

# 7

## Transfer Pricing

### Basic Concepts

<b>Bargained or Negotiated Prices</b>	Under this method each decentralised unit is considered as an independent unit and such units decide the transfer price by negotiations or bargaining. Divisional managers have full freedom to purchase their requirement from outside if the prices quoted by their sister unit are lower.
<b>Dual Rate Transfer Pricing System</b>	In this system two separate transfer prices are used to price interdivisional transactions. In this system, accounts of both divisions show profit and accordingly performance of the division is evaluated.
<b>Multinational Transfer Pricing</b>	Multinational companies (MNCs), operates in different countries with different taxation laws and rates. In such an environment MNCs use to set transfer prices in such a manner which minimizes the overall tax burden, such as corporate taxes, import duties, and other tariffs etc. Sometimes import duties offset income tax effects. However many countries has laws to prevent this type of practice and tax the transaction at arm's length prices.
<b>Objectives of Transfer Pricing System</b>	The main-objectives of intra-company transfer pricing are as below: (i) To utilise capacity of the plant and other resources as maximum as possible. (ii) To optimise allocation of financial resources.
<b>Pricing at Cost</b>	In this method the goods and services are transferred at the following costs: (i) Actual Manufacturing Cost (ii) Standard Cost (iii) Full Cost (iv) Full Cost plus Mark-up

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<b>Pricing at Market Price</b>	Under this method, the transfer prices of goods/services transferred to other units/divisions are based on market prices. Since market prices will, by and large be determined by demand and supply in the long run, it is claimed that profits which results under this method, will provide a good indicator of the overall efficiency of the various units.
<b>Transfer Price</b>	Transfer price can be defined as the price charged for products exchanged in internal transactions between sellers (or transferors) and buyers (or transferees) who belong to the same organisation usually a decentralised organisation.
<b>Two Part Transfer Pricing System</b>	In this system supplying division transfer its products to receiving division at marginal cost and a fixed fee for a particular period say per annum.

## SECTION - A

### Transfer Pricing - Methods

#### Question-1

*What should be the basis of transfer pricing, if unit variable cost and unit selling price are not constant?*



#### Answer

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

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

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

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#### Question-2

*(a) What will be the marketable transfer pricing procedure regarding the goods transferred under the following conditions (each condition is independent of the other)?*

*(i) When division are not captives of internal divisions and the divisions are free to do business both internally and externally and when there are reasonably competitive external markets for the transferred products.*

*(ii) If the external market for the transferred good is not reasonably competitive.*

*(b) Discuss the potential for maximization of income by a multinational through the use of transfer pricing mechanism.*



#### Answer

**(a) Marketable Transfer Pricing Procedure**

**(i)** When division are not captives of internal divisions and the divisions are free to

- do business both internally and externally and when there are reasonably competitive external markets for the transferred products, then the most suitable transfer price would be, the market price, as it generally leads to optimal decisions.
- (ii) In case, the external market for the transferred good is not reasonable competitive, following two situations may arise in this case.
    - (a) If there is idle capacity: Under this situation opportunity cost will be zero hence minimum transfer price should be equal to the additional outlay costs incurred upto the point of transfer (sometimes approximated by variable costs).
    - (b) If there is no idle capacity: Under this situation opportunity cost should be added to outlay costs for determining minimum transfer price.
  - (b) The potential for maximization of income by a multinational through the use of transfer pricing mechanism is based on the successful implementation of the following steps
    - (i) Transfer pricing may be set relatively higher for affiliates in relatively high-tax countries that purchase inputs from affiliates located in relatively low-tax countries.
    - (ii) Transfer prices to affiliates in countries which are subject to import duties for goods or services purchase may be set low so as to avoid host country taxes.
    - (iii) Transfer prices to an affiliate in a country that is encountering relatively high inflation may be set relatively high to avoid some of the adverse effects of local currency devaluation that are related to the high inflation.
    - (iv) Transfer prices may be set high for goods and services purchased by an affiliate operating in a country that has imposed restriction on the repatriation of income to foreign companies.
    - (v) Transfer prices may be set low for an affiliate that is trying to establish a competitive advantage over a local company either to break into a market or to establish a higher share of the company's business.

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## Transfer Pricing - Miscellaneous

### Question-3

*What are some goals of a 'transfer-pricing' system in an organization?*

 Answer

The goals of transfer pricing are that it should:

- (i) 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.
- (ii) Provide information which will be useful for evaluating the divisional performance.
- (iii) Seek to achieve goal congruence.
- (iv) Ensure that divisional autonomy is not undermined.

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**Question-4**

*"Transfer pricing is a widely debated and contested topic" – Discuss.*

 Answer

Usually a conflict between a division of the company and the company as a whole is faced by the management of decentralized units when products or services are exchanged among different divisions of the company. Such a conflict becomes more significant in the case of those concerns where profitability is used as criteria for evaluating the performance of each division.

The essence of decentralization is reflected in the freedom to make decisions. Under such a set up it is expected that the top management should not interfere with the decision making process of its subordinates heading different units. In other words, management of decentralized units is given autonomy with regard to decision-making. In this system top management is expected to preserve 'autonomy in decision making'. The management of such companies also expects that each division should not only achieve its own objective – necessary for evaluating the performance but should also achieve the objective of goal congruence.

A divisional head in a company under aforesaid set up is free to use a price as a transfer price for goods and services, which may provide incentive. Such a transfer price may fail to achieve the objective of 'Goal congruence' (which means a perfect congruence between division's goal and the goal of the company. In case of failure of a division to achieve the objective of 'Goal congruence' the management of the company may dictate their transfer price. Such an interference of management of the company is usually the main basis of conflict between a division and the company as a whole.

Further this conflict is aggravated if the management advocates the transfer of goods and services at cost. As such, the transfer price will not reflect a good picture about the performance of the transferring division. The profitability of the transferring division will not be known by the use of such a transfer price.

Each division appreciates the transfer of its goods/services at usual selling price/market price so as to arrive at the correct return / profitability figure, used for measuring the performance.

There is no incentive to the transferring division if goods and services are transferred at variable cost.

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#### Question-5

*Enumerate - the expected disadvantages in taking divisions as profit centres.*



#### 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.
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## SECTION - B

### Transfer Price - Shared Contribution / Market Price Method

#### Problem-1

A company is engaged in the manufacture of edible oil. It has three divisions as under:

- (i) Harvesting oil seeds and transportation thereof to the oil mill.
- (ii) Oil Mill, which processes oil seeds and manufactures edible oil.
- (iii) Marketing Division, which packs the edible oil in 2 kg. containers for sale at ₹ 150 each container.

The Oil Mill has a yield of 1,000 kgs of oil from 2,000 kg of oil seeds during a period. The Marketing Division has a yield of 500 cans of edible oil of 2 kg each from every 1,000 kg of oil. The net weight per can is 2 kgs of oil.

The cost data for each division for the period are as under:

<b>Harvesting Division</b>	₹
Variable cost per kg of oil seed	2.50
Fixed cost per kg of oil seed	5.00
<b>Oil Mill Division</b>	₹
Variable cost of processed edible oil	10.00 per kg
Fixed cost of processed edible oil	7.50 per kg
<b>Marketing Division</b>	₹
Variable cost per can of 2 kg of oil	3.75
Fixed cost per can of 2 kg of oil	8.75

The fixed costs are calculated on the basis of the estimated quantity of 2,000 kg of oil seeds harvested, 1,000 kg of processed oil and 500 cans of edible oil packed by the aforesaid divisions respectively during the period under review.

The other oil mills buy the oil seeds of same quality at ₹ 12.50 per kg in the market. The market price of edible oil processed by the oil mill, if sold without being packed in the marketing division is ₹ 62.50 per kg of oil.

**Required**

- (i) Compute the overall profit of the company of harvesting 2,000 kg of oil seeds, processing it into edible oil and selling the same in 2 kg cans as estimated for the period under review.
- (ii) Compute the transfer prices that will be used for internal transfers from (1) Harvesting Division to Oil Mill Division and (2) from Oil Mill Division to Marketing Division under the following pricing methods:
- (1) Shared contribution in relation to variable costs; and
  - (2) Market price.
- (iii) Which transfer pricing method will each divisional manager prefer to use?

