
Answers

1 T Co

(a) Cost statement

	\$	Note
Lunch	0	1
Engineers' costs	500	2
Technical advisor	480	3
Site visits	0	4
Training costs	125	5
Handsets	2,184	6
Control system	7,600	7
Cable	1,300	8
Total cost	<u>12,189</u>	

Notes

Note 1: Lunch

This past cost is a 'sunk cost' and should therefore be excluded from the cost statement. It has already arisen and is therefore not incremental.

Note 2: Engineers' costs

Since one of the engineers has spare capacity, the relevant cost of his hours is Nil. This is because relevant costs must arise as a future consequence of the decision, and since his wage will be paid regardless of whether he now works on the contract for Push Co, it is not an incremental cost.

The situation for the other two engineers is slightly different. Their time is currently fully utilised and earning a contribution of \$5 per hour each. This is after deducting their hourly cost which, given a salary of \$4,000 per month each, is \$25 per hour ($\$4,000/4 \times 40$). However, in one week's time – when they would otherwise be idle – they can complete Contract X and earn the contribution anyway. Therefore, the only relevant cost is the penalty of \$500 that will be payable for the delay on Contract X.

Note 3: Technical advisor

Since the advisor would have to work overtime on this contract, the relevant cost is the overtime rate of \$60 ($\40×1.5) per hour. This would total \$480 for the whole job.

Note 4: Site visits

This is a cost paid directly by Push Co to a third party. Since it is not a relevant cost for T Co, it has been excluded.

Note 5: Training costs

Since the trainer is paid a monthly salary irrespective of what work he does, this element of his cost is not relevant to the contract, since it is not incremental. However, the commission of \$125 will arise directly as a consequence of the decision and must therefore be included.

Note 6: Handsets

Although T Co has 80 of the 120 handsets required already in inventory, they are clearly in regular use in the business. Therefore, if the 80 are used on this contract, they will simply need to be replaced again. Consequently, the relevant cost for both the 40 that need to be bought and the 80 already in inventory is the current purchase price of \$18.20 each. $120 \times \$18.20 = \$2,184$.

Note 7: Control system

The historic cost of Swipe 1, \$5,400, is a 'sunk' cost and not relevant to this decision. However, since the company could sell it for \$3,000 if it did not use it for this contract, the \$3,000 is an opportunity cost here. The current market price for Swipe 1 of \$5,450 is totally irrelevant to the decision as T Co has no intention of replacing Swipe 1, since it was bought in error. In addition to the \$3,000, there is a modification cost of \$4,600, bringing the total cost of converting Swipe 1 to \$7,600. This is still a cheaper option than buying Swipe 2 for \$10,800, therefore the company would choose to do the modification to Swipe 1. The cost of \$10,800 of a new Swipe 2 system is therefore irrelevant now.

Note 8: Cable

The cable is in regular use by T Co, therefore all 1,000 metres should be valued at the current market price of \$1.30 per metre. The \$1.20 per metre is a sunk cost and not relevant.

(b) Relevant costing principles

Relevant costs are those costs that change as a result of making a particular decision. In simple terms, a relevant cost is a future cash flow arising as a direct consequence of a decision. In order for a cost to be relevant to a decision, it must therefore meet all three of these criteria:

Future – any costs which have already been incurred are regarded as 'sunk' costs and will prevent a cost from being considered relevant.

Cash flow – the cost must be a cash flow and not just an accounting adjustment, such as a provision for a debt or depreciation. Also, cash flows that are the same for all alternatives are not relevant.

Direct consequence – this criteria means that the cash flow must be incremental. For example, if a cost has already been committed to, then it will arise irrespective of whether the decision goes ahead. It will not therefore meet the 'direct consequence' criteria.

Opportunity cost – this is the value of the best alternative that is foregone as a result of making a decision. In the case of the telephone system that Push Co needs for the contract, the foregone sales proceeds of \$3,000 are an example of an opportunity cost since, by using the system for this contract, Push Co foregoes these sales proceeds.

Note: candidates would not be required to write all of this for the available marks.

