CIMA

Management Level Paper

P2 – Performance Management
May 2012 examination

Examiner's Answers

Note: *Some of the answers that follow are fuller and more comprehensive than would be expected from a well-prepared candidate. They have been written in this way to aid teaching, study and revision for tutors and candidates alike.*

These Examiner's answers should be reviewed alongside the question paper for this examination which is now available on the CIMA website at www.cimaglobal.com/p2papers

The Post Exam Guide for this examination, which includes the marking guide for each question, will be published on the CIMA website by early August at www.cimaglobal.com/P2PEGS

SECTION A

Answer to Question One

Rationale

The question examines candidates' knowledge and understanding of the learning curve and its application with a simple scenario. The learning outcome tested is B1 (e) *apply learning curves to estimate time and cost for new products and services.*

Suggested Approach

Carefully read the data provided and recognise that 8 units is simply three doublings of the first batch.

By use of the learning curve formula (or the traditional 'doubling approach') calculate the average direct labour cost of the first four batches. This is followed by specific use of the formula to calculate the cost of the fourth batch.

Part (a)(iii) involved using the answers from part (a)(i) and (a) (ii) and adding the sales and other costs to calculate the contribution for the product over its short lifetime

Part (b) required understanding of the learning rate that would generate a contribution of £150 000.

The average cost per batch needed to be compared to the original cost, followed by the calculation of the third root of this percentage to determine the rate of the learning required.

(a) (i)

Average cost for 4 batches:
$y = ax^b$
$y = \$40,000 \times 4^{-0.152} = \$32,400$

*(a) (*ii)

The total cost for the 4 batches = 4 x $32,400 = $129,600
Average cost for 3 batches:
$y = ax^b$
$y = \$40,000 \times 3^{-0.152} = \$33,848$
The total cost for 3 batches = 3 x $33,848 = $101,544
Cost for 4th batch = $28,056

(a) (iii)

Total labour cost over the product's life = $129,600 + (4 x $28,056) =	$241,824
Sales less non labour related cost over the product's life = 8,000 x ($90 - $45) =	$360,000
CONTRIBUTION	$118,176

(b)

In order to achieve a contribution of $150,000 the total labour cost over the products lifetime would have to equal ($360,000 - $150,000) = $210,000
This equals an average batch cost of $210,000 / 8 = $26,250
This represents $26,250 / $40,000 = 65.625% of the cost of the first batch
8 batches represents 3 doublings of output
Therefore the rate of learning required =3 √0.65625 = 86.9% = 87%

Answer to Question Two

Rationale
The question tests learning outcome C3 (c) *compare and contrast traditional approaches to budgeting with recommendations based on the 'balanced scorecard'.*

The question examines candidate's knowledge of the Balanced Scorecard in the context of a community library, in particular the use of a non-financial performance indicators.

Suggested Approach
Carefully read the question and explain the key features of the balanced scorecard, followed by the request to state two perspectives and recommend, with reasons, a relevant performance indicator for each perspective.

(a)

The Balanced Scorecard can be used to measure the performance of an organisation. Traditionally performance was measured only in financial terms, but it is now recognised that financial measures alone are not enough, hence the development of the Balanced Scorecard.

There are different variations of the Balanced Scorecard that may be used since it facilitates internal performance measurement and thus is designed by each organisation to meet their requirements, however most Balanced Scorecards contain four perspectives. These are: Customer perspective; Internal Business perspective; Innovation & Learning perspective; Financial perspective. Each of these segments represents a different viewpoint on the operation of the organisation. Each of these contributes to the success of the organisation, in fact many argue that success in the first three of these perspectives leads to financial success. The Balanced Scorecard develops strategies into operations.

(b)

Its customers would want to know that they can borrow the latest books and DVDs from the library so as part of the Customer perspective a measure that could be used to monitor the library's success in this area would be the number of new items that had been added to the library within a specified time period.

The library would also need to measure its own efficiency of operations, particularly as it relies on government funding and donations. As part of the Internal Business perspective the library can measure its speed in obtaining new titles. Recognising demand, identifying a source, negotiating a price and placing an order all take time. The smaller the amount of time taken the better will be the customer perception and the better value for money for the library.