**Solution**

(i)

**Statement of the Overall Profit of the Company**

(By Harvesting 2,000 Kgs. of Oil Seeds, Processing it into Edible Oil & Selling the same in 2 Kg Cans)

	Harvesting Division	Oil Mill Division	Marketing Division	Total (₹)
Output of each Department	2,000 Kgs. of Oil Seeds	1,000 Kgs. of Oil Produced	500 Cans of 2 Kg. each	---
Variable Cost (₹)	5,000 (2,000 Kgs × ₹2.50)	10,000 (1,000 Kgs × ₹10)	1,875 (500 Cans × ₹3.75)	16,875
Fixed Cost (₹)	10,000 (2,000 Kgs × ₹5)	7,500 (1,000 Kgs × ₹7.50)	4,375 (500 Cans × ₹8.75)	21,875
Total Cost (₹)	15,000	17,500	6,250	38,750
Sales Revenue (₹) [500 Cans × ₹150]				75,000
Profit (₹)				36,250

(ii) Working Notes

$$\begin{aligned}
 \text{(a) Total Contribution} &= \text{Sales Revenue} - \text{Total Variable Cost} \\
 &= ₹75,000 - ₹16,875 \\
 &= ₹58,125
 \end{aligned}$$

(b) Amount of Shared Contribution *in relation to Variable Costs*

$$\text{Harvesting Division} = ₹58,125 \times \frac{₹5,000}{₹16,875}$$

$$= ₹17,222$$

$$\text{Oil Mill Division} = ₹58,125 \times \frac{₹10,000}{₹16,875}$$

$$= ₹34,445$$

$$\text{Marketing Division} = ₹58,125 \times \frac{₹1,875}{₹16,875}$$

$$= ₹6,458$$

Computation of Transfer Price *for internal transfers* under the Following Pricing Methods

(1) Shared Contribution *in relation to Variable Costs*

Transfer Price from Harvesting Division to Oil Mill Division

$$= \text{Variable Cost of Harvesting Division} + \text{Shared Contribution of Harvesting Division } *in relation to Variable Costs*$$

$$= ₹5,000 + ₹17,222 \text{ [W.N.-(b)]}$$

$$= ₹22,222$$

Transfer Price from Oil Mill Division to Marketing Division

$$= \text{Transfer Price from Harvesting Division to Oil Mill Division} + \text{Variable Cost of Oil Mill Division} + \text{Shared Contribution of Oil Mill Division } *in relation to Variable Costs* \text{ [W.N.-(b)]}$$

$$= ₹22,222 + ₹10,000 + ₹34,445$$

$$= ₹66,667$$

(2) Market Price

Transfer Price from Harvesting Division to Oil Mill Division

$$= \text{Market Price of 2,000 Kgs. of Oil Seeds } *transferred to* \text{ Oil Mill Division}$$

$$= 2,000 \text{ Kgs.} \times ₹12.50$$

$$= ₹25,000$$

Transfer Price from Oil Mill Division to Marketing Division

$$\begin{aligned}
 &= \text{Market Price of 1,000 Kgs. of Edible Oil} \\
 &= 1,000 \text{ of Kgs.} \times ₹62.50 \\
 &= ₹62,500
 \end{aligned}$$

(iii) Statement Showing "Profitability under Different Transfer Prices Method"

	From Harvesting Division to Oil Mill Division (₹)	From Oil Mill to Marketing Division (₹)	From Marketing Division to Market (500 Cans of 2Kgs.) (₹)
<b>Shared Contribution Method</b>			
Transfer Price [Refer to (1) above]	22,222	66,667	75,000
Less: Transfer Price [Refer to (ii) above]	—	22,222	66,667
Less: Variable Cost	5,000	10,000	1,875
Less: Fixed Cost [Refer to (i) above]	10,000	7,500	4,375
Profit	7,222	26,945	2,083
<b>Market Price Method</b>			
Transfer Price [Refer to (2) above]	25,000	62,500	75,000
Less: Transfer in Price [Refer to (ii) above]	—	25,000	62,500
Less: Variable Cost [Refer to (ii) above]	5,000	10,000	1,875
Less: Fixed cost [Refer to (i) above]	10,000	7,500	4,375
Profit	10,000	20,000	6,250

#### Decision

Divisional Manager of Harvesting Division would prefer the use of Market Price Method for transferring 2,000 Kgs. of Oil Seeds to Oil Mill Division because its usage increases the Profit by ₹2,778 (₹10,000 – ₹7,222) over the Shared Contribution Method. Whereas

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Oil Mill Division Manager would prefer the use of Shared Contribution Method over the Market Price Method because its use would increase its Profit by ₹6,945 (₹26,945 – ₹20,000). Similarly Marketing Divisional Manager would be benefited to the extent of ₹4,167 (₹ 6,250 – ₹ 2,083) by using Market Price Method.

### Transfer Pricing Based on Opportunity Cost

#### Problem-2

Division Z is a profit center which produces four products A, B, C and D. Each product is sold in the external market also. Data for the period is:

	A	B	C	D
Market price per unit (₹)	150	146	140	130
Variable cost of production per unit (₹)	130	100	90	85
Labour hours required per unit	3	4	2	3

Product D can be transferred to Division Y, but the maximum quantity that may be required for transfer is 2,500 units of D.

The maximum sales in the external market are:

A.....	2,800 units
B.....	2,500 units
C.....	2,300 units
D.....	1,600 units

Division Y can purchase the same product at a price of ₹ 125 per unit from outside instead of receiving transfer of product D from Division Z.

#### Required

What should be the transfer price for each unit for 2,500 units of D, if the total labour hours available in Division Z are 20,000 hours?

 Solution

#### Ranking of Products When Availability of Time is the Key Factor

Products	A	B	C	D
Market Price (₹)	150	146	140	130
Less: Variable Cost (₹)	130	100	90	85

Contribution <i>per unit</i> (₹)	20	46	50	45
Labour Hours <i>per unit</i>	3 hrs.	4 hrs.	2 hrs.	3 hrs.
Contribution <i>per Labour Hour</i>	6.67	11.50	25.00	15.00
Ranking	IV	III	I	II
Maximum Demand (units)	2,800	2,500	2,300	1,600
Total No. of Hours	8,400	10,000	4,600	4,800
Allocation of 20,000 Hours on the Basis of Ranking	600*	10,000	4,600	4,800

(\*) Balancing Figure

#### Note

Time required to meeting the demand of 2,500 units of Product D for Division Y is 7,500 hrs. This requirement of time viz. 7,500 hrs for providing 2,500 units of Product D for Division Y can be met by sacrificing 600 hours of Product A (200 units) and 6,900 hours of Product B (1,725 units).

$$\begin{aligned}
 \text{Transfer Price} &= \text{Variable Cost} + \text{Opportunity Cost} \\
 &= ₹85 + \frac{(6,900 \text{ hrs.} \times ₹11.5 + 600 \text{ hrs.} \times ₹6.66)}{2,500 \text{ units}} \\
 &= ₹85 + \frac{₹79,350 + ₹4,000}{2,500 \text{ units}} \\
 &= ₹85 + ₹33.34 \\
 &= ₹118.34
 \end{aligned}$$

#### Problem-3

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.

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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.



### Solution

- (i) **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 <i>per unit</i> of Product Z (₹ 2,48,00,000 ÷ 40,000 units)	620
Transfer Price of Product Z to Division B (Variable Cost <i>per unit</i> + Contribution <i>per unit</i> )	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.

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**Problem-4**

A large business consultancy firm is organized into 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.

**Required**

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.

