

### Model Solution

**Answer to the Q. No. 1.**

(i)

The Tk 2.80 per drum general overhead cost is not relevant to the decision, since this cost will be the same regardless of whether the company decides to make or buy the drums. Also, the present depreciation figure of Tk 1.60 per drum is not a relevant cost, since it represents a sunk cost (in addition to the fact that the old equipment is worn out and must be replaced). The cost of supervision is relevant to the decision, since this cost can be avoided by buying the drums.

	Differential Costs Per Drum		Total Differential Costs— 60,000 Drums	
	Make	Buy	Make	Buy
Outside supplier's price .....		Tk 18.00		Tk 1,080,000
Direct materials .....	Tk 10.35		Tk 621,000	
Direct labor (Tk 6.00 × 70%) .....	4.20		252,000	
Variable overhead (Tk 1.50 × 70%) .....	1.05		63,000	
Supervision .....	0.75		45,000	
Equipment rental (Tk 135,000 ÷ 60,000 drums)	<u>2.25</u>	<u>      </u>	<u>135,000</u>	<u>      </u>
Total cost .....	<u>Tk 18.60</u>	<u>Tk 18.00</u>	<u>Tk 1,116,000</u>	<u>Tk 1,080,000</u>
 Difference in favor of buying .....		<u>Tk 0.60</u>		<u>Tk 36,000</u>

(ii)

(a)

Notice that unit costs for both supervision and equipment rental decrease with the greater volume since these fixed costs are spread over more units.

	Differential Cost Per Drum		Total Differential Cost— 75,000 Drums	
	Make	Buy	Make	Buy
Outside supplier's price .....		Tk 18.00		Tk 1,350,000
Direct materials .....	Tk 10.35		Tk 776,250	
Direct labor .....	4.20		315,000	
Variable overhead .....	1.05		78,750	
Supervision (Tk 45,000 ÷ 75,000 drums) ..	0.60		45,000	
Equipment rental (Tk 135,000 ÷ 75,000 drums)	<u>1.80</u>	<u>      </u>	<u>135,000</u>	<u>      </u>
Total cost .....	<u>Tk 18.00</u>	<u>Tk 18.00</u>	<u>Tk 1,350,000</u>	<u>Tk 1,350,000</u>
 Difference .....		<u>Tk 0</u>		<u>Tk 0</u>

The company would be indifferent between the two alternatives if 75,000 drums were needed each year.

(b)

Again, notice that the unit costs for both supervision and equipment rental decrease with the greater volume of units.

	Differential Costs Per Drum		Total Differential Cost— 90,000 Drums	
	Make	Buy	Make	Buy
Outside supplier's price .....		Tk 18.00		Tk 1,620,000
Direct materials .....	Tk 10.35		Tk 931,500	
Direct labor.....	4.20		378,000	
Variable overhead .....	1.05		94,500	
Supervision (Tk 45,000 ÷ 90,000 drums)..	0.50		45,000	
Equipment rental (Tk 135,000 ÷ 90,000 drums)	<u>1.50</u>	<u>      </u>	<u>135,000</u>	<u>      </u>
Total cost .....	<u>Tk 17.60</u>	<u>Tk 18.00</u>	<u>Tk 1,584,000</u>	<u>Tk 1,620,000</u>
Difference in favor of making .....		<u>Tk 0.40</u>		<u>Tk 36,000</u>

The company should purchase the new equipment and make the drums if 90,000 units per year are needed.

(iii)

Other factors that the company should consider include:

- (a) Will volume in future years be increasing, or will it remain constant at 60,000 units per year? (If volume increases, then renting the new equipment becomes more desirable, as shown in the computations above.)
- (b) Can quality control be maintained if the drums are purchased from the outside supplier?
- (c) Will costs for materials and labor increase in future years, thereby increasing the cost of making the drums?
- (d) Will the outside supplier be dependable in meeting shipping schedules?
- (e) Can the company begin making the drums again if the supplier proves to be undependable, or are there alternative suppliers?
- (f) What is the labor outlook in the supplier's industry (e.g., are frequent labor strikes likely)?
- (g) If the outside supplier's offer is accepted and the need for drums increases in future years, will the supplier have the added capacity to provide more than 60,000 drums per year?

