a. Traditional costing system
    b. ABC System

Part 1:

Computation of cost per unit under traditional costing system:

Particulars	Job No.201	Job No.202
Direct material cost	8,60,000	1,30,000
Direct Labour cost	6,40,000	50,000
Overheads (90 per hour)	7,20,000	54,000
Total cost	**22,20,000**	**2,34,000**
No of units	100	10
Cost per unit	**22,200**	**23,400**

Part 2:

Computation of cost per unit under Activity Based Costing:

Particulars	Job No.201	Job No.202
Direct material cost	8,60,000	1,30,000
Direct Labour cost	6,40,000	50,000
Overheads:		
Material Handling	51,000	6,800
Machine setup	12,000	8,000
Assembling	4,80,000	64,000
Quality control	52,500	6,250
Shipping	6,000	6,000
Total cost	**21,01,500**	**2,71,050**
No of units	100	10
Cost per unit	**21,015**	**27,105**

Part 3:

Activity based costing approach ensures greater accuracy by using multiple cost drivers and determines areas generating the greatest profit or loss.

Part 4:

Action under Traditional Costing System:

- **Job No.201:** The cost of manufacture is Rs.22,200 per unit whereas the cost of purchase is Rs.21,600 per unit. The manager would go ahead with outsourcing decision for Job No.201
- **Job No.202:** The cost of manufacture is Rs.23,400 per unit whereas the cost of purchase is Rs.21,600 per unit. The manager would go ahead with outsourcing decision for Job No.202

Action under Activity based costing system:

- **Job No.201:** The cost of manufacture is Rs.21,015 per unit whereas the cost of purchase is Rs.21,600 per unit. The manager will not agree for outsourcing and would continue to manufacture the product in house.
- **Job No.202:** The cost of manufacture is Rs.27,015 per unit whereas the cost of purchase is Rs.21,600 per unit. The manager would go ahead with outsourcing decision for Job No.202

❖ ❖ ❖

Question 46: PEX is a manufacturing company of which Division PQR manufacture a single standardized product. Some of the output is sold externally whilst the remainder is transferred to Division RPQ where it is a sub-assembly in the manufacture of that division's product.PQR has the capacity (annual) to produce 30,000 units of the product. The unit costs of Division PQR's products is as under:

	(`)
Direct Material	40
Direct Labour	20
Direct Expenses	20
Variable Manufacturing Overheads	20
Fixed Manufacturing Overheads	40
Sells and Packaging Expenses-Variable	10

	150

Annually 20,000 units of the product are sold extremely at the standard price of ` 300 per unit.

In addition to the external sales, 10,000 units are transferred annually to Division RPQ at an internal transfer price of ` 290 per unit. This transfer price is obtained by deducting variable selling and packing expenses from the external price since those expenses are not incurred for internal transfers.

Division RPQ Incorporates the transferred-in goods into a more advanced product. The unit costs of this product are as follows:—

	(`)
Transferred in item (from Division PQR)	290
Direct Material and components	230
Direct Labour	30
Variable Overheads	120
Fixed Overheads	120
Selling and Packing Expenses-Variable	10
	800

Division RPQ's manager disagrees with the basis used to set the transfer price. He argues that the transfers should be made at variable cost plus an agreed (minimal) mark up because his division is taking output that Division PQR would be unable to sell at the price of ` 300.

Partly because of this disagreement a study of the relationship between selling price and demand has recently been carried out for each division by the company's sales director. The study has brought out the following demand schedule.

Division PQR			
Selling Price (`)	200	300	400
Demand (Units)	30,000	20,000	10,000
Division RPQ			
Selling price (`)	800	900	1,000
Demand (units)	14,400	10,000	5,600

The manager of the Division RPQ claims that this study supports his case. HE suggests that a transfer price of ` 120 would give division PQR a reasonable contribution to its fixed overheads while allowing Division RPQ to earn a reasonable profit. He also believes that it would lead to an increase of output and an improvement in the overall

level of company profits.

Required:

1. Calculate the effect of the transfer price of ` 290 per unit on company's operating profit. Calculate the optimal product Mix.
2. Advise the company on whether the transfer price should be revised to ` 120 per unit.

