COST ACCOUNTING AND QUANTITATIVE ANALYSIS

Foundation stage examination
6 December 2000

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 Paving Ltd operates an interlocking cost accounting system and it is the responsibility of the cost accountant to prepare the cost accounts each month. At the beginning of April, the following balances were recorded in the cost accounts:

	£	£
Raw materials stock	142,000	
Work in progress	185,000	
Finished goods	94,000	
Cost Ledger Control		421,000

Details of transactions for the month of April have been provided by the financial accounting department. The relevant transactions are as follows:

(i) Raw materials of £152,000 were purchased on credit.

(ii) Direct materials totalling £168,000 were issued to production from stores.

(iii) £25,000 of indirect materials were issued from stores.

(iv) Direct wages paid:

Basic	£87,000
Overtime	£6,700

(v) Indirect wages paid:

Production		£28,000
Administration	£18,000	
Selling and distribution	£31,000	

(vi) £6,000 of production overhead expenses were paid, and a further £600 have been incurred but not yet paid.

(vii) Administration expenses totalling £12,000 were incurred.

(viii) Selling and distribution expenses for the period amounted to £9,000.

Other cost data for the period include the following:

(ix) The cost of goods completed and transferred to the finished goods store was £306,000.

(x) Sales for April amounted to £380,000.

(xi) The cost of goods sold was £295,000.

Information relating to overheads is:

Overheads are absorbed on the basis of a predetermined direct wages overhead rate. The absorption rate is £5.20 per direct labour hour worked (based on monthly budgeted hours of 12,500 and budgeted overheads of £65,000). The actual direct labour hours worked in April were 12,400.

- **Requirement for question 1**

(a) Open and complete the necessary cost accounts for the period. *12*

(b) Explain, giving advantages of each, the difference between integrated and interlocking accounting systems. *5*

(c) Analyse the under or over-absorption of production overheads in April. *4*

(d) The fluctuations over time of the consumption of raw materials stocks roughly follow the normal distribution. Describe the main characteristics of the normal distribution. *4*

(25)

2 Bona Parts plc are a medium sized engineering company making components for the fishing industry. Their most popular product is called the Nelson with upwards of 60,000 Nelsons being produced each year. The company uses a standard costing system and the standard cost card for a Nelson is as follows:

Standard Cost Card for production of a Nelson

Cost item		£
Materials:		
Mild steel	20 kg @ £2.00 per kg	40
Plastic	2 kg @ £0.50 per kg	1
Screws	50 @ £0.02 each	1
Labour:		
Assembly section	4 hours @ £25 per hour	100
Finishing section	2 hours @ £15 per hour	30

Last month Bona produced 4,900 Nelsons with the following actual results showing in the costing records:

Materials:

Mild steel used	102,000 kg which cost £224,400 in total
Plastic used	10,200 kg at a price paid of 45p per kg.
Screws	250,000 were bought (costing £3,750) but only 245,000 were used on last month's production of Nelsons.

Labour:

Assembly section	Worked 19,700 hours at a wage rate of £26.20 per hour
Finishing section	Worked 9,900 hours for which £153,450 was paid

The Managing Director, Vic Tory, wishes to see detailed variances calculated showing performance last month. He wants to know the Materials Cost, Price and Usage variances for each material, as well as Labour Cost, Rate and Efficiency variances for both the Assembly and Finishing sections. He also wants to know whether the following comments about variances could still apply to any or all of last month's calculations:

Materials price variances	- bulk buying has resulted in cheaper prices.
Materials usage variances	- lost or wasted material has been less than expected.
Labour rate variances	- wages paid were at higher overtime rates generally.
Labour efficiency variances	- labour efficiency was excellent last month.

- **Requirement for question 2**

(a) Calculate all the materials and labour variances for the Managing Director. *15*

(b) State whether the comments on the variances are consistent with the calculations. *5*

(c) The production manager is concerned about the variability of Nelsons, and has established that the mean length is 9.5 cm with a standard deviation of 1.5 cm. Assuming the dimensions of Nelsons are normally distributed, calculate:

(i) the proportion of Nelsons with a length of less than 8.9 cm.