Significance of minimum price calculated

The cost calculated in part (a) is a starting point only, showing the minimum cost that could be charged to the customer. If T Co charged this price, it would be no better or worse off than if it did not carry out the work, i.e. it would make no profit or loss. This means that T Co would not be rewarded for the risk that it takes in completing the work, unless some kind of a mark-up is also incorporated.

Also, other costs – such as the lunch of \$400 – whilst not incremental to the decision now, have been incurred. Ideally, therefore, T Co should seek to recover them.

It could also be that, for example, in one week's time, when the engineers are busy completing the delayed contract X, another opportunity comes up that the company has to reject because the engineers are busy on Contract X. Therefore, with hindsight, it would be seen that there was an opportunity cost associated with using the engineers on this work and delaying contract X.

Furthermore, none of the business's overheads have been considered in the cost statement and, in the long term, these would need to be covered.

It is clear, therefore, that the relevant cost calculated in part (a) is only a starting point for T Co to use when deciding how to price the contract. The purpose of accepting contracts is to make profit and increase shareholder wealth. This will only be done if a price higher than the relevant cost of the contract is charged. In setting this price, however, T Co also needs to give consideration to the fact that it hopes to attract future work from Push Co. The price needs to be attractive enough for the customer to return in the future.

2 Bath Co

(a) Profit statement

	Division A \$'000	Division B \$'000	Company \$'000
Sales revenue:			
External (1)	36,000	9,600	45,600
Inter-divisional transfers	0	6,000	
Total	<u>36,000</u>	<u>15,600</u>	<u>45,600</u>
Variable costs:			
External material costs (2)	(16,000)	(1,000)	(17,000)
Inter-divisional transfers (3)	(6,000)	0	
Labour costs (4)	<u>(3,600)</u>	<u>(3,000)</u>	<u>(6,600)</u>
Total	<u>(25,600)</u>	<u>(4,000)</u>	<u>(23,600)</u>
Fixed costs	<u>(7,440)</u>	<u>(4,400)</u>	<u>(11,840)</u>
Profit	<u>2,960</u>	<u>7,200</u>	<u>10,160</u>

Workings (\$'000)

(1) External sales

Div A: $80,000 \times \$450 = \$36,000$

Div B: $120,000 \times \$80 = \$9,600$

Div B: $80,000 \times \$75 = \$6,000$

(2) External material costs

Div A: $80,000 \times \$200 = \$16,000$

Div B: $200,000 \times \$5 = \$1,000$

(3) Inter-divisional transfers

Div A: $80,000 \times \$75 = \$6,000$

(4) Labour costs

Div A: $80,000 \times \$45 = \$3,600$

Div B: $200,000 \times \$15 = \$3,000$

(b) Bath Co's profit if transfer pricing is optimised

	Division A \$'000	Division B \$'000	Company \$'000
Sales revenue:			
External (1)	36,000	14,400	50,400
Internal sales (2)		1,300	
Total	<u>36,000</u>	<u>15,700</u>	<u>50,400</u>
Variable costs:			
External material costs (3)	(19,900)	(1,000)	(20,900)
Inter-divisional transfers (2)	(1,300)		
Labour costs	(3,600)	(3,000)	(6,600)
Total	<u>(24,800)</u>	<u>(4,000)</u>	<u>(27,500)</u>
Fixed costs	(7,440)	(4,400)	(11,840)
Profit	<u>3,760</u>	<u>7,300</u>	<u>11,060</u>

Note: A transfer price of \$65 has been used on the assumption that the company will introduce the policy discussed in (c). Provided that the transfer price is set between the minimum of \$20 (Division B's marginal cost) and \$65 (the cost to Division A of buying from outside the group), the actual transfer price is irrelevant in this calculation. The overall profit of the company will be the same.

