

Performance Pillar

P2 – Performance Management

Examiner's Answers

SECTION A

Answer to Question One

(a)

- (i) The optimum selling price occurs where marginal cost = marginal revenue.

Marginal cost is assumed to be the same as variable cost. From the data it can be determined that the costs of direct materials and direct labour are wholly variable and total \$8 per unit. $[(\$200,000 + \$600,000) / 100,000]$

The overhead costs appear to be semi-variable and will be analysed using the High Low method:

	<i>Units</i>	<i>\$000</i>
High	200,000	1,460
Low	100,000	880
Difference	100,000	580

Thus the variable overhead cost per unit is $\$580,000 / 100,000 = \5.80 .

The total variable cost per unit is therefore \$13.80

- (ii) The price at which there is zero demand can be calculated to be $\$25 + ((150,000 / 25,000) \times \$1) = \$31$

There is a change in demand of 25,000 units for every \$1 change in selling price so the equation of the selling price is:

$$\$31 - 0.00004x$$

And thus the equation for marginal revenue is:

$$\$31 - 0.00008x$$

Equating marginal cost and marginal revenue gives:

$$13.80 = 31 - 0.00008x$$

$$-17.20 = -0.00008x$$

$$-17.2 / -0.00008 = x = 215,000$$

If $x = 215,000$ then the optimum selling price is:

$$\$31 - (0.00004 \times 215,000) = \$22.40$$

(b)

There are many reasons why this price may not be used (candidates are expected to explain two).

- There may be inaccuracies in the demand forecasts at different prices because the model assumes that demand is driven solely by price. In fact there are many different factors that influence demand; these include advertising, competitor actions and changing fashions / tastes.
 - The model also assumes that the relationship between price and demand is static whereas in reality it is regularly changing.
 - There may be inaccuracies in the determination of the marginal cost, the assumption that marginal cost equals variable cost may itself be invalid, but even if this is acceptable then the assumption that all variable costs vary with volume is unrealistic. Some of these costs may be driven by factors other than volume. Again there is an assumption the unit variable cost is unchanging once it has been determined.
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Answer to Question Two

(i) Growth Stage

Compared to the introduction stage the likely changes are as follows:

Unit selling prices

These are likely to be reducing for a number of reasons:

- The product will become less unique as competitors use reverse engineering to introduce their versions of the product
- PT may wish to discourage competitors from entering the market by lowering the price and thereby lowering the unit profitability
- The price needs to be lowered so that the product becomes attractive to customers in different market segments thus increasing demand to achieve growth in sales volume.

Unit production costs

These are likely to reduce for a number of reasons:

- Direct materials are being bought in larger quantities and therefore PT may be able to negotiate better prices from its suppliers thus causing unit material costs to reduce
- Direct labour costs may be reducing if the product is labour intensive due to the effects of the learning and experience curves
- Other variable overhead costs may be reducing as larger batch sizes reduce the cost of each unit
- Fixed production costs are being shared by a greater number of units.

(ii) Maturity Stage

Compared to the growth stage the likely changes are as follows:

Unit selling prices

These are unlikely to be reducing any longer as the product has become established in the market place. This is a time for consolidation and while there may be occasional offers to tempt customers to buy the product the selling price is likely to be fairly constant during this period.

Unit production costs

Direct material costs are likely to be fairly constant in this stage. They may even increase as the quantities required diminish compared to those required in the growth stage, with the consequential loss of negotiating power.

Direct labour costs are unlikely to be reducing any longer as the effect of the learning and experience curves has ended. Indeed the workers may have started working on the next product so that their attention towards this product has diminished with the result that direct labour costs may increase.

Overhead costs are likely to be similar to those of the end of the growth stage as optimum batch sizes have been established and are more likely to be used in this maturity stage of the product life cycle where demand is more easily predicted.

Answer to Question Three

Target Costing is a system that is used when the company is unable to dictate the selling price of its products and (like JYT) is forced to accept the market price of the item it is planning to market. Once the specification of the product has been completed, then the company determines the price that the market is prepared to pay for its product. This may be discovered by market research or by considering the prices of similar items that are already available. The company then subtracts its profit target from this price to determine its cost target. If the expected product costs already meet the target cost over the lifecycle of the product, taking account of any cost reductions that may occur, for example due to the benefits of the learning and experience curves, then production commences. However, it is more likely that at this initial stage the expected product costs exceed the target costs and as a result major product / process changes are made in order to achieve the target cost. If it is not possible to achieve the target cost by making these changes then the product is abandoned.