Solution:

Contribution Analysis of Divisions:

(i) Contribution –Division PQR

Selling Price (`)	200	300	400
Less: Variable Cost (`)	110	110	110
Contribution per unit (`)	90	190	290
Demand (units)	30,000	20,000	10,000
Total Contribution(`)	27,00,000	38,00,000*	29,00,000

(*) Optimal

The above table shows ` 300 price to be the most profitable and that cutting prices would not result in increased profits.

(ii) Contribution-Division RPQ(transfer Price at ` 290)

Selling Price (`)	800	900	1,000
Less: Variable Cost (`)	680	680	680
Contribution per unit (`)	120	220	320
Demand (units)	14,400	10,000	5,600
Total Contribution(`)	17,28,000	22,00,000*	17,92,000

(*) Optimal

(iii) Contribution-Division RPQ (at Alternative Transfer price ` 120)

Selling Price (`)	800	900	1,000
Less: Variable Cost (`)	510	510	510
Contribution per unit (`)	290	390	490
Demand (units)	14,400	10,000	5,600
Total Contribution (`)	41,76,000	39,00,000	27,44,000

(*) Optimal

The maximum capacity of the Division PQR is given as 30,000 units. Hence there is no question of internal transfer if the entire 30,000 units are sold by Division PQR in the

external market. However, from the above computations it is clear that Division PQR would sell 20,000 units in external market to optimize its profit and therefore the maximum transfer to Division RPQ is 10,000 units only. The question of transferring 14,400 units would arise as an alternative to analyze the overall profitability only when Division PQR sells 10,000 units in the external market. Based on the demand projection of division RPQ, the demand level of 5,600 units is not relevant. It can be further noted from the question that Division RPQ will purchase the entire quantity only from Division PQR and not externally. Hence the various options would be as follows:

	Option-1	Option-2	Option-3
PQR External Sales (units)	20,000	10,000	10,000
Transfer to RPQ (units)	10,000	14,400	10,000

Overall Profitability of the Company:

(iii) Transfer Price at ` 290

PQR External Sales (units)	**20,000**	**10,000**	**10,000**
Transfer to RPQ (units)	**10,000**	**14,400**	**10,000**
	(`)	**(`)**	**(`)**
Contribution to Division PQR (External) (Refer Computation (i) above)	38,00,000	29,00,000	29,00,000
Contribution to division PQR (Transfer)@ `190 (`290 less ` 100 variable cost#)	19,00,000	27,36,000	19,00,000
Contribution to division RPQ (Refer Computation (ii) above	22,00,000	17,28,000	22,00,000
Total Contribution for the company	79,00,000	73,64,000	70,00,000
Less: Fixed Costs (PQR 30,000 units × `40 + RPQ 10,000 units × ` 120)	24,00,000	24,00,000	24,00,000
Total Company Profit	55,00,000	49,64,000	46,00,000

(*) Optimal

(v) Transfer Price at ` 120

PQR External Sales (units)	**20,000**	**10,000**	**10,000**
Transfer to RPQ (units)	**10,000**	**14,400**	**10,000**

	(`)	(`)	(`)
Contribution to Division PQR (External) (Refer Computation (i) above)	38,00,000	29,00,000	29,00,000
Contribution to division PQR (Transfer)@ `20 (` 120 less ` 100 variable cost#)	2,00,000	2,88,000	2,00,000
Contribution to division RPQ (Refer Computation (ii) above	39,00,000	41,76,000	39,00,000
Total Contribution for the company	79,00,000	73,64,000	70,00,000
Less: Fixed Costs (PQR 30,000 units × `40 + RPQ 10,000 units × ` 120)	24,00,000	24,00,000	24,00,000
Total Company Profit	55,00,000	49,64,000	46,00,000

(*) Optimal

Advise

The revision of transfer price has no impact on the overall profitability of the company. However, it will alter the profitability of the Divisions.

(*) The optimal level is 30,000 of division PQR of which 20,000 units are for external sale and 10,000 units are transferred to Division RPQ under both the transfer prices.

(#) On internal transfers, Division PQR's variable cost per unit is ` 100, since the ` 10 on selling is not incurred.

