Performance Pillar

P2 – Performance Management

Examiner's Answers

SECTION A

Answer to Question One

(a)

The standard cost of the actual hours worked was $3,493 - $85 = $3,408.

At $12 per hour the actual hours worked were $3,408 / $12 = 284 hours.

So the average time per batch for the first 32 batches was 284 / 32 = 8.875 hours per batch.

32 batches represent 5 doublings of output.

The learning rate was therefore:

$5 \sqrt{} 8.875 / 20 = 0.85 = 85\%$

(b)

Actual labour rate paid = $3,493 / 284 = $12.30 per hour.

Learning index = log 0.85 / log 2 = -0.2345

$Y = 20 \times 128^{-0.2345} = 6.41$ hours

Total cost of direct labour = 6.41 x 128 x $12.30 = $10,092

Answer to Question Two

(a)

A JIT production system is based around the principle of zero inventory at all stages of the production cycle. This means that PR would

- use a production control system so that there was no work in progress between the various stages of production; and

- not hold an inventory of finished goods because items would be completed just as the customer required them to be delivered.

(b)

There are a number of reasons why the profitability of PR may not increase as a result of changing to a JIT production system. These include the following.

(i)   Rather than ordering materials in bulk to obtain lower supply prices, PR would place smaller, more frequent orders as items are required, thus eliminating inventory holdings. Charges made by suppliers for smaller more frequent deliveries may be greater than the cost saving from holding zero raw material inventory;

(ii)   The need to use a production control system to match production and demand at all stages may necessitate overtime working. Overtime might be paid at premium labour rates, thus labour costs might be higher compared to those incurred when operating a constant flow production system.

Answer to Question Three

There are potential advantages and disadvantages of the involvement of staff in the preparation of the budget.

Potential advantages include:

• Involvement would encourage senior staff to be motivated to achieve the target because they would take ownership of it as their budget.

• Senior staff may have a better knowledge of individual courses and how they may be delivered more efficiently and cost effectively. They would also have a better understanding of how to attract more students to the course thus increasing its profitability. This would improve the accuracy of the budget.

• Senior staff would feel that they are being respected for the value that their experience brings to the running of the college.

Potential disadvantages include:

• Senior staff may be excellent academically but could lack the knowledge and skills required to formulate their budget and to work together to form the budget for the college overall.

• Senior staff may spend a great deal of time arguing with each other (and with the college director) as to how to measure the benefits of a particular course and how the cost / benefit analysis of each course should be compared.

• Senior staff may agree among themselves to include unnecessary expenditure (budgetary slack) so that it is easier for them to achieve the cost targets they have set.

• Senior staff may underestimate the expected revenue in order to make their final target more achievable.

• The participative process can be very time consuming, thus delaying the availability of the budget for the forthcoming year.

Answer to Question Four

Actual production during April 2011 was 6,000 units. There are two alternative proofs of this:

Fixed overhead absorbed = $60,000
Absorption rate = $10 / unit
Therefore $60,000 / $10 = 6,000 units

OR

Inventory has increased (production costs reduced to calculate cost of sales) by $15,000. In standard absorption costing inventory is valued at standard production cost ($12 + $20 + $8 +$10 = $50). $15,000 / $50 = 300 units increase. Sales were 5,700 units therefore production = 6,000 units.

The production cost variances must therefore be calculated based on 6,000 units produced.

Reconciliation statement for April 2011

			$	
Budgeted profit			84,000	
Sales volume variance			4,200	(A)
Standard profit on actual sales			79,800	
Selling price variance			34,200	(A)
			45,600	

	Adverse	Favourable		
Direct material price		3,720		
Direct material usage	2,400			
Direct labour rate	13,800			
Direct labour efficiency		5,000		
Variable overhead expenditure	1,150			
Variable overhead efficiency		2,000		
Fixed overhead expenditure	7,000			
Fixed overhead volume		10,000		
Totals	24,350	20,720	3,630	(A)
Actual profit			41,970	

Workings

Direct material price = (18,600 x $4) - $70,680 = $3,720 favourable
Direct material usage = [(6,000 x 3) – 18,600] x $4 = $2,400 adverse
Direct labour rate = (11,500 x $10) - $128,800 = $13,800 adverse
Direct labour efficiency = [(6,000 x 2) – 11,500] x $10 = $5,000 favourable
Variable overhead expenditure = (11,500 x $4) - $47,150 = $1,150 adverse
Variable overhead efficiency = [(6,000 x 2) – 11,500] x $4 = $2,000 favourable
Fixed overhead expenditure = $50,000 - $57,000 = $7,000 adverse
Fixed overhead volume = (6,000 – 5,000) x $10 = $10,000 favourable

Answer to Question Five

TQM is a management philosophy whereby quality is placed at the heart of the organisation's thinking and activities. The view is that the quality experience of the customer (whether internal or external) should be one of excellence. The organisation should strive for continuous improvement in the quality that it delivers with the ultimate aim of achieving zero defects in this quality.

