COST ACCOUNTING AND QUANTITATIVE ANALYSIS

Foundation stage examination
June 2000

MARKING SCHEME

CIPFA

Question 1

(a) **Machine Hours**

Forecast for Period 1

$$\frac{4{,}900 + 5{,}100 + 4{,}950 + 5{,}150 + 5{,}300 + 4{,}870}{6 \text{ periods}} = \frac{30{,}270 \text{ hrs}}{6} = \mathbf{5{,}045 \text{ hrs}}$$ *1½*

Forecast for Period 2

$$\frac{30{,}270 - 4{,}900 + 5{,}045}{6 \text{ periods}} = \frac{30{,}415 \text{ hrs}}{6} = \mathbf{5{,}069 \text{ hrs}}$$ *1½*

Forecast for Period 3

$$\frac{30{,}415 - 5{,}100 + 5{,}069}{6 \text{ periods}} = \frac{30{,}384 \text{ hrs}}{6} = \mathbf{5{,}064 \text{ hrs}}$$ *1½*

Production Overheads

Forecast for Period 1

$$\frac{25{,}850 + 27{,}177 + 24{,}447 + 25{,}532 + 26{,}424 + 23{,}552}{6 \text{ periods}} = \frac{£152{,}982}{6} = \mathbf{£25{,}497}$$ *1½*

Forecast for Period 2

$$\frac{152{,}982 - 25{,}850 + 25{,}497}{6 \text{ periods}} = \frac{£152{,}629}{6} = \mathbf{£25{,}438}$$ *1½*

Forecast for Period 3

$$\frac{152{,}629 - 27{,}177 + 25{,}438}{6 \text{ periods}} = \frac{£152{,}890}{6} = \mathbf{£25{,}148}$$ *1½*

(9)

(b) Machine Hour absorption rate = $\frac{\text{Budgeted Overheads}}{\text{Budgeted Hours}}$ *1 for formula*

$$= \frac{£25{,}497 + £25{,}438 + £25{,}148}{5{,}045 \text{ hrs} + 5{,}069 \text{ hrs} + 5{,}064 \text{ hrs}} = \frac{£76{,}083}{15{,}178 \text{ hrs}} = £5.0127$$ *2*

$$= \mathbf{£5.02}$$ *1 for rounding up*

Assumption: that the total of the first three periods for next year will be representative of the whole year.

1 for stating assumption
(5)

(c)

Under or over absorption of production overheads

= Actual O/Hds – Absorbed O/Hds *1 mark for formula*

Actual O/Hds = £152,982

Absorbed O/Hds = Actual machine hours x Pre-determined absorption rate

$= 30{,}270 \text{ hours} \times \frac{£150{,}000}{30{,}000 \text{ hrs}}$

= 30,270 hours x £5.00 = £151,350 *1*

£152,982 - £151,350 = £1,632 under recovery

Impact on the Costing Profit and Loss Account would be a **debit of £1,632**

2 marks for £1,632
2 marks for stating impact would be a debit

(6)

(d)

Differences between the Costing Profit & Loss A/C and the Financial Profit & Loss A/C include:

- There is a legal requirement for a company to produce the Financial P&L, but there is no such requirement for the Costing P&L;
- The Costing P&L is not governed by the accepted accounting principles that are followed for the Financial P&L;
- The Costing P&L excludes many financial costs, such as bad debts, bank charges and audit fees, that have to be charged to the Financial P&L;
- The responsibility for the preparation of the Accounts differs in larger organisations, with the Chief Accountant being responsible for the Financial P&L and the Cost Accountant for the Costing P&L;
- External parties use the Financial P&L, whereas the Costing P&L is for internal use.

1 mark for each acceptable difference up to a maximum of 5 marks

(25)

Question 2

(a)

Workings for (i) & (ii)

Mid-Value c		Frequency f	fc	fc^2
55.5		15	832.5	46,203.75
65.5		22	1,441.0	94,385.50
75.5		32	2,416.0	182,408.00
85.5		30	2,565.0	219,307.50
95.5		22	2,101.0	200,645.50
105.5		18	1,899.0	200,344.50
115.5		11	1,270.5	146,742.75
	Σ	150	12,525.0	1,090,037.50

(i) Arithmetic Mean $(\bar{x}) = \frac{\Sigma f\chi}{\Sigma f} = \frac{12,525.0}{150} =$ **83.5** units

2 marks awarded: 1 mark if calculated incorrectly, but the formula is shown

(ii) Standard Deviation (s) $= \sqrt{\frac{\Sigma f\chi^2}{\Sigma f} - (\bar{x})^2}$

$$s = \sqrt{\frac{1,090,037.50}{150} - (83.5)^2}$$

$$s = \sqrt{7,266.92 - 6,972.25}$$

$$s = \sqrt{294.67} = \textbf{17.17} \text{ units}$$

3 marks awarded: 1 mark if calculated incorrectly, but the formula is shown

Note: 17.22 will be acceptable, which is derived by using $f - 1$ in the above formula. This is the formula used by Lucey, which is a recommended book for this course.