❖ ❖ ❖

Question 47: Maryanne Ltd. has two divisions Division A and Division B. Division A produces product Z, which it sells to external market and also to Division B. Divisions in the Maryanne Ltd. are treated as profit centres and divisions are given autonomy to set transfer prices and to choose their supplier. Performance of each division measured on the basis of target profit given for each period.

Division A can produce 1,00,000 units of product Z at full capacity. Demand for product Z in the external market is for 70,000 units only at selling price of ` 2,500 per unit. To produce product Z Division A incurs ` 1,600 as variable cost per unit and total fixed overhead of ` 4,00,00,000. Division A has employed ` 12,00,00,000 as working capital, working capital is financed by cash credit facility provided by its lender bank @ 11.50% p.a. Division A has been given a profit target of ` 2,50,00,000 for the year.

Division B has found two other suppliers R Ltd and S Ltd. who are agreed to supply product Z.

Division B has requested a quotation for 40,000 units of product Z from Division A.

Required

(i) CALCULATE the transfer price per unit of product Z that Division A should quote in order to meet target profit for the year.

(ii) CALCULATE the two prices Division A would have to quote to Division B, if it became Maryanne Ltd. policy to quote transfer prices based on opportunity costs.

Answer: Transfer Price *per unit* of Product Z that Division A Should Quote *in order to meet* Target Profit

Quotation for the 40,000 units of product Z should be such that meet Division A's target profit and interest cost on working capital. Therefore the minimum quote for product Z will be calculated as follows:

Particulars	Amount (`)
Target Profit (given for the year)	2,50,00,000
Add: Interest Cost on Working Capital (`12,00,00,000 @11.5%)	1,38,00,000
Required Profit	3,88,00,000
Add: Fixed Overhead	4,00,00,000
Target Contribution	7,88,00,000
Less: Contribution Earned --- External Sales {60,000 units × (` 2,500 – `1,600)}	5,40,00,000
Contribution Required – Internal Sales	2,48,00,000
Contribution per unit of Product Z (` 2,48,00,000 ÷ 40,000 units)	620
Transfer Price of Product Z to Division B (Variable Cost per unit + Contribution per unit)	2,220

(ii) The Two Transfer Prices Based on Opportunity Costs

For the 30,000 units (i.e. maximum capacity – maximum external market demand) at variable cost of production i.e. ` 1,600 per unit.

For the next 10,000 units (i.e. external market demand – maximum possible sale) at market selling price i.e. ` 2,500 per unit.

❖ ❖ ❖

Summary of Transfer Price

1. Transfer price means the price which is to be placed for the goods and services by supply division to be received from other division within the company.

2. Transfer Price is different from sale price because in case of sale of goods, the title would be transferred and goods reaches in the hands of customers but in case of transfer. Title of goods would not be transfer and goods remain within the business.
3. Transfer price is a notional price because higher Transfer price would increase the profit of supply division, correspondingly decrease the profit of receiving division but overall profit of the company remains same. (Other factor remain constant).
4. Transfer price becomes revenue for the supply division & cost for the receiving division.
5. The purpose of transfer price is the evaluation of performance for each department separately.
6. The Conflict in relation with the transfer price is to be resolved either by management or management accountant.

Reason for Conflict

Supply division	To receive higher amount	For Goods & Services
Receiving Division	To pay low amount	

Fixation of Transfer price

By Management	By management Accountant
1:- Transfer Price = Market Price (no fluctuation)	We should fix the transfer price so that overall profit of the company would remain constant.
2:- Transfer Price = cost plus return	Transfer price always based on relevant cost.
Or	
Cost + Mark up	
Return means profit as a % of investment.	
Investment = Fixed Assets + working capital	
Mark up means margin as a % of cost.	
Cost means = variable cost + Avoidable Fixed cost + unavoidable cost.	
Variable cost + Contribution = Selling Price	
Variable cost + Fixed cost + profit = Price	

By Management	By management Accountant
Total cost + contribution ≠ Price	
Variable cost + Fixed cost + fixed cost + Profit ≠ Price.	

Statement of Comparative Cost

Variable Cost	10	Purchase Cost	25

Decision: manufacture & transfer

Now we should fix the transfer price so that B Dept would not like to purchase the component from outside market i.e. Transfer price should be less than purchase cost but Transfer price should be based on relevant cost instead of an arbitrary price.

