COST ACCOUNTING AND QUANTITATIVE ANALYSIS

Foundation stage
June 2002

MARKING SCHEME

CIPFA

Question 1

	Month		Units	Overhead	Units^2	Oheads^2		
	A	A^2	B	C	B^2	C^2	B x C	A x B
	1	1	20.5	7.2	420.25	51.84	147.60	20.5
	2	4	21.6	7.6	466.56	57.76	164.16	43.2
	3	9	21.2	7.4	449.44	54.76	156.88	63.6
	4	16	22.3	7.9	497.29	62.41	176.17	89.2
	5	25	24.2	8.2	585.64	67.24	198.44	121.0
	6	36	24.6	8.4	605.16	70.56	206.64	147.6
Total	21	91	134.40	46.7	3,024.34	364.57	1,049.89	485.1
			÷ 6					
			= 22.4					

(a) The mean number of units produced is 22,400. *(2)*

(1 mark for 22.4, second mark for realising thousands)

(b) In this case regression is being used to establish cost behaviour for the production overheads. Using the equation y=a + bx in this case x is the no. of units and y is the production overhead cost.

$$b = \frac{n\,?\,xy - ?\,x\,?\,y}{n\,?\,x^2 - (?\,x)^2} \qquad a = \frac{?\,y}{n} - \frac{b\,?\,x}{n}$$

$$\text{So } b = \frac{6 \times 1{,}049.89 - (134.40 \times 46.7)}{6 \times 3{,}024.34 - (134.40)^2}$$

$$= \frac{6{,}299.34 - 6{,}276.48}{18{,}146.04 - 18{,}063.36} = 0.2765$$

$$a = \frac{46.7}{6} - 0.2765 \times \frac{134.40}{6} = 1.5897$$

So formula for production overheads is £1,590 fixed cost plus £0.2765 per unit.

There are 8 marks available for part (b). 6 marks are available for application of regression formulae and producing values for 'b' (0.2765) and 'a' (1.5897). Marks should be deducted for any arithmetical error leading to values for 'a' and 'b' (allowances to be made for roundings). The final 2 marks are for showing awareness that the fixed cost (1.5897) means a cost of £1,590 (ie thousands) and that 'b' is £0.2765 per unit (ie pounds) *(8)*

(c) Main assumption is that there is a *causal* link between the variables. It is perfectly possible that there is an apparent good fit between the data but that no cause and effect is in fact present (NB text book quotes wheat harvest in USA and drowning deaths in UK).

Secondly the assumption being made is that the relationship is linear. It is possible that there may be non-linear relationships. NB in this case as production is increasing month by month there will undoubtedly be some fixed and semi fixed costs which will "trigger" when output reaches certain levels.

Equal importance is being given to each value – this might be less valid when regression is being carried out against time with older data perhaps being less reliable.

There is a difference between using regression to interpolate (within a range of observations) and as a basis for extrapolating beyond a range of data (as is the case here for months 7 to 9). With the latter case, assumptions are being made that no outside factors will affect production and sales (such as competitors, market tastes and so on) which in reality is probably not very likely – thus caveats need to be placed on figures being produced from these regressions.

(1 mark for each well stated/argued assumption up to a maximum of 5)

(d)

? x (Months 1 to 6) = 134.4 so average (/6) = 22.4	Month 7	*1*
Adding 22.4 and deducting (month 1) 20.5 gives 136.3 (/6) = 22.7	Month 8	*1*
Adding 22.7 and deducting (month 2) 21.6 gives 137.4 (/6) = 22.9	Month 9	*1*

So likely sales/production level for months 7 to 9 = 68.0 ie 68,000 units *1*

(4)

(e) Forecast number of units for next 3 months is 68,000.

		£	
Direct materials (£4 per unit)	68,000 x £4	= 272,000	*1*
Direct Labour (£5 per unit)	68,000 x £5	= 340,000	*1*
		612,000	

Production Overhead –	Month 7 (1,590 + (0.2765 x 22,400)	7,784	
	Month 8 (1,590 + (0.2765 x 22,700)	7,867	
	Month 9 (1,590 + (0.2765 x 22,900)	7,922	
		635,573	*3*
Non production overheads (NB £12,000 per annum) (assume spread evenly across year)		3,000	*1*
		638,573	

(6)

(25)