It may be necessary to incur expenditure in order to improve quality. However, in TQM this expenditure is viewed as an investment that will yield future benefits, rather than as a cost that should be minimised.

By investing in TQM the ZX bank can improve its customers' experience in having their banking needs fulfilled. This should enable the bank to gain a competitive advantage.

There are many ways in which ZX can invest in TQM.

ZX could provide its employees with training in the technical aspects of banking practice as well as in customer care. Customers would therefore receive a better service not only technically but also from a customer care perspective. This should lead to fewer customer complaints and greater customer satisfaction. It could also encourage customers to recommend others to use this bank.

A TQM approach would require ZX to respond to its customers' comments, for example by providing more staff at busy times to reduce the lengths of queues. They could also open for longer hours to allow customers to complete their banking and have meetings with bank managers at a time that is more convenient for the customer. This should lead to more satisfied customers.

In the long run improved quality, despite incurring some additional expenditure, should enable ZX to gain competitive advantage and therefore generate higher profits for the bank.

Answer to Question Six

(a)

The internal manufacturing cost of the component is as follows:

	$/unit
Direct labour (1 hour @ $8/hour)	8.00
Direct material B (2kgs @ $5/kg)	10.00
Variable overhead (working 1):	
Direct labour (1 hour @ $0.50 / hour)	0.50
Machine hours (0.5 hours @ $0.25 / hour)	0.125
	18.625

The buying price of the component is $35 per unit so if resources are readily available the company should manufacture the component. However, due to the scarcity of resources during the next 10 weeks the contribution earned from the component needs to be compared with the contribution that can be earned from the other products.

Working 1
Using product J (though any product could be used) the variable overhead rates per hour can be calculated:

Labour related variable overhead per unit = $1.25
Direct labour hours per unit = $20 / $8 = 2.5 hours
Labour related variable overhead per hour = $1.25 / 2.5 hours = $0.50 per hour

Machine related variable overhead per unit = $1.25
Machine related variable overhead per hour = $1.25 / 5 hours = $0.25 per hour

Both material A and material B are limited in supply during the next 10 weeks, but calculations are required to determine whether this scarcity affects the production plans of WZ. The resources required for the maximum demand must be compared with the resources available to determine whether either of the materials is a binding constraint.

All figures in kg:

Resource	Available	Total	J	K	L	M	P
Direct material A	21,000	20,150	2,200	3,700	0	14,250	0
Direct material B	24,000	31,050	2,200	0	8,850	19,000	1,000

It can be seen from the above that the scarcity of material B is a binding constraint and therefore the contributions of each product and the component per kg of material B must be compared. At this point product K can be ignored because it does not use material B.

	J	L	M	P
	$	$	$	$
Selling price / buying cost	56	78	96	35
Direct labour	20	24	20	8
Material A	6	0	9	0
Material B	10	15	20	10
Overhead:				
Labour	1.25	1.50	1.25	0.50
Machinery	1.25	0.75	1	0.125
Contribution	17.50	36.75	44.75	16.375
Contribution /kg of material B	8.75	12.25	11.19	8.19
Rank	3	1	2	4

Since the component is the lowest ranked usage of material B then WZ should continue to purchase the component so that the available resources can be used to manufacture products L, M and J.

(b)

The optimum usage of material B is based on the ranking shown above:

	J	L	M	P	Total
Minimum (units)	100	150	250		
Uses (kg)	200	450	1,000		1,650
Balance (units)		2,800	3,487.5		
Uses		8,400	13,950		22,350
					24,000
Production (units)	100	2,950	3,737.5	0	

(c)(i)

The decision concerning the purchase of the component would change if the contribution from its manufacture were equal to the least best contribution from the products using material B. Apart from the minimum demand constraint the least best usage is derived from product M which has a contribution per kg of $11.19 which is $3 per kg higher than that from component P. Since each unit of P requires 2 kgs of B then the buying price would have to be 2 x $3 = $6 per component higher than at present before it would have the same rank as product M. Thus the buying price at which the decision would change = $35 + $6 = $41.