**Answer to the Q. No. 2.**

(i) (1)

Supporting computations:

Number of pads manufactured each year:

$$38,400 \text{ labor-hours} \div 2.4 \text{ labor-hours per pad} = 16,000 \text{ pads.}$$

Selling, general, and administrative expenses:

Variable (16,000 pads × Tk 9 per pad) .....	Tk 144,000
Fixed .....	<u>732,000</u>
Total .....	<u>Tk 876,000</u>

$$\begin{aligned}
 \text{Markup percentage on absorption cost} &= \frac{(\text{Required ROI} \times \text{Investment}) + \text{SG\&A expenses}}{\text{Unit sales} \times \text{Unit product cost}} \\
 &= \frac{(24\% \times \$1,350,000) + \$876,000}{16,000 \text{ pads} \times \$60 \text{ per pad}} \\
 &= \frac{\$1,200,000}{\$960,000} = 125\%
 \end{aligned}$$

**## Alternative Solution:**

Supporting computations:

Number of pads manufactured each year:

$$38,400 \text{ labor-hours} \div 2.4 \text{ labor-hours per pad} = 16,000 \text{ pads.}$$

Selling, general, and administrative expenses:

Variable (16,000 pads × Tk 9 per pad) .....	Tk 144,000
Fixed .....	732,000
Total .....	<u>Tk 876,000</u>

Calculation of markup price :

Let X = Mark up price

$$(16,000 \times X) - (16,000 \times 60) - 876,000 = (1,350,000 \times 24\%)$$

$$\text{Or } X = 2,160,000 \div 16,000 = \text{Tk. } 135$$

$$\text{Mark up \% on standard cost} = (135 - 60) \div 60 = 1.25 \text{ or } 125\%$$

(2)

Direct materials .....	Tk 10.80
Direct labor .....	19.20
Manufacturing overhead .....	<u>30.00</u>
Unit product cost .....	60.00
Add markup: 125% of unit product cost .....	<u>75.00</u>
Selling price .....	<u><u>Tk 135.00</u></u>

(3)

The income statement will be:

Sales (16,000 pads × Tk 135 per pad) .....	Tk 2,160,000
Less cost of goods sold (16,000 pads × Tk 60 per pad) .....	<u>960,000</u>
Gross margin .....	1,200,000
Less selling, general, and admin. expenses:	
Sales commissions .....	Tk 144,000
Salaries .....	82,000
Warehouse rent .....	50,000
Advertising and other .....	<u>600,000</u>
Total selling, general, and admin. expense .....	<u>876,000</u>
Net operating income .....	<u><u>Tk 324,000</u></u>

The company's ROI computation for the pads will be:

$$\text{ROI} = \frac{\text{Net Operating Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average Operating Assets}}$$

$$= \frac{\$324,000}{\$2,160,000} \times \frac{\$2,160,000}{\$1,350,000}$$

$$= 15\% \times 1.6 = 24\%$$

(ii) Variable cost per unit:

Direct materials.....	Tk 10.80
Direct labor .....	19.20
Variable manufacturing overhead (1/5 × Tk 30).....	6.00
Sales commissions .....	9.00
Total	<u>Tk 45.00</u>

If the company has idle capacity and sales to the retail outlet would not affect regular sales, any price above the variable cost of Tk 45 per pad would add to profits. The company should aggressively bargain for more than this price; Tk 45 is simply the rock-bottom floor below which the company should not go in its pricing.