Workings (\$'000)

(1) External sales

Div A: $80,000 \times \$45 = \$36,000$

Div B: $180,000 \times \$80 = \$14,400$

(2) Internal sales/inter-divisional transfers

$20,000 \times \$65 = \$1,300$

(3) Material costs

Div A: $60,000 \times \$265 + (20,000 \times \$200) = \$19,900$

Div B: $200,000 \times \$5 = \$1,000$

(c) Issues and suitable transfer price

Divisional managers' performance is assessed using a metric as decided by the company. This may simply be the profit for the period, or, depending on the type of responsibility centre being used, a metric such as residual income or return on capital employed. Whatever the metric being used, the division's profit figure is going to affect it and divisional managers are therefore going to be keen to maximise their individual profits. By focusing on individual decisions, divisional managers are often not aware of the impact of their decisions on the company as a whole. This would particularly be the case where a decision which is in the best interests of the company actually makes an individual division's performance look worse.

The transfer pricing system in place needs to take into account the behavioural impact of the prices being charged. Sometimes, this can mean that a 'dual transfer pricing system' needs to be introduced in order to ensure that divisional managers act in the interests of the company as a whole.

It can be seen from part (b) that the best decision for the company is that:

- Division A buys 60,000 sets of fittings from an outside supplier and buys the remaining 20,000 sets of fittings from Division B in order to ensure that Division B is working to full capacity.
- Division B sells as many sets of fittings as possible externally, at \$80 per set. Since the maximum external demand is 180,000 units, Division B sells the remaining 20,000 sets of fittings to Division A. The minimum transfer price that would be acceptable to Division B is its marginal cost of \$20 per unit, since it has spare capacity. However, if this transfer price is used, Division B becomes worse off than before the autonomy was given, and Division B's manager will not like this. As far as Division A is concerned, it will not want to pay more than the \$65 that it can buy from outside the group.

Bath Co's policy therefore needs to ensure that, firstly, Division A's manager is prepared to buy 20,000 sets of fittings from Division B and secondly, Division B is prepared to sell them at \$65 per set. Since it is in Division B's best interest to work to full capacity and the manager of Division B knows that Division A can obtain fittings for \$65 per set, it should not be difficult for B to agree to sell to A at this price. A policy of negotiated transfer prices would achieve this fairly quickly. However, the company also needs to have a policy that divisions buy internally first, where this would be in the best interests of the overall profitability of the company. This would ensure that Division A buys the 20,000 sets of fittings from Division B. This way, the overall profit of the company is maximised whilst also ensuring that divisional managers do not become demotivated.

3 (a) Objectives of a budgetary control system

- **To compel planning**
Budgeting makes sure that managers plan for the future, producing detailed plans in order to ensure the implementation of the company's long term plan. Budgeting makes managers look at the year ahead and consider the changes in conditions that might take place and how to respond to those changes in conditions.
- **To co-ordinate activities**
Budgeting is a method of bringing together the activities of all the different departments into a common plan. If an advertising campaign is due to take place in a company in three months' time, for example, it is important that the production department know about the expected increase in sales so that they can scale up production accordingly. Each different department may have its own ideas about what is good for the organisation. For example, the purchasing department may want to order in bulk in order to obtain bulk quantity discounts, but the accounts department may want to order in smaller quantities so as to preserve cash flow.
- **To communicate activities**
Through the budget, top management communicates its expectations to lower level management. Each department has a part to play in achieving the desired results of the company, and the annual budget is the means of formalising these expectations. The whole process of budget setting, whereby information is shared between departments, facilitates this communication process.
- **To motivate managers to perform well**
The budget provides a basis for assessing how well managers and employees are performing. In this sense, it can be motivational. However, if the budget is imposed from the top, with little or no participation from lower level management and employees, it can have a seriously demotivational effect. This is discussed further in part (b).
- **To establish a system of control**
Expenditure within any organisation needs to be controlled and the budget facilitates this. Actual results are compared to expected results, and the reasons for any significant, unexpected differences are investigated. Sometimes the reasons are within the control of the departmental manager and he/she must be held accountable; at other times, they are not.
- **To evaluate performance**
Often, managers and employees will be awarded bonuses based on achieving budgeted results. This makes more sense than evaluating performance by simply comparing the current year to the previous year. The future may be expected to be very different than the past as economic conditions change. Also, events happen that may not be expected to reoccur. For example, if weather conditions are particularly wet one year, a company making and selling umbrellas would be expected to make higher than usual sales. It would not be fair to assess managers against these historical sales levels in future years, where weather conditions are more normal.

