

7

Transfer Pricing

Question 1

Tycon 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 metres cloth per month, but at present its sales is limited to 50% to outside market and 30% to process house.

The transfer price for the year 2004 was agreed at ₹ 6 per metre. This price has been fixed in line with the external wholesale trade price on 1st January, 2004. 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 metre with effect from 1st June, 2004. 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 metres 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 metres of cloth from textile unit, whose capacity can be fully utilised. The outside market has no further scope.

The cost data relevant to the operations are:

	Textile unit ₹	Process house ₹
Raw material (per metre) on 1 st June, 2004	3.00	Transfer price
Variable cost	1.20 (per metre)	80 (per bundle)
Fixed cost (per month)	4,12,000	1,00,000

You are required to:

- (i) *Prepare statement showing the estimated profitability for June, 2004 for Textile unit and Process house and company as a whole on the following basis:*
 - (a) *At 80% and 100% capacity utilisation of the Textile unit at the market price and the transfer price to the Processing house of ₹ 6 per metre.*

- (b) At 80% capacity utilisation of the Textile unit at the market price of ₹ 5.60 per metre and the transfer price to the Processing house of ₹ 6 per metre.
- (c) At 100% capacity utilisation of the Textile unit at the market price of ₹ 5.60 per metre and the transfer price to the Processing house of ₹ 5.60 per metre.
- (ii) Comment on the effect of the company's transfer pricing policy on the profitability of Processing house. (11 Marks)(Nov., 2004)

Answer

- (i) (a) At 80% level (in ₹)

-Textile unit		-Process house	
Sales (4,00,000 × 6)	24,00,000	Sales(1,50,000/100) × 825	12,37,500
Less		Less	
Raw material (4,00,000 × 3)	12,00,000	Transfer Price (1,50,000 × 6)	9,00,000
Variable cost (4,00,000 × 1.2)	4,80,000	Variable cost (1,500 × 80)	1,20,000
Fixed cost	4,12,000	Fixed cost	1,00,000
Profit	3,08,000	Profit	1,17,500

Overall profit = 3,08,000 + 1,17,500 = ₹ 4,25,500

At 100% level

Sales (5,00,000 × 6)	30,00,000	Sales (2,50,000/100) × 725	18,12,500
Less		Less	
Raw material (5,00,000 × 3)	15,00,000	Transfer Price (2,50,000 × 6)	15,00,000
Variable cost (5,00,000 × 1.2)	6,00,000	Variable cost	2,00,000
Fixed cost	4,12,000	Fixed cost	1,00,000
Profit	4,88,000	Profit	12,500

Overall profit = 4,88,000+12,500 = ₹ 5,00,500

- (b) At 80% level (market price 5.60 and transfer price 6/-) (in ₹)

Textile unit		Process house	
Sale (2,50,000 × 5.6)	1400000		
(1,50,000 × 6.0)	900000		
	23,00,000		
Less			
Raw material (4,00,000 × 3)	12,00,000		
Variable cost (4,00,000 × 1.2)	4,80,000		
Fixed cost	4,12,000		
Profit	2,08,000	Profit	1,17,500

Overall profit = 2,08,000+1,17,500 = ₹ 3,25,500

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(c) Sales 100% level at (5.60) (in ₹)

Sale (5,00,000 × 5.6)	28,00,000	Sales(2,50,000 × 725)	18,12,500
Less		Less	
Raw material (5,00,000 × 3)	15,00,000	Transfer Profit (2,50,000 × 5.6)	14,00,000
Variable cost (5,00,000 × 1.20)	6,00,000	Variable cost (2,500 × 80)	2,00,000
Fixed cost	4,12,000	Fixed cost	1,00,000
Profit	2,88,000	Profit	1,12,500

Overall profit = 2,88,000 + 1,12,500 = 4,00,500

(ii) Comments on the profitability of processing units:-

	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.

Question 2

AB Cycles Ltd. has 2 divisions, A and B which manufacture bicycle. Division A produces bicycle frame and Division B assembles rest of the bicycle on the frame. There is a market for sub-assembly and the final product. Each division has been treated as a profit centre. The transfer price has been set at the long-run average market price. The following data are available to each division:

Estimated selling price of final product ₹ 3,000 p.u.

Long run average market price of sub-assembly ₹ 2,000 p.u.

Incremental cost of completing sub-assembly in division B ₹ 1,500 p.u.

Incremental cost in Division A ₹ 1,200 p.u.

Required:

- If Division A's maximum capacity is 1,000 p.m. and sales to the intermediate are now 800 units, should 200 units be transferred to B on long-term average price basis.*
- What would be the transfer price, if manager of Division B should be kept motivated?*
- If outside market increases to 1,000 units, should Division A continue to transfer 200 units to Division B or sell entire production to outside market? (9 Marks)(May 2005)*

Answer

- (i) In this case there are two options available –

	₹
(a) Sell at the sub assembly stage (after completion of Div. A) @ ₹ 2000/-	
Incremental cost in Div. A	1,200/-
Contribution	800/-
(b) Sell at the final product stage	3,000
Cost at Div. A and Div. B ₹ (1200+1500)	2,700
Contribution	300

Therefore it is profitable to sell at the subassembly stage because of higher contribution, provided there is a market.

Hence, if there is market at intermediate stage, first priority is to sell intermediary (sub assembly). Therefore, 800 units should be sold as sale of intermediary.

The balance capacity available of $(1000 - 800) = 200$ units should be transferred to B and B should complete the assembly and sell as final product, since the company can earn ₹ 300 per unit for each unit of such sale.

- (ii) If B Div. receives the subassembly at market price of ₹ 2,000, plus its own incremental cost of ₹ 1,500 will give total cost of ₹ 3,500, thereby yielding a loss of ₹ 3500 – ₹ 3000 = ₹ 500 per unit, whereas the company makes a profit of ₹ 300 per unit.

In order to keep the manager of Div. B motivated, the profit earned of ₹ 300 per unit should be shared between A and B. Hence transfer price will be variable cost of Div. A + 50% of profit earned in the final product = $1200 + 150 = ₹ 1,350$

- (iii) Both Div. A and the Company make higher contribution by selling to intermediate market. If the market demand increases to 1,000 units, the full quantity should be sold outside as intermediary and nothing should be transferred to Div. B.

Question 3

A Company is organised into two divisions. Division X produces a component, which is used by division Y in making of a final product. The final product is sold for ₹ 540 each. Division X has capacity to produce 2,500 units and division Y can purchase the entire production. The variable cost of division X in manufacturing each component is ₹ 256.50.

Division X informed that due to installation of new machines, its depreciation cost had gone up and hence wanted to increase the price of component to be supplied to division Y to ₹ 297, however division Y can buy the component from outside the market at ₹ 270 each. The variable cost of division Y in manufacturing the final product by using the component is ₹ 202.50 (excluding component cost).