Question 2

(a) **Overhead Statement**

Expense	Basis	Total	R	C	H/K	M	
Consumables	Allocated	82,000	16,000	26,000	29,000	11,000	*1*
Indirect staff costs	Allocated	52,500	17,500	14,000	11,200	9,800	*1*
Rent & rates	Floor area	37,500	20,625	10,125	4,500	2,250	*1½*
Heat & light	Floor area	18,500	10,175	4,995	2,220	1,110	*1½*
Contents insurance	Equipment value	14,000	6,533	4,667	1,400	1,400	*1½*
Depreciation	Equipment value	37,500	17,500	12,500	3,750	3,750	*1½*
		242,000	88,333	72,287	52,070	29,310	

(8)

(b) Algebraic method / simultaneous equations

H = 52,070 + .2M
M = 29,310 + .1H
H = 52,070 + .2 (29,310 + .1H)
H = 52,070 + 5,862 + .02H
.98H = 57,932 . Therefore H = £59,114
M = 29,310 + 5,911 = £35,221 *2*

	R	C	H	M
	88,333	72,287	52,070	29,310
	41,380	11,823	(59,114)	5,911
	10,566	17,611	7,044	(35,221)
Total £242,000	140,279	101,721	nil	Nil

2

Residential $\frac{£140,279}{2,950}$ = £47.55 per guest night

Conference $\frac{£101,721}{12,000}$ = £8.48 per delegate day *2*

(6)

(c) Two other methods of dealing with reciprocal service costs:

1. Specified order of closure method (alternative name – elimination method).
   The service cost centre that does the largest proportion of work for other service cost centres is closed first, with no further reapportionments being made to this cost centre. The service cost centre that does the second largest proportion of work for the other service cost centres is closed second, with no further reapportionments and so on.

2. Continuous allotment (alternative name – repeated distribution method).
   Each service cost centre is apportioned in full to all other cost centres (including the other service cost centre) until amounts are left that are considered too small to warrant further reapportionment.

1 mark for each specific named method
1 mark for each explanation
(4)

(d)

	Residential	**Conference**	
Expenditure (actual)	144,000	98,600	*½*
Recovery 3,000 x £47.55	142,650		*1*
11,600 x £8.48		98,368	*1*
(Under) recovery	(1,350)	(232)	*1*
Expenditure (Budget – Actual)	(3,721)	3,121	*½*
Activity 50 x 47.55	2,378		*1*
(400) x 8.48		(3,392)	*1*
Rounding	(7)	39	
	(1,350)	(232)	*1*
			(7)

(25)

Question 3

(a) **Cost Accounts for the month**

Raw Materials

Balance b/f (CLC)	42,000	Work in Progress (WIP)	60,000
CLC	150,000	Factory o/h	20,000
		Bal c/d	112,000
	192,000		192,000

1

Work in Progress

Balance b/f (CLC)	85,000	Finished Goods	200,000
Raw Materials	60,000	Bal c/d	115,000
Wages	80,000		
Factory Overhead	90,000		
	315,000		315,000

1½

Finished Goods

Balance b/f (CLC)	19,000	Cost of Sales (COS)	120,000
WIP	200,000	Bal c/d	99,000
	219,000		219,000

1

Wages

CLC	120,000	WIP	80,000
		Factory Overhead	40,000
	120,000		120,000

1½

Cost Ledger Control

Sales	250,000	Balance b/f (CLC)	146,000
Bal c/d	326,000	Raw materials	150,000
		Wages	120,000
		Factory overheads	35,000
		Administration	12,000
		Profit	113,000
	576,000		576,000

2

Factory Overheads

Materials	20,000	WIP	90,000
Wages	40,000	Profit and Loss (P &L)	5,000
CLC	35,000	[Underabsorbed o/h]	
	95,000		95,000

2

Administration

CLC	12,000	P&L	12,000
	12,000		12,000

½

Cost of Sales

Finished Goods	120,000	P&L	120,000

½

Sales

P&L	250,000	CLC	250,000

½

Profit & Loss

COS	120,000	Sales	250,000
Factory Overheads (Under absorbed)	5,000		
Administration	12,000		
Profit [CLC]	113,000		
	250,000		250,000

1½

(12)

(b) An interlocking accounting system maintains a separate cost and financial accounts ledger with corresponding double entry being provided by a Cost Ledger Control account. No attempt is made to record financial accounting transactions in the cost accounts. An integrated system is essentially just one set of books with all cost and financial transactions recorded together.