Answer to Question Three

Rationale

In part (a) the question tests learning outcome C2 (b) *evaluate the consequences of "what if" scenario and their impact on the master budget.*

Part (b) tests learning outcome C3 (a) *discuss the impact of budgetary control systems and setting of standard costs on human behaviour, i*n particular, behavioural issues related to a participative budget and its possible beneficial consequences for ownership and motivation.

Suggested Approach

Part (a)
Carefully understand the data provided, appreciate that a flexed budget was required and confirm the format that was requested, as opposed to general budgeting issues.

Part (b)
Carefully read the question to confirm that motivational factors involving functional managers needed to be discussed.

(a)

	$000	*$000*
Sales (90,000 units)		
Production costs (100,000 units):		
Direct materials	400.00	
Direct labour	550.00	
Variable overhead	105.00	
Fixed overhead	230.00	
	1,285.00	
Inventory adjustment	128.50	
Cost of Sales		1,156.50
Gross Profit		(256.50)
Other overhead costs		200.00
Net Loss		(456.50)

(b)

If functional managers are involved in setting their own functional budget then this should have a positive motivational effect on their attempts to achieve it. These is because they will own the budget and accept it as being a fair target, seeing it as a personal failure if they do not achieve the target that they set (and therefore believed was achievable).

The difficulty with involving managers in the budget setting process is that if their performance is to be measured by comparing the actual results with the budget they have set then they may be tempted to set an easy budget by building in budget slack. This will prevent them from performing as well as they might do if a harder, but fair and achievable, budget had been set by someone else.

Answer to Question Four

Rationale
The question tests learning outcome B1(b) *evaluate the impacts of just-in-time production, the theory of constraints and total quality management of efficiency inventory and cost.*

Suggested Approach
Carefully read the data required to clarify the exact requirements.

Part (a) required the production of a table to identify the average inventory level for each quarter and from these figures the quarterly holding cost could be calculated.

Part (b) required calculations to establish the financial impact of changing to a JIT production system, in particular calculating the relevant overtime costs in quarters 3 and 4. The total cost of a move to JIT then needed comparing with the answer to part (a).

(a)

Annual demand = 540,000 units. (Quarterly capacity of 135,000 units x 4 quarters = 540,000 so no overtime is required)

Current system – Constant production

Quarter	*1*	*2*	*3*	*4*	*Total*
Opening inventory	0	35,000	60,000	5,000	
Production	135,000	135,000	135,000	135,000	
Sales	100,000	110,000	190,000	140,000	
Closing inventory	35,000	60,000	5,000	0	
Average inventory	17,500	47,500	32,500	2,500	
Inventory cost ($)	70,000	190,000	130,000	10,000	<u>400,000</u>

(b)

JIT production system

Quarter	*1*	*2*	*3*	*4*	*Total*
Overtime production	0	0	54,000	5,000	
Lost sales			1,000		
Additional cost ($)*	0	0	1,107,000	102,500	
Lost contribution			15,000		
					<u>1,224,500</u>

<u>The change in profit would be a reduction of $824,500</u>

* Additional Overtime cost per unit =
Direct labour $35 x 0.5 = $17.50
Variable overhead $10 x 0.3 = $ 3.00
<u>$20.50</u>

Answer to Question Five

Rationale
The question tests learning outcome B1 (h) *explain how target costs can be derived from target prices and the relationship between target costs and standard costs.*
Suggested Approach
Carefully read the scenario to understand why total cost plus pricing might be the reason for the falling profits and loss of market share. Part (b) required an explanation of target costing and how it could address the present circumstances associated with the company.

(a)

Total Cost Plus pricing is a pricing technique based on determining the total cost of a product or service and adding a profit percentage to that total cost to determine the selling price.

In a competitive environment any cost inefficiencies or the use of too great a profit percentage will mean that the company is no longer able to compete and will start to lose its market share. As this happens and output volumes fall, then the total unit cost will rise due to the sharing of fixed costs among a smaller number of units. The total cost plus pricing formula will then result in increased selling prices thereby reducing still further the company's ability to compete.