(iii) In a grouped frequency distribution the modal class is the class with the largest frequency, which is **71 – 80 units**

2 marks awarded: 1 mark if calculated incorrectly, but an explanation of modal class is provided

(iv) $\text{Median} = L + \frac{C(\frac{1}{2}n - F)}{f} = 81 + \frac{10(75 - 69)}{30} = \mathbf{83}$ units

3 marks awarded: 1 mark if calculated incorrectly, but the formula is shown

(10)

(b)

- Acts as a benchmark sales level; - aim would be to increase the benchmark.
- Useful for comparisons with previous periods.
- Assess the effectiveness of the bonus scheme, as it would be expected that the arithmetic mean would increase after the introduction of the scheme.

1 mark for each acceptable point to a maximum of 3 marks

(c)

In the last 150 days the bonus days would have been:

Daily sales: units	**Frequency: days**
91 - 100	30 (22+8)
101 - 110	24 (18+6)
111 - 120	15 (11+4)

1 mark in total for correct calculation of new frequency levels

Over a year of 250 sales days bonus would be:

Daily sales:	**Frequency:**	**Bonus per day:**	**Annual bonus:**
units	**days**	**£**	**£**
91 - 100	50	40	2,000
101 - 110	40	50	2,000
111 - 120	25	60	1,500
		Total	5,500

2

Bonus per each member of the sales team = £1,100 *1*

% increase in average earnings = $\frac{£1,100}{£20,000} \times \frac{100}{1}$ = 5.5% increase *2*

(6)

(d)

Merits: *1 mark for each acceptable merit, up to a maximum of 3 marks*

- Encourages teamwork.
- Could increase sales and profit levels.
- Could reduce absenteeism.
- Reduce staff turnover if bonus significantly increases earnings.
- May encourage more flexible working arrangements within the group.

Demerits: *1 mark for each acceptable demerit, up to a maximum of 3 marks*

- Can be difficult to set the appropriate level of bonus.
- Exceptional good workers not necessarily recognised.
- Sharing the bonus on a fair basis can be difficult to achieve.
- Calculations of the bonus for some schemes can be difficult.
- Can be expensive to administer.

(6)

(25)

Question 3

(a)

Sales Margin Variance (AM-SM) AV

= (£7.77 - £8.00) 500 units = - £0.23 x 500 = **£115 ADV** *1*

Direct Labour Variance (AH x AR) – (SH x SR)

= (1,050 hrs x £5.80) – (1,000 hrs x £6.00) = £6,090 - £6,000 = **£90ADV** *1*

Direct Labour Rate Variance (AR x SR) AH

= (£5.80 - £6.00) x (500 units x 2.1 hrs) = - £0.20 x 1,050 hrs = **£210 FAV** *1*

Direct Labour Efficiency Variance (AH – SH) SR

= (1,050 hrs – 1.000 hrs) x £6.00 = 50 hrs x £6.00 = **£300 ADV** *1*

Direct Materials Variance (AQ x AP) – (SQ x SP)

= (2,450 kg x £4.10) – (2,500 kg x £4.00) = £10,045 - £10,000 = **£45 ADV** *1*

Direct Materials Price Variance (AP – SP) AQ

= (4.10 - £4.00) x (500 units x 4.9 kg) = £0.10 x 2,450 kg = **£245 ADV** *1*

Direct Materials Usage Variance (AQ – SQ) SP

= (2,450 kg – 2,500 kg) x £4.00 = -50 kg x £4.00 = **£200 FAV** *1*

(7)

(b)

Reconciliation Statement

	£	£	
Standard Contribution		4,000	*1*
+ Favourable Variances:			
Labour Rate	210		
Material Usage	200	410	*1*
		4,410	
- Adverse Variances:			
Labour Efficiency	300		
Material Price	245		
Sales Margin Price	115	660	*1*
Actual Contribution		3,750	*1*

1 mark for presentation

(5)

(c)

1 mark for each acceptable limitation up to a maximum of 5

Limitations include:

- realistic standards can be difficult to set;
- standards have to be regularly updated, which can be costly and time consuming;
- calculations of variances are not always easily understood;
- only suitable when costs can be analysed into units of output;
- is a quantitative (ie number crunching) method of control, rather than qualitative (ie quality, customer satisfaction).

(d)

Workings

Opening Stock = 100 units

Value of opening stock:

using marginal costing = 100 units x £32.50 = £3,250 *1*

using absorption costing = marginal costing + production overheads

$$= £3,250 + \left(\frac{100}{500} \text{ units} \times £3,200 \times 75\%\right)$$

= £3,250 + £480 = £3,730 *1*

Closing stock = 100 units

Value of closing stock (based on FIFO basis):

using marginal costing = 100 units x £32.27 = £3,227 *1*

using absorption costing = £3,227 + $\left(\frac{100}{500} \text{ units} \times £3,000 \times 75\%\right)$

= £3,227 + £450 = £3,677 *1*

Profit for May 2000

	Marginal Costing	**Absorption Costing**
	£	**£**
Contribution	3,750	3,750
-Fixed Costs	3,000	3,000
Profit before stock adjustments	750	750
+ Closing Stock	3,227	3,677
	3,977	4,427
- Opening Stock	3,250	3,730
Profit for Month	727	697
	2	*2*

(8)

(25)

Question 4

(a)

Process 1

	Kgs	Per Kg £	Cost £			Kgs	Per Kg £	Cost £	
Material P	15,000		89,680	*1½*	Normal Loss (15,000 x 4%)	600	1.50	900	*1*
Labour			52,960		Abnormal Loss	100	11.40	1