# COST ACCOUNTING AND QUANTITATIVE ANALYSIS

# Foundation stage examination 4 June 2003

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 e qual 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.

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.

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

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A Kelly plc is a small manufacturing company situated in the city of Coastville. They produce a component which is used in the fishing industry as part of navigation equipment.

The cost of this product is as follows:

Direct materials	£7 per unit
Direct wages	£10 per unit
Fixed production overheads	£3 per unit (based on normal production level of 20,000 units per month)

The selling price of the product is £30 each.

Production and sales quantities for Months 1 and 2 were as follows:

	Month 1	Month 2
Production	20,000 units	20,000 units
Sales	18,000 units	21,500 units

(NB: There were no opening stocks at the start of Month 1.)

## • Requirement for question 1

- (a) Prepare operating statements for each of the two months using:
  - (i) Marginal costing.

	(ii)	Absorption costing.	8
(b)	Prep repo	pare a statement that reconciles the difference between the monthly profits orted in the operating statements in (a).	3
(c)	Dese	cribe the advantages and disadvantages of each approach.	4
(d)	Whe 40 o cheo resp signi	en completed the component is supposed to have an electrical resistance of hms. A sample of five components was tested and the electrical resistance cked. The five components had resistance of 41, 39, 37, 40 and 38 ohms ectively. Is the claim of a 40 ohm resistance justified at the 5% level of ficance?	8
(e)	Expl testi	ain the difference between a Type 1 and Type 2 error, when hypothesis ng.	2
			(25)



Bruce Crossings is an engineering company which designs and builds large bridges and tunnels for governments around the world. A typical project will take some 3 or 4 years from start to finish.

At the beginning of 2002 Bruce Crossings started two projects for the government of Tepiland – a tunnel (agreed contract price  $\pounds 10m$ ) and a bridge (agreed contract price  $\pounds 6m$ ).

The details for the year ended 31 December 2002 are as follows:

	Bridge	Tunnel
	£000	£000
Materials delivered to sites	900	550
Wages paid	850	800
Managers' salaries	200	250
Hire of plant and machinery	100	100

#### Notes:

- (i) Value of materials still on sites at 31 December 2002 was £50,000 (Bridge contract) and £20,000 (Tunnel contract).
- (ii) On the Bridge contract, wages accrued amount to £20,000, but on the Tunnel contract prepaid wages were £40,000.
- (iii) Work in progress (cost of work not certified) amounts to £40,000 (Bridge contract) and £20,000 (Tunnel contract).

The value of work which had been certified at 31 December 2002 was £2,800,000 on the Bridge contract and £1,500,000 on the Tunnel contract.

As well as hiring some plant and machinery for these contracts, Bruce Crossings also used some heavy plant for digging foundations and excavations. This digging machinery was transferred to the contracts at a net book value of £200,000 (Bridge contract) and £450,000 (Tunnel contract). It is company policy to depreciate such equipment at 10% per annum. (NB This equipment was used from day one of each contract.)

Central overheads are charged to contracts on the basis of 10% of management salaries and the agreed retention rate is 5% of the value of work certified by the architects on both contracts.

The Ministry of Highways in Tepiland commissioned some research into possible traffic flows across the new bridge, based on figures from similar crossings in another part of the country. It seems that there might be a link between charges made and the number of vehicles using a crossing. The following data is available:

Charge	Vehicles per week
Pence	
80	69,000
90	66,000
100	61,000
110	57,000
120	51,000

# • Requirement for question 2

(a) For each contract:

	(i)	Construct a contract account for the year ended 31 December 2002.	12
	(ii)	Determine the profit or loss which should be taken in the year to 31 December 2002.	4
	(iii)	Explain the general principle behind the reporting of profits on long-term contracts and explain why the profit or loss taken is as suggested in (ii) above.	3
(b)	Calc base	ulate the degree of correlation between charges and vehicles per week, d on the given figures. Briefly state any assumptions made.	6
			(25)

3

Saville Supplies uses a chemical called Kilbanite in the production of its products and this chemical has to be bought in frequently and used quite quickly because of its volatile nature. The price paid for Kilbanite also tends to change widely and frequently. This can cause problems when costing jobs and charging customers for work which contains Kilbanite.

The following table shows details of Kilbanite purchases over the last month:

Date	Quantity	Price paid
	Kilo	£ per kg
3 May	100	22
9 May	300	25
17 May	120	30

There was a stock of 80 kilos of Kilbanite at the beginning of May, which had a total value of £1,600.