(ii) the proportion of Nelsons with a length plus or minus 1 cm of the mean. *5*

(25)

3 Wildwillow plc makes cricket gear in two production departments (manufacturing and finishing), which are supported by two support service departments (stores and maintenance). The budgeted overheads in the coming year are as follows:

	£
Indirect labour	
Manufacturing	200,000
Finishing	400,000
Stores	70,000
Maintenance	70,000
Personnel/Administration/Finance	200,000
Rates	15,000
Rent	22,000
Staff canteen subsidy	15,000
Utilities	28,000
Machinery Insurance/Depreciation	20,000
	1,040,000

Other information:

	Manufacturing	Finishing	Stores	Maintenance
Direct staff (£)	110,000	210,000		
Direct labour hours	20,000	35,000		
Area (sq m.)	440	140	100	120
Number of staff	15	25	5	5
Stores estimate of work done	60%	25%	-	15%
Value of machinery (£)	80,000	15,000	5,000	-
Machine hours	100,000	20,000		

- **Requirement for question 3**

(a) Calculate separate overhead absorption rates for each production department using bases of apportionment and absorption you consider to be the most appropriate, ensuring that the cost of reciprocal services is fully taken into account. *13*

(b) Determine the full unit cost of the 'Broadbat' assuming it requires the following activity in each department:

	Manufacturing	**Finishing**
Machine hours	3	1
Labour hours	1	2

Raw materials for this product cost £20 per unit. *4*

(c) The production manager wishes to test the assumption that the machine time for Broadbats does take on average 240 minutes. A randomly chosen sample of 6 bats are observed and the machine times in minutes were:

234, 246, 252, 264, 270, 282

(i) Calculate the mean and standard deviation for this sample.

(ii) Test the hypothesis at the 95% level that the mean production time is 240 minutes, and comment on the results.

8

(25)

4 Waterloo plc manufactures an exclusive range of suntan lotions. Its lotions have a relatively short shelf-life, so production levels vary seasonally. The cost accountant has recently become concerned over an apparent overall downward trend in sales (and production).

The following production data are available (production data for quarter 4 of 2000 has not yet been collated):

Year	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1998	2,849	2,933	2,253	1,780
1999	2,802	2,884	2,209	1,731
2000	2,751	2,837	2,160	Not available

Production figures are in litres

During 1999, the fixed costs of Waterloo plc were £50,000 in total, and the variable production costs remained at the 1998 level of £3 per litre of suntan lotion. The selling price was £10 per litre.

Stock levels were as follows:

- Start of 1999, 481 litres were in stock
- End of 1999, 407 litres were in stock

In order to understand the trends in production and to forecast likely levels for future quarters, the cost accountant requires an analysis of the production data. There are also concerns over the level of Waterloo's profitability, and whether fixed costs are being covered throughout the year.

- **Requirement for question 4**

(a) Using 'Time Series Analysis – Decomposition', forecast quarterly production for quarter 4 of 2000 and the following four quarters of 2001. *14*

(b) Time Series Analysis is a **quantitative** forecasting technique. Explain the difference between quantitative and qualitative approaches and describe two **qualitative** forecasting techniques. *6*

(c) Prepare a profit and loss account for 1999, using a marginal costing layout. *5*

(25)

5 Megabite Ltd produces a single product which requires quantities of a specialist raw material called Debitanium. The company buys in the Debitanium in frequent but smallish quantities because of the volatile nature of the material. The aim is to have enough material in the factory to ensure continuous production but not too much which would risk the material deteriorating such that it would become unusable. Another feature of this specialist material is that the price paid fluctuates widely on the world Debitanium market.

The management accountant of Megabite Ltd, Des Parrate, is interested in the different options available for pricing out material issued to the production section and has gathered the following information regarding last month's supply and use of Debitanium.

Purchases of Debitanium

2 April	100 kg	Price	£22	per kg
13 April	300 kg	Price	£20	per kg
21 April	120 kg	Price	£18	per kg
27 April	80 kg	Price	£25	per kg

Issues to Production

14 April	150 kg
19 April	200 kg
28 April	150 kg

At the beginning of April the stock of Debitanium was 80 kg which was valued at a cost of £1,600.

Des Parrate is aware that there are a number of methods which can be used to price out the issue of materials including First In First Out (FIFO), Last In First Out (LIFO), and Weighted Average Cost (WAC) methods.

- **Requirement for question 5**

(a) For Debitanium, calculate the value of closing stock as at 30 April, and the cost of materials issued to production for the month of April, using:

FIFO;
LIFO; and
Weighted average cost. *12*

(b) Briefly describe <u>two</u> other methods which could be adopted. *4*

(c) Debitanium prices for the next 12 months are being investigated.

(i) Over the next 12 months, it is anticipated that the average price paid for Debitanium will either be £22, £25, or £27. The likelihood of each of these outcomes is 20%, 45% and 35% respectively. Calculate the expected average price to be paid next year, and explain what this figure means.

(ii) A new supplier of Debitanium has been found who will guarantee a price of £20 per kg from next month, but rising with inflation. Three options have been suggested.

- The price rises each month at a rate of 0.2%, for three years
- The price rises at 2.3% each year for three years
- The price rises in accordance with the Retail Price Index which is forecast to rise from 115 in April to 118, 121 and 123 for the next three years.

Calculate the price at the end of each of the next three years under each option. *9*

(25)