Statement of Transfer Price (Relevant Cost)

Cost to be incurred due to transfer	10
+ Benefit to be lost	-
= Minimum Transfer price	**10**

Transfer price ` 10 to 25 (Range).

❖ ❖ ❖

If we took the Transfer price –s 9.10 than company will be suffer with loss.

1. In transfer price decision, we have 3 type of situations. (Questions)
   A. what should be an appropriate Transfer price for the given situation? (transfer price = relevant cost or method suggested by management).
   B. what should be the best strategy for the company as a whole as well as for individual department (justification of the Transfer price by preparing Statement of profit in comparative situation or by preparing cost analysis statement).
   C. we should prepare the statement of profit at the given Transfer Price (There is no decision making process).in this situation we should consider unavoidable fixed cost also.

- Best strategy means "How much Quantity should be produced & How much Quantity should be transferred & achieved as sale to outsider, so that overall profit of department & Company as a whole to be Maximized".

CASE STUDY:Relevant Cost Concept, Transfer Pricing & COQ

Aditya Group was established in 1975, manufactures and sells electronic personal

grooming and beauty products. The group has two 100% subsidiaries AUS Ltd. and ANZ Ltd. AUS Ltd. manufactures luxury products that cater to niche customers who prefer specialized personal grooming and beauty care. ANZ Ltd. caters to regular daily beauty and grooming requirements that has a wide reach within the market. Factories of both companies are located within India.

The products are sold to wholesalers, who supply these products to the retail market.

Aditya Group purchases its raw material requirements from both domestic and overseas markets. Additionally, certain products manufactured by AUS Ltd. can be enhanced based on the products manufactured by ANZ Ltd. Therefore, as per production requirements, AUS Ltd. sources some product components from ANZ Ltd.

Aditya Group has a centralized decision making set-up. Basic policy decisions for functions such as production planning, sales and client relationship, finance and human resources are handled at the group level. Individual units AUS Ltd. and ANZ Ltd. concentrate on the manufacturing alone.

About You

You are an Assistant Manager in Finance and Accounts department of Aditya Group, headed by Director- Finance Ms. Elsea. You assist and report to Ms. Fiona, Manager of your department. Sometime you also assist Director Finance in analysing financial and non-financial information, drafting reports for board meetings, preparation of presentation and staff trainings.

Business Situation- 1

Yesterday, 5.15 P.M.

You got an email from Ms. Elsea, with Cc to Ms. Fiona. Ms. Elsea, asked you to prepare a cost statement for making a quotation to a new customer. She has also informed you that the customer can also maintain a long- term business relation with us. You have been requested to gather information related to the specification from Sales Manager.

Yesterday, 5.25 P.M.

You have been called by Ms. Fiona, and provided the product specification received from Sales- Manager for which quotation has to be quoted. Ms. Fiona has also requested you to gather relevant information to prepare cost statement. Due to the expected long term business relationship that AUS Ltd. wants to have with the customer, the sales manager wants to quote the lowest possible price. AUS Ltd. currently has some spare capacity that can be utilized to cater to this entire order. Therefore, only the relevant cost to AUS Ltd. has to be considered to arrive at the quote.

After meeting with your reporting officer, you mailed to various concerned department and requested for data.

The following information has been obtained in relation to the contract:

Today, 10.05 A.M.

You got an e-mail from Production Manager, it has been informed that 40 tonnes of material Dx would be required. This material is in regular use by AUS and has a current purchase price of `380 per tonne. Currently, there are 5 tonnes in inventory which cost `350 per tonne. The resale value of the material in inventory is `240 per tonne.

Further, with regards to components, it has been informed that 4,000 components would be required. These could be bought externally for `15 each or alternatively they could be supplied by ANZ Ltd. The variable cost of the component if it were manufactured by ANZ Ltd. would be `8 per unit. ANZ Ltd. has sufficient capacity to produce 2,500 components without affecting its ability to satisfy its own external customers. However, in order to make the extra 1,500 components required by AUS Ltd., ANZ Ltd. would have to forgo other external sales of `50,000 which have a contribution to sales ratio of 40%. To have uniformity in the quality of the component, it is assumed that AUS Ltd. would procure its entire requirement of 4,000 components either externally or from ANZ Ltd. The transfer pricing policy of Aditya Group for sales between units aims at goal congruence. The unit selling the goods would be allowed to charge any opportunity cost on account of catering to internal demand, while the purchasing unit should ensure that the company is not at a loss.

