

COST ACCOUNTING AND QUANTITATIVE ANALYSIS

Foundation stage examination 4 December 2002

From 10.00 am to 1.00 pm
plus ten minutes reading time from 9.50 am to 10.00 am.

Instructions to candidates

Answer **four** questions in total: All questions carry equal marks.

All workings should be shown. Where calculations are required using formulae, calculators may be used but steps in the workings must be shown. Calculations with no evidence of this (for example, using the scientific functions of calculators) will receive no credit. Programmable calculators are not permitted in the examinations room.

Formula sheets, statistical tables, graph paper and cash analysis paper are available from the invigilator, where applicable.

Where a question asks for a specific format or style, such as a letter, report or layout of accounts, marks will be awarded for presentation and written communication.



1 Dawson Supplies is a small organisation involved in the manufacture of a component for handheld computers. The founder, Arthur Dawson, is supported by two production workers with his wife Mabel taking care of all non production matters such as sales, purchasing and all administration.

Accounting support consists of the local accounting firm Tick, Turn and Charge coming in at the end of the year to write up the books and tell Arthur how much profit he has made (assuming that there is some).

For a couple of years, as the organisation has grown, Arthur has pondered about the benefits of employing an accountant/administrator on a full time basis, but is a little unsure about the role of an accountant and the benefits of such a move.

For the year just ended however, some limited statistics and comments were produced by a niece of Mabel, who spent two weeks at Dawson Supplies prior to taking up her place at university. Unfortunately Arthur and Mabel seem to have lost most of the niece’s work, with the following scrap of paper being all that survived:

“...found following statistics in the trade magazine. I wonder if there is a link between sales and advertising spending. Might be worth checking out...”

Organisation	Advertising Spending	Units sold
	£	
A	10,000	14,000
B	5,000	1,200
C	1,000	1,700
D	8,000	15,000
E	25,000	28,000
F	2,000	3,000

• **Requirement for question 1**

- (a) Describe briefly the role of a cost & management accountant and compare it with that of a financial accountant. 6
- (b) State the problems Dawson Supplies would have if they continue without any internal accounting support. 4
- (c) Calculate the degree of correlation between the spending on advertising and the number of units sold for the six organisations shown (full workings should be shown); comment on the findings and state briefly any assumptions made. 8

- (d) The six advertising spending figures are a sample (random) taken from a large survey conducted by the trade magazine. If the mean of this sample is £8,500 and the standard deviation is £8,780.66, then establish the 95% confidence limits (two tailed) for the population mean (average advertising spending) and comment briefly on the result. 6
- (e) If the 99% confidence limits were required, would the range of values become wider or narrower? 1

(25)

2

Ross and Sons is a medium-sized manufacturing organisation situated in the town of Glendale. Work is carried out on individual jobs as ordered by customers and production takes place in three departments: a Machining Department, an Assembly Department and a Finishing Department.

At present, production overheads are charged to the jobs carried out by means of a single blanket overhead absorption rate for the whole factory. The absorption base used is direct labour cost. The following table shows the budgeted information that was available at the start of the last costing period. Ross and Sons used this information to set up a predetermined overhead absorption rate and used this during the subsequent costing period to charge/absorb production overhead costs to jobs.

Department	Budgeted production overheads	Budgeted machine hours	Budgeted labour hours	Budgeted labour cost
	£	Hours	Hours	£
Machining	20,000	100,000	50,000	250,000
Assembly	40,000	10,000	20,000	150,000
Finishing	50,000	Nil	10,000	40,000
TOTALS	110,000	110,000	80,000	440,000

During the costing period a particular piece of work carried out was Job XYZ. The following table shows actual direct costs and timings incurred on Job XYZ as it was processed through the three departments:

	Machining	Assembly	Finishing
Direct materials (£)	500	100	100
Direct labour (£)	200	400	100
Machine hours (Hrs)	70	20	Nil
Labour hours (Hrs)	40	50	30

At the end of the costing period the following costs and timings were ascertained for the whole factory (three departments):

Department	Actual production overheads	Actual machine hours	Actual labour hours	Actual labour cost
	£	Hours	Hours	£
Machining	24,000	98,000	48,000	240,000
Assembly	50,000	9,800	24,000	180,000
Finishing	40,000	Nil	10,000	44,000
TOTALS	114,000	107,800	82,000	464,000

- **Requirement for question 2**

- (a) Calculate the predetermined overhead absorption rate (the blanket rate) which was used throughout the costing period. 2
- (b) Using this rate, calculate the total production cost of Job XYZ. 3
- (c) Calculate the total amount of under/over absorption at the end of the year (using the present absorption base), showing amounts for the three departments, as well as a factory-wide total. 4
- (d) Discuss the advantages and disadvantages of using individual departmental absorption rates instead of the present blanket rate. 4
- (e) Establish individual departmental overhead absorption rates using appropriate bases of absorption and recalculate the production cost of Job XYZ using those individual rates. 5
- (f) Recalculate the amounts of under/over absorption for the individual departments and factory wide total and comment on the results compared with amounts calculated in part (c). 4
- (g) George Ross would like a chart for his office showing overhead costs. He has heard of *histogram*, *frequency polygon* and *ogive*, but would like a brief explanation of these terms. 3

(25)

3

Singleton Electrical is a small manufacturing organisation which builds specialist testing equipment to individual customer specifications.

The labour force consists of 5 technicians who are paid £10 per hour for a 40 hour week and each worker is entitled to 6 weeks leave a year. Every week of the year the individual workstation of each technician has to be shutdown for 4 hours for specialist cleaning and recalibration. The technicians are allowed time for meal breaks, union meetings and training, which is the equivalent of 4 days per person per year and sickness normally adds 1 more day per person per year. (NB assume that a year consists of 52 weeks – 5 days, 40 hours per week).