Kaizen Costing is a system that is used once production has commenced. Kaizen means improvement and it is applied by continually striving to improve. However, Kaizen does not look for large significant improvements; instead it is based around making small improvements continuously. It is a group effort in which everyone is involved. It should become part of every employee's daily routine to constantly look for ways to improve the workflow within the organisation. Kaizen is based around a continuous circle of Plan, Do, Check, Act. Plan refers to the need to set a target for improvement as without a benchmark success cannot be measured. Do refers to the implementation of the plan. Check is the determination of whether the plan improved the process. Act means standardise the improved procedure so that it can be repeated.

One of differences is that Target Costing applies before production commences whereas Kaizen Costing applies once production has commenced. Another difference is that although both Target Costing and Kaizen Costing involve making changes to improve results, Target Costing looks at making significant changes in order to reduce the expected cost until it reaches the Target Cost necessary to achieve the Target Profit from the given selling price. Kaizen Costing deals with making a number of further small improvements as a result of involving everyone in the process.

Answer to Question Four

(a)

(i)

	<i>Actual sales</i>	<i>Std Mix</i>	<i>Difference</i>	<i>Profit per unit</i>	<i>Variance</i>
DVD	3,000	2,800	+200	\$48.33 - \$25	\$4,667 A
Blu-ray	<u>1,200</u>	1,400	-200	\$48.33 - \$95	<u>\$9,334 A</u>
	<u>4,200</u>	4,200			<u>\$14,000 A</u>

The total sales mix profit margin variance is \$14,000 A

ALTERNATIVE METHOD:

	<i>Actual sales</i>	<i>Std Mix</i>	<i>Difference</i>	<i>Profit per unit</i>	<i>Variance</i>
DVD	3,000	2,800	+200	\$25	\$5,000 F
Blu-ray	<u>1,200</u>	1,400	-200	\$95	<u>\$19,000 A</u>
	<u>4,200</u>	4,200			<u>\$14,000 A</u>

(ii) The sales volume profit variance relates only to Blu-ray players because the actual and revised budget volumes of DVD players are the same.

Therefore the variance is 300 players x \$95 = \$28,500 A

(b)

The market size is not within the control of the sales manager and therefore variances caused by changes in the market size would be regarded as planning variances. However, variances caused by changes in the selling prices and consequently the selling price variances and market shares would be within the control of the sales manager and treated as operating variances.

The market size variance compares the original and revised market sizes. This is unchanged for DVD players so the only variance that occurs relates to the Blu-ray players and is:

500 players x \$95 = \$47,500 F

It is important to make this distinction because as can be seen from the scenario the measurement of the manager's performance is distorted if the revised market size is ignored. The favourable volume variance of \$19,000 referred to in the sales manager's e-mail is made up of two elements, one of which, the market size, is a planning variance which is outside their control. It is this that has caused the overall volume variance to be favourable, and thus the manager is not responsible for the overall favourable performance.

Answer to Question Five

(a)

The modern service sector is extremely competitive and as a consequence if a business is to succeed it needs to ensure that it is both efficient and that it satisfies the needs of its guests. Financial performance is important but this is described as a “lagging measure” in that it reports on what has happened. Failing to meet targets can mean that profits are not achieved and that inadequate current returns are obtained. However, short term action to improve current financial performance might, in the long term, be at the expense of the company’s interests. This is why modern thinking suggests that non-financial measures may be more appropriate in assessing performance. Non-financial “leading” measures indicate how well the company is doing things that can lead to future profits.

(b)

One measure could consider customer satisfaction such as number of complaints and / or recommendations. In the short term saving money by cutting back on customer service might lead to long term loss of business due to a declining reputation.

Another measure might look at the number of new accommodation and events packages offered by the hotel. In the short term these would cost money to set up but in the long term they may lead to new business by achieving a competitive edge.

(c)

Uncontrollable costs may be included in the performance report of a responsibility centre so that the report shows the final profit of that centre. This is sometimes done to make the manager aware of the other costs involved in running the business.