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Present the statement indicating the position of each Division and the company as whole taking each of the following situations separately:

- (i) If there is no alternative use for the production facility of X, will the company benefit, if division Y buys from outside suppliers at ₹ 270 per component.
- (ii) If internal facilities of X are not otherwise idle and the alternative use of the facilities will bring an annual cash saving of ₹ 50,625 to division X, should division Y purchase the component from outside suppliers ?
- (iii) If there is no alternative use for the production facilities of division X and the selling price for the component in the outside market drops by ₹ 20.25, should division Y purchase from outside supplier?
- (iv) What transfer price would be fixed for the component in each of the above circumstances? (12 Marks)(Nov. 2005)

Answer

- (i) (a) When component is purchased by division Y from outside

	₹	(₹)
Division Y sales 2500×540		13,50,000
Less: cost of purchase 2500×270	6,75,000	
Variable cost 2500×202.50	5,06,250	11,81,250
Division Y contribution		1,68,750
Division X contribution		<u>Nil</u>
Total contribution		<u>1,68,750</u>

- (b) When component is purchased from division X

	(₹)	(₹)
Division X		
Sales 2500×297	7,42,500	
Less variable cost 2500×256.50	6,41,250	1,01,250
Division Y		
Sales 2500×540	13,50,000	
Less: Variable cost		
Purchase cost 2500×297	7,42,500	
Variable cost of division Y 2500×202.50	5,06,250	<u>1,01,250</u>
Total contribution		<u>2,02,500</u>

Thus it will be beneficial for the company as whole to buy component from division X.

(ii) When there is alternative use of Division X with given cash saving

		(₹ .)
Division X Contribution from alternative use of facilities		50,625
Division Y sales 2500×540	13,50,000	
Less: Cost of purchase 2500×270	6,75,000	
Variable cost 2500×202.50	5,06,250	
Division Y contribution		<u>1,68,750</u>
Company's total contribution		<u>2,19,375</u>

(iii) When there is no alternative use of Division X & selling price of component reduces in the market

		₹
Division Y sales 2500×540	13,50,000	
Less: Cost of purchase 2500×249.75	6,24,375	
Variable cost 2500×,*202.20	5,06,250	
Total contribution		2,19,375

It is beneficial to buy component from outside.

(iv) Transfer price

- Where there is no alternative use of capacity of division X, then variable cost i.e. ₹ 256.50 per component will be charged
- If facilities of division X can be put to alternative use then variable cost ₹ 256.50+ opportunity cost ₹ 20.25 = ₹ 276.75 will be transfer price.
- If market price gets reduced to ₹ 249.75 and there is no alternative use of facilities of Division X the variable cost ₹ 256.50 per component should be charged.

Question 4

What are some goals of a 'transfer-pricing' system in an organization? (4 Marks)(May 2006)

Answer

The goals of transfer pricing are that it should:

- provide information that motivates divisional managers to take good economic decisions which will improve the divisional profits and ultimately the profits of the company as a whole.
- provide information which will be useful for evaluating the divisional performance.
- seek to achieve goal congruence.
- ensure that divisional autonomy is not undermined.

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Question 5

Hardware Ltd. Manufactures computer hardware products in different divisions which operate as profit centres. Printer Division makes and sells printers. The Printer Division's budgeted income statement, based on a sales volume of 15,000 units is given below. The Printer Division's Manager believes that sales can be increased by 2,400 units, if the selling price is reduced by ₹ 20 per unit from the present price of ₹ 400 per unit, and that, for this additional volume, no additional fixed costs will be incurred.

Printer Division presently uses a component purchased from an outside supplier at ₹ 70 per unit. A similar component is being produced by the Components Division of Hardware Ltd. And sold outside at a price of ₹ 100 per unit. Components Division can make this component for the Printer Division with a small modification in the specification, which would mean a reduction in the Direct Material cost for the Components Division by ₹ 1.5 per unit. Further, the Component Division will not incur variable selling cost on units transferred to the Printer Division. The Printer Division's Manager has offered the Component Division's Manager a price of ₹ 50 per unit of the component.

Component Division has the capacity to produce 75,000 units, of which only 64,000 can be absorbed by the outside market.

The current budgeted income statement for Components Division is based on a volume of 64,000 units considering all of it as sold outside.

	Printer Division	Component Division
	₹ '000	₹ '000
Sales revenue	<u>6,000</u>	<u>6,400</u>
Manufacturing cost:		
Component	1,050	–
Other direct materials, direct labour and variable OH	1,680	1,920
Fixed OH	<u>480</u>	<u>704</u>
Total manufacturing cost	<u>3,210</u>	<u>2,624</u>
Gross margin	2,790	3,776
Variable marketing costs	270	384
Fixed marketing and Admn. OH	<u>855</u>	<u>704</u>
Non-manufacturing cost	<u>1,125</u>	<u>1,088</u>
Operating profit	<u>1,665</u>	<u>2,688</u>

- (i) Should the Printer Division reduce the price by ₹ 20 per unit even if it is not able to procure the components from the Component Division at ₹ 50 per unit?

(ii) Without prejudice to your answer to part (i) above, assume that Printer Division needs 17,400 units and that, either it takes all its requirements from Component Division or all of it from outside source. Should the Component Division be willing to supply the Printer Division at ₹ 50 per unit?

(iii) Without prejudice to your answer to part (i) above, assume that Printer Division needs 17,400 units. Would it be in the best interest of Hardware Ltd. for the Components Division to supply the components to the Printer Division at ₹ 50?

Support each of your conclusions with appropriate calculations. (12 Marks) (May, 2007)

Answer

Particulars	Printer Division			Components Division	
	Existing price	Reduction in selling price	If component is purchased internally	Existing	If transfer is effected
Selling price	400	380	380	100	50
Component cost	70	70	50		
Other direct materials, labour and Variable overhead	112	112	112	30	28.50
Variable marketing cost	18	18	18	6	
Contribution	200	180	200	64	21.50
Volume units	15,000	17,400	17,400	64,000	17,400
Total contribution ('000)	3,000	3,132	3,480	4,096	374.10
Volume lost in the market					6,400 units
Contribution lost					6,400 × 64 = 409.60

(i) Yes, Printer Division should institute the ₹ 20 price reduction on its printer units because net income would increase by ₹ 1,32,000 (₹ 31,32,000 – ₹ 30,00,000).