### Answer to the Q. No. 3.

Before a cash budget can be prepared, the following supporting computations must be made:

#### **Cash payments for crossbow purchases:**

	February	March	April	May	June	July
Budgeted sales	Tk 2,000,000	Tk 1,800,000	Tk 2,200,000	Tk 2,500,000	Tk 2,800,000	Tk 3,000,000
Cost of crossbows (50%)	1,000,000	900,000	1,100,000	1,250,000	1,400,000	1,500,000
<b>Crossbow purchases:</b>						
For next month's sales*	540,000	660,000	750,000	840,000	900,000	
For this month's sales**	400,000	360,000	440,000	500,000	560,000	
Total cost of purchases	Tk 940,000	Tk 1,020,000	Tk 1,190,000	Tk 1,340,000	Tk 1,460,000	

#### **Payments for purchases:**

February purchases: (940,000 × 20%)			Tk 188,000			
March purchases: (1,020,000 × 80%, 20%)			816,000	Tk 204,000		
April purchases: (1,190,000 × 80%, 20%)				952,000	Tk 238,000	
May purchases: (1,340,000 × 80%)					1,072,000	
Total cash payments			Tk 1,004,000	Tk 1,156,000	Tk 1,310,000	

\* 60% of next month's sales.

\*\* 40% of this month's sales.

#### **General and administrative expenses:**

	February	March	April	May	June	July
Salaries (1/12 of annual) .....			Tk 40,000	Tk 40,000	Tk 40,000	
Promotion (1/12 of annual).....			55,000	55,000	55,000	
Property taxes (1/4 of annual) ..			—	—	60,000	
Insurance (1/12 of annual) .....			30,000	30,000	30,000	
Utilities (1/12 of annual) .....			25,000	25,000	25,000	
Depreciation (non-cash item) ....			—	—	—	
Total cash payments.....			Tk 150,000	Tk 150,000	Tk 210,000	

#### **Income tax expense:**

Note that Tk 612,000 is the company's net income; the income before tax would be: Tk 612,000 ÷ 0.60 = Tk 1,020,000. Thus, the income tax would be: Tk 1,020,000 × 0.40 = Tk 408,000.

#### **Cash receipts from sales:**

	April	May	June	Quarter
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February sales: Tk 2,000,000 × 40%.....	Tk 800,000			Tk 800,000
March sales: Tk 1,800,000 × 60%, 40%.....	1,080,000	Tk 720,000		1,800,000
April sales: Tk 2,200,000 × 60%, 40% .....		1,320,000	Tk 880,000	2,200,000
May sales: Tk 2,500,000 × 60% .....			1,500,000	1,500,000
Total cash receipts .....	Tk 1,880,000	Tk 2,040,000	Tk 2,380,000	Tk 6,300,000

Given the above data, the cash budget can be prepared as follows:

	April	May	June	Quarter
Cash balance, beginning.....	Tk 100,000	Tk 100,000	Tk 100,000	Tk 100,000
Add cash receipts.....	1,880,000	2,040,000	2,380,000	6,300,000
Total cash available .....	1,980,000	2,140,000	2,480,000	6,400,000
Less cash disbursements:				
Crossbow purchases .....	1,004,000	1,156,000	1,310,000	3,470,000
Wages (20% of sales).....	440,000	500,000	560,000	1,500,000
General and administrative.....	150,000	150,000	210,000	510,000
Income taxes .....	408,000	—	—	408,000
Equipment and facilities .....	28,000	324,000	—	352,000
Total disbursements .....	2,030,000	2,130,000	2,080,000	6,240,000
Excess (deficiency) of cash available over disbursements.....	(50,000)	10,000	400,000	160,000
Financing:				
Borrowings .....	150,000	90,000	—	240,000
Repayments.....	—	—	(240,000)	(240,000)
Interest .....	—	—	(8,000)	(8,000)
Invested funds .....	—	—	(52,000)	(52,000)
Total financing .....	150,000	90,000	(300,000)	(60,000)
Cash balance, ending .....	Tk 100,000	Tk 100,000	Tk 100,000	Tk 100,000

**Answer to the Q. No. 4(a).**

Full cost is charged under absorption costing. We deduct closing inventory from cost of goods manufactured in the time of calculation cost of goods sold. thus a portion of fixed cost transferred to next period through closing inventory. By transferring fixed cost to the next period, profit can be increased without increasing sales.