However, from a performance measurement perspective if it is the performance of the manager that is being measured then it is unfair to measure their performance on results that include items that are beyond their control. The solution to this is to include the non-controllable items in a separate section of the report and to measure the manager’s performance based on only the controllable items.

SECTION B

Answer to Question Six

(a)

Hotel closure

Workings Calculations		Gross Contributions					Restaurant
Season	Days	Rooms	Occupants	Guests	Snacks		
Peak	90	95	1.8	15,390	13,851	17,313.75	
Mid	120	75	1.5	13,500	12,150	33,750	
Low	150	50	1.2	9,000	8,100	47,250	
		Peak	Mid	Low	Total		
Room Revenue		855,000	720,000	412,500	1,987,500		
Guest related costs		184,680	162,000	108,000	454,680		
Room costs		68,400	81,000	82,500	231,900		
Avoidable general costs		225,000	300,000	375,000	900,000		
		478,080	543,000	565,500	1,586,580		
Room / Guest contribution		376,920	177,000	-153,000	400,920		
Snacks							
Gross contribution	4,617	12,150		8,100	24,867		
Cook costs	5,000	-383	6,667	5,483	8,333	-233	
						20,000	
						4,867	
Restaurant							
Gross contribution	17,313.75	33,750		47,250	98,313.75		
Staff costs	13,500	3,813.75	18,000	15,750	22,500	24,750	
						54,000	
						44,313.75	
Total contribution		380,350.75	198,233	-128,483	450,100.75		
Non avoidable general costs		75,000	100,000	125,000	300,000		
Net contribution		305,350.75	98,233	-253,483	150,100.75		
Hotel annual fixed costs					200,000		
Hotel annual profit						-49,899.25	

(b)

Closure?	No	No	Yes
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(b)

- (i) The statement shows that overall the hotel makes a loss. However further analysis shows that certain actions could make the hotel profitable.

The statement shows that the hotel makes a significant loss during the low season and therefore if it were to be closed for this part of the year the hotel would then be profitable.

Furthermore the snack service is only profitable during the mid season so if the service were to be closed during the other seasons of the year this would also add to the hotel's profitability.

- (ii) However, there are other factors to be considered before making the above short term changes. If the snack service were to be closed for parts of the year could it easily be re-opened just for the mid season or if it were to be closed entirely would this encourage more guests to use the hotel restaurant?

If the hotel were to be closed in the low season would the hotel retain its popularity during the other parts of the year or would its regular guests feel that the hotel was not customer focused and only interested in its own profits thus reducing the hotel's demand in other seasons?

Answer to Question Seven

(a)

The internal sales volume is 70,000 components. Division E could have sold a further 42,000 components to the external market if it had extra capacity or were to reduce its internal sales. Therefore this volume of components was sold to Division D at market price and the balance was sold at variable cost.

An analysis of the sales is therefore as follows:

	<i>Internal</i>		<i>External</i>	<i>Total</i>
	<i>@ cost</i>	<i>@ MV</i>		
Number of components	28,000	42,000	70,000	140,000
	<i>\$000</i>	<i>\$000</i>	<i>\$000</i>	<i>\$000</i>
Variable Cost	28,000	42,000	70,000	140,000
Sales Value	28,000	65,100	108,500	201,600

(b)

Division E has sold components to Division D without deriving any financial benefit. If Division D had bought them at market value the cost to Division D would have been \$43.4m which is \$15.4m greater than the current transfer price.

While it may not be appropriate for Division D to pay the full market price (since Division E could not sell these components externally) it does seem unfair that all of the profit from the use of these components accrues to Division D and therefore a transfer price that accrues some reward to Division E for the supply of the components would be fairer to both divisions. Any transfer price above variable cost would reduce the profits of Division D and increase those of Division E by the same amount. For example if the difference between variable cost and market price were shared equally then the change in profit of each division would be \$7.7m.

If the external demand for the components were to decrease, then more of the components supplied to Division D would be transferred at variable cost thus lowering the profits of Division E, but increasing the profits of Division D. If the external demand were to increase then the opposite effect would occur until all of the internal transfers were being made at the external selling price.

(c)

- (i) The investment has two effects: the increase in E's capacity by 10% and the 20% reduction in its variable cost. From Division E's perspective the benefit of these effects is diluted due to the internal sales and the transfer pricing policy.