Issues to production for the month of May were as follows:

8 May 150 kilos 16 May 200 kilos 28 May 150 kilos

A newly appointed Director of the company has taken an interest in financial matters at Saville Supplies and has written asking for some accounting terms to be defined. In particular, he is not sure of the difference between cost allocation, cost apportionment and cost absorption.

Because of the volatile nature of Kilbanite prices, Saville Supplies is considering entering into a longer term agreement with a supplier, with increases in prices being index linked. Wilko Minerals are suggesting a contract where the price is automatically increased each month by 0.2%. Ashworth Aggregates, however, suggest an automatic price increase of 0.7% per quarter. (NB both proposals should be appraised using £32 per kilo as the initial starting price at the end of May and to show how the suppliers' prices compare by the end of another 3 years.)

### • Requirement for question 3

(a)	Calculate the value of closing stock for Kilbanite as at 31 May, and the cost of materials issued to production for the month of May, using FIFO; LIFO; and Weighted Average Cost methods.	12
(b)	List and describe three further methods which could be used to price material issues.	6
(c)	Explain the difference between cost allocation, cost apportionment and cost absorption.	3
(d)	Calculate the price of Kilbanite at the end of three years for both the proposals suggested.	4

(25)

4

Lawton Enterprises specialises in custom built heating control systems and uses an absorption costing system to establish a full cost. Production is carried out in an Assembly Department and a Wiring Department.

Production overheads are absorbed by using predetermined overhead absorption rates – a direct labour hour rate for the Assembly Department and a machine hour rate for the Wiring Department.

The following estimates were made at the beginning of the financial year which started on 1 January:

	Wiring department	Assembly department
Direct labour costs (£)	150,000	450,000
Production overheads (£)	500,000	450,000
Direct labour usage (hours)	20,000	90,000
Machine usage (hours)	50,000	12,000

During the month of April an order was received from a customer for Job XYZ. The following actual times and costs were recorded for this job:

	Wiring department	Assembly department
Materials used (£)	800	200
Direct labour cost (£)	160	190
Direct labour hours	20	30
Machine hours	21	10

At the end of the financial year on 31 December, it was ascertained that the actual production overheads incurred by the Wiring Department were £520,000 and those incurred by the Assembly Department were £440,000. Also, the actual direct labour hours worked in the Assembly Department were 80,000 hours and actual machine hours worked in the Wiring Department were 52,000 hours.

#### • Requirement for question 4

(a)	Calculate the predetermined overhead absorption rates used by the two production departments.	3
(b)	Determine the total production costs which would be charged to Job XYZ.	3
(c)	Establish the under/over absorption of overheads for each department, identify the causes giving rise to the under/over absorption and state the amount attributable to each cause.	8
(d)	Name four other absorption bases which can be used, other than the direct labour hour and machine hour methods adopted by Lawton Enterprises.	4

(e) A survey has been carried out of the amounts of Category 4 wire which have been used over the last 12 months. The results were as follows:

Month	1	2	3	4	5	6	7	8	9	10	11	12
Wire (km)	24	22	26	23	27	26	25	28	23	26	24	27

Calculate the mean, median and mode amounts of monthly wire usage and briefly state an advantage for each type of average.

7

(25)



Kendall Manufacturing make and sell a single product called the Youngstar. The prime cost of a Youngstar is £12 (Direct Labour £4 per unit and Direct Materials £8 per unit).

The Cost Accountant at Kendall Manufacturing has been analysing overhead costs. Non-production overheads amount to £840,000 per annum, spread evenly over the 12 months. Production overheads have been more difficult to estimate. The Cost Accountant believes that production overheads exhibit a semi-variable cost behaviour. To help with the analysis, a record of production overhead costs has been kept for the last six months, as follows:

	Units 000	Costs £000
Month 1	21	380
Month 2	33	396
Month 3	40	462
Month 4	42	486
Month 5	50	558
Month 6	60	580
Total	246	2,862

The Cost Accountant would like to know what total costs will amount to for the next three months (months 7 to 9). The Sales Manager expects that sales might dip in month 7, but then continue the general upward trend. He is forecasting sales of 45,000 units for month 7, followed by 65,000 units and 70,000 units in months 8 and 9 respectively.

### • Requirement for question 5

(a) Estimate, using both the least squares (single regression) method and the high- low method, the fixed costs per month and the variable cost per unit for production overheads.	- 10
production overneads.	10
(b) Using the figures calculated in part (a), estimate for both methods the total cos for months 7 to 9.	t 4
(c) Comment on the results of the calculations in (a) and (b).	5
(d) Describe briefly and show in graphical form, a fixed cost, a variable cost and a semi-fixed cost.	6
	(25)