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Alternatively by incremental approach the net increase can be computed as follows:

	₹.
Contribution margin of sales increase (₹ 180 × 2,400)	4,32,000
Loss in contribution margin on original volume arising from decrease in selling price (15,000 × ₹ 20)	3,00,000
Increase in operating profit	1,32,000

- (ii) No, the Component Division should not sell all 17,400 units to Printer Division for ₹ 50. If the Component Division does sell all 17,400 units to Printer, Component Division will only be able to sell 57,600 units to outside customers instead of 64,000 units due to the capacity restrictions. This would decrease Component Division's profit before taxes by ₹ 35,500. Supporting calculations are as follows:

	₹.
Contribution from sales to printer (₹ 21.50 × 17,400)	3,74,100
Loss in contribution from loss of sales to outsiders (₹ 64 × 6,400)	<u>4,09,600</u>
Decrease in operating profit	<u>35,500</u>

- (iii) Yes, it would be in the best interest of Hardware Ltd. for the Component Division to sell the units to the Printer division at ₹ 50 each. The net advantage to the Hardware Ltd. is ₹ 3,12,500 as shown below. The net Advantage is the result of the cost savings from purchasing the Component unit internally and the contribution margin lost from 6,400 units that the Component Division otherwise would sell to outsiders.

	<i>Total Company</i>
	₹ '000s
Incremental contribution – if the component is transferred within (₹ '000) (3,480 – 3,132)	348.00
Contribution to the Component Division	374.10
Total incremental contribution	722.10
Less: Contribution lost by the Component Division	409.60
Net contribution gain	312.50

Question 6

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 responsibility and credit for their performance.

The following figures are presented:

	Division A	Division B	
	₹ Per Unit	₹ 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 from competitors.

B can sell its product B in the external market at ₹ 300 per unit, whereas, if it supplied to X Ltd.'s 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 Divisions A and B will have to operate during the year.

What is the best strategy for:

- Department A?
- Department B, given that A will use its best strategy?
- For X Ltd. As a whole?

(14 Marks) (May 2008)

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Answer

	<i>Div A</i>	<i>B</i>	<i>B</i>
	₹ / unit	₹ / unit	₹ / unit
Direct Material (Other than A)	50	24	
Direct Labour	25	14	
Variable Overhead (Production)	<u>20</u>	<u>2</u>	
Variable Production Cost (excl. A)	95	40	40
From A		144	
From Outside		—	<u>160</u>
Variable production Cost / unit		184	200
Selling Price			
From outside	160	300	
Less: Selling Overhead	<u>13</u>	<u>26</u>	
Net Selling Price (outside)	<u>147</u>	<u>274</u>	
Net Selling Price to B	<u>144</u>		
Net Selling Price to S		<u>250</u>	
Net Selling Price (outside)	147	274	274
Variable Production Cost	<u>-95</u>	<u>-184</u>	<u>-200</u>
Contribution / unit (outside)	52	90	74
(Sale to B & S respectively)	144	250	250
Variable Production Cost	<u>-95</u>	<u>-184</u>	<u>-200</u>
Contribution / unit	<u>49</u>	<u>66</u>	<u>50</u>

Best strategy for A:

A = Maximise Production; Sell maximum no. of units @ 18,000 × 52 = 9,36,000
52 / unit (outside)

(To B) remaining units 2,000 × 49 = 98,000

Total Contribution for A 10,34,000

Best strategy for B:

Maximise contribution / unit by selling outside and procuring from A 90 / unit

Contribution × 2,000 units

Balance units can yield contribution of either 74/ unit for outside or ₹ 50 / unit to S Ltd.

Production Capacity = 28,000.

<i>Option I</i>		<i>Option II</i>
Outside Sales	Sales to S	Outside Sales × contribution / unit
$20,000 \times 74 = 14,80,000$	$6,000 \times 50 = 3,00,000$	$24,000 \times 74 = 17,76,000$
$2,000 \times 90 = 1,80,000$		$2,000 \times 90 = 1,80,000$
16,60,000	3,00,000	
Total Contribution (16,60,000 + 3,00,000)		19,60,000

(B) Choose Option I i.e. get 2,000 units from A, sell 6,000 units to S and 20,000 to outside. Make 28,000 units @ full capacity. Total Contribution ₹ 19,60,000.

If A and B are allowed to act independent of the group synergy,

₹.

Total contribution	A – 10,34,000
	B – <u>19,60,000</u>
Total contribution for X Ltd.	<u>29,94,000</u>

Cost from X Ltd.'s Perspective

Variable Cost of production	Div A	₹ 95
	Div B	
Variable cost of production other than A	40	40
A supplied by Division	95	
A – Variable Cost		
A purchased	_____	<u>160</u>
	<u>135</u>	<u>200</u>
Option I	Outside 26,000 units	Option II
Outside $20,000 \times (274 - 135)$	27,80,000	$20,000 (274 - 135)$
<u>2,000</u> $\times (274 - 200)$	1,48,000	<u>6,000 (274 - 200)</u>
22,000		<u>4,44,000</u>
S Ltd. 6,000 units (250 – 200)	<u>3,00,000</u>	_____
	<u>32,28,000</u>	<u>32,24,000</u>

Choose Option I

Contribution = ₹ 32,28,000 for X Ltd. as a whole

Transfer (2,000 units)

Make A transfer all output to B. Sell 6,000 units of B to S and 22,000 units to outside market. This will make X Ltd. better off by $32,28,000 - 29,94,000 = ₹ 2,34,000$

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(i.e. 18,000 units of A sold to outside increases contribution to A by 3 ₹ / unit and decreases contribution to B by 16 ₹ / unit Net negative effect = $13 \times 18,000 = ₹ 2,34,000$).

Question 7

A large business consultancy firm is organized in to several divisions. One of the divisions is the Information Technology (IT) division which provides consultancy services to its clients as well as to the other divisions of the firm. The consultants in the IT divisions always work in a team of three professional consultants on each day of consulting assignment. The external clients are charged a fee at the rate of ₹ 4,500 for each consulting day. The fee represents the cost plus 150% profit mark up. The break up of cost involved in the consultancy fee is estimated at 80% as being variable and the balance is fixed.

The textiles division of the consultancy firm which has undertaken a big assignment requires the services of two teams of IT consultants to work five days in a week for a period of 48 weeks. While the director of the textiles division intends to negotiate the transfer price for the consultancy work, the director of IT division proposes to charge the textiles division at ₹ 4,500 per consulting day.

In respect of the consulting work of the textiles division, IT division will be able to reduce the variable costs by ₹ 200 per consulting day. This is possible in all cases of internal consultations because of the use of specialized equipment.

You are required to explain the implications and set transfer prices per consulting day at which the IT division can provide consultancy services to the textiles division such that the profit of the business consultancy firm as a whole is maximized in each of the following scenarios:

- (i) Every team of the IT division is fully engaged during the 48 week period in providing consultancy services to external clients and that the IT division has no spare capacity of consultancy teams to take up the textiles division assignment.*
 - (ii) IT division will be able to spare only one team of consultants to provide services to the textiles division during the 48 week period and all other teams are fully engaged in providing services to external clients.*
 - (iii) A new external client has come forward to pay IT division a total fee of ₹ 15,84,000 for engaging the services of two teams of consultants during the aforesaid period of 48 weeks.*
- (11 Marks) (Nov., 2008)**

Answer

Transfer Price is ₹ 4,500 for each consulting day.