Therefore one disadvantage of this approach to pricing is that it does not consider the nature of the market and as a result can lead to loss of sales and of course profits.
A second disadvantage is that the company is not motivated to save cost because if it does so this simply results in a lower selling price. Indeed if the market supports a total cost plus price then by increasing costs the size of the profit is increased!

(b)

Target Costing is useful in a competitive market such as this where a company is not dominant in the market and is forced to accept the market price for its products or services.

Thus Target Costing focuses on the achievement of a unit cost which will earn the company the financial return that it requires.

The starting point for the operation of Target Costing is the unit selling price of the company's product or service. From this is deducted the required profit (to yield the company's required financial return) and the result is the target unit cost that is to be achieved. This target cost is then compared with the expected unit cost to see if the target cost is already being met or if the company needs to consider making changes which will result in a lowering of unit costs.

It may be that the effects of the learning and experience curves will reduce the present cost to the level of the target cost; or it may be that the company can achieve other cost savings provided they do not diminish the quality of the product or service as perceived by the customer.

If these cost savings cannot be made the company may have to lower its required return from the product or service or decide that it is not financially viable for it to sell this product or service in the market.

Thus Target Costing would benefit this company by forcing it to consider its internal processes and costs and to conduct these as efficiently as possible. If despite making these as efficient as possible the required return from the product cannot be achieved, then the company should cease to make a product that is not viable and therefore would be able to focus its resources on alternative sources of income.

SECTION B

Answer to Question Six

Rationale

The question tests learning outcomes 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* and A2 (c) *discuss the meaning of 'optimal' solutions and how linear programming methods can be employed for profit maximising, revenue maximising and satisfying objectives.*

Suggested Approach

Carefully analyse the data to identify the variable costs related to each product unit. Determine the ranking of each product, based on contribution per limiting factor and generate the optimum product mix after removing the requirement of the order from the major customer.

In part (b), a comparison was needed to evaluate the contribution that would have been generated from the answer to part (a), and the contribution that would have been generated if the major customer order was not satisfied in full. The comparison would reveal the value of the financial penalty.

Part (c)(i) required the identification of the objective function and the constraints that would be used in a linear programming model to determine the optimum usage of the resources to maximise profits.

In part (c)(ii), explain which of the constraints are binding on the solution.

(a)

Product	*W*	*R*	*X*
	$/unit	*$/unit*	*$/unit*
Selling price	90	126	150
Variable costs	61	92	106
Contribution	29	34	44
Kgs of Material B	4	6	5
Contribution / kg of B	$7.35	$5.67	$8.80
Ranking	2nd	3rd	1st

The major customer order is for 400 units of each of W, R and X and therefore uses 6,000kgs of material B (400 x (4+6+5)). This leaves 11,500 kgs of material B to be used for other sales.

Production plan:

Make (units)	500	250	1,600
Uses (kg of B)	2,000	1,500	8,000

Optimum plan (including major customer order) is therefore:

W	900 units
R	650 units
X	2,000 units

(b)

By completing the order for the major customer WRX is giving up sales of 550 units of R (800 – 250) to the full price market. These units would yield of a contribution of $34 each = $18,700

In order to produce these units and thus not fulfil the major customer order in full WRX would need to release 3,300 kg of material B from the major customer order (550 units x 6kgs per unit). This material would be released as follows:

Major customer sales:

Product	*W*	*R*	*X*
	$/unit	*$/unit*	*$/unit*
Selling price	80	116	140
Variable costs	61	92	106
Contribution	19	24	34
Kgs of Material B	4	6	5
Contribution / kg of B	$4.75	$4.00	$6.80
Ranking	2nd	3rd	1st

Thus the additional contribution that can be earned and therefore the penalty value at which WRX would decide not to supply the major customer order in full is $4,825 ($18,700 - $13,875).