Today, 10.45 A.M.

You got an e-mail from Personnel Manager, it has been informed that 2,000 high skilled labour hours would be required. The grade of labour required is currently paid `5 per hour. Highly skilled labour is in short supply and cannot be increased significantly in the short-term. This labour is presently engaged in meeting the, demand for product 'G', which requires 4 hours of highly skilled labour. The contribution from the sale of one unit of product L is `24. It has also been informed that the contract would require a specialist machine. The machine could be hired for `15,000 or it could be bought for `50,000. At the end of the contract if the machine were bought, it could be sold for `30,000. Alternatively, it could be modified at a cost of `5,000 and then used on other contracts instead of buying another essential machine that would cost `45,000. The operating costs of the machine are payable by AUS whether it hires or buys the machine. These costs would total `12,000 in respect of the new contract.

Supervisor

The contract would be supervised by an existing manager who is paid an annual salary of `50,000 and has sufficient capacity to carry out this supervision. The manager would receive a bonus of `5,000 for the additional work.

Development Time

15 hours of development time at a cost of `30,000 have already been worked in determining the resource requirements of the contract.

Fixed Overhead Absorption Rate

AUS uses an absorption rate of `20 per direct labour hour to recover its general fixed

overhead costs. This includes `5 per hour for depreciation.

Today, 11.15 A.M: Ms. Fiona called you in her place as asked you the following:

Required

CALCULATE the relevant cost of the contract to AUS. You must present your answer in a schedule that clearly shows the relevant cost value for each of the items identified above. You should also EXPLAIN each relevant cost value you have included in your schedule and why any values you have excluded are not relevant. Ignore taxation and the time value of money.

(ii) DISCUSS two problems that can arise as a result of setting prices using relevant costing.

Business Situation- 2

Today, 5.26 P.M:A memo from Managing Director of the group has been circulated to all officers of the group which stated "My objective for the forthcoming year is to reduce our quality costs in each of the primary activities in our value chain". The company is keen to build a reputation forquality and gives a five-year guarantee with all of its products.

Today, 5.37 P.M: Ms. Fiona, called you in her place and asked the following:

Required

(iii) EXPLAIN, by giving examples, how each of the four types of quality cost could be reduced. You should also IDENTIFY in which primary activity each one of your examples would occur in Aditya Group's value chain.

Solution

Statement Showing Relevant Cost

Type of Cost	Explanation	Amount (`)
Material Dx (40 tonnes × `380)	1	15,200
Components	2	52,000
Direct labour (2,000 hrs. × `11)	3	22,000
Specialist machine	4	10,000
Machine operating cost	5	12,000
Supervision	6	5,000
Development time	7	Nil
General fixed overhead	8	Nil
Total relevant cost		1,16,200

Explanation

1. Material Dx is in regular use by AUS Ltd. and must be replaced. Consequently, its relevant value is its replacement cost. The historical cost is not relevant because it is a past cost and the resale value is not relevant because AUS Ltd. is not going to sell itbecause the material is in regular use.

   AUS Ltd. would like to procure 4,000 components either from ANZ Ltd. or externally from the market. At the current production level, ANZ Ltd. (seller) has available capacity to accommodate part of AUS Ltd's request to the extent of 2,500 components. At this point, ANZ Ltd. would be operating at its maximum capacity. To cater to the remaining demand of 1,500 units from AUS Ltd., ANZ Ltd. has to forego external sales of `50,000 to its own customers. Given that the contribution to sales ratio is 40%. Therefore, ANZ Ltd. has to forego contribution of `20,000 (40% of external sales foregone ₹50,000) in order to cater to AUS Ltd.'s request. Fixed cost at ANZ Ltd. is irrelevant, since it would be incurred irrespective of whether AUS Ltd.'s order to catered to or not.