**Solution**

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

Profit Mark-up	=	150%
Let Cost	=	K
Profit	=	1.5 K

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	Cost + Profit	=	Transfer Price
⇒	K + 1.5 K	=	4,500
⇒	2.5 K	=	4,500
⇒	K	=	1,800
∴	Cost	=	₹1,800
	and Profit	=	1.5 K
		=	1.5 × ₹1,800
		=	₹2,700
	Variable Cost (80%)	=	₹1,800 × 80%
		=	₹1,440
	Fixed Cost (20%)	=	₹1,800 × 20%
		=	₹360

### Scenario (i)

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

Hence, Transfer Price	=	Marginal Cost <i>plus</i> Opportunity Cost
Marginal Cost	=	₹1,440
Saving for Internal Work	=	₹200
Net Marginal Cost	=	₹1,240
[Opportunity Cost is the Lost Contribution]		
Lost Contribution	=	Contribution from External Client
	=	Fee Charged from External Client – Variable Cost
	=	₹4,500 – ₹1,440
	=	₹3,060
∴ Transfer Price	=	₹1,240 + ₹3,060
	=	₹4,300 <i>per consulting day per team</i>

### 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 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 <i>per consulting day per team</i>

## 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 Days
	= ₹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

## Problem-5

*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

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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.



### Solution

- (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

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(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

**Problem-6**

Division A is a profit centre, which produces four products P, Q, R and S. Each product is sold in the external market also. Data for the period is as follows:

	P	Q	R	S
Market Price per unit (₹)	350	345	280	230
Variable Cost of Production per unit	330	310	180	185
Labour Hours Required per unit	3	4	2	3

Product S can be transferred to Division B but the maximum quantity that might be required for transfer is 2,000 units of S.

The maximum sales in the external market are:

P.....	3,000 units
Q.....	3,500 units
R.....	2,800 units
S.....	1,800 units

Division B can purchase the same product at a slightly cheaper price of ₹ 225 per unit instead of receiving transfers of product S from Division A.

**Required**

What should be transfer price for each unit for 2,000 units of S, if the total labour hours available in Division A are:

- (i) 24,000 hours?  
(ii) 32,000 hours?

 Solution

### Working Note

#### Ranking of Products When Availability of Time is the Key Factor

Product	P	Q	R	S
Market Price <i>per unit</i> (₹)	350	345	280	230
Less: Variable Cost of Production <i>per unit</i> (₹)	330	310	180	185
Contribution <i>per unit</i> (₹)	20	35	100	45
Labour Hours Required <i>per unit</i>	3 hrs.	4 hrs.	2 hrs.	3 hrs.
Contribution <i>per hour</i> (₹)	6.67 (₹20 ÷ 3hrs)	8.75 (₹35 ÷ 4hrs)	50 (₹100 ÷ 2hrs)	15 (₹45 ÷ 3hrs)
Ranking	IV	III	I	II

### Requirement

- (i) **Statement Showing "Production Mix"**  
(When Total Available Hours in Division A are 24,000)

Product (Refer to W.N.)	Maximum Demand (units)	Hours <i>per unit</i>	Units Produced	Hours Used	Balance Hours
(a)	(b)	(c)	(d)	(e)=(b)×(c)	(f)
R	2,800	2	2,800	5,600	18,400 (24,000 – 5,600)
S	1,800	3	1,800	5,400	13,000 (18,400 – 5,400)
Q	3,500	4	3,250	13,000	0 (13,000 – 13,000)
P	3,000	3	0	0	0

**Note**

Time required to meet the demand of 2,000 units of Product S for Division B is 6,000 hrs. This requirement of time viz., 6,000 hours for providing 2,000 units of Product S for Division B can be met by sacrificing the production of 1,500 units of Product Q (1,500 units × 4 hrs.).

**Statement Showing "Transfer Price for each unit for 2,000 units of S"**

Transfer Price	2,000 units of Product S (₹)	Per unit of Product S (₹)
Variable Cost	3,70,000	185.00
Opportunity Cost of the Contribution Foregone <i>by not producing</i> 1,500 units of Q (1500 units × ₹35)	52,500	26.25
Transfer Price	4,22,500	211.25

**(ii) Statement of Product Mix (When Total Available Hours in Division A are 32,000)**

Product (Refer to W.N.)	Maximum Demand (units)	Hours <i>per unit</i>	Units Produced	Hours Used	Balance Hours
(a)	(b)	(c)	(d)	(e)=(b)×(c)	(f)
R	2,800	2	2,800	5,600	26,400 (32,000 – 5,600)
S	1,800	3	1,800	5,400	21,000 (26,400 – 5,400)
Q	3,500	4	3,500	14,000	7,000 (21,000 – 14,000)
P	3,000	3	2,333	7,000	0 (7,000 – 7,000)

**Note**

The required time for producing 2,000 units of Product S for Division B is 6,000 hrs. This requirement can be met by sacrificing the output of 2,000 units of Product P.

**Statement of Transfer Price for each unit for 2,000 units of S**

Transfer Price	2,000 units of Product S (₹)	Per unit of Product S (₹)
Variable Cost	3,70,000	185.00

Opportunity Cost of the Contribution Foregone by not producing 2,000 units of P (2,000 units × ₹20)	40,000	20.00
Transfer Price	4,10,000	205.00

**Problem-7**

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 fabricate 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's 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				

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<i>Frame Fabrication</i>				
- $(0.5 \times ₹ 30.00/DLH^{\#})$	15.00		---	
- $(0.5 \times ₹ 30.00/DLH)$	---		15.00	
<i>Cushion Fabrication</i>				
- $(0.5 \times ₹ 30.00/DLH)$	15.00		---	
<i>Assembly*</i>				
- $(0.5 \times ₹ 30.00/DLH)$	15.00		---	
- $(0.3 \times ₹ 30.00/DLH)$	---	45.00	9.00	24.00
<i>Less: Manufacturing Overhead</i>				
- $(1.5 DLH \times ₹ 51.20/DLH)$		76.80		---
- $(0.8 DLH \times ₹ 51.20/DLH)$		---		40.96
<i>Profit / (Loss)</i>		45.00		32.00

(\*)Attaching seats to frames and attaching rubber feet

(#) DLH refers to Direct Labour Hour

### 'FQR' DIVISION Manufacturing Overhead Budget

<i>Overhead Item</i>	<i>(₹)</i>
<i>Indirect Material (Variable - at Current Market Prices)</i>	16,80,000
<i>Indirect Labour (Variable)</i>	15,00,000
<i>Supervision (Non Variable)</i>	10,00,000
<i>Power (Use Varies with Activity; Rates are Fixed)</i>	7,20,000
<i>Heat and Light (Non Variable - Same Regardless of Production)</i>	5,60,000
<i>Miscellaneous Overheads (Non Variable - Any Change in Amounts or Rates is Independent of Production)</i>	8,00,000
<i>Depreciation (Fixed)</i>	68,00,000
<i>Employee Benefits (20% of Supervision, Direct and Indirect Labour)</i>	23,00,000
<i>Total Overhead</i>	1,53,60,000
<i>Capacity in DLH</i>	3,00,000
<i>Overhead Rate / DLH</i>	₹ 51.20

**Required**

Assume that you are the corporate controller. What transfer price would you recommend 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 <i>per Cushioned Seat</i>		55.72
Total Variable Cost <i>per 200-unit lot</i> (₹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 and Light	---	---	5,60,000	1.87
Miscellaneous Overheads	---	---	8,00,000	2.67
Depreciation	---	---	68,00,000	22.67

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Employee Benefits:				
- 20% Direct Labour*	18,00,000	6.00	---	---
- 20% Supervision	---	---	2,00,000	0.66
- 20% Indirect Labour	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 = ₹93,60,000 ÷ 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 <i>per unit</i>	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 Stools *that can be produced*

Labour Hours *to make* a 200-unit lot of Stylish Stools (1.50 × 200) 300 Hrs  
Less: Labour Hours *to make* a 200-unit lot of Cushioned Seats (0.50 × 200) 100 Hrs

Labour Hours <i>available for</i> Normal Stool	<u>200Hrs</u>
Labour hours <i>required to make</i> one Normal Stool	0.8 Hrs / Stool
Use of Extra Labour <i>devoted to</i> 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 ₹15,264 (₹11,144 + ₹4,120).

