Fundamentals Level – Skills Module

Performance Management

Monday 13 June 2011

Paper F5

The Association of Chartered Certified Accountants

ACCA

ALL FIVE questions are compulsory and MUST be attempted

1 Cement Co is a company specialising in the manufacture of cement, a product used in the building industry. The company has found that when weather conditions are good, the demand for cement increases since more building work is able to take place. Last year, the weather was so good, and the demand for cement was so great, that Cement Co was unable to meet demand. Cement Co is now trying to work out the level of cement production for the coming year in order to maximise profits. The company doesn't want to miss out on the opportunity to earn large profits by running out of cement again. However, it doesn't want to be left with large quantities of the product unsold at the end of the year, since it deteriorates quickly and then has to be disposed of. The company has received the following estimates about the probable weather conditions and corresponding demand levels for the coming year:

Weather	Probability	Demand
Good	25%	350,000 bags
Average	45%	280,000 bags
Poor	30%	200,000 bags

Each bag of cement sells for $9 and costs $4 to make. If cement is unsold at the end of the year, it has to be disposed of at a cost of $0·50 per bag.

Cement Co has decided to produce at one of the three levels of production to match forecast demand. It now has to decide which level of cement production to select.

Required:

(a) Construct a pay off table to show all the possible profit outcomes. (8 marks)

(b) Decide the level of cement production the company should choose, based on the following decision rules:

    (i) Maximin (1 mark)

    (ii) Maximax (1 mark)

    (iii) Expected value (4 marks)

    You must justify your decision under each rule, showing all necessary calculations.

(c) Describe the 'maximin' and 'expected value' decision rules, explaining when they might be used and the attitudes of the decision makers who might use them. (6 marks)

(20 marks)

2 Heat Co specialises in the production of a range of air conditioning appliances for industrial premises. It is about to launch a new product, the 'Energy Buster', a unique air conditioning unit which is capable of providing unprecedented levels of air conditioning using a minimal amount of electricity. The technology used in the Energy Buster is unique so Heat Co has patented it so that no competitors can enter the market for two years. The company's development costs have been high and it is expected that the product will only have a five-year life cycle.

Heat Co is now trying to ascertain the best pricing policy that they should adopt for the Energy Buster's launch onto the market. Demand is very responsive to price changes and research has established that, for every $15 increase in price, demand would be expected to fall by 1,000 units. If the company set the price at $735, only 1,000 units would be demanded.

The costs of producing each air conditioning unit are as follows:

	$	
Direct materials	42	
Labour	12	(1·5 hours at $8 per hour. See note below)
Fixed overheads	6	(based on producing 50,000 units per annum)
Total cost	60	

Note

The first air conditioning unit took 1·5 hours to make and labour cost $8 per hour. A 95% learning curve exists, in relation to production of the unit, although the learning curve is expected to finish after making 100 units. Heat Co's management have said that any pricing decisions about the Energy Buster should be based on the time it takes to make the 100th unit of the product. You have been told that the learning co-efficient, b = –0·0740005.

All other costs are expected to remain the same up to the maximum demand levels.

Required:

(a) (i) Establish the demand function (equation) for air conditioning units; (3 marks)

   (ii) Calculate the marginal cost for each air conditioning unit after adjusting the labour cost as required by the note above; (6 marks)

   (iii) Equate marginal cost and marginal revenue in order to calculate the optimum price and quantity. (3 marks)

(b) Explain what is meant by a 'penetration pricing' strategy and a 'market skimming' strategy and discuss whether either strategy might be suitable for Heat Co when launching the Energy Buster. (8 marks)

(20 marks)

3 Noble is a restaurant that is only open in the evenings, on SIX days of the week. It has eight restaurant and kitchen staff, each paid a wage of $8 per hour on the basis of hours actually worked. It also has a restaurant manager and a head chef, each of whom is paid a monthly salary of $4,300. Noble's budget and actual figures for the month of May was as follows:

	Budget		Actual	
Number of meals	1,200		1,560	
	$	$	$	$
Revenue: Food	48,000		60,840	
Drinks	12,000		11,700	
		60,000		72,540
Variable costs:				
Staff wages	(9,216)		(13,248)	
Food costs	(6,000)		(7,180)	
Drink costs	(2,400)		(5,280)	
Energy costs	(3,387)		(3,500)	
		(21,003)		(29,208)
Contribution		38,997		43,332
Fixed costs:				
Manager's and chef's pay	(8,600)		(8,600)	
Rent, rates and depreciation	(4,500)	(13,100)	(4,500)	(13,100)
Operating profit		25,897		30,232

The budget above is based on the following assumptions:

1   The restaurant is only open six days a week and there are four weeks in a month. The average number of orders each day is 50 and demand is evenly spread across all the days in the month.

2   The restaurant offers two meals: Meal A, which costs $35 per meal and Meal B, which costs $45 per meal. In addition to this, irrespective of which meal the customer orders, the average customer consumes four drinks each at $2·50 per drink. Therefore, the average spend per customer is either $45 or $55 including drinks, depending on the type of meal selected. The May budget is based on 50% of customers ordering Meal A and 50% of customers ordering Meal B.

3   Food costs represent 12·5% of revenue from food sales.

4   Drink costs represent 20% of revenue from drinks sales.

5   When the number of orders per day does not exceed 50, each member of hourly paid staff is required to work exactly six hours per day. For every incremental increase of five in the average number of orders per day, each member of staff has to work 0·5 hours of overtime for which they are paid at the increased rate of $12 per hour. You should assume that all costs for hourly paid staff are treated wholly as variable costs.

6   Energy costs are deemed to be related to the total number of hours worked by each of the hourly paid staff, and are absorbed at the rate of $2·94 per hour worked by each of the eight staff.

Required:

(a) Prepare a flexed budget for the month of May, assuming that the standard mix of customers remains the same as budgeted.
(12 marks)

(b) After preparation of the flexed budget, you are informed that the following variances have arisen in relation to total food and drink sales:

Sales mix contribution variance $1,014 Adverse
Sales quantity contribution variance $11,700 Favourable

Required:

BRIEFLY describe the sales mix contribution variance and the sales quantity contribution variance. Identify why each of them has arisen in Noble's case. (4 marks)

(c) Noble's owner told the restaurant manager to run a half-price drinks promotion at Noble for the month of May on all drinks. Actual results showed that customers ordered an average of six drinks each instead of the usual four but, because of the promotion, they only paid half of the usual cost for each drink. You have calculated the sales margin price variance for drink sales alone and found it to be a worrying $11,700 adverse. The restaurant manager is worried and concerned that this makes his performance for drink sales look very bad.

Required:

Briefly discuss TWO other variances that could be calculated for drinks sales or food sales in order to ensure that the assessment of the restaurant manager's performance is fair. These should be variances that COULD be calculated from the information provided above although no further calculations are required here.

(4 marks)

(20 marks)

4 (a) Brace Co is an electronics company specialising in the manufacture of home audio equipment. Historically, the company has used solely financial performance measures to assess the performance of the company as a whole. The company's Managing Director has recently heard of the 'balanced scorecard approach' and is keen to learn more.

Required:

Describe the balanced scorecard approach to performance measurement. (10 marks)

(b) Brace Co is split into two divisions, A and B, each with their own cost and revenue streams. Each of the divisions is managed by a divisional manager who has the power to make all investment decisions within the division. The cost of capital for both divisions is 12%. Historically, investment decisions have been made by calculating the return on investment (ROI) of any opportunities and at present, the return on investment of each division is 16%.

A new manager who has recently been appointed in division A has argued that using residual income (RI) to make investment decisions would result in 'better goal congruence' throughout the company.

Each division is currently considering the following separate investments:

	Project for Division A	Project for Division B
Capital required for investment	$82·8 million	$40·6 million
Sales generated by investment	$44·6 million	$21·8 million
Net profit margin	28%	33%

The company is seeking to maximise shareholder wealth.

Required:

Calculate both the return on investment and residual income of the new investment for each of the two divisions. Comment on these results, taking into consideration the manager's views about residual income.