   Therefore, in spirit of goal congruence, the transfer price that ANZ Ltd. would charge AUS Ltd. would be the variable cost of `8 per unit and `20,000 towards lost contribution as explained above. Therefore, the transfer price

   = (`8 per unit × 4,000 components) + `20,000

   = `32,000 + `20,000

   = `52,000 for 4,000 components

   Therefore, per component, the price charged would be `52,000 / 4,000 = `13 per component. This is lower than the external market price of `15 per unit. Therefore, in the interest of goal congruence the cheaper option is preferred. AUS Ltd. should source its components from ANZ Ltd, for a total procurement cost of `52,000.

3. Skilled labour is in short supply and can only be obtained by reducing the production of product 'G', resulting in a loss of contribution of `24 (given) or `6 per hour of skilled labour. Hence the relevant labour cost will be `6 (contribution lost per hour) + `5 (hourly rate of skilled labour) i.e. `11 per hour.

4. AUS Ltd. has a number of options: (a) If the machine were to be hired it would have a cost of `15,000; (b) if the machine were bought and then sold at the end of the work it would have a net cost of `20,000; or (c) if the machine were bought and then modified to avoid the need to buy the other machine it would have a net cost of `10,000 (`50,000 plus `5,000 modifications less `45,000 cost of another machine). Thus, the most economic approach is buy the machine and then modify it so the relevant cost is `10,000.

5. The machine operating costs are future costs of doing the work and therefore are

relevant.

6. The supervisor's salary is irrelevant, but the bonus needs to be included because it is dependent on this work and therefore is relevant.
7. The development time has already been incurred. Therefore, it is a past cost and not relevant.
8. General fixed overhead costs and their absorption are not relevant because they will be incurred whether the work goes ahead or not. Depreciation is also not relevant because it is an accounting entry based on the historical purchase of assets. It is not affected by the work being considered.

(ii) Two main issues arise when pricing work based on relevant costs:

Profit reporting; and Pricing of future work.

With regard to profit reporting, the decision as to whether to proceed with the work will have been based on the use of relevant costs, but the routine reporting of the profit from the work will be based on the company's normal accounting system. Since this system will be based on total cost, it is probable that the costs of the work reported will be greater than its relevant cost. Consequently, the amount of profit reported to have been made on this order will be lower than expected and may even be a loss. This may cause difficulties for the manager who accepted the work as an explanation will be required of the reasons why there is such a difference in profit.

With regard to the pricing of future work the difficulty lies in increasing the price for similar items for the same customer in future. Once a price is set, customers tend to expect that any future items will be priced similarly. However, where a special price has been offered based on relevant cost because of the existence of spare capacity the supplier would not be able to continue to price on that basis as it does not recover its long term total costs.

There may also be difficulties created by this method of pricing as other customers are being charged on a full cost basis and if they were to discover that a lower price was offered to a new customer they would feel that their loyalty was being penalised.

(iii) Prevention

Operations: Preventative maintenance and checking of the calibration of machinery. This would reduce the number of potentially faulty products being produced and therefore reduce guarantee claims.

Appraisal

Inbound Logistics: Reduce costs of incoming inspections by building close links with suppliers and getting them to adopt TQM. If suppliers can guarantee their quality, then inbound inspections could be eliminated.

Internal Failure

Operations: Reduce costs of re-works by training employees on a continual basis e.g. quality circles. This would reduce failure costs and also improve quality.

External Failure

Service: Design quality into the product to try to prevent guarantee claims and therefore the cost of servicing/repairing the product.

❖ ❖ ❖

CASE STUDY: TRANSFER PRICING:-Business Model

Rest Easy Companyis a rapidly growing start-up in the technology sector. It develops customized ERP packages for clients across various business sectors. The business comprises primarily of two departments (1) consultant and (2) customer support. Consultant department has highly qualified professionals from management, accounting and technology background, who approach clients as a team and work out solutions that meet their needs. Customer support personnel are in charge of IT implementation and provide support through telephone, e-mail or on-site. Currently, the strength of the consultants department is 200 while that of customer support is 150.

Yash, the founder and CEO of the company, is very passionate about this business model. To deliver high-quality product solutions, he believes that his staff should be well-trained and up-to-date with developments in their professional fields. Therefore, Rest Easy provides periodic training to its staff in-house. All employees are expected to undergo 2 weeks of training annually. A training department has been set up with qualified trainers in various fields, who provide periodic training sessions to both Consultant and Customer Service departments. The training department has 5 trainers. Training sessions are aimed at providing skills that the executives need to provide better service to their clients. This in-house focus of high-quality delivery,is the key factor that Yash believes would set apart Rest Easy from its competitors.