## Negotiated Transfer Price

### Problem-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 (units)</i>	20,000	30,000	40,000
<i>External Demand (units)</i>	14,000	26,000	42,000

### Required

*Discuss the range of negotiation for Managers X, Y and Z, for the number of units and the transfer price for internal transfers.*

 Solution

## 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*
<i>Less: Commission</i>	15	--	--
Net Selling Price	95	70	79
<i>Less: Variable Cost</i>	70	70	70
<i>Contribution per unit</i>	25	0	9
Units	14,000	6,000	6,000
Total Contribution (Units × Contribution <i>per unit</i> )	3,50,000	0	54,000

(\*) External Rate – Transport Expense

## Analysis of Range of Negotiation for Manager of Division Y

(Figures in ₹)

Division Y

	Outside Sales			Sale to Div. Z		
	From Division X	From Outside	From Outside	From Division X	From Outside	From Outside
Price Range	70	79	85	70	79	85
<i>Add: Transport</i>	6	6	---	6	6	---
Total	76	85	85	76	85	85
<i>Add: Direct Labour</i>	50	50	50	50	50	50
Total	126	135	135	126	135	135
<i>Add: Delivery Cost</i>	10	10	10	8	8	8

	Total	136	145	145	134	143	143
Add. Sales Commission		15	15	15	---	---	---
Total Cost	...(B)	151	160	160	134	143	143
Selling Price	...(A)	170	170	170	135	135	135
Contribution	...(A)-(B)	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 Division Y at a price between ₹70 (variable manufacturing cost to Division X) and ₹95 (maximum amount to equal outside contribution). But Division Y can get the material outside at ₹85. So, Division Y will not pay to Division X anything above ₹79 (₹85 – ₹6) to match external available price.

Division X will be attracted to sell to Division Y only in the range of ₹71 – ₹79 per unit at a volume of 6,000 units. At ₹70, Division X will be indifferent, but may offer to sell to Division Y to use idle capacity.

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

	Division Y	Division Z
Provided Division X sells to Division Y at ₹70 per unit	Sell 4,000 units to Division Z at ₹134 (Indifferent)	Buy 4,000 units from Division Y at ₹134 (attracted)
	Sell 4,000 units to Division Z at ₹135 (Willingly for a contribution of ₹1)	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.

## Transfer Pricing Decision – Different Capacity Levels

### Problem-9

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

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The transfer price for the year 2014 was agreed at ₹ 6 per metre. This price has been fixed in line with the external wholesale trade price on 1<sup>st</sup> 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 metre with effect from 1<sup>st</sup> 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 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 <sup>st</sup> June, 2014	3.00	Transfer price
Variable cost	1.20 (per metre)	80 (per bundle)
Fixed cost (per month)	4,12,000	1,00,000

### Required

- (i) 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 utilisation of the Textile unit at the market price (external wholesale trade price on 1<sup>st</sup> January, 2014) 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.

 Solution

(i) (a)

At 80% Level

Textile Unit	(₹)	Process House	(₹)
Sales (4,00,000 Mtr. × ₹6)	24,00,000	Sales (1,50,000 Mtr. ÷ 100 Mtr. × ₹ 825)	12,37,500
Less: Raw Material (4,00,000 Mtr. × ₹3)	12,00,000	Less: Transfer Price (1,50,000 Mtr. × ₹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 ₹4,25,500 (₹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. ÷ 100 Mtr. × ₹725)	18,12,500
Less: Raw Material (5,00,000 Mtr. × ₹3)	15,00,000	Less: Transfer Price (2,50,000 Mtr. × ₹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	23,00,000	Sales	12,37,500

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[(2,50,000 Mtr. × ₹5.6) + (1,50,000 Mtr. × ₹6.0)]		(1,50,000 Mtr. ÷ 100 Mtr. × ₹ 825 )	
Less: Raw Material (4,00,000 Mtr. × ₹3)	12,00,000	Less: Transfer Price (1,50,000 Mtr. × ₹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 ₹3,25,500 (₹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. ÷ 100 Mtr. × ₹725 )	18,12,500
Less: Raw Material (5,00,000 Mtr. × ₹3)	15,00,000	Less: Transfer Price (2,50,000 Mtr. × ₹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.

## Transfer Pricing Decision – Different Demand Levels

### Problem-10

The two manufacturing divisions of a company are organized on profit centre basis. Division X is the only source of a component required by Division Y for their product 'P'. Each unit of P requires one unit of the said component. As the demand of the product is not steady, orders for increased quantities can be obtained by manipulating prices.

The manager of Division Y has given the following forecast:

Sales per Day (units)	Average Price per Unit of P (₹)
5,000	393.75
10,000	298.50
15,000	247.50
20,000	208.50
25,000	180.00
30,000	150.75

The manufacturing cost (excluding the cost of the component from Division X) of P in Division Y is ₹ 14,06,250 on first 5,000 units and ₹ 56.25 per unit in excess of 5,000 units.

Division X incurs a total cost of ₹ 5,62,500 per day for an output upto 5,000 components and the total costs will increase by ₹ 3,37,500 per day for every additional 5,000 components manufactured. The Manager of Division X has set the transfer price for the component at ₹ 90 per unit to optimize the performance of his Division.

### Required

- (i) Prepare a divisional profitability statement at each level of output, for Division X and Y separately;
- (ii) Find out the profitability of the company as a whole at the output level where:
  - (a) Division X's net profit is maximum;
  - (b) Division Y's net profit is maximum.
- (iii) Find out at what level of output, the company will earn maximum profit, if the company is not organized on profit centre basis.

 Solution

## (i) Statement Showing "Profitability of Division X"

No. of Components (a)	Transfer Price for the component to Division Y @ ₹ 90 per unit (b)	Total Cost of Components (₹) (c)	Profit / (Loss) (₹) (d) = (b) - (c)
5,000	4,50,000	5,62,500	(1,12,500)
10,000	9,00,000	9,00,000	—
15,000	13,50,000	12,37,500	1,12,500
20,000	18,00,000	15,75,000	2,25,000
25,000	22,50,000	19,12,500	3,37,500
30,000	27,00,000	22,50,000	4,50,000

## Statement Showing "Profitability of Division Y"

No. of Components (a)	Sale Revenue on Average Price Basis (₹) (b)	Component Cost (Transfer Price) to Division Y (₹) (c)	Manufacturing Cost in Division Y (₹) (d)	Total Cost (₹) (e) = (c)+(d)	Profit / (Loss) (₹) (f) = (b)-(e)
5,000	19,68,750	4,50,000	14,06,250	18,56,250	1,12,500
10,000	29,85,000	9,00,000	16,87,500	25,87,500	3,97,500
15,000	37,12,500	13,50,000	19,68,750	33,18,750	3,93,750
20,000	41,70,000	18,00,000	22,50,000	40,50,000	1,20,000
25,000	45,00,000	22,50,000	25,31,250	47,81,250	(2,81,250)
30,000	45,22,500	27,00,000	28,12,500	55,12,500	(9,90,000)

## (ii) Profitability of the Company as a Whole

(a)	At 30,000 units level, at which Division X's Net Profit is <i>maximum</i>	(₹)
	Profit of Division X	4,50,000
	Profit of Division Y	<u>(9,90,000)</u>
	Operating Profitability/ (Loss) of the Company	(5,40,000)

(b)	At 10,000 units level, at which Division Y's Net Profit is <i>maximum</i>	(₹)
	Profit of Division X	NIL
	Profit of Division Y	<u>3,97,500</u>
	Operating Profitability of the Company	3,97,500

(iii) Profitability of the Company, *if it is not organized on Profit Centre Basis*

No. of Components	Sales Revenue on Average Basis	Cost of Component to Division X	Manufacturing Cost in Division Y	Total Cost	Profit/(Loss)
	(₹)	(₹)	(₹)	(₹)	(₹)
(a)	(b)	(c)	(d)	(e)=(c)+(d)	(f)=(b)-(e)
5,000	19,68,750	5,62,500	14,06,250	19,68,750	-
10,000	29,85,000	9,00,000	16,87,500	25,87,500	3,97,500
15,000	37,12,500	12,37,500	19,68,750	32,06,250	5,06,250
20,000	41,70,000	15,75,000	22,50,000	38,25,000	3,45,000
25,000	45,00,000	19,12,500	25,31,250	44,43,750	56,250
30,000	45,22,500	22,50,000	28,12,500	50,62,500	(5,40,000)

The Level of Output, the company will earn *maximum* Profit; if the company is not organized on Profit Centre basis are 15,000 Components.