(ii)

A number of factors could be explained:

- The control of the production if it were to be manufactured internally
- The quality of the component produced
- The skill set of the employees
- The exposure of WZ to pressure from the external supplier to withhold supplies / assist a competitor

(d)

Objective function: Maximise 17.5J + 36.75L + 44.75M = C
Material A: 2J + 1K + 0L + 3M $\leq$21,000
Material B: 2J + 0K + 3L + 4M $\leq$24,000

Answer to Question Seven

(a)

Company	P Limited	Z Limited
ROCE	10/459.6 = 2.2%	30/453.216 = 6.6%
Pre-tax profit %	10/200 = 5.0%	30/220 = 13.6%
Asset Turnover	200/459.6 = 0.435	220/453.216 = 0.485

(b)

The value of the group transaction can be identified by comparing the group results with the sum of the two individual company results: the sales value was $20,000 and the cost of sale value was $10,000 thus Z Limited made a profit of $10,000 on this transaction which is equal to a gross margin of 50%.

The gross margin on the external sales was $50,000 / $200,000 = 25%. Thus there is a significant difference in the margins being achieved. If this transaction had not occurred and assuming that P Limited had sold these items using its normal mark-up then the ratios would have been:

Company	P Limited	Z Limited
ROCE	6.47/459.6 = 1.4%	20/453.216 = 4.4%
Pre-tax profit %	6.47/176.47 = 3.7%	20/200 = 10%
Asset Turnover	176.47/459.6 = 0.384	200/453.216 = 0.441

These calculations show that the relative performance of the two companies is significantly different. Further analysis identifies two key reasons for this:

Gearing
P Limited is financed partly by borrowing and partly by equity and the interest charge made by the lenders amounts to a 6.7% return (10/150). This is a significant cost to P Limited and amounts to a higher return than is being achieved before interest is paid which is 4.4% (20/459.6).

Non-current asset values
Although there are differences in the original cost of the non-current asset values (P Limited is two thirds of Z Limited) which reflects the relative sizes of the companies there is also a difference in the age of the assets which can be identified by the proportion of the non-current asset that has depreciated. Both companies use the same depreciation policy of 20% per annum on a reducing balance basis yet the non-current asset value of P Limited has been depreciated by 59.0% of its original cost whereas the non-current asset value of Z Limited has been depreciated by 73.8% of its original cost. Thus the non-current assets of P Limited are newer and because they have a higher net book value, this reduces the apparent ROCE.

(c)

Three factors that should be considered when setting the transfer pricing policy are:

- The policy should lead to transfer prices that are fair to both the internal supplier and the internal customer and should provide them both with an incentive to carry out the internal transaction where it is worthwhile from the Group's viewpoint to do so.
- The policy should reflect the capacity constraints and market demand for the item being transferred. Therefore the transfer price should take account ofthe the supplier's opportunity cost.
- The policy should provide autonomy to both the internal supplier and the internal customer to make their own decisions concerning internal transactions.

Section A – Compulsory

Question One This question tests candidates knowledge and understanding of variance analysis to interpret the data provided and then requires them to calculate the rate of learning that occurred in part (a) and use this in part (b) to determine the total labour cost of a product. This question addresses the following learning outcome: *apply learning curves to estimate time and cost for new products and services.*

Question Two This question tests candidates' knowledge of JIT production systems and how their use may impact on the profits of an organisation. This question addresses the following learning outcome: *evaluate the impacts of just-in-time production, the theory of constraints and total quality management on efficiency, inventory and cost.*

Question Three This question tests candidates' understanding of the advantages and disadvantages of involving staff in the budget preparation process. This question addresses the following learning outcome: *discuss the impact of budgetary control systems and setting of standard costs on human behaviour.*

Question Four This question tests candidates' knowledge of flexible budgets and the use of variance analysis to measure performance by requiring candidates to calculate variances and present them in the format of a profit reconciliation statement. This question addresses the following learning outcome: *evaluate performance using fixed and flexible budget reports.*

Question Five This question tests candidates' understanding of Total Quality Management (TQM) and how it may be used to gain competitive advantage in the banking sector. This question addresses the following learning outcome: *prepare cost of quality reports*

Section B – Compulsory

Question Six This question tests candidates' ability to interpret the data provided to solve a scarce resource problem and measure the sensitivity of the solution to a change in the value of one of the input variables. This question addresses the following learning outcomes: *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 *discuss the meaning of optimal solutions and how linear programming methods can be employed for profit maximising, revenue maximising and satisfying objectives* and *analyse the impact of uncertainty and risk on decision models based on CVP analysis.*

Question Seven This question tests candidates' ability to interpret the data provided and measure the performance of two companies within a group and the impact that internal transactions and their transfer prices have on the performance of each company. Finally candidates are asked to explain the factors to be considered when setting a transfer pricing policy. This question addresses the following learning outcomes: *discuss alternative measures of performance for responsibility centres* and *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.*