(c) (i)

The objective function (P) is to maximise 29w + 34r + 44x where

w = number of units of W
r = number of units of R
x = number of units of X

And the constraints are:

Material B: 4w + 6r + 5x <= 11,500
Direct labour: 2w + 4r + 5x <= 5,400
Demand W: 0 <= w <= 500
Demand R: 0 <= r <= 800
Demand x: 0 <= x <= 1600

(c) (ii)

Two constraints are binding:

Demand W – because the optimal solution is to produce 500 units of W

Direct labour hours – because the optimal solution uses 5,400 direct labour hours (500w uses 1,000 hours and 880 x uses 4,400 hours; total 5,400 hours)

Answer to Question Seven

Rationale

The question tests learning outcomes D3 (b) *discuss the financial consequences of alternative pricing strategies*; A3 (a) *apply an approach to pricing based on profit maximisation in imperfect markets*, A3 (a) *discuss the impact of budgetary control systems and setting of standard costs on human behaviour*, and 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.*

Suggested Approach

Carefully read the scenario to identify the selling and buying divisions and the relevant quantities, variable costs and transfer prices. Using the formula provided calculate the selling price that would maximise the profits generated by the YD division and use this figure to calculate the contribution that CX would generate for each division and the company in total.

In part (b), use the data given in the question, and figures generated in part (a), taking careful note of the principles associated with transfer pricing.

Part (c) required a discussion to describe the impact that alternative transfer prices have on divisional and company profits.

(a) (i)

Currently the selling price is $375 and this gives demand of 2,000 units. For every $25 increase in selling price demand reduces by 500 units so if the price was increased by (4 x $25) to $475 then demand would be zero.

Hence the price equation P = $475 – 0.05x

And therefore Marginal Revenue = $475 – 0.1x

Marginal cost = Variable cost = $310

So, equating marginal revenue and marginal cost gives:

475 – 0.1x = 310

0.1x = 165

X = 1,650

And thus selling price = $475 – (0.05 x 1,650) = $392.50

(a) (ii)

This would yield a monthly contribution for YD as follows:

	$/unit	*$*
Selling price	392.50	
Variable cost	310.00	
Contribution	82.50	
Total monthly contribution: 1,650 units x $82.50		136,125

(b) (i)

From a company perspective optimal decision making will occur if the transfer price is at company variable cost + any opportunity cost due to lost external sales.

It is stated that there is sufficient capacity within the company so no opportunity cost arises.

If the transfer price were to be at the variable cost of $70 per component this would change YD's perspective of its own variable costs (which would now be $200 per unit) and lead it to a different external price for its own product:

The price equation is unchanged P = $475 – 0.05x

And therefore Marginal Revenue = $475 – 0.1x

Marginal cost = Variable cost = $200

So, equating marginal revenue and marginal cost gives:

475 – 0.1x = 200

0.1x = 275

x = 2,750

And thus selling price = $475 – (0.05 x 2750) = $337.50 per unit

(b) (ii)

This would yield a monthly contribution for YD as follows:

	$/unit	*$*
Selling price	337.50	
Component cost	140	
Other Variable cost	60	
Contribution	137.50	
		378,125
However, GH is no longer making any contribution on its internal sales		
The monthly contribution of the GHYD company is now ($Nil +$378,125)		378,125

(c)

The original company contribution from the sale of CX was $350,000. ($220,000 + $130,000).When the optimum price for the component was determined in part (a) above the total company contribution decreased to $317,625 but as shown in part (b) above with an internal transfer price based on company variable cost the total company contribution increased to $378,125.

Clearly therefore the effect of the transfer price is to distort the decision making processes in such a way as to not be beneficial to the company as a whole.

The use of a company variable cost as the transfer price yields a better result for the company as a whole and also for YD. However the manager of GH will not be happy with this transfer price because all of the additional contribution has accrued to YD and it is GH that has forgone contribution on its internal sales. Thus while the transfer price should be set at variable cost to enable the optimum decision to be made from a company perspective there needs to be a separate transfer price paid by YD to GH (as a fixed cost element) to compensate them for their lost contribution.

If the transfer price were to be the external price, but the decision in (ii) above were made on a company optimisation basis then the company contribution from product CX would still be $378,125 but it would be shared YD $75,625 and GH $302,500. This means that the increased activity for YD reduces its contribution but increases that of GH. YD will not be happy with this because their efforts result in a reduction of their divisional contribution. They will therefore expect a transfer price that is lower than the external price because GH is not giving up any external sales to meet the internal demand and consequently can only sell extra units to YD.

Clearly it can be seen that different transfer prices have an effect on both the company contribution and on the contributions of each division.