Singleton has been approached by two new customers with requests to carry out work for them. The details of these two possible new pieces of work are as follows:

Contract A

This would require 200 hours of technicians’ time to complete. The materials required are subject to volatile price fluctuations on the world market. The Chief Accountant at Singleton states “there is a 50% chance that the materials cost for this contract will be £4,000, a 30% probability of £2,000 and a 20% chance they will cost £5,000”. The customer has said that they will pay £7,500 for the work.

Contract B

This contract is estimated to need 100 hours of technicians’ time to complete and the direct materials required are expected to cost £4,000. This customer is willing to pay £7,000 maximum for the work.

NB It is usual for Singleton to add 25% as an on-cost to cover non-production costs and allow for a profit margin on their work.

• **Requirement for question 3**

- (a) Explain the difference between *payroll accounting* and *labour cost accounting*. 4
- (b) Calculate the productive direct labour rate per hour which Singleton should use to price contracts/pieces of work for customers. 6
- (c) Explain what is meant by the term *expected value* and state any assumptions which have to be made when using expected values. 4
- (d) Evaluate the two possible contracts from both a financial and non-financial point of view and advise the management of Singleton whether or not to accept. 8
- (e) Singleton is considering the introduction of a group incentive bonus scheme for technicians. Briefly describe the disadvantages of such a scheme. 3

(25)

4

Bruce Transport is a transport company which operates fleets of buses throughout the county. There are 6 double decker buses in the fleet and 12 single decker coaches. The following information is available relating to the operation of the fleet for the year just ended:

	Single deck	Double deck
The capital cost per vehicle	£60,000	£120,000
Average distance travelled (per vehicle per annum)	50,000km	50,000km
Fuel consumption (km per litre)	4	3
Tyre replacement costs (per km)	£0.20	£0.30
Drivers' wages per vehicle per annum –		
Basic pay (including holiday pay)	£20,000	£20,000
Vehicle licences (each)	£1,000	£1,500
Vehicle insurance (each)	£4,000	£6,000
Cost of diesel (bulk discount £ per litre)	£0.40	£0.40

The following additional information is also available:

- (i) Overtime pay for drivers amounted to 5% of basic pay. Pension contributions and other benefits amounted to 10% of basic pay. In addition, the drivers operating the double decker buses received a special bonus of £500 following some changes in working conditions.
- (ii) It is company policy to depreciate all vehicles on a straight line basis over ten years. (Assume zero residual value). A further 5% of the capital cost of the vehicles is charged to operating costs as a notional interest charge.
- (iii) Any maintenance and repairs are carried out in a company garage which employs two full-time mechanics at an average salary (each) of £15,000. The total cost of maintenance materials and spare parts used was £24,000.
- (iv) Central support costs were recharged from Head Office at the year end and amounted to £240,000 in total.

The management of Bruce Transport has a target cost per kilometre of £1.50 and would like to know if this was achieved for the year just ended.

As well as investigating costs of the operation, the management of Bruce Transport is also interested in the time a journey on Route 27 takes to go from Pillartown to Postville. A large number of journeys were analysed and it was found that the average journey time was 3 hours 35 minutes, with a standard deviation of 15 minutes. (NB journey times follow a normal distribution pattern).

- **Requirement for question 4**

- (a) Produce a table of operating costs for the two types of bus for the last year. The table should show unit costs per km, as well as total costs for the fleet of both single and double deckers. 10
- (b) Compare the calculated unit costs against the target cost and briefly comment on the findings. 5
- (c) Using the information on journey times for Route 27, calculate the probability that a journey takes:
- (i) longer than 4 hours;
 - (ii) less than 3 hours. 6
- (d) Bruce Transport are considering the use of *Time Series Analysis* as an aid for analysing and forecasting income from routes. Explain the difference between the *multiplicative* and *additive* models. 4
- (25)

5

Wilson plc produce fruit pies for supply to supermarkets throughout the country. A single type of pie is produced which consists of the pastry case and mixed fruit filling. A standard costing system is used and normal output is 100,000 pies per month. The following information is available for the month just ended:

Materials used

Filling	4,200kg	(Actual price paid £5.20 per kg)
Pastry	2,500kg	(Actual price paid £1.90 per kg)
Labour costs	£17,000	
Number of pies produced	80,000	

The company’s computer system holds the standard cost card containing information regarding standard costs and amounts which should be used in pie production. Each pie should contain 50gm of filling and 30gm of pastry, at a cost of £5.00 and £2.00 per kg respectively. With regard to labour cost and usage, pie production should normally achieve a rate of 50 pies per hour worked. The wage rate should be £9.50 per hour, but for last month the company had to pay 50p per hour more than standard.

The amount of filling used over the last 6 months has been recorded and the quantities are as follows:

Month	Amount (kg)
1	4,000
2	4,100
3	4,400
4	3,900
5	4,000
6	4,200

The managing director of Wilson would like to see some statistical analysis carried out on amounts of filling used. He has been told that the filling quantities *follow a normal distribution about the filling machine’s mean weight setting*, but he is not exactly sure what this means.

• **Requirement for question 5**

- (a) Calculate the materials variances (cost, price and usage) and the labour variances (cost, rate and efficiency) for the month just ended. 9
- (b) Comment briefly on the findings for the management of Wilson. 4
- (c) Suggest *in general terms* three possible causes of a materials price variance and a materials usage variance. 3

- (d) Calculate the mean and standard deviation of the six filling amounts.
(NB all workings must be shown). 4
 - (e) Describe the characteristics of a normal distribution. 5
- (25)