**Answer to the Q. No. 4(b).**

**(i) (1)**

Aleya Ltd. Comparative Income Statement under Absorption Costing		
Particulars	2015	2016
	Tk.	Tk.
Sales ( 1,40,000 x 5) / (1,60,000 x 5)	7,00,000	8,00,000
Direct material (1,70,000 x 130) / (1,40,000 x 1.30)	2,21,000	1,82,000
Direct labour (1,70,000 x 1.5) / (1,40,000 x 1.5)	2,55,000	2,10,000
Variable overhead (1,70,000 x .20) / (1,40,000 x .20)	34,000	28,000
Fixed factory overhead (1,70,000 x 1) / (1,40,000 x 1)	1,70,000	1,40,000
Cost of goods manufactured	6,80,000	5,60,000
Add Beginning inventory (30,000 x 4)	-	1,20,000
Cost of goods available	6,80,000	6,80,000
Closing inventory	1,20,000	40,000
Cost of goods sold	5,60,000	6,40,000
Over and under recovered of F/Overhead	(20,000)	10,000
Adjusted cost of goods sold	5,40,000	6,50,000
Gross Margin	1,60,000	1,50,000
Less Fixed selling & administration expenses	65,000	65,000
	95,000	85,000
Less sales commission 4%	28,000	32,000
Net operating income	67,000	53,000

(2)

## Aleya Ltd. Comparative Income Statement under variable Costing

Particulars	2015	2016
	Tk.	T k.
Sales	7,00,000	8,00,000
Direct material (1,70,000 × 1.30) / (1,40,000 × 1.30)	2,21,000	1,82,000
Direct labour (1,70,000 × 1.5) / (1,40,000 × 1.5)	2,55,000	2,10,000
Variable factory overhead	34,000	28,000
Variable cost of goods manufactured	5,10,000	4,20,000
Add: Beginning Inventory	-	90,000
Less: Ending Inventory	5,10,000	5,10,000
	90,000	30,000
Variable cost of goods sold	4,20,000	4,80,000
Sales commission	28,000	32,000
Total variable costs	4,48,000	5,12,000
Contribution Margin	2,52,000	2,88,000
Less: Fixed cost	2,15,000	2,15,000
Net Operating Income	<u>37,000</u>	<u>73,000</u>

Workings:

Fixed selling & administrative expenses	65,000	65,000
Fixed overhead	<u>1,50,000</u>	<u>1,50,000</u>
	<u>2,15,000</u>	<u>2,15,000</u>

(ii)

## Aleya Ltd. Statement Showing Reconciliation of Profit

Particulars	2015	2016
	Tk.	Tk.
Profit as per Absorption Costing	67,000	53,000
Profit as per Direct Costing	37,000	73,000
Profit increase/ (decrease); Difference to be explained	<u>30,000</u>	<u>( 20,000)</u>
Ending Inventory (Units)	30,000	10,000
Beginning Inventory (Units)	-	30,000
Ending Inventory Increase/ (Decrease) {Units}	30,000	(20,000)
Fixed Overhead (1,50,000 ÷ 1,50,000) per unit	Tk. 1	Tk. 1
Profit Increase/ (Decrease)	<u>Tk. 30,000</u>	<u>Tk. (20,000)</u>

**Answer to the Q. No. 5(b).**

(i)

The 2015 sales mix in units is 1:2 (70,000 tape recorders; 140,000 electronic calculators).