Advantages of interlocking systems are the flexibility afforded for such as depreciation methods and stores pricing whereas an integrated system has the advantage of fewer entries and (arguably) is less complex.

2 marks for defining integrated and interlocking systems
2 marks for describing advantages of each system
(4)

(c) Examples of financial accounting transactions not appearing in an interlocking cost accounting system would be: creditor, debtor and capital accounts eg items relating to accruals and prepayments, PAYE/taxation, National Insurance, depreciation provision, share transactions, audit fees and so on. (NB Students are asked for *three* examples).

3 marks (one each) for 3 example items
(3)

(d) Progress payments: stage payment made to a contractor during course of long-term contract.
Architect's certificate: certificate confirming work of a certain value and satisfaction has been done (then used to authorise progress payment).
Retention monies: money held back from progress payments till end of contract pending making good of defects and/or satisfactory quality tests etc.

2 marks per explanation

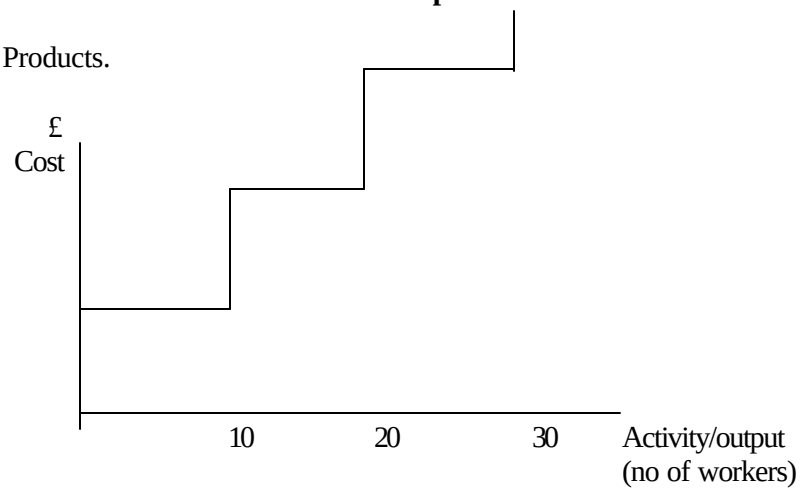
(6)

(25)

Question 4

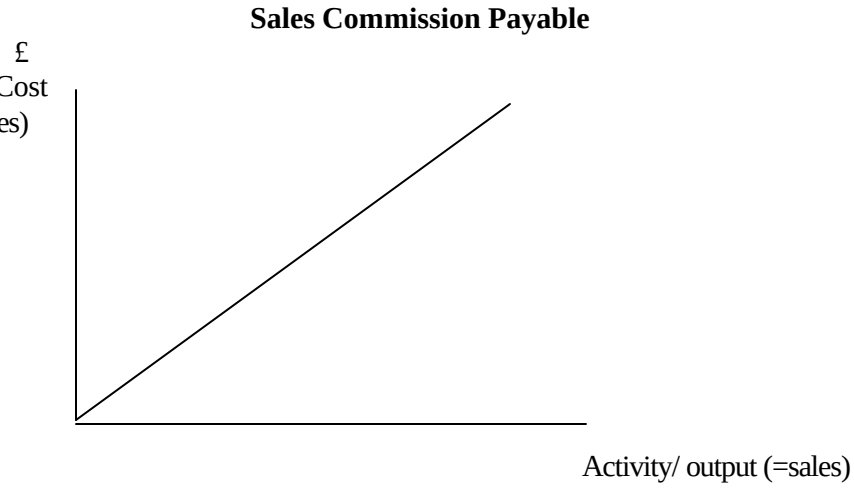
Purrfect Products.

Cost (i)