Profit mark-up = 150%

Let cost = x

$$\begin{aligned}
 \text{Profit} &= x \times \frac{150}{100} \\
 &= 1.5x \\
 \text{Cost + profit} &= \text{Transfer price} \\
 \Rightarrow x + 1.5x &= 4,500 \\
 \Rightarrow 2.5x &= 4,500 \\
 \Rightarrow x &= \frac{4,500}{2.5} = 1,800 \\
 \therefore \text{Cost} &= ₹ 1,800 \\
 \text{and profit} &= 1.5x = 1.5 \times 1,800 \\
 &= ₹ 2,700 \\
 \text{Variable cost (80\%)} &= ₹ 1,800 \times 80\% \\
 &= ₹ 1,440 \\
 \text{Fixed cost (20\%)} &= ₹ 1,800 \times 20\% \\
 &= ₹ 360.
 \end{aligned}$$

Scenario (i):

Every consultancy team is fully engaged. There is no idle time or spare capacity.

Hence, transfer price = Marginal cost plus opportunity cost

$$\text{Marginal cost} = ₹ 1,440$$

$$\text{Saving for internal work} = ₹ 200$$

$$\text{Net Marginal Cost} = ₹ 1,240$$

Opportunity cost is the lost contribution.

$$\begin{aligned}
 \text{Lost contribution} &= \text{Contribution from external client} \\
 &= \text{Fee charged from external client} - \text{Variable cost} \\
 &= ₹ (4,500 - 1,440) \\
 &= ₹ 3,060.
 \end{aligned}$$

$$\begin{aligned}
 \therefore \text{Transfer price} &= ₹ 1,240 + 3,060 \\
 &= ₹ 4,300 \text{ per consulting day per team.}
 \end{aligned}$$

Scenario (ii):

One team is idle. Idle time has no opportunity cost. Variable cost for internal work is ₹ 1,240 per consulting day. Second team is busy. Hence opportunity cost is relevant in case of

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second team. Hence charge of second team is ₹ 4,300 per consulting day per team.

Average of charge of two teams = ₹ (1,240 + 4,300) / 2

= ₹ 2,770 per consulting day per team.

Scenario (iii):

New client offers a fee of ₹ 15,84,000

Duration: 5 days of 48 weeks × 2 teams = 480 days

Fee per day 15,84,000 / 480 = ₹ 3,300

Variable cost = ₹ 1,440

Contribution ₹ (3,300 – 1,440) = ₹ 1,860

Fee for consulting day for internal work:

Variable cost = ₹ 1,240

Contribution lost = ₹ 1,860

Fee to be charged = ₹ 3,100 per consulting day per team.

Question 8

Tripod Ltd. has three divisions – X, Y and Z, which 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. Direct selling overhead, representing commission to external sales agents are avoided on all internal transfers. Division Y additionally incurs ₹ 10 per unit and ₹ 8 per unit on units delivered to external customers and Z respectively. Y also incurs ₹ 6 per unit picked up from X, whereas external suppliers supply at Y's factory at the stated price of ₹ 85 per unit.

Additional information is given below:

	Figures ₹ /unit		
	X	Y	Z
<i>Direct materials (external supplier rate)</i>	40	85	135
<i>Direct labour</i>	30	50	45
<i>Sales Agent's commission</i>	15	15	10
<i>Selling price in external market</i>	110	170	240
<i>Production capacity</i>	20,000	30,000	40,000 units
<i>External demand</i>	14,000	26,000	42,000 units

You are required to discuss the range of negotiation for Managers X, Y and Z, for the number of units and the transfer price for internal transfers. (11 Marks) (Nov. 2008)

Answer

Analysis of range of negotiation for Manager of Division X

(Figures in ₹)

	Division X			
	Outside sales	Sales to Y (Range)		
Selling Price	110	70	–	79
(–) Commission	<u>15</u>	=		=
Net Selling Price	95	70	–	79
Variable Cost	<u>70</u>	<u>70</u>	–	<u>70</u>
Contribution per unit	25	0		9
Units	14,000	6,000		6,000
Total contribution (Units × Contribution per unit)	<u>3,50,000</u>	0		54,000

Analysis of Range of negotiation for Manager of Division Y

(Figures in ₹)

	Division Y					
	Outside Sales			Sale to Z		
	From X	From outside		From X	From outside	
Price range	<u>70</u>	79	85	70	79	85
Add: Transport	<u>6</u>	<u>6</u>	=	<u>6</u>	<u>6</u>	=
	76	85	85	76	85	85
Add: Direct Labour	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>
	126	135	135	126	135	135
Add: Delivery cost	<u>10</u>	<u>10</u>	<u>10</u>	<u>8</u>	<u>8</u>	<u>8</u>
	136	145	145	134	143	143
Add: Sales Commission	<u>15</u>	<u>15</u>	<u>15</u>	=	=	=

7.17 Advanced Management Accounting

Total Cost	151	160	160	134	143	143
Selling Price	<u>170</u>	<u>170</u>	<u>170</u>	<u>135</u>	<u>135</u>	<u>135</u>
Contribution	19	10	10	+1	(-) 8	(-) 8

Range of Negotiations:

Manager of division X will sell 14,000 units outside at 110 ₹ per unit and earn contribution of ₹ 3.50 lakhs.

Excess capacity of 6,000 units can be offered to Y at a price between 70 (the variable manufacturing cost at X) and ₹ 95 (the maximum amount to equal outside contribution). But Y can get the material outside @ 85. So, y will not pay to X anything above (₹ 85 – 6) = ₹ 79 to match external available price.

X will be attracted to sell to Y only in the range of 71 – 79 ₹ per unit at a volume of 6,000 units.

At ₹ 70, X will be indifferent, but may offer to sell to Y to use idle capacity.

Z will not buy from Y at anything above 135. If X sells to Y at 70 per unit, Y can sell to Z at 134 and earn no contribution, only for surplus capacity and if units transferred by X to Y at ₹ 70 per unit.

	Y	Z
Provided X sells to Y at ₹ 70 per unit	Sell 4,000 units to Z at 134 (Indifferent) Sell 4,000 units to Z at 135 (willingly for a contribution of Re. 1)	Buy 4,000 units from y at 134 (attracted) Indifferent, since market price is also 135

For buying from X at 71 – 79 price range, Y will be interested in selling to Z only at prices 136 – 143, which will not interest Z.