Let: x = Number of tape recorders to breakeven

2x = Number of electronic calculators to break even

At breakeven:

Sales = Variable cost + Fixed cost

Tk. 15x + 2 (Tk.22.50x) = Tk.8x + 2 (Tk.9.50x) + Tk.1,320,000

Tk.15x + Tk.45x = Tk. 8x + Tk.19x + Tk.1,320,000

Tk.60x = Tk.27x + Tk.1,320,000

Tk.33x = Tk.1,320,000

x = 40,000 tape recorders

2x = 80,000 electronic calculators

Fixed costs:

Factory overhead..... Tk.280,000

Marketing and administrative..... 1,040,000

Total ..... Tk. 1,320,000

(ii)

The following formula can be used to calculate the sales amount required to earn an after tax profit of 9% on sales, using 2016 estimates:

$S = VC(S) + FC + P(S) / 1 - T$

Where:

S = Necessary sales amount

VC = Variable cost stated as a percentage of sales amount (S) as per W-1

FC = Fixed cost (as per W-2)

P = Desired profit stated as a percentage of sales amount (S)

T = Income tax rate

$S = .46S + Tk.1,377,000 + .09(S) / 1 - .55$

$S = .46S + Tk. 1,377,000 + .2S$

$.34S = Tk.1,377,000$

$S = Tk.4,050,000$

W-1: Variable cost rate for tape recorders and electronic calculators:

	Tape recorder		Electronic calculators	
	Per unit	%	Per unit	%
Sales	Tk. 15	100	Tk. 20	100
Variable costs:				
Materials.....	3.6		3.6	
Direct labor.....	2.2		3.3	
Factory, overhead.....	<u>2.0</u>		<u>2.0</u>	
Total variable cost.....	<u>7.8</u>	52%	<u>8.9</u>	44.5%
Contribution margin.....	<u>7.2</u>	48%	<u>11.1</u>	55.5%

Composite variable cost rate per dollar of sales:

$(.20 \times \text{Tape recorder variable cost rate}) + (.80 \times \text{Calculator variable cost rate}) = .20 (.52) + .80 (.445) = .104 + .356 = .46$

W-2: Fixed costs: Factory overhead..... Tk. 280,000

Marketing and administrative..... 1,040,000

Additional advertising..... 57,000

Total..... 1,377,000

### Alternative calculation

Sales price :

Tape recorders Tk. 15

Electronic Calculators Tk. 20

Variable Cost :

Tape Recorder =  $(4 \times .80) + (2 \times 1.10) + 2 =$  Tk. 7.80

Electronic Calculators =  $(4.50 \times .80) + (3 \times 1.10) + 2 =$  Tk. 8.90

Fixed Cost : 1,320,000 + 57,000 + 1,377,000

New sales mix 1:3

Let sales of Tape Recorders = x numbers

Sales of Electronic Calculators = 3x numbers

Now,

$$(x \times 15) + (3x \times 20) - (x \times 7.80) - (3x \times 8.90) - 1,377,000 = [(x \times 15 + 3x \times 20) \times .09] / (1 - .55)$$

$$\text{Or, } 40.5x - 1,377,000 = 15x$$

$$\text{Or, } x = 54,000$$

Sales of Tape Recorder 54,000 \* Tk. 15 = 8,10,000

Sales of Electric Calculators 54,000 \* 3 \* Tk. 20 = 3,240,000

Total = Tk. 4,050,000

(iii)

Let: x = Number of tape recorders to break even

3x = Number of electronic calculators to break even

At breakeven:

Sales = Variable cost + Fixed cost

$$\text{Tk. } 15x + 3(\text{Tk. } 20x) = \text{Tk. } 7.80x + 3(\text{Tk. } 8.90x) + \$1,377,000$$

$$\text{Tk. } 15x + \text{Tk. } 60x = \text{Tk. } 7.80x + \text{Tk. } 26.70x + \text{Tk. } 1,377,000$$

$$\text{Tk. } 75x = \text{Tk. } 34.50x + \text{Tk. } 1,377,000$$

$$\text{Tk. } 40.50x = \text{Tk. } 1,377,000$$

$$x = 34,000 \text{ tape recorders}$$

$$3x = 102,000 \text{ electronic calculators}$$