If the capacity of Division E is increased by 10% then it will increase its external sales, but in doing so will reduce the volume of external sales foregone by selling the components to Division D. Therefore the effect of the additional capacity would be to transfer an additional 10% by volume at cost. Thus there is no financial benefit to Division E.

E sells 50% of its present capacity internally, and 28/70 of this is transferred to Division D at variable cost therefore any cost savings arising in respect of this proportion will be passed on to Division D due to the transfer pricing policy. The cost saving that will accrue to Division E will therefore be limited to items sold at market value. This amounts to:

Variable cost of items sold at market value = 80% x \$140m = \$112m per annum

20% cost saving thereon = \$22.4m per annum

Using the 8% annuity factor for 5 years this saving has a present value of:

$\$22.4\text{m} \times 3.993 = \89.4432m

Since the capital cost of the equipment is \$120m with no residual value the investment is not financially viable from Division E's perspective.

- (ii) However, if the investment were to be evaluated from the position of the whole organisation then consideration would be given to the benefits that accrue to Division D as a consequence of the transfer pricing policy. These benefits can be identified as the difference between the original and revised values of internal sales. The original value was \$93.1m (\$28m + \$65.1m - see above). The revised transfer value will be:

42,000 components @ revised cost of \$42m less 20%	\$33.6m
28,000 components @ market value of \$1,550	<u>\$43.4m</u>
	<u>\$77.0m</u>

A saving to Division D of \$16.1m per annum.

If this were added to the Division E saving of \$22.4m the total saving is \$38.5m per annum which would have a present value of \$153.73m which clearly makes the investment of \$120m worthwhile.

Note: Alternative methods of deriving the same solution are also acceptable.

(d)

A number of factors should be considered when designing divisional performance measures. These include:

- Each measure should be simple to calculate and to understand so that managers can see the effect of the decisions that they make on the measurement of their division's performance.
 - Each measure should be fair to the manager of the division and only include items that are within their control.
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The Senior Examiner for P2 Performance Management offers to future candidates and to tutors using this booklet for study purposes, the following background and guidance on the questions included in this examination paper.

Section A – Compulsory

Question One examines candidates' knowledge and understanding of product pricing using the economist's pricing model and the limitations as to its use. The learning outcome examined is A3 (a) *apply an approach to pricing based on profit maximisation in imperfect markets.*

Question Two examines candidates' knowledge of the product life cycle and how unit selling prices and unit production costs are likely to change as the product moves through its life cycle. The learning outcome examined is B1 (i) *discuss the concept of life cycle costing and how life cycle costs interact with marketing strategies at each stage of the life.*

Question Three examines candidates' knowledge of Target Costing and Kaizen Costing and the differences between them. The learning outcomes examined are B1 (h) *explain how target costs can be derived from target prices and the relationship between target costs and standard cost* B1 (c) *explain the concepts of continuous improvement and Kaizen costing that are central to total quality management.*

Question Four examines candidates' understanding of sales variances, and planning and operating variances in the context of responsibility accounting. The learning outcome examined is C2 (c) *evaluate performance using fixed and flexible budget reports.*

Question Five examines candidates' knowledge of non-financial performance measures and the reporting of non-controllable costs. The learning outcomes examined are C3 (b) *discuss the role of non financial performance indicators* and C 1 (c) *identify controllable and uncontrollable costs in the context of responsibility accounting and why uncontrollable costs may or may not be allocated to responsibility centres.*

Section B – Compulsory

Question Six examines candidates' knowledge and understanding of relevant costs in the context of a closure decision. The learning outcome examined is A2 (b) *interpret variable/fixed cost analysis in multiple product contexts to break-even analysis and product mix decision making, including circumstances where there are multiple constraints and linear programming methods are needed to identify optimal solutions.*

Question Seven examines candidates' understanding of transfer pricing and its impact on divisional performance measurement and on decision making. The learning outcomes examined are D2 (b) *discuss revenue and cost information in appropriate formats for profit and investment centre managers, taking due account of cost variability, attributable costs, controllable costs and identification of appropriate measures of profit centre contribution,* D3 (c) *discuss the likely consequences of different approaches to transfer pricing for divisional decision making, divisional and group profitability, the motivation of divisional management and the autonomy of individual divisions* and D2 (c) *discuss alternative measures of performance for responsibility centres.*