Thus Y will sell to Z only if X sells to Y at ₹ 70 per unit and Y will supply to Z maximum 4,000 units.

Question 9

Bearings Ltd. makes three products, A, B and C in Divisions A, Band C respectively. The following information is given:

	A	B	C	
Direct Materials (excluding material A for Divisions B and C)	4	15	20	₹ /u
Direct Labour	2	3	4	₹ /u
Variable overhead	1	1	1	₹ /u

<i>Selling price to outside customers</i>	15	40	50	₹ /u
<i>Existing Capacity</i>	5,000	2,500	2,500	(No. of units)
<i>Maximum External demand</i>	3,750	5,000	4,000	(No. of units)
<i>Additional fixed costs that would be incurred to install additional capacity</i>	24,000	6,000	18,700	₹
<i>Maximum Additional units that can be produced by additional capacity</i>	5,000	1,250	2,250	(No. of units)

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 do one of the following:

(i) Inspect it at its own shop floor at ₹ 3 per unit

Or

(ii) Get the supplier to supply inspected products and pay the supplier ₹ 2 p. u. as inspection charges.

Or

(iii) A has enough idle labour, which it can lend to C to inspect at Re. 1 p.u. even though C purchases from outside.

A has to fix a uniform transfer price for both B and C. The transfer price will not be known to outsiders and is at the discretion of the Divisional Managers.

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

(12 Marks)(June, 2009)

Answer

B will not pay A anything more than 13, because at 13, it will incur additional cost of ₹ 2/- to modify it, $13 + 2 = 15$, the outside cost.

7.19 Advanced Management Accounting

	A		B	C
	Outside sale	Transfer to B & C		
Divisional variable cost of production	7	7	19	25
Transfer from A			13	13
Modification			2	
Total Variable Cost of production	7	7	34	38
Selling Price	15	13	40	50
Contribution	8	6	6	12

Option for C, Purchase all units from A @ 13: Any other option is costlier.

	A	B	C
Maximum external demand	3,750	5,000	4,000
Existing capacity	5,000	2,500	2,500
Maximum capacity that can be added	5,000	1,250	2,250
Total maximum that can be produced	10,000	3,750	4,750
Additional fixed cost on expansion	24,000	6,000	18,700
Units that must be sold/transfer to get this amount as contribution	$\frac{24,000}{6} = 4,000$	$\frac{6,000}{6} = 1,000$	$\frac{18,700}{6} = 1,558.33$
External demand not covered by existing capacity	-	2,500	1,500
Decision	Expand make 10,000 units 3,750 – outside 3,750 – B – C	Expand make 2,500 + 1,250 = 3,750 units	Do not expand make only 2,500 units.

	A		B	C
	Outside sale	Transfer to B & C		
Units	3,750	3,750 + 2,500 = 6,250	3,750	2,500

Contribution / unit	8	6	6	12
Contribution (₹)	30,000	37,500	22,500	30,000
		67,500	22,500	30,000
Additional Fixed Cost		24,000	6,000	-
Net revenue addition		43,500	16,500	30,000

Individual strategy is the Company's best strategy.

Question 10

Optically Ltd. makes two kinds of products, P (lenses) and Q (swimming goggles) in divisions P and Q respectively. P is an input for Q and two units of P are needed to make one unit of Q.

The following data is given to you for a period :

	<i>P</i> ₹ /u of P	<i>Q</i> ₹ /u of Q
<i>Direct Materials</i>	20	25 (excluding P)
<i>Direct Labour</i>	30	35
<i>Variable Overhead</i>	10	20
<i>External Demand (units)</i>	3,000	3,000
<i>Capacity (units)</i>	7,000	2,500
<i>Selling Price ₹ /u (outside market)</i>	100	410

If Q buys P from outside, it has the following costs:

For order quantity 2,499 or less ₹ 90 per unit for the entire quantity ordered.

For order quantity 2,500 – 5,000 ₹ 80 per unit for the entire quantity ordered.

For order quantity more than 5,000 ₹ 70 per unit for the entire quantity ordered.

You are required to:

(i) Evaluate the best strategies for Division P and Q.

(ii) Briefly explain the concept of goal congruence. (12 Marks)(Nov., 2009)

Answer

(i) Optically Ltd manufactures P (lenses) and Q (swimming goggles).

Division P has option to supply to Division Q or sell to outside market.

Division Q has option to buy from Division P or purchase from outside market.

However, both divisions have to work within their individual capacity.

7.21 Advanced Management Accounting

Variable Cost for product P in Division P = ₹ 60.

Variable cost for product Q in Division Q (excluding 2 Nos P's) = ₹ 80.

Division P has better market price of its product P than the market price offered to Q division.

For maximizing profit of the organization :	₹
P division should optimise its profit by selling maximum units to outside market.	
Contribution per unit for sale to outside for division P	40
Contribution per unit for Div Q as follows :	
Sale price - Variable cost (excluding lenses)	330
Max Contribution per unit (if procured from P div at its variable cost i.e ₹ 60)	210
Min Contribution per unit (if procured at ₹ 90 per unit from outside)	150
Contribution per unit at transfer price of ₹ 70 i.e minimum market price	190

Option 1 : Division Q buys 5001 units from market @ ₹ 70 and meets its capacity. Division P sells 3000 units to outside market @ ₹ 100

Sale / Transfer	Contrib. /unit	Contribution in thousand rupees		
		₹	P Div	Q Div
DivP : Sale of 3000 units to outside market @ ₹ 100	40	120		120
DivQ: Sale of 2500 units with P from market @ ₹ 70	190		475	475
Less : cost of rejection of one unit of product P			-0.07	-0.07
Total		120	474.93	594.93

Option 2 : Division P sells 3000 units to outside market, transfer 4000 units to div Q and Division Q buys 1000 units from outside market to work within the capacity

P Division agrees to a transfer price so that profitability of Q is not affected. To maintain the same profitability of Q, contribution required from 2000 units for Div Q is ₹ 400,000 i.e contribution per unit ₹ 200 i.e transfer price per unit of P is ₹ 65 per unit to make cost of lenses ₹ 130

Sale / Transfer	Contrib. /unit	Contribution in thousand rupees		Total
		₹	P Div	
Div P : Sale of 3000 units to outside market	40	120		120
Div P : Transfer of 4000 units to div Q at ₹ 65	5	20		20
Div Q : Sale of 2000 units with P from P div @ ₹ 65	200		400	400
Div Q : Sale of 500 units with P from market @ ₹ 90	150		75	75
Total		140	475	615

Under Option 1, both divisions worked dis-jointly without caring for capacity utilization resulting lower profitability of the organization.

Under Option 2, both divisions worked with mutual advantages for optimizing their individual profits and overall profit for the organization has gone up by effective utilization of capacity.

