COST ACCOUNTING AND QUANTITATIVE ANALYSIS

Foundation stage examination
6 June 2001

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.

1 Beaties Home Furnishing Company manufactures an exclusive range of settees for the domestic consumer. Their Snuggles settee is particularly popular with consumers.

A summary of production numbers and costs of the Snuggles settee for a recent full working week (Monday to Saturday) is as follows:

Day	**Number of "Snuggles" produced**	**Manufacturing cost £000**
Monday	25	8.6
Tuesday	21	8.3
Wednesday	28	9.2
Thursday	22	8.5
Friday	25	8.8
Saturday	23	8.5
Total	144	51.9

Due to the popularity of the Snuggles settee, production is to be increased to 30 Snuggles per day from next month. Variable costs per unit will remain the same, but fixed costs will increase by £500 per day. The marketing department sets prices based on the manufacturing cost, and is keen to understand the cost implications of the increase in production.

- **Requirement for question 1**

(a) Explain the terms fixed cost, variable cost, semi-fixed cost and semi-variable cost. Illustrate each diagrammatically and give two examples of each cost type. *6*

(b) Based on the six day data provided above, use linear regression to calculate the following:

(i) The current fixed cost per day, and the variable cost of producing a Snuggles settee.

(ii) The percentage change in *unit cost* (cost per settee) due to production increasing to 30 settees per day. Comment on the result.

13

(c) Calculate the correlation coefficient (r), and comment on how good the level of production is as a predictor of cost. *6*

(25)

2 Vobis Construction plc is currently part way through two construction projects with public sector organisations. The first, which commenced on 1 July 2000, involves refurbishing a new wing at Bovis NHS Trust, and the second which started on 1 October 2000, involves construction of new secure accommodation at the Catlan Prison complex. The fixed contract prices are £1.675 million and £950,000 respectively and the details for the financial year ended 31 March 2001 are as follows:

	Bovis NHS Trust	**Catlan Prison**
Transactions during the year:		
Materials delivered	£468,000	£185,000
Direct wages (effective hours worked)	17,000 hours	5,500 hours
Site foreman salary	£20,000	£14,000
Hire of machinery	£77,000	£25,000
Balances at 31 March 2001:		
Materials on site	£121,000	£92,000
Salary accrued for site foreman	£8,000	£6,500
Work in Progress (cost of work not certified)	£45,000	£42,000

The value of work certificated is £902,500 for the NHS Trust project and £190,000 for the Prison project.

The following additional information is available:

Direct Labour: It is company policy to calculate an average effective hourly rate for labour and then charge this to contracts according to the number of recorded direct hours. The effective hourly rate needs to be calculated from the following information:

- Average annual wage for a direct labour employee is £23,000
- Average employer costs to be added is 12% (NI and Pension)
- Workers paid for 52 weeks a year, for 5 days per week and for 8 hours per day
- An allowance per person of 3 days per year is made for sickness and 2 days per year for training
- Annual leave entitlement is 5 weeks per person

Machinery: Machinery was transferred to the contracts at a net book value of £200,000 for Bovis and £450,000 for Catlan. Equipment was used from day one of each contract and it is company policy to depreciate equipment at 10% per annum.

Central overheads are charged to contracts at £0.70 per direct labour hour, and the agreed retention rate for both contracts is 5% of the value of the work certified by the independent surveyors.

- **Requirement for question 2**

(a) Calculate the effective hourly rate for direct labour at Vobis Construction plc. *3*

(b) For each contract:

(i) Construct a contract account for the year ended 31 March 2001.

(ii) Calculate the profit or loss which should be taken in the year to 31 March 2002.

(iii) Explain the general principle behind reporting of profits on long-term contracts and explain why the profit or loss taken is as suggested in part (ii) above.

17

(c) Vobis also has another contract with an agreed completion date of 28 February 2002 and is currently experiencing delays due to the complex design. The board is concerned that there are penalties of £250,000 for each month's delay and has to make a decision whether to hire specialist engineering consultants, at a cost of £200,000, to assist with the contract.

If the company takes no action, there is only a 25% chance of completing the contract on time, and delays could be one, two or three months, with equal probabilities. The board believes that if they hire specialist engineering consultants, their chance of completing on time will be doubled, and that, if the completion was still late, it would only be by one or two months, with equal probabilities.

(i) Calculate the expected value of additional cost for each option, and conclude whether, on this basis, the specialist engineering consultants should be hired.

(ii) Explain what other financial and non-financial considerations should be taken into account.

5

(25)

3

Amerton plc produces and sells one product – the Barter. Standard costs have been calculated from past samples of production, updated for inflation. The following are the standard direct costs for Barters:

	Usage	**Price**	**£**
Materials:			
Plastic	0.6 kg	£3.50 / kg	2.10
Wood	2.4 kg	£4.50 / kg	10.80
Labour	2.0 hrs	£7.75 / hr	15.50

Budgeted production and sales for the year was 5,000 Barters. At this level of production and sales, variable production overheads of £23,000 were anticipated, along with sales income of £250,000.