**Problem-11**

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 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

### 7.35 Advanced Management Accounting

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	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:

<b>Division PQR</b>			
Selling Price (₹)	200	300	400
Demand (units)	30,000	20,000	10,000
<b>Division RPQ</b>			
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**

- (i) Calculate the effect of the transfer price of ₹ 290 per unit on company's operating profit. Calculate the optimal product mix.
- (ii) 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 <i>per unit</i> (₹)	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 <i>per unit</i> (₹)	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 <i>per unit</i> (₹)	290	390	490
Demand (units)	14,400	10,000	5,600
Total Contribution(₹)	41,76,000*	39,00,000	27,44,000

(\*) Optimal

### 7.37 Advanced Management Accounting

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 problem 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 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 <sup>#</sup> ]	2,00,000	2,88,000	2,00,000
Contribution to Division 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
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.
- (<sup>#</sup>) On internal transfers, Division PQR's variable cost per unit is ₹ 100, since the ₹ 10 on selling is not incurred.

#### Problem-12

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	2,500	12,600	15,000	18,000

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

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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 instead 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 1,92,000 hrs.

**Required**

- What is A's optimal product mix and the corresponding contribution net of specific fixed costs?
- How many units should A transfer to B and at what price?
- Is it in the company's interest to transfer 20,000 units of S to B?

 **Solution**

- Statement Showing "Contribution *per unit* as well as Contribution *per labour hour*"

	Maximum Sales (Units)			
	30,000	31,000	28,000	18,000
	P	Q	R	S
Market Price (₹/u)	70	69	56	46
Less: Variable Cost of Production (₹/u)	66	59	36	37
Contribution (₹/u)	4	10	20	9
Labour Hours <i>per unit</i>	3	2	2	3
Contribution (₹/hr.)	1.33	5	10	3
Rank [Contribution (₹/hr.)]	IV	II	I	III
Specific Fixed Costs (₹/10,000 units)	2,500	12,600	15,000	18,000



Rank would be same in case of 'Contribution *net of* Specific Fixed Cost'.

Allocation of Labour Hours *on the basis of ranking*

	Hrs.
Hours Available	1,92,000
Less: Allocated for R (Rank I) {28,000 units × 2 hrs.}	56,000

Balance	1,36,000
Less: Allocated for Q (Rank II) {30,000 units* × 2 hrs.}	60,000
Balance	76,000
Less: Allocated for S (Rank III) {18,000 units × 3 hrs.}	54,000
Balance	22,000
Less: Allocated for P (Rank IV) $\left\{ \frac{22,000 \text{ hrs.}}{3 \text{ hrs.}} = 7,333.33 \text{ units} \right\}$	22,000

(\*)

Manufacture Product Q only up to 30,000 units, as next 1,000 units is not justified due to ₹ 12,600 being spent.

**Statement Showing "Optimal Product Mix and  
Contribution Net of Specific Fixed Costs *on the basis of ranking*"**

Product	P	Q	R	S	Total
Rank	IV	II	I	III	
Units	7,333.33	30,000	28,000	18,000	
Contribution (₹/u)	4	10	20	9	
Total Contribution (₹)	29,333.32	3,00,000	5,60,000	1,62,000	10,51,333.32
Specific Fixed Cost (₹)	2,500	37,800	45,000	36,000	1,21,300
	26,833.32	2,62,200	5,15,000	1,26,000	9,30,033.32

(ii)

**Statement Showing "Contribution *per unit* as well as  
Contribution *per labour hour* Product P & S"**

	Maximum Sales/ Transfer (Units)		
	30,000	18,000	20,000
	P	S <sub>EXT.</sub>	S <sub>DIV.B</sub>
Market Price (₹/u)	70	46	45
Less: Variable Cost of Production (₹/u)	66	37	37
Contribution (₹/u)	4	9	8
Labour Hours <i>per unit</i>	3	3	3
Contribution (₹/hr.)	1.33	3	2.66
Rank [Contribution (₹/hr.)]	III	I	II
Specific Fixed Costs (₹/10,000 units)	2,500	18,000	18,000

## Statement Showing "Computation of Qty. Transfer to Division B"

	Hrs.
Hours Available (After allocation to Q & R)	76,000
Less: Allocated for S <sub>EXT.</sub> (Rank I) {18,000 units × 3 hrs.}	54,000
Balance	22,000
Less: Allocated for S <sub>DIV.B</sub> (Rank II) $\left\{ \frac{22,000 \text{ hrs.}}{3 \text{ hrs.}} = 7,333.33 \text{ units} \right\}$	22,000

## Statement Showing "Computation of Transfer Price"

	units
Variable Cost {7,333.33 units × ₹37}	2,71,333.21
Add: Loss of Contribution Net of Specific Fixed Cost "P"	26,833.32
Add: Additional Specific Fixed Cost "S"	18,000
Total	3,16,166.53
Transfer Qty.	7,333.33
Transfer Price $\left\{ \frac{₹ 3,16,166.53}{7,333.33 \text{ units}} \right\}$	43.11

## (iii) Statement Showing "Qty. of 'Loss of External Sales'"

	units
Requirement S <sub>DIV.B</sub>	20,000
Less: On the basis of allocation (ii) S <sub>DIV.B</sub>	7,333.33
Loss of External Sales S <sub>EXT.</sub>	12,666.67

## Statement Showing "Net Gain on Transfer of 20,000 units to Division B"

	Rs.
Savings {20,000 units × (₹45 - ₹37)}	1,60,000
Less: Loss of Contribution S <sub>EXT.</sub> (12,666.67 units × ₹9)	1,14,000
Less: Loss of Contribution Net of Specific Fixed Cost "P"	26,833.32
Less: Additional Specific Fixed Cost "S"	18,000
Net Gain	1,166.68

## Conclusion

From the *financial perspective* net gain from transfer of 20,000 units to Division B is negligible. To take final call to transfer 20,000 units to Division B Company should consider other factors also such as its market share, future market demand, market price, and transportation cost etc.

## Pricing Model

### Problem-13

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

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

- 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'

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$$\begin{aligned}
 P &= ₹17,10,000 - (\₹50,000 / 2) \times Q \\
 \text{Revenue (R)} &= Q \times [17,10,000 - 25,000 \times Q] \\
 &= 17,10,000 Q - 25,000 Q^2 \\
 \text{Marginal Revenue (MR)} &= 17,10,000 - 50,000 Q \\
 \text{Marginal Cost (MC)} &= 13,60,000
 \end{aligned}$$

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

$$\begin{aligned}
 17,10,000 - 50,000 Q &= 13,60,000 \\
 Q &= 7.00 \text{ units}
 \end{aligned}$$

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

$$\begin{aligned}
 P &= 17,10,000 - (50,000/2) \times Q \\
 &= 17,10,000 - 25,000 \times 7.00 \\
 &= ₹15,35,000
 \end{aligned}$$

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.

$$\begin{aligned}
 \text{MR of a Casnub Bogies} &= \text{MC of Manufacturing a Casnub Bogies} \\
 3,20,000 - 2(10,000/30) \times Q &= 2,20,000 \\
 Q &= 150 \text{ units}
 \end{aligned}$$

Selling Price of a Casnub Bogie 'P' is

$$\begin{aligned}
 P &= 3,20,000 - (10,000/30) \times 150 \\
 &= ₹2,70,000
 \end{aligned}$$

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.

$$\begin{aligned}
 \text{MR of a Wagon} &= \text{MC of Manufacturing a Wagon} \\
 17,10,000 - 50,000 \times Q &= (\₹2,70,000 \times 4 \text{ Casnub Bogies}) + \\
 &\quad ₹4,80,000 \\
 Q &= 3.00 \text{ units}
 \end{aligned}$$

Quotation Price of a Wagon 'P' should be:

$$\begin{aligned} P &= ₹17,10,000 - 25,000 \times 3.00 \\ &= ₹16,35,000 \end{aligned}$$

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

## Multinational Transfer Pricing

### Problem-14

*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 CE CDC 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 CE CDC 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 'L<sub>x</sub>' are required. The following cost is incurred by the CE CDC to manufacture a unit of component 'L<sub>x</sub>':*

	Amount (TWD)
<i>Direct Material</i>	440.00
<i>Direct Labour (3 hours)</i>	120.00
<i>Variable Overheads</i>	40.00

(\*) purchased from domestic market.