Product P from Division P fetches higher price from open market indicating good quality of product. Moreover, supply from P division is well assured in the long run which is the justification of establishment of two parallel divisions.

Hence, Option 2 is suggested.

- (ii) Division functioning as profit centers strive to achieve maximum divisional profits, either by internal transfers or from outside purchase. This may not match with the organisation's objective of maximum overall profits. Divisions may be commercial to advice overall objects objectives, where divisional decisions are in line with the overall best for the company, and this is goal congruence. Divisions at a disadvantage may be given due weightage while appraising their performance. Goal incongruence defeats the purpose of divisional profit centre system.

Question 11

In a company, division A makes product A and Division B makes product B.

One unit of A needs one unit of B as input. State the unit transfer price to be adapted by the transferring Division A to B in each of the following independent situations:

- (i) *There is a ready market for A. There are no constraints for production or demand for A and A does not incur any external selling cost.*

7.23 Advanced Management Accounting

- (ii) *Supply is more than demand for A. External market resorts to distress price for A and this is expected to last for a temporary period. The product cannot be stocked until better times.*
- (iii) *Product A is highly specialized. Internal specifications are too many that B has to only buy from A.*
- (iv) *A has excess capacity. It can transfer any quantity to B. Goal congruence is to be achieved.*
- (v) *A has no spare capacity, has adequate demand in a competitive market.*
- (vi) *A has no spare capacity and has adequate demand in a competitive market. But on units transferred to B, it incurs ₹ 10 per unit as additional transport cost and ₹ 10,000 as fixed expenses irrespective of the number of units transferred.*

(8 Marks)(Nov., 2011)

Answer

Transfer Price

- (i) Market Price = Transfer price
- (ii) For any quantity that the market can absorb, Price offered by B or Market price whichever is higher
For quantity that the market can no longer absorb, any price that B may offer
- (iii) Maximum Transfer price = Total Cost + Profit subject to maximum price B can pay to keep its ultimate product profitable.
Minimum transfer price = variable cost
- (iv) Transfer Price = Variable Cost to A
- (v) Transfer price = Either Market Price or Variable Cost + Opportunity Cost of diverting market sale
- (vi) Transfer price = Variable Cost + Opportunity Cost + specific cost + (fixed cost/units transferred)
Transfer Price/unit = (Market Price + 10) + (10,000/units transferred)

The question has an error. It says "one unit of A needs one unit of B". Hence students can assume B transfers to A. Then, considering each sub division independently,

- (i) B will offer A at market price of B less any avoidable selling expenses on units transferred to A.
- (ii) A will stop buying from B since stock already exists.
- (iii) Maximum Transfer price = Total Cost + Profit subject to maximum price B can pay to keep its ultimate product profitable.
Minimum transfer price = variable cost

- (iv) Transfer Price = Variable Cost to A
- (v) A will pay up to market price of B, less any avoidable selling expenses for transfers to A
- (vi) Transfer price = Variable Cost + Opportunity Cost + specific cost + (fixed cost/units transferred)

Transfer Price/unit = (Market Price + 10) + (10,000/units transferred)

Question 12

AB Ltd. makes component 'C' and billing machines. Division A makes component 'C' that is used in the final assembly of the machine in Division B.

(One unit of Component 'C' is used per machine). Component C has an outside market also. A and B operate as profit centres and each can take its own decisions. The following data is given in the existing scenario for Divisions A and B, under which Division A has enough special and external demand to use its capacity and hence is offering B rates of 800 ₹/ Unit for quantity up to 750 units and 900 ₹ /unit for more than 750 units, so that its outside contribution is not affected by transfers to B. A and B can sell any quantity up to the maximum indicated under 'units sold', without affecting their future demands.

	Division A		Division B	
	External Market (normal sales)	Special sales	External Market (normal sales)	
<i>Selling Price (₹/u)</i>	1,000	800	4,000	
<i>Variable manufacturing cost (₹/u)</i>	600	600	1,500*	(*excluding component C)
<i>Variable selling cost (₹/u)</i>	100**	--	200**	** Not incurred on inter division transfers)
<i>Total variable cost (₹/unit)</i>	700	600	1,700*	(*excluding component C)
<i>Contribution (₹/unit)</i>	300	200		
<i>Units Sold</i>	1,250	750	900	
<i>Production capacity</i>	2,000 units		900 units	

For the next period, A requires for its own use in its selling outlets, 50 units of billing machines produced by B. B's manager proposes as follows:

Option 1 - B will supply 50 machines to A on its variable manufacturing cost basis provided A supplies to B, 500 units of Component C at A's variable manufacturing cost basis.

7.25 Advanced Management Accounting

Option II - Both A and B resort to total variable cost per unit basis applicable to normal external sale, though neither A nor B incurs any selling cost on inter division transfers. A will be given 50 machines for its use. A will have to supply B all the 900 units that B requires.

Option III - Both A and B use the external market selling price (i.e. 1,000 and 4,000 ₹/Unit for 900 units of Component 'C' and 50 machines respectively).

From a financial perspective, advise Division A's manager what he should choose. Support your advice with relevant figures.

What is the change in the rate of discount per unit given by B to A (based on unit transfer price to market price ratio) from option I to option II ?

(Note: Students need not work out the total cost statements. Steps showing relevant figures for evaluation are sufficient). (10 Marks)(May, 2012)

Answer

Note : The basic strategy for division A is to first divert the Special Sales and then the Normal Sales in the external market to minimize the opportunity loss. The analysis is done on this basis.

	Option 1	Option 2	Option 3
Opportunity Lost (Units)			
Special Sales	500	750	750
External Market	-	150	150
Agreed Selling Price by Division A	600	700	1,000
Agreed Selling Price by Division B (Including the Transfer price of Division A)	2,100	2,400	4,000
Contribution (Lost) / Gain ₹ per unit			
Special Sales	(200)	(100)	200
External Market	-	(200)	100
Total Contribution (Lost) / Gain (₹)			
Special Sales	(1,00,000)	(75,000)	1,50,000
External Market	-	(30,000)	15,000
Total	(1,00,000)	(1,05,000)	1,65,000
Contribution Gain per unit by buying from B (₹/u)	1,900	1,600	-
Total Contribution Gained (50 Machines) ₹	95,000	80,000	-
Net Contribution Gained (50 Machines) ₹	(5,000)	(25,000)	165,000

Decision : Option 3 is preferred.

Rate of change in discount $(1900 - 1600)/4000 = 7.5\%$

Question 13

PEX is a manufacturing company of which division PQR manufactures a single standardized product. Some of the output is sold externally whilst the remainder is transferred to division RPQ where it is a subassembly 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 product are as under:

	₹
Direct material	40
Direct labour	20
Direct expenses	20
Variable manufacturing overheads	20
Fixed manufacturing overheads	40
Sells and packaging expenses-variable	<u>10</u>
	<u>150</u>

Annually 20,000 units of the product are sold externally 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	<u>10</u>
	<u>800</u>

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.