(Other possible objectives include:

- **To delegate authority to budget holders**
A formal budget permits budget holders to make financial decisions within the specified limits agreed, i.e. to incur expenditure on behalf of the organisation.
- **To ensure achievement of the management's objectives**
Objectives are set not only for the organisation as a whole but also for individual targets. The budget helps to work out how these objectives can be achieved.)

(b) Participative budgeting

'Participative budgeting' refers to a budgeting process where there is some level of involvement from subordinates within the organisation, rather than budgets just being set by the top level of management.

There are various views about whether participative budgeting is more effective than other styles. Each of the objectives from part (a) is dealt with below, considering the extent to which participative budgeting helps to achieve this.

- **To compel planning**
Participative budgeting will compel planning. Although participation can take many forms, often it will take the form of bottom-up budgeting, whereby the participation starts at the lowest level of management and goes all the way up to the top. If this is the case, then planning is taking place at many levels, and should be more accurate than if it simply takes place at a high level, by individuals who are not familiar with the day to day needs of the business.
- **To co-ordinate activities**
Co-ordination of activities may become more time consuming if a participative style of budgeting is used. This is because, not only does there need to be co-ordination between departments but there also has to be co-ordination between the different levels of management within each department. The process should be cumbersome but also effective, with everyone knowing exactly what the plan is.
- **To communicate activities**
Communication will be particularly effective with participative budgeting, although how effective depends on the extent of the participation. If all levels of management are involved, from the bottom up, then all levels of management know what the plan is. However, the plan may change as different departments' budgets are reviewed together and the overall

budgeted profit compared to the top level management's expectations. Hence, it may be the case that those people involved in the initial budgets, i.e. lower level management, have to deal with their budgets being changed.

– **To motivate managers to perform well**

If managers play a part in setting the budget, they are more likely to think that the figures included in them are realistic. Therefore, they are more likely to try their best to achieve them. However, it may be that managers have built budgetary slack into their budgets, in an attempt to make themselves look good. Therefore, managers could end up performing less well than they would do had tougher targets been set by their superiors.

– **To establish a system of control**

In terms of establishing a system of control, it is largely irrelevant whether the budget setting process is a participative one or not. What is important is that actual results are compared to expected, and differences are investigated. This should happen irrespective of the budget setting process. Having said that, control is only really effective if the budgeted figures are sound. As stated above, whilst they are more likely to be realistic if a participative style of budgeting is used, the system is open to abuse in the form of budgetary slack.

– **To evaluate performance**

Managers will be appraised by comparing the results that they have achieved to the budgeted results. A participative budget will be an effective tool for this provided that participation is real rather than pseudo and provided that the managers have not built slack into their figures, which has gone uncorrected.

Note: candidates would not be required to write all of this for the available marks.

4 (a) Life cycle cost per unit

	\$
R & D costs	160,000
Product design costs	800,000
Marketing costs	3,950,000
Fixed production costs	1,940,000
Fixed distribution costs	240,000
Fixed selling costs	360,000
Administration costs	2,600,000
Variable manufacturing costs (100,000 x \$40 + 200,000 x \$42)	12,400,000
Variable distribution costs (100,000 x \$4 + 200,000 x \$4.50)	1,300,000
Variable selling costs (100,000 x \$3 + 200,000 x \$3.20)	940,000
Total costs	24,690,000

Therefore cost per unit = \$24,690,000/300,000 = \$82.30

(b) New life cycle cost

Total labour time for first 100 units:

$$y = ax^b$$

$$b = -0.0740005$$

$$\text{If } x = 100, \text{ then } y = 0.5 \times 100^{-0.0740005}$$

$$= 0.3556 \text{ hours per unit.}$$

$$\text{Therefore total hours for 100 units} = 35.56 \text{ hours}$$

Time for 99th unit

$$y = 0.5 \times 99^{-0.0740005}$$

$$= 0.3559 \text{ hours per unit.}$$

$$\text{Therefore total hours for 99 units} = 35.23 \text{ hours.}$$

$$\text{Therefore, time for 100th unit} = 35.56 \text{ hours} - 35.23 \text{ hours} = 0.33 \text{ hours}$$