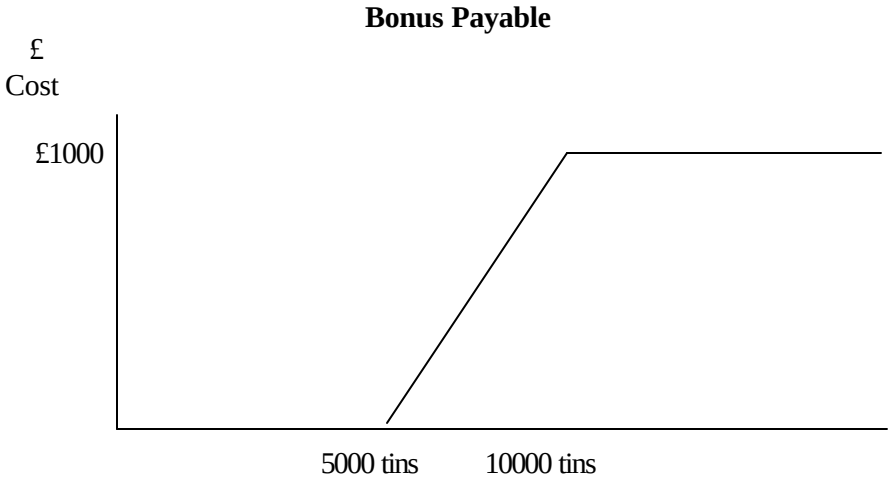
This is a semi-fixed/stepped cost where increases in cost are triggered at certain defined points by increases in activity/output.

Cost (ii)



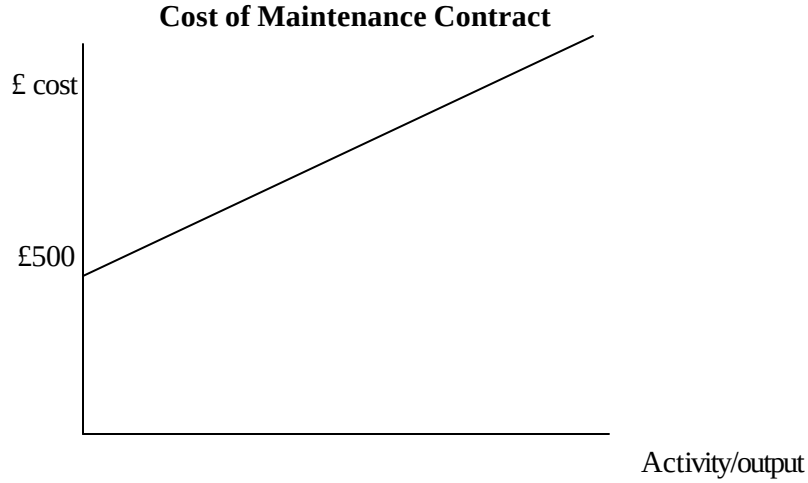
This is a variable cost where the cost is directly proportional to the level of activity /output.

Cost (iii)



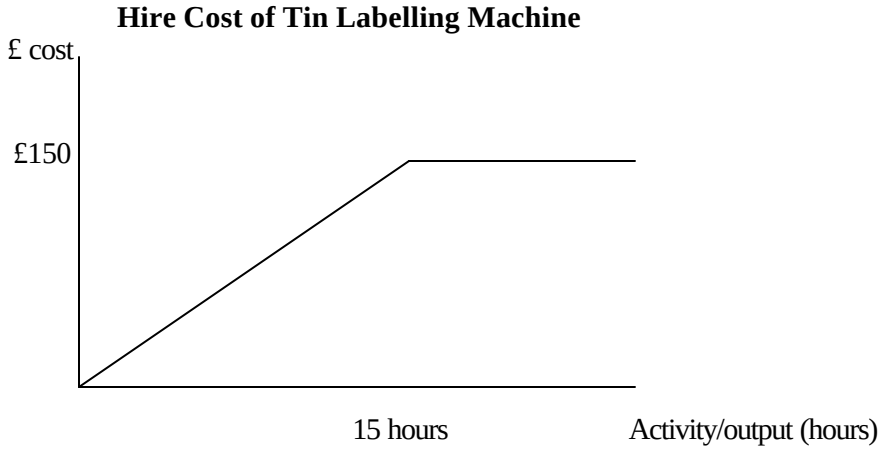
The bonus payment is a variable cost but only payable once the 5,000 tin level is reached and becomes capped (ie limited to a maximum cost of £1,000) at the 10,000 tin level.

Cost (iv)



This is a semi-variable cost (ie composed of a fixed element and a variable cost element.)

Cost (v)

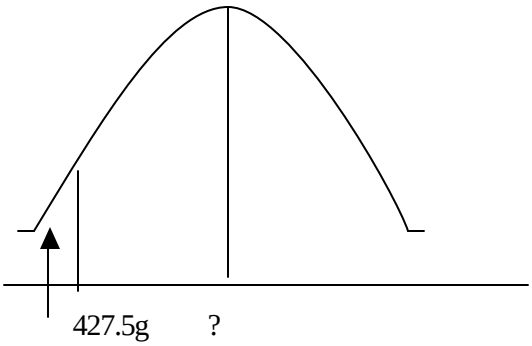


This is a variable cost (ie vary with activity/output) up to a maximum activity of 15 hours when it becomes capped (ie subject to a maximum cost of £150.) Any use over 15 hours is "free".