*CE CDC incurs TWD 30 per unit as Wharfage Charges.*

*CE CDC has a normal manufacturing capacity of 5,00,000 units of component 'L<sub>x</sub>' 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. The tax authorities both in Taiwan and India, consider TWD 750 (= ₹1,500) per component 'L<sub>x</sub>' 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 (₹)
<i>Variable Costs per unit:</i>	
<i>Direct Material (excluding component 'L<sub>x</sub>')</i>	6,200
<i>Direct Labour</i>	115
<i>Fixed Cost:</i>	
<i>Office and Administrative Overheads</i>	1,18,00,000
<i>Selling &amp; Distribution Overheads</i>	2,58,00,000

## 7.45 Advanced Management Accounting

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 'L<sub>x</sub>' 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 'L<sub>x</sub>' can be purchased from the Indian market at ₹1,490 only and moreover it has to pay import duty on import of component 'L<sub>x</sub>' 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

### Required

From the above information, Calculate:

- Minimum Price at which CECDC can transfer component 'L<sub>x</sub>' to CIPL.
- Maximum Price that can be paid by CIPL to CECDC for each component 'L<sub>x</sub>'.
- Profitability Statement for the group in TWD.

Note:

- For Duty and Tax calculation, consider arm's length price only.
- Ignore the DTAA and other tax provisions.
- Conversion Rate 1 INR = 0.50 TWD



### Solution

- The minimum price at which CECDC can transfer component 'L<sub>x</sub>' to CIPL is Variable Cost per unit *plus* Corporate Tax attributable to per unit of component 'L<sub>x</sub>'

#### Minimum Transfer Price *per unit* of component 'L<sub>x</sub>'

	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 <sub>x</sub> ' (W.N.1)	30.00
Total	660.00

Minimum Transfer Price *per unit* of component 'Lx' is 660 TWD or ₹1,320

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

**Maximum Transfer Price *per unit* of component 'Lx'**

	Amount (₹)
Market Price of component 'Lx' (Indian Market)	1,490.00
<i>Less:</i> Import Duty (750 TWD × 2 × 10%)	150.00
<i>Less:</i> Shipment Cost	10.00
Total	1,330.00

Maximum Transfer Price that CIPL can pay to CECD for every unit of component 'Lx' is ₹1,330 or 665 TWD.

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

Particulars	LED TV	Component 'Lx'	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
<b>Total Revenue</b>	... (A)		<b>10,75,000</b>
Variable Manufacturing Cost (Component 'Lx')	2,10,000 (3,50,000 units × 600 TWD)	90,000 (1,50,000 units × 600TWD)	3,00,000
Wharfage Charges	10,500 (3,50,000 units × 30 TWD)	4,500 (1,50,000 units × 30TWD)	15,000
Other Variable Manufacturing Cost (excluding 'Lx')	5,52,562.50 (1,75,000 units × ₹6,315 × 0.50)	---	5,52,562.50
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 Admin. Overheads	5,900 (₹1,18,00,000 × 0.50)	---	5,900
Selling & Dist. Overheads	12,900 (₹2,58,00,000 × 0.50)	---	12,900

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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 'L<sub>x</sub>' (TWD)

	Amount
Profit <i>per unit</i> (750 TWD – 440 TWD – 120 TWD – 40 TWD – 30 TWD)	120
Corporate tax <i>per unit</i> (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 'L <sub>x</sub> ' (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 CECD (TWD)

	Amount
Profit <i>per unit</i> (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

**Problem-15**

*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 of the same MNC group. The Indian subsidiary buys 1,50,000 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 of the components purchased.*

*A Japanese MNC which manufactures the same component 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 Chinese subsidiary to presents its views on this issue. The Chinese subsidiary of the SCI has informed that it will be able to 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 inland taxes @ 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:*

<b>Corporation Tax Rates</b>		<b>Currency Exchange Rates</b>	
<i>China</i>	<i>25%</i>	<i>1 US Dollar (\$)</i>	<i>= ₹61.50</i>
<i>India</i>	<i>34%</i>	<i>1 US Dollar (\$)</i>	<i>= ¥ 6.25</i>
<i>USA</i>	<i>40%</i>	<i>1 CNY (¥)</i>	<i>= ₹ 9.80</i>

**Required**

- (i) Prepare a financial appraisal for the impact of the proposal by the Japanese manufacturer to supply components for Printers and Scanners to Indian subsidiary of SCI. [Present your solution in Indian Currency and its 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 problem 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 $\{(1,50,000 \text{ units} \times ₹ 30) \times ₹ 9.80\}$	4,41,00,000
Add: Total Custom Duty $(₹ 4,41,00,000 \times 29.5\%)$	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 $(1,50,000 \text{ units} \times ₹ 320)$	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 $\{[(1,50,000 - 1,20,000 \text{ units}) \times ₹ (30 - 20)] \times ₹ 9.80\}$	29,40,000
Add: Inland taxes on Local Sale - Chinese Manufacturer $\{[(1,20,000 \text{ units} \times ₹ 30) \times 10\%] \times ₹ 9.80\}$	35,28,000
Total Loss Before Corporate Taxes	64,68,000
Less: Tax Savings on the Losses $(₹ 64,68,000 \times 25\%)$	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	48,51,000
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.

## Transfer Pricing – Miscellaneous

### Problem-16

*Fox-2-Tec Ltd (F2TL) has Division 'Dx' and Division 'Dz' with full profit responsibility. The Division 'Dx' produces Component 'X' which it sells to 'outside' customers only. The Division 'Dz' produces a product called the 'Z' which incorporates Component 'X' in its design. 'Dz' Division is currently purchasing 2,500 units of Component 'X' per year from an outside supplier at a cost of ₹ 35 per unit, less a 10 percent quantity discount. 'Dx' Division can sell its entire Component 'X' to outside customers at the normal ₹ 35 price. Costs associated with manufacturing of a unit of Component 'X' are as follows:*

<i>Variable Expenses</i>	<i>₹ 21</i>
<i>Fixed (based on a capacity of 25,000 units per year)</i>	<i>₹ 9</i>

*F2TL's new managing director agrees for internal transfer if an acceptable transfer price can be worked out. Accordingly, he requires solution of following questions:-*

- (i) *If the 'Dz' Division purchases 2,500 units of Component 'X' per year from the 'Dx' Division, what price should control the transfers? Why?*
- (ii) *Refer to your computations in (1). What is the lower limit and the upper limit for a transfer price? Is an upper limit relevant in this situation?*

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- (iii) If the 'Dx' Division meets the price that the 'Dz' Division is currently paying to its supplier and sells 2,500 units of Component 'X' to the 'Dz' Division each year, what will be the effect on the profits of the 'Dx' Division, the 'Dz' Division, and the company as a whole?
- (iv) If the intermediate market price for Component 'X' is ₹ 35 per unit, is there any reason why the 'Dx' Division should sell to the 'Dz' Division for less than ₹ 35? Explain.

### Solution

- (i) The transfer price should be ₹35 per unit, the regular price charged to other customers. Since the 'Dx' Division is operating at capacity, it will lose ₹14 in contribution margin for each outside sale given up in favor of sales to the 'Dz' Division ( $₹ 35 - ₹ 21 = ₹14$ ).

$$\begin{aligned}\text{Transfer Price} &= \text{Variable Cost per unit} + \text{Lost Contribution Margin per unit on} \\ &\quad \text{Outside Sales} \\ &= ₹21 + ₹14 \\ &= ₹35\end{aligned}$$

- (ii) The lower limit is ₹35, the price obtained in (1). The upper limit is also ₹35, since ₹35 is the intermediate market price. That is, it would not be fair to charge the other Division more than the price being charged to regular customers. However, an upper limit is not really relevant in this situation since no transfers will be made between the two Divisions.
- (iii) The price being paid to the outside supplier, net of the quantity discount, is only ₹31.50. If this price is met by the 'Dx' Division, then profits in the 'Dx' Division and in the company as a whole will drop by ₹8,750 per year.