7.27 Advanced Management Accounting

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:

- Calculate the effect of the transfer price of ₹ 290 per unit on company's operating profit. Calculate the optimal product mix.
- Advise the company on whether the transfer price should be revised to ₹ 120 per unit.

(11 Marks)(Nov, 2012)

Answer

Contribution Analysis of Divisions:

- Contribution – Division PQR

Selling Price (₹)	200	300	400
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.

- Contribution – Division RPQ (transfer price at ₹ 290)

Selling Price (₹)	800	900	1,000
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
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 PQR division is given as 30,000 units. Hence there is no question of internal transfer if the entire 30,000 units are sold by 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 PQR sells 10,000 units in the external market. Based on the demand projection of 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:

(iv) 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 PQR (External) [Refer computation (i) above]	38,00,000	29,00,000	29,00,000
Contribution PQR (Transfer) @ ₹ 190 [₹ 290 less ₹ 100 Variable cost#]	19,00,000	27,36,000	19,00,000

7.29 Advanced Management Accounting

Contribution 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
Fixed Costs [PQR 30,000 units x ₹40 + RPQ 10,000 units x ₹120]	24,00,000	24,00,000	24,00,000
Total Company Profit (Contribution-Fixed costs)	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 PQR (External) [Refer computation (i) above]	8,00,000	29,00,000	29,00,000
Contribution PQR (Transfer) @ ₹ 20 [₹ 120 less ₹ 100 Variable cost#]	2,00,000	2,88,000	2,00,000
Contribution RPQ [Refer computation (iii) above]	39,00,000	41,76,000	39,00,000
Total Contribution for the Company	79,00,000*	73,64,000	70,00,000
Fixed Costs [PQR 30,000 units x ₹40 + RPQ 10,000 units x ₹120]	24,00,000	24,00,000	24,00,000
Total Company Profit (Contribution-Fixed costs)	55,00,000	49,64,000	46,00,000

*Optimal

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 PQR of which 20,000 units are for external sale and 10,000 units are transferred to RPQ under both the transfer prices.

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

Question 14

Enumerate the expected disadvantages in taking divisions as profit centres. (4 Marks)(May, 2013)

Answer

The expected disadvantages of taking divisions as profit centres are as follows:

- Divisions may compete with each other and may take decisions to increase profits at the expense of other divisions thereby overemphasizing short term results.
- It may adversely affect co-operation between the divisions and lead to lack of harmony in achieving organizational goals of the company. Thus it is hard to achieve the objective of goal congruence.
- It may lead to reduction in the company's overall total profits.
- The cost of activities, which are common to all divisions, may be greater for decentralized structure than centralized structure. It may thus result in duplication of staff activities.
- Top management loses control by delegating decision making to divisional managers. There are risks of mistakes committed by the divisional managers, which the top management, may avoid.
- Series of control reports prepared for several departments may not be effective from the point of view of top management.
- It may under utilize corporate competence.
- It leads to complications associated with transfer pricing problems.
- It becomes difficult to identify and define precisely suitable profit centres.
- It confuses division's results with manager's performance.

Question 15

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

	X	Y	Z
<i>Direct Material (₹ / Unit) (excluding material X for Divisions Y and Z)</i>	8	22	40
<i>Direct Labour (₹ / Unit)</i>	4	6	8
<i>Variable Overhead (₹ / Unit)</i>	2	2	2
<i>Selling price to outside customers (₹ / Unit)</i>	25	65	90
<i>Existing capacity (no. of units)</i>	6,000	3,000	3,000
<i>Maximum external Market demand (no of units)</i>	5,000	5,500	5,000
<i>Additional fixed cost that would be incurred to install additional capacity (₹)</i>	45,000	9,000	23,100
<i>Maximum additional units that can be produced by additional capacity</i>	6,000	2,000	2,250

7.31 Advanced Management Accounting

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 transfers or purchases.

Discuss with relevant figures the best strategy for each division and for the company as a whole. (12 Marks)(Nov., 2013)

Answer

Statement Showing Contribution *per unit*

(₹)

Particulars	Division X			Division Y		Division Z
	Sale to	Internal Transfer to		Purchase from	Transfer from	Transfer from
	Outside	Y	Z	Outside	X	X
Selling Price	25.00	---	---	65.00	65.00	90.00
Transfer Price	---	24.00*	25.00#	---	---	---
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 ₹ 24, because at 24, it will incur additional cost of ₹ 2 per unit to modify it, ₹ 23 + ₹ 3 = ₹ 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 ₹ 28 (₹ 23 + ₹ 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 ₹ 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	5,000 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 × ₹ 11 + 2,000 units × ₹ 10)	₹ 18,000 (2,000 units × ₹ 9)	₹ 28,000 (2,000* units × ₹ 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 3,000 units. Balance 2,000 units from expansion.

Statement Showing Net Revenue Addition (₹)

Particulars	X	Y	Z	Total
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7.33 Advanced Management Accounting

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

Strategy for Company & Divisions

- 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 organisation as a whole.
- 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 their activity by incurring additional fixed cost on expansion.

Question 16

Divisions X and Y are two divisions in XY Ltd. Division X manufactures a component (X) which is sold to external customers and also to Division Y.

Details of Division X are as follows:

Market price per component	₹ 300
Variable cost per component	₹ 157
Fixed costs per production period	₹ 20,62,000
Demand from Y Division per production period	20,000 components
Capacity per production period	35,000 components

Division Y assembles a product (Y) which is sold to external customers. Each unit of Y requires two units of X.

Details of Division Y are as follows:

Selling price per unit	₹ 1,200
Variable cost per unit:	
(i) Two components from X	2@ transfer price
(ii) Other variable costs per unit	₹ 375
Fixed costs per production period	₹ 13,50,000

Demand per production period	10,000 units
Capacity per production period	10,000 units

The Group Transfer Pricing Policy stipulates that

Transfers must be at opportunity cost.

Y must buy the components from X.

X must satisfy the demand from Y before making external sales.

- (i) Present figures showing the weighted average transfer price, per component transferred to Y and the total profits earned by X for each of the following levels of external demand of X:

External demand = 15,000 components

External demand = 19,000 components

External demand = 35,000 components

- (ii) Compute Division Y's profits when Division X has each of the above levels of demand.