Total labour cost over life of product:

Year 2

100 units at 0.3556 per unit	36 hours
99,900 at 0.33 hours per unit	32,967 hours
	33,003 hours
at \$24 per hour	\$792,072

Year 3	
200,000 at 0.33 per unit	66,000 hours
at \$26 per hour	<u>\$1,716,000</u>

Total revised life cycle cost

	\$
Therefore total labour cost	2,508,072
Other life cycle costs from (a)	24,690,000
Less labour cost included in (a)	(3,800,000)
(100,000 x 0.5 x \$24) + (200,000 x 0.5 x \$26)	<u>23,398,072</u>

Therefore cost per unit = \$23,398,072/300,000 = \$77.99

(c) Benefits of life cycle costing

- The visibility of ALL costs is increased, rather than just costs relating to one period. This facilitates better decision-making.
- Individual profitability for products is more accurate because of this. This facilitates performance appraisal and decision-making, and means that prices can be determined with better knowledge of the true costs.
- More accurate feedback can take place when assessing whether new products are a success or a failure, since the costs of researching, developing and designing those products are also taken into account.

Note: Other valid benefits would also be awarded marks.

5 (a) (i) Usage variance

	Std usage for actual output kgs	Actual usage kgs	Variance kgs	Std cost per kg \$	Variance \$
Honey	2,020	2,200	(180)	20	(3,600)
Sugar	1,515	1,400	115	30	3,450
Syrup	1,010	1,050	(40)	25	(1,000)
					<u>(1,150) A</u>

(ii) Mix variance

	Actual qty std mix kgs	Actual qty actual mix kgs	Variance kgs	Std cost per kg \$	Variance \$
Honey	2,066.67	2,200	(133.33)	20	(2,666.60)
Sugar	1,550	1,400	150	30	4,500
Syrup	1,033.33	1,050	(16.67)	25	(416.75)
					<u>1,416.65 F</u>

(iii) Yield variance

	Std quantity std mix kgs	Actual qty std mix kgs	Variance kgs	Std cost per kg \$	Variance \$
Honey	2,020	2,066.67	(46.67)	20	(933.40)
Sugar	1,515	1,550	(35)	30	(1,050)
Syrup	1,010	1,033.33	(23.33)	25	(583.25)
					<u>(2,566.65) A</u>

The method used above is a more simple method for calculating the mix and yield variances than the one shown below. However, in the method shown below, the individual variances for each material are also meaningful, whereas they are not in the method shown above. Since the question only asks for the total variances, students will be given credit for either method.

(ii) Mix variance

	Actual qnty std mix kgs	Actual qnty actual mix kgs	Variance kgs	budgeted WAC per kg	Std cost per kg \$	Difference	Variance \$
Honey	2,066.67	2,200	(133.33)	24.44	20	(4.44)	592.59
Sugar	1,550	1,400	150	24.44	30	5.56	833.33
Syrup	1,033.33	1,050	(16.67)	24.44	25	0.56	(9.26)
							<u>1,416.66</u> F

(iii) Yield variance

	Std usage for actual output kgs	Actual qnty actual mix kgs	Variance kgs		Variance \$
Honey	2,020	2,200	(180)	24.44	(4,400.00)
Sugar	1,515	1,400	115	24.44	2,811.11
Syrup	1,010	1,050	(40)	24.44	(977.78)
					<u>(2,566.67)</u> A

Budgeted weighted average cost

Honey	2,066.67	20	41,333.4	
Sugar	1,550	30	46,500	
Syrup	1,033.33	25	25,833.25	
		4,650	<u>113,666.65</u>	24.44

WAC = $\$113,666.65 / 4,650 \text{ kg} = \24.44

(b) (i) Expenditure variance

Cost driver rate = $\$52,800 / 330 = \160	
Expected cost therefore = $360 \times \$160$	\$57,600
Actual cost	<u>\$60,000</u>
Variance	<u>\$2,400</u> A

(ii) Efficiency variance

Expected no. of units per set up $264,000 / 330 = 800$	
Therefore expected no. of set ups for $320,000 = 320,000 / 800 =$	400
Actual number of set ups	<u>360</u>
Difference	<u>40</u> F
x standard rate per set up	<u>\$160</u>
Variance	<u>\$6,400</u> F

(c) Steps involved in activity based costing

- Identify the organisation's major activities.
- Collect the costs associated with each activity into cost pools.
- Identify the cost drivers i.e. those factors which give rise to the costs.
- Charge the costs to the products on the basis of the cost driver.