Minimum Transfer Price	₹35
Outside Supplier's Price	<u>₹31.50</u>
Loss in Contribution Margin <i>per unit</i>	₹3.50
No. of units <i>per year</i>	<u>2,500</u>
Total Loss in Profits	<u>₹8,750</u>

Profits in the 'Dz' Division will remain unchanged, since it will be paying the same price internally as it is now paying externally.

- (iv) Yes, if costs can be avoided as a result of the inside business. The price would then be ₹35 less the avoided costs.

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### Problem-17

Division X and Y are two divisions of ZIOMI 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*

<b>Particulars</b>	<b>₹ In '000</b>
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?
- (iii) 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)
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) - (B)	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 <i>per component</i>	35.00
Relevant Cost for Transfer <i>per component</i> (from above)	26.80
Saving <i>per component</i>	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.

## Problem-18

A company has two Divisions, Division 'A' and Division 'B'. Division 'A' has a budget of selling 2,00,000 nos. of a particular component 'x' to fetch a return of 20% on the average assets employed. The following particulars of Division 'A' are also known:

Fixed Overhead.....	₹ 5 lakhs
Variable Cost.....	₹ 1 per unit
Average Assets:	
Sundry Debtors.....	₹ 2 lakhs
Inventories.....	₹ 5 lakhs
Plant & Equipments.....	₹ 5 lakhs

However, there is constraint in Marketing and only 1,50,000 units of the component 'x' can be directly sold to the Market at the proposed price.

It has been gathered that the balance 50,000 units of component 'x' can be taken up by Division 'B' Division 'A' wants a price of ₹ 4 per unit of 'x' but Division 'B' is prepared to pay ₹ 2 per unit of 'x'.

Division 'A' has another option in hand, which is to produce only 1,50,000 units of component 'x'. This will reduce the holding of assets by ₹ 2 lakhs and fixed overhead by ₹ 25,000.

**Required**

Advise the most profitable course of action for Division 'A'.

 Solution

## Working Notes

1. Profit = 20% Return on the Average Assets Employed  
 = 20% × ₹12,00,000  
 = ₹2,40,000
2. Desired Revenue  
 (on the Sale of 2,00,000 units of Component 'x')  
 = Fixed cost + Variable cost + Profit  
 = ₹ 5,00,000 + ₹ 2,00,000 + ₹ 2,40,000  
 = ₹ 9,40,000
3. Selling Price *per unit*  
 = Desired Revenue ÷ No. of units *to be sold* of Component 'x'  
 = ₹9,40,000 ÷ 2,00,000 units  
 = ₹4.70 *per unit*

## Advise About the Most Profitable Course of Action for Division A

Option – I: Sell, 1,50,000 units in Market and Transfer 50,000 units to Division B

Option – II: Sell only 1,50,000 units in Market

	Option – I (₹)	Option – II (₹)
Sales Revenue (1,50,000 units of Component 'x' @ ₹4.70 p.u) [W.N.-3]	7,05,000	7,05,000
Units of Component 'x' Transferred to Division B (@ ₹ 2/- p.u.) [under Option-I only]	1,00,000	---
Total Revenue	8,05,000	7,05,000
<i>Less: Cost Incurred</i>		
- Fixed Overhead	5,00,000	4,75,000
- Variable Overhead	2,00,000	1,50,000
Profit ... (A)	1,05,000	80,000
Capital Employed ... (B)	12,00,000	10,00,000
Return on Capital Employed ... (A) / (B) × 100	8.75%	8%

Since the Return on Capital Employed under Option – I is more than that under Option – II, therefore Option – 1 is preferred over Option – II. Selection of this Option also gives an extra Profit of ₹25,000/-.

### Problem-19

*AB Cycles Ltd. has two 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:*

<i>Estimated Selling Price of Final Product.....</i>	<i>₹ 3,000 per unit</i>
<i>Long Run Average Market Price of Sub-Assembly.....</i>	<i>₹ 2,000 per unit</i>
<i>Incremental Cost of Completing Sub-Assembly in Division B.....</i>	<i>₹ 1,500 per unit</i>
<i>Incremental Cost in Division A.....</i>	<i>₹ 1,200 per unit</i>

### Required

- If Division A's maximum capacity is 1,000 units 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?*



### Solution

- Two Options are Available

Option - (a)	(₹)
Sell at the Sub Assembly Stage (after completion of Division A)	2,000
Incremental Cost in Division A	1,200
Contribution	800
Option - (b)	(₹)
Sell at the Final Product Stage	3,000
Cost at Division A and Division B (₹1,200 + ₹1,500)	2,700
Contribution	300

Therefore it is profitable to sell at the sub assembly 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 200 units (1,000 units – 800 units) should be transferred to Division B and it should complete the assembly and sell as *final product*, as the Company can earn ₹300 per unit for each unit of such sale.

- (ii) If Division B receives the sub assembly 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 ₹500 per unit (₹3,500 – ₹3,000), whereas the Company makes a profit of ₹300 per unit.

In order to keep the manager of Division B motivated, the profit earned of ₹300 per unit should be *shared* between Division A and Division B. Hence transfer price will be variable cost of Division A + 50% of profit earned in the final product equals to ₹1,350 (₹1,200 + ₹150).

- (iii) Both Divisions 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 Division B.

#### Problem-20

*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:*

	<i>Division A</i> (₹) Per Unit	<i>Division B</i> (₹) Per Unit
<i>Direct Material Cost</i>	50	24*
<i>Material A, if transferred from Division A</i>	---	144
<i>Material A, if purchased from outside</i>	---	160
<i>Direct Labour</i>	25	14
<i>Variable Production Overhead</i>	20	2
<i>Variable Selling Overhead</i>	13	26
<i>Selling Price in outside market</i>	160	300
<i>Selling Price to B</i>	144	---
<i>Selling Price to S Ltd.</i>	---	250

(\*) other than A

*Other Information:*

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

Product A is available in the outside market at ₹ 160 per unit from competitors.

Division 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 Division B or none at all.

	Division A (units)	Division 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.

**Required**

Identify best strategy for:

- (i) Division A?
- (ii) Division B, given that Division A will use its best strategy?
- (iii) For X Ltd. as a whole?

 **Solution**
**Statement Showing "Contribution per unit"**

	Division A (₹ per unit)	Division B (If Product A is taken from Division A) (₹ per unit)	Division B (If Product A is purchased from outside market) (₹ per unit)
Direct Material (other than Product A)	50	24	24
Direct Labour	25	14	14
Variable Production Overhead	20	2	2
Variable Production Cost (excluding A)	95	40	40
- Product A (transferred from Division A)	---	144	---

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- Product A (purchased from outside market)	---	---	160
Variable Production Cost <i>per unit</i>	95	184	200
Selling Price (if sold in outside market)	160	300	300
Less: Variable Selling Overhead	(13)	(26)	(26)
Net Selling Price (if sold in outside market)	147	274	274
Less: Variable Production Cost	(95)	(184)	(200)
Contribution <i>per unit</i> (if sold in outside market)	52	90	74
Selling Price (if sold to Division B and S Ltd. respectively)	144	250	250
Less: Variable Production Cost	(95)	(184)	(200)
Contribution <i>per unit</i>	49	66	50

- (i) **Best Strategy for Division A:** Division A should produce at its full capacity of 20,000 units and sell 18,000 units to the outside market and remaining 2,000 units to Division B. The total contribution for Division A will be as calculated below:

**Total Contribution**

	(₹)
Sell to Outside Market (18,000 units × ₹52)	9,36,000
Sell to Division B (2,000 units × ₹49)	98,000
<b>Total Contribution</b>	<b>10,34,000</b>

- (ii) **Best Strategy for Division B when Division A will use its Best Strategy:** Division B will procure 2,000 units from Division A and balance units by choosing best option from the two options calculates as below:

Option-I: Sell 6,000 units to S Ltd. And 22,000 units to Outside Market

Option-II: Only to Outside Market Sale

*Production Capacity - 28,000 units*

Option-I	(₹)	Option- II	(₹)
Sales to Outside Market: (20,000 units × ₹74 + 2,000 units × ₹90)	16,60,000	Sales to Outside Market: (24,000 units × ₹74 + 2,000 units × ₹90)	19,56,000
Sales to S Ltd.: (6,000 units × ₹50)	3,00,000	Sales to S Ltd.:	---
<b>Total</b>	<b>19,60,000</b>	<b>Total</b>	<b>19,56,000</b>

Division B should produce at full capacity and choose option- I i.e. get 2,000 units from Division A, sell 6,000 units to S Ltd. and 20,000 units to outside market. Total contribution to Division B will be ₹19,60,000.