The actual results from sales of Barters were:

	£/unit	**£**
Sales (5,500 Barters)	49.50	272,250
Variable cost of sales (5,500 Barters):		
Plastic	3.80 / kg	10,450
Wood	4.60 / kg	63,250
Labour	7.50 / hr	85,800
Variable overheads		22,000
Total variable cost of sales		181,500
Contribution		90,750

- **Requirement for question 3**

(a) Explain the difference between flexible budgeting and standard costing. *2*

(b) Calculate all materials, labour and sales margin variances. *13*

(c) Discuss the results of the **labour** and **sales margin** variance analysis calculated in part (b), including possible reasons for the variances. *4*

(d) The production manager is testing all of the usage assumptions in the production of Barters. For labour, a sample of 37 recently produced Barters was investigated and it was found that the average time taken to manufacture one Barter was 1.8 hours with a standard deviation of 0.6 hours.

(i) Test at the 95% and 99% significance levels the hypothesis that the time taken to manufacture Barters is now *less* than 2.0 hours.

(ii) Discuss the results and suggest what could be done to be more certain of the outcome of such a test.

6

(25)

4 Following a marketing campaign, the Director of Finance of Underwood plc is interested in the financial performance of its production facility in the north west.

The Director of Finance wishes to prepare profit and loss accounts for the 6 month period prior to the marketing campaign (period 1) and for the 6 month period following the campaign (period 2). He has been provided with the following information relating to production of Pogens:

Selling price	£150 per unit
Direct materials (variable)	£36 per unit
Direct wages (variable)	£28 per unit
Selling expenses (fixed)	£40,000 per month
General administration expenses (fixed)	£85,000 per month

	Period 1	**Period 2**
Production	24,500 units	25,800 units
Stock – opening	0	1,900 units
Stock – closing	1,900 units	1,500 units

Production overheads contain fixed and variable elements. In production period 1 the production overheads totalled £795,000, and in period 2 they were £808,000. When absorbing fixed production overheads into production, the overhead absorption rate should be based on normal production of 25,000 Pogens per period.

The marketing campaign in the north west increased sales of Pogens from 22,600 in period 1, to 26,200 in period 2.

Underwood plc manufactures and sells Pogens in a number of other regions and has run similar marketing campaigns in each. The average percentage increase in sales across all regions was 12%, but there was considerable variety in the success of campaigns (the standard deviation was 4%).

- **Requirement for question 4**

(a) Calculate the fixed and variable elements of production overheads. *2*

(b) Prepare a profit and loss account for the north west region, showing each production period separately, by adopting both a marginal costing and an absorption costing approach. *12*

(c) Prepare a statement which reconciles the profits under each costing approach for each production period, and explain why profits are different. *4*

(d) The Marketing Manager is very pleased with the success of Underwood's marketing campaign and is considering undertaking another campaign. Before

committing the expenditure, some additional information has been requested. You are required to:

(i) Calculate the percentage increase in sales which was achieved in the latest campaign.

(ii) Establish the proportion of marketing campaigns which would be expected to achieve at least this level of sales increase, assuming the results of marketing campaigns are normally distributed.

(iii) Determine the probability that sales will increase by 7% or more, as it is not considered worth investing in a campaign, unless sales increase by at least this amount.

7

(25)

5 Tinseltown Technologies plc carries out production of specialist cameras used in the film industry. Cameras are built to individual customer requirements and production is carried out in three separate production departments – a Machining Shop, an Assembly Department and a Finishing Section. At present, production overheads are absorbed using a single (blanket) overhead absorption rate for the whole factory and the basis used is *percentage of direct wages cost*.

At the start of the last accounting period, the following budgeted information was available:

BUDGET

	Production overhead £	**Direct labour hours**	**Machine hours**	**Direct wages £**
Department				
Machining	1,200,000	10,000	40,000	250,000
Assembly	300,000	50,000	10,000	1,000,000
Finishing	750,000	25,000	Nil	250,000
TOTAL	2,250,000	85,000	50,000	1,500,000

During the costing period, a particular order was produced for a customer (Job Number 127), which incurred the following times and costs in each department:

	Direct materials £	**Direct wages £**	**Direct labour hours**	**Machine hours**
Machining	1,200	1,000	35	40
Assembly	600	600	40	10
Finishing	100	100	10	nil

After adding production overheads to prime costs, an additional one third is added to arrive at the price of the order.

At the end of the costing period, total production overhead expenditure of £2,380,000 and total direct wages costs of £1,400,000 were incurred.

- **Requirement for question 5**

(a) Calculate the *current* overhead absorption rate. *2*

(b) Calculate the total production cost of Job 127 by using the rate obtained in (a), and state the expected gross profit of the job. *2*

(c) (i) Comment on the suggestion that absorption rates calculated for each department would produce more accurate job costs.

(ii) Calculate the individual departmental overhead absorption rates which would have been set at the start of the costing period, briefly explaining the reasons for choice of absorption base.

(iii) Using the rates calculated in (c)(ii), determine the revised price of Job 127.

12

(d) Calculate the amount of under/over absorption using the original blanket overhead absorption rate. Comment on and quantify the reasons for any over or under absorption identified. *3*

(e) The Managing Director of Tinseltown is interested in forecasting sales of cameras for next year and has approached you for an explanation of the time-series analysis approach.

(i) Describe the four characteristics into which a time-series may be decomposed.

(ii) Explain (with diagrams if appropriate), the difference between an "additive" model and a "multiplicative model" in relation to time-series analysis.

6

(25)