In addition to delivering training sessions, trainers are responsible for developing training material for routine, on-going as well as specialized training sessions. They attend conferences, train the trainer sessions and subscribe to journals to keep themselves up-to-date with various developments that consultants and customer support executives need to be aware of.

At the beginning of each year, heads of consultant and customer service departments advise the training department on the expected number of training sessions that their staff would undertake. In special situations, where developments need to be communicated rapidly, extra sessions can also be conducted. Training department budgets are prepared based on these needs.

❖ ❖ ❖

Problem of Goal Congruence

In accordance with the above explanation, the training department quoted a rate of `14,800 per session based on the budgeted cost and budgeted training sessions. (Budgeted cost `29,60,000 for 200 training sessions). Actual cost per session is `21,250 (Actual cost `38,25,000 for 180 training sessions). Cost overrun of `6,450 per session, a jump of 44% from the original quote.

Consequently, a meeting was called that was attended by the managers of consultant, customer service and training departments, along with the CEO Yash.

The user departments were unhappy with the higher charge. Manager of the consultant department raised the following concerns:

(a) The market rate for similar trainings provided by external vendors was only `12,000 per session. He has accepted a higher transfer price of `14,800 per session only because the in-house training program was more customized towards Rest Easy's end-user-clients. However, if the department is actually going to be charged ` 21,250 per session, he would rather source the training to the outside vendor.

(b) Further, he pointed out that while his department had adhered to its commitment of 100 training sessions, the customer service department has availed of 20 lesser sessions than its commitment. Reviewing the cost structure of the training department, most of the expenses are fixed in nature. Therefore, when the transfer price is based on the actual cost and actual training sessions, the per session cost has increased because the customer service department did not undergo the entire 100 sessions. He questions, why he should bear a higher allocation of cost due to variance in actual and budgeted usage of training resources of the customer service department?

Manager of the customer service department explained that the variance of 20 training session is on account of the executives handling high-priority work pressure that did not allow them enough time to complete some of the training sessions. At the same time she contended that she should not be charged for those 20 sessions for which no training was availed.

Manager of the training department explained that the `500,000 cost overrun on salary due to new hire of a trainer. The trainer's experience is very valuable to the company and hence to get her on board, the company had to offer a higher pay scale. Depreciation on office equipment was higher by `300,000 due to higher replacement cost of ageing equipment. A specialized software license resulted in an excess spend of `25,000. The manager argued that the rest of the expenses were normal increases which were not controllable.

Yash, the CEO, was understandably not happy with the cost over-run. Higher internal transfer price to the end user departments would affect employee morale. However, even though a cheaper option was available from an outside vendor, he could still foresee the value of investing in in-house training programs. Intangible benefits from these customized sessions, would definitely help the company's growth.

To conclude, he was not willing to shut down the training department. At the same time, he had to resolve the dispute resulting from internal transfer pricing in an amicable way. Like profits, teamwork is critical to success.

Required

(i) IDENTIFY the threats to goal congruence due to internal transfer pricing.

(ii) During the meeting, an alternate transfer pricing methodology based on two-part pricing system was formulated. Costs would be segregated into fixed and variable categories. A transfer price for each category would be arrived based on budgeted costs and budgeted usage. The standard rate for fixed cost will be applied to the budgeted training sessions and charged to the user departments. The standard rate for variable cost will be applied to the actual training sessions and charged to the user departments. Fixed cost would be defined as those that are not directly impacted by the number of training sessions.
CALCULATE the transfer price to be charged to each department under this method.

(iii) EVALUATE how the two-part pricing price method of transfer pricing address the threats to goal congruence as identified in question 1?

Solution

(i) Threats to goals congruence due to internal transfer pricing are:

(a) User groups, consulting and customer service department are concerned that training department is not controlling its costs. Since the entire actual costs gets allocated to the users, training department may not be managing its costs efficiently. Since the financials of user departments are affected, it may lead to conflict between the departments.