		<i>Marks</i>
1	(a) Costing statement	
	Lunch	1
	Engineer costs	3
	Technical advisor	1
	Site visits	1
	Training costs	2
	Handsets	2
	Control system	3
	Cable	1
		<hr/> 14
	(b) Explanation	
	Relevant costing	
	Future cost/sunk cost	1
	Cash flow not accounting adjustment	1
	Incremental	1
	Committed cost	1
	Opportunity cost	1
	Maximum	<hr/> 4
	Price to be charged	
	Doesn't incorporate profit	1
	Doesn't cover all costs	1
	Ignores fixed costs	1
	Contract X – engineer's time	1
	Starting point only	1
	Need to make a profit	1
	Need to attract future work	1
	Maximum for price	<hr/> 4
	Maximum for (b) overall	<hr/> 6
	Total marks	<hr/> 20 <hr/>

		<i>Marks</i>
2	(a) Profit statement	
	Sales revenue:	
	External	1
	Inter-divisional transfers	0.5
	External material costs	1
	Inter-divisional transfers	0.5
	Labour costs	1
	Fixed costs	1
	Profit	1
		<hr style="width: 100%; border: 0.5px solid black;"/> 6
(b)	Revised profit	
	External sales	1
	Inter-divisional transfers	1
	Material costs	2
	Internal transfers (materials)	1
	Labour costs	1
	Fixed costs	1
	Profit	1
	<hr style="width: 100%; border: 0.5px solid black;"/> 8	
(c)	Transfer price difficulties and policy	
	Each well-explained point on difficulties	1
	Maximum	4
	Well reasoned recommendation	4
	Maximum for (c) overall	6
	<hr style="width: 100%; border: 0.5px solid black;"/> 6	
	Total marks	<u>20</u>
3	(a) Objectives	
	Each objective	1.5
	Maximum	9
		<hr style="width: 100%; border: 0.5px solid black;"/> 9
	(b) Participative style of budgeting	
Explaining participative budgeting	2	
Each objective discussed in relation to it	1.5	
Maximum	11	
	<hr style="width: 100%; border: 0.5px solid black;"/> 11	
	Total marks	<u>20</u>

		<i>Marks</i>
4	(a) Life cycle cost	
	R & D costs	0.5
	Product design costs	0.5
	Marketing costs	0.5
	Fixed production costs	0.5
	Fixed distribution costs	0.5
	Fixed selling costs	0.5
	Administration costs	0.5
	Variable manufacturing costs	0.5
	Variable distribution costs	0.5
	Variable selling costs	0.5
	Total costs	0.5
	Cost per unit (correct figure)	0.5
		<u>6</u>
	(b) Revised life cycle cost	
	Time per unit for 100 units	1
	Total time of 100 units	1
	Time per unit for 99 units	1
	Total time of 99 units	1
	Time for 100th unit	1
	Total labour cost year 2	1
	Total labour cost year 3	1
	Carry forward life cycle costs from (a)	1
	Deduct original labour cost in (a)	1
	Revised cost per unit	1
		<u>10</u>
	(c) Benefits of life cycle costing	
	Per valid point made	1.5
	Maximum	4
	Total marks	<u><u>20</u></u>
5	(a) Material variances	
	(i) Usage variance	4
	(ii) Mix variance	4
	(iii) Yield variance	4
		<u>12</u>
	(b) Overhead variances	
	(i) Expenditure variance	3
	(ii) Efficiency variance	3
		<u>6</u>
	(c) ABC	
	Each step	0.5
	Maximum	2
	Total marks	<u><u>20</u></u>