(10 marks)

(20 marks)

5 Thin Co is a private hospital offering three types of surgical procedures known as A, B and C. Each of them uses a pre-operative injection given by a nurse before the surgery. Thin Co currently rent an operating theatre from a neighbouring government hospital. Thin Co does have an operating theatre on its premises, but it has never been put into use since it would cost $750,000 to equip. The Managing Director of Thin Co is keen to maximise profits and has heard of something called 'throughput accounting', which may help him to do this. The following information is available:

1   All patients go through a five step process, irrespective of which procedure they are having:

– step 1: consultation with the advisor;
– step 2: pre-operative injection given by the nurse;
– step 3: anaesthetic given by anaesthetist;
– step 4: procedure performed in theatre by the surgeon;
– step 5: recovery with the recovery specialist.

2   The price of each of procedures A, B and C is $2,700, $3,500 and $4,250 respectively.

3   The only materials' costs relating to the procedures are for the pre-operative injections given by the nurse, the anaesthetic and the dressings. These are as follows:

	Procedure A $ per procedure	Procedure B $ per procedure	Procedure C $ per procedure
Pre-operative nurse's injections	700	800	1,000
Anaesthetic	35	40	45
Dressings	5·60	5·60	5·60

4   There are five members of staff employed by Thin Co. Each works a standard 40-hour week for 47 weeks of the year, a total of 1,880 hours each per annum. Their salaries are as follows:

– Advisor: $45,000 per annum;
– Nurse: $38,000 per annum;
– Anaesthetist: $75,000 per annum;
– Surgeon: $90,000 per annum;
– Recovery specialist: $50,000 per annum.

The only other hospital costs (comparable to 'factory costs' in a traditional manufacturing environment) are general overheads, which include the theatre rental costs, and amount to $250,000 per annum.

5   Maximum annual demand for A, B and C is 600, 800 and 1,200 procedures respectively. Time spent by each of the five different staff members on each procedure is as follows:

	Procedure A Hours per procedure	Procedure B Hours per procedure	Procedure C Hours per procedure
Advisor	0·24	0·24	0·24
Nurse	0·27	0·28	0·30
Anaesthetist	0·25	0·28	0·33
Surgeon	0·75	1	1·25
Recovery specialist	0·60	0·70	0·74

Part hours are shown as decimals e.g. 0·24 hours = 14·4 minutes (0·24 x 60).

Surgeon's hours have been correctly identified as the bottleneck resource.

Required:

(a) Calculate the throughput accounting ratio for procedure C.

Note: It is recommended that you work in hours as provided in the table rather than minutes. (6 marks)

(b) The return per factory hour for products A and B has been calculated and is $2,612·53 and $2,654·40 respectively. The throughput accounting ratio for A and B has also been calculated and is 8·96 and 9·11 respectively.

Calculate the optimum product mix and the maximum profit per annum. (7 marks)

(c) Assume that your calculations in part (b) showed that, if the optimum product mix is adhered to, there will be excess demand for procedure C of 696 procedures per annum. In order to satisfy this excess demand, the company is considering equipping and using its own theatre, as well as continuing to rent the existing theatre. The company cannot rent any more theatre time at either the existing theatre or any other theatres in the area, so equipping its own theatre is the only option. An additional surgeon would be employed to work in the newly equipped theatre.

Required:

Discuss whether the overall profit of the company could be improved by equipping and using the extra theatre.

Note: Some basic calculations may help your discussion. (7 marks)

(20 marks)

Formulae Sheet

Learning curve

$Y = ax^b$

Where Y = cumulative average time per unit to produce x units
   a = the time taken for the first unit of output
   x = the cumulative number of units produced
   b = the index of learning (log LR/log2)
   LR = the learning rate as a decimal

Regression analysis

$y = a + bx$

$$b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2}$$

$$a = \frac{\sum y}{n} - \frac{b\sum x}{n}$$

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{(n\sum x^2 - (\sum x)^2)(n\sum y^2 - (\sum y)^2)}}$$

Demand curve

$P = a - bQ$

$$b = \frac{\text{change in price}}{\text{change in quantity}}$$

a = price when Q = 0

$MR = a - 2bQ$

End of Question Paper