(b) Yash, the CEO is a firm believer of in-house training and its benefits. However, there are outside vendors that provide similar service at substantially reduced costs. Performance assessment of managers of consulting and customer service is based on their department's financial metrics. Higher internal transfer price for training would affect employee morale since they have no control over these allocated costs. However, their performance is being evaluated based on uncontrollable factors. This could lead to discontent among the managers. Alternatively, Yash may want to re-consider his strategy of in-house training. When suitable, training can be sourced to cheaper options available in the market, without compromising on quality.

(c) Most costs of the training department are fixed in nature, as they need to be incurred irrespective of the number of training sessions. These costs are being allocated to the users based on actual training sessions. The budgeted target price is used by the user departments, to determine their billing model to Rest Easy's end user clients. Hence it is important that the budget transfer price is

not very different from the actual transfer price charged at the end of the year.

In the given problem, internal transfer price has been based on a budget of 200 sessions. Here the customer service department does not adhere to its commitment of 100 training sessions, training sessions actually availed are only 80. Since costs are mostly fixed in nature, the actual cost per training session increases. This is then charged out to the consultant and customer service departments. Consequently, despite meeting its commitment, the consultant department bears a higher cost allocation due to variance in the usage of training resources. This can lead to friction between the user departments.

(ii) By segregating the costs into fixed and variable components, Rest Easy is working out two-part pricing system for transfer price.

Two-Part Pricing System = Lump-Sum Charge + Marginal Cost

To segregate the costs into fixed and variable categories, the criteria is whether the costs change per additional training session. Accordingly, the classification of costs will be as below:

Cost Particulars	Budget (`)	Classification
Salaries	25,00,000	Fixed
Depreciation on Office Equipment	2,00,000	Fixed
Software Licenses for Training Packages	80,000	Fixed
Conference Travel for Train the Trainer Sessions	10,000	Fixed
Telephone	20,000	Fixed
Training Supplies	50,000	Variable
Trainee Lunch	100,000	Variable
Total Expenses	29,60,000	

The lump-sum charge would be based on the fixed cost budget. Marginal cost would be based on the variable cost budget.

Total budget fixed expenses = `28,10,000 and total budget variable expenses = `150,000. Number of training sessions is 200, that is 100 each for consultant and customer service departments. Hence the fixed cost allocation rate would be `14,050 per session and variable cost allocation rate is `750 per session.

Transfer price to the consulting department = lump-sum charge + marginal cost

= (Standard Fixed Cost per session × Budgeted Training Sessions) + (Standard Variable Cost per Session × Actual Training Sessions)

= (`14,050×100) + (`750×100)

= `14,05,000 + 75,000

= `14,80,000.

Transfer price to the customer service department = lump-sum charge + marginal cost = (Standard Fixed Cost per session × Budgeted Training Sessions) + (Standard Variable Cost per session × Actual Training Sessions)

= (’14,050 x 100) + (‘750 x 80)

= `14,05,000 + `60,000

= `14,65,000.

Total transfer price allocation is `29,45,000 versus actual expenses of `38,25,000. Un allocated expenses are `880,000.

(iii) Evaluate how the two-part transfer pricing model would address the goal congruence issues listed in question 1?

(a) Since transfer prices are based on budgets, the training department would become more cost-conscious. As explained above, as per this transfer pricing method, unallocated expenses of `880,000 would have to be borne by the training department. As given in the problem, this variance is mainly on account of extra cost for the newly hired trainer and the higher depreciation expense. The department will be more cautious while taking future decisions. However, Yash the CEO must ensure that the quality of training is not compromised and remains in line with the company’s strategic policy.

(b) Internal transfer price of `14,800 per session is still higher than the outside rate of `12,000 per session. Further decisions would be based on the company’s strategic objective. At the same time, if the number of training sessions is expected to increase beyond the budget, this transfer pricing method charges the user department only a marginal cost of `750 per session. This is definitely lower that the external rate.

(c) Under this method, fixed expenses that form majority of the cost are allocated based on budgeted cost and budgeted usage. Variable expense are allocated based on actual training sessions. Hence, any variance in the utilization of training resources, does not impact the other user department.

Therefore, most of the goal congruence issues can be addressed through this methodology.

❖ ❖ ❖