There are 3 marks available for each graph:
1 mark for drawing the shape correctly, 1 mark for labelling each axis and heading the graph, and 1 mark for a brief description

(15)

Part (b)



1%

The tins should weigh 450g.
The standard deviation is 8g.

Minimum weight is supposed to be 427.5g or else could be prosecuted.

If the requirement is only 1% chance of an underweight tin then:

$\left|\frac{X - 427.5\,g}{8\,g}\right| = 2.33$ (from normal distribution tables - 99% chance). *3*

NB. A one tailed test.

Where X is the setting for the mean which gives only 1 % chance of a tin weighing less than 427.5g. *1*

So X = 2.33 x 8g + 427.5g = 18.64g + 427.5g = 446.14g. *2*

(6)

(c) Properties of good estimators (Section 16.2 of Open Learning Material)

Unbiased: the mean of the distribution of sample means would equal the population mean.

Consistency: if the sample size increases, the precision of the estimate of the population parameter also increases.

Efficiency: an estimator is said to be more efficient than another if, in repeated sampling, its variance is smaller.

Sufficiency: an estimator is said to be sufficient if it uses all the information in the sample in estimating the required population parameter.

1 mark for each explanation of a valid property, up to a maximum of 4
(4)

(25)

Question 5

(a)

Process A

	Kg	£		Kg	£
Aythene	1,000	2,000	Normal Loss	150	30
Beethene	500	1,500	Transfer to B	1,300	5,460
Labour		450	Abnormal loss	50	210
Overheads		1,750			
		5,700			5,700

Valuation of output: £5,700 - £30 = £5,670/1,350 = £4.20 per kilo.

Process B

	Kg	£		Kg	£
Transfer from A	1,300	5,460	Normal Loss	90	nil
Ceethene	500	2,000	Transfer to finished goods	1,600	8,000
Labour		500	Abnormal loss	110	550
Overheads		590			
		8,550			8,550

Valuation of Output: £8,550 - nil = £8,550/1,710 = £5.00 per kilo.

5 marks for each Process account. 1 mark for costs
1 mark for normal loss (quantity and value)
1 mark for abnormal loss (quantity and va lue)
1 mark for transfer (quantity and value)
1 mark for calculation of normal value of output
(10)

(b)

Normal loss account

	£		£
Process A	30.00	Scrap sales	30.00
Process B	Nil		
	30.00		30.00

Abnormal Loss Account

	£		£
Process A	210.00	Scrap sales	10.00
Process B	550.00	Scrap sales	
			Nil
		Balance to P/L account	750.00
	760.00		760.00

Scrap sales account

	£		£
Normal loss (Process A)	30.00	Cash/bank	40.00
Abnormal loss (Process A)	10.00		
Normal loss (Process B)	Nil		
Abnormal loss (Process B)	Nil		
	40.00		40.00

2 marks for each of the three accounts
Basically 1 mark each for the debit and credit sides

(NB the scrap on process B is technically waste given that there is no value for the lost material. It is not strictly necessary to show entries for the Process B items above but these are included at nil value for clarity and completeness).

(6)

(c) Alternative treatment of scrap value.

Scrap value is normally credited to the process account. This is technically correct and essential if of a significant amount. However, in practice, scrap values may be relatively small and only realised from time to time. In such cases it is possible to credit an overhead income account and reduce overheads for the period. Can be justified if the cost of recording outweighs the benefits of such recording. (Using the FA doctrine of materiality).

(Maximum of 3 marks for clear, well expressed explanation of alternative treatment)

(3)

(d) Mean: Sum of all values divided by number of items ie arithmetic mean (NB can also calculate geometric mean). Can be used for subsequent (statistical) analysis. May not coincide with an actual value.

Median: The middle value. Could be more representative than mean (which can be distorted by outlying values).

Mode: The commonest value. Might be useful for (say) clothing sales where the commonest size needs to be stocked (which is neither mean nor median value).

1 mark for each definition and 1mark for each advantage

(6)

(25)