(Only relevant figures need to be discussed. A detailed profitability statement for each situation is not required). **(8 Marks) (May, 2014)**

Answer

- (i) Computation of Weighted Average Transfer Price

Particulars	External Demand 15,000 Components	External Demand 19,000 Components	External Demand 35,000 Components
Component's Transfer Price (Base)	Variable Cost	Variable Cost <i>plus</i> Opportunity Cost for 4,000 Components	Variable Cost <i>plus</i> Opportunity Cost for 20,000 Components
Variable Cost	₹157.00	₹157.00	₹157.00
Opportunity Cost	0	₹28.60 $\left(\frac{4,000}{20,000} \times ₹143\right)$	₹143.00 $\left(\frac{20,000}{20,000} \times ₹143\right)$
Transfer Price	₹157.00	₹185.60	₹300.00

Opportunity Cost for a Component is the Contribution *forgone* by not Selling it to the market.

$$\begin{aligned} \text{Contribution} &= \text{Market Selling Price} - \text{Variable Cost} \\ &= ₹300 - ₹157 = ₹143 \end{aligned}$$

Statement Showing Profitability of Division- X

Particulars	External Demand 15,000 Components (₹)	External Demand 19,000 Components (₹)	External Demand 35,000 Components (₹)
Sales :			
Division-Y	31,40,000 (₹157 × 20,000)	37,12,000 (₹185.60 × 20,000)	60,00,000 (₹300 × 20,000)
Market	45,00,000 (₹300 × 15,000)	45,00,000 (₹300 × 15,000)	45,00,000 (₹300 × 15,000)
Total Revenue	76,40,000	82,12,000	1,05,00,000
Less: Variable Cost (₹157 × 35,000)	54,95,000	54,95,000	54,95,000
Less: Fixed Cost	20,62,000	20,62,000	20,62,000
Profit	83,000	6,55,000	29,43,000

(ii) Statement Showing Profitability of Division- Y

Particulars	External Demand 15,000 Components (₹)	External Demand 19,000 Components (₹)	External Demand 35,000 Components (₹)
Selling Price <i>per unit</i>	1,200.00	1,200.00	1,200.00
Less: Variable Cost <i>per unit:</i>	314.00 (₹157 × 2)	371.20 (₹185.60 × 2)	600.00 (₹300 × 2)
Component –X			
Others	375.00	375.00	375.00
Contribution <i>per unit</i>	511.00	453.80	225.00
No. of units	10,000	10,000	10,000
Total Contribution	51,10,000	45,38,000	22,50,000
Less: Fixed Cost	13,50,000	13,50,000	13,50,000
Profit	37,60,000	31,88,000	9,00,000

Question 17

X Division and Y Division are two divisions in the XY group of companies. X Division manufactures one type of component which it sells to external customers and also to Y Division.

Details of X Division are as follows:

Market price per component	₹300
Variable cost per component	₹157
Fixed costs	₹20,62,000 per period
Demand from Y Division	20,000 components per period
Capacity	35,000 components per period

Y Division assembles one type of product which it sells to external customer. Each unit of that product requires two of the components that are manufactured by X Division.

Details of Y Division are as follows:

Selling price per unit	₹1,200
Variable cost per unit:	
(i) Two components from X	2 @ transfer price
(ii) Other variable costs per unit	₹375
Fixed costs	₹13,50,000 per period
Demand	10,000 units per period
Capacity	10,000 units per period

Group Transfer Pricing Policy

Transfers must be at opportunity cost.

Y must buy the components from X.

X must satisfy demand from Y before making external sales.

Required:

- (1) Calculate the profit for each division if the external demand per period for the components that are made by X Division is:
 - (i) 15,000 components
 - (ii) 19,000 components
 - (iii) 35,000 components
- (2) Calculate the financial impact on the Group if Y Division ignored the transfer pricing policy and purchased all of the 20,000 components that it needs from an external supplier for ₹255 each. Your answer must consider the impact at each of the three levels of demand (15,000, 19,000 and 35,000 components) from external customers for the component manufactured by X Division. **(10 Marks) (November, 2014)**

Answer

(i) Computation of Weighted Average Transfer Price

Particulars	External Demand 15,000 Components	External Demand 19,000 Components	External Demand 35,000 Components
Component's Transfer Price (Base)	Variable Cost	Variable Cost <i>plus</i> Opportunity Cost for 4,000 Components	Variable Cost <i>plus</i> Opportunity Cost for 20,000 Components
Variable Cost (₹)	157.00	157.00	157.00
Opportunity Cost (₹)	0	28.60 $\left(\frac{4,000}{20,000} \times ₹143\right)$	143.00 $\left(\frac{20,000}{20,000} \times ₹143\right)$
Transfer Price (₹)	157.00	185.60	300.00

Opportunity Cost for a Component is the Contribution *forgone* by not selling it to the market.

$$\begin{aligned}
 \text{Contribution} &= \text{Market Selling Price} - \text{Variable Cost} \\
 &= ₹300 - ₹157 \\
 &= ₹143
 \end{aligned}$$

Statement Showing Profitability of Division- X

Particulars	External Demand 15,000 Components (₹)	External Demand 19,000 Components (₹)	External Demand 35,000 Components (₹)
Sales :			
- Division-Y	31,40,000 (₹157 × 20,000)	37,12,000 (₹185.60 × 20,000)	60,00,000 (₹300 × 20,000)
- Market	45,00,000 (₹300 × 15,000)	45,00,000 (₹300 × 15,000)	45,00,000 (₹300 × 15,000)
Total Revenue	76,40,000	82,12,000	1,05,00,000
Less: Variable Cost (₹157 × 35,000)	54,95,000	54,95,000	54,95,000
Less: Fixed Cost	20,62,000	20,62,000	20,62,000
Profit	83,000	6,55,000	29,43,000

Statement Showing Profitability of Division- Y

Particulars	External Demand 15,000 Components (₹)	External Demand 19,000 Components (₹)	External Demand 35,000 Components (₹)
Selling Price <i>per unit</i>	1,200.00	1,200.00	1,200.00
Less: Variable Cost <i>per unit</i> : Component – X	314.00 (₹157 × 2)	371.20 (₹185.60 × 2)	600.00 (₹300 × 2)
Others	375.00	375.00	375.00
Contribution <i>per unit</i>	511.00	453.80	225.00
No. of units	10,000	10,000	10,000
Total Contribution	51,10,000	45,38,000	22,50,000
Less: Fixed Cost	13,50,000	13,50,000	13,50,000
Profit	37,60,000	31,88,000	9,00,000

(ii) Financial Impact on the Group if Y Division Ignored the Transfer Pricing Policy

Particulars	External Demand 15,000 Components (₹)	External Demand 19,000 Components (₹)	External Demand 35,000 Components (₹)
Extra Cost of External Purchase (₹255–₹157) × 20,000	19,60,000	19,60,000	19,60,000
Extra Contribution by External Selling by X 0 × ₹143	0	---	---
4,000 × ₹143	---	5,72,000	---
20,000 × ₹143	---	---	28,60,000
Net Impact	(19,60,000)	(13,88,000)	9,00,000