- (iii) If Division A and B are allowed to act independent of the group synergy, total contribution to X Ltd. will be-

	(₹)
Division A	10,34,000
Division B	<u>19,60,000</u>
Total Contribution for X Ltd.	29,94,000

**Cost from X Ltd.'s Perspective**

	If 'A' made in Division A (₹)	If 'A' purchased from outside market (₹)
Variable Cost of Production in Division A	95	---
Variable Cost of Production in Division B	40	40
Purchase Cost from Outside	---	160
<b>Total</b>	<b>135</b>	<b>200</b>

Option-I	(₹)	Option- II	(₹)
Sales to Outside Market: [20,000 units × (₹274 – ₹135) + 2,000 units × (₹274 – ₹200)]	29,28,000	Sales to Outside Market: [20,000 units × (₹274 – ₹135) + 6,000 units × (₹274 – ₹200)]	32,24,000
Sales to S Ltd.: [6,000 units × (₹250 – ₹200)]	3,00,000	Sales to S Ltd.:	---
<b>Total</b>	<b>32,28,000</b>	<b>Total</b>	<b>32,24,000</b>

Choose Option-I, where X Ltd. earns a contribution of ₹32,28,000. At this option Division A transfers all products i.e. 20,000 units to Division B and Division B transfers 6,000 units to S Ltd and 22,000 units to the outside market. Division B purchases 2,000 units of Product - A from the outside market.

At this option X Ltd earns ₹2,34,000 more than the Division A & B's individual earnings i.e. ₹32,28,000 – ₹29,94,000.

**Problem-21**

Hardware Ltd. manufactures computer hardware products in different divisions which operate as profit centers. 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 units 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.

	<i>Printer Division</i> (₹ '000)	<i>Component Division</i> (₹ '000)
<i>Sales Revenue</i>	6,000	6,400
<i>Manufacturing Cost</i>		
<i>Component</i>	1,050	-
<i>Other Direct Materials, Direct Labour &amp; Variable Overhead</i>	1,680	1,920
<i>Fixed Overhead</i>	480	704
<i>Variable Marketing Costs</i>	270	384
<i>Fixed Marketing and Administration Overhead</i>	855	704
<i>Operating Profit</i>	1,665	2,688

**Required**

- (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?

 Solution

(Amount in ₹)

Particulars	Printer Division			Component Division	
	Existing Price	Reduction in Selling Price	If Component is Purchased Internally	Existing	If Transfer Effected
Selling Price	400	380	380	100	50
Less: Component Cost	70	70	50	-	-
Less: Other Direct Materials, Direct Labour & Variable Overhead	112	112	112	30	28.50
Less: 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	30,00,000	31,32,000	34,80,000	40,96,000	3,74,100
Volume Lost in the Market (units)					6,400*
Contribution Lost (6,400 units × ₹64)					4,09,600

(\*) 17,400 units – Spare Capacity i.e. 11,000 units (75,000 units – 64,000 units)

- (i) Yes, Printer Division should reduce price of its Printer by ₹20, as there is an increment in net income by ₹1,32,000 (₹31,32,000 – ₹30,00,000). Incremental operating profit can be found in the as below:

	(₹)
Contribution Margin of Sales increase (₹180 × 2,400 units)	4,32,000

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<i>Less: Loss in Contribution Margin on Original Volume arising</i>	
<i>from decrease in Selling Price (15,000 units × ₹20)</i>	<u>3,00,000</u>
Increase in Operating Profit	<u>1,32,000</u>

- (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 Division, 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 by ₹35,500. Supporting calculations are as follows:

	(₹)
Contribution from Sales to Printer (₹21.50 × 17,400 units)	3,74,100
<i>Less: Loss in Contribution from Loss of Sales to outsiders (₹64 × 6,400 units)</i>	<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.

<b>Total Company</b>	(₹ '000)
Incremental Contribution- If the component is transferred within ₹ (3,480 – 3,132)	348.00
Contribution to the Component Division	<u>374.10</u>
Total incremental Contribution	722.10
<i>Less: Contribution Lost by the Component Division</i>	<u>409.60</u>
Net Contribution Gain	<u>312.50</u>

### Problem-22

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)</i> <i>(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

Existing capacity (no. of units)	6,000	3,000	3,000
Maximum external Market demand (no of units)	5,000	5,500	5,000
Additional fixed cost that would be incurred to install additional capacity (₹)	45,000	9,000	23,100
Maximum additional units that can be produced by additional capacity	6,000	2,000	2,250

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.

### Required

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
	Sale to Outside	Internal Transfer to		Purchase from Outside	Transfer from X	Transfer from X
		Y	Z			
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

## 7.65 Advanced Management Accounting

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	5,500 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 × ₹ 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
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 &amp; 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 organisation 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 their activity by incurring additional fixed cost on expansion.

## SECTION - C

### Transfer Pricing- Basic Concepts

#### Problem-1

*G is the transferring division and R, the receiving division in a company. R has a demand for 20% of G's production capacity which has to be first met as per the company's policy. State with reason, which division, G or R enjoys more advantage in each of the following independent situations, assuming no inventory build up.*

Sl. No.	G Transfers to R at Transfer Price equal to	G's Production level	External Demand	Division having more advantage	Reason
(i)	Full cost: No markup	60%	40%		
(ii)	Market Price	80%	60%		
(iii)	Marginal Cost	100%	80%		
(iv)	Market Price	100%	90%		

#### Solution

Sl. No.	Division (More Advantage)	Reason
(i)	G	G is utilizing only 40% of production capacity by selling to 'External Market' which implies that G might have not been able to recover its full fixed costs. By transferring 20% of its production capacity to division R at full cost, G will be able to recover fixed costs components.
(ii)	G	G will not be loosing any external market demand as it is within its production capacity. By transferring 20% of production capacity to division R at market price, G will earn extra contribution towards the fixed costs and profit.
(iii)	R	Here G is operating at 100% capacity level and external market demand is 80% only i.e. G is not loosing any external market demand. But by transferring 20% of production capacity to R at marginal cost i.e. at variable cost, G may not be able to recover fixed cost part of total cost. On the other hand R will be able to get these units at marginal cost only.
(iv)	G	Though G is loosing its 10% of external market demand but it would be able to earn the same revenue by transferring the goods to division R at market price. Moreover G will be able to utilize 100% of its production capacity.

## Optimal Decision Making Vs Performance Evaluation

### Problem-2

*Global Multinational Ltd. (GML) has two Divisions 'Dx' and 'Dz' with full profit responsibility. The Division 'Dx' produces Component 'X' which it sells to 'outside' customers only. The Division 'Dz' produces a product called the 'Z' which incorporates Component 'X' in its design. 'Dz' Division is currently purchasing required units of Component 'X' per year from an outside supplier at market price.*

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

*Manager of Division 'Dx' 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 'Dx' will not induce managers of both Divisions to make optimum decisions.*

*You are requested to help him out of the problem.*



### 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 Rate 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 'Dx' should be allowed to record the transactions at **full cost per unit plus a profit margin**. On the other hand Division 'Dz' may be charged only **marginal cost**. Any inter divisional profits can be eliminated by accounting adjustment.

#### Impact:

- Division 'Dx' will earn a profit on inter-division transfers.
- Division 'Dz' can chose the output level at which the marginal cost of the product 'X' is equal to the net marginal revenue of the product 'Z'.

### Two Part Transfer Pricing System

*“The ‘Two Part Transfer Pricing System’ involves 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 ‘Dx’ can transfer its products to Division ‘Dz’ at *marginal cost per unit* and *a lump-sum fixed fee*.

#### Impact:

- ‘Two Part Transfer Pricing System’ will inspire the Division ‘Dz’ to choose the optimal output level.

This pricing system also enable the Division ‘Dx’ to obtain a profit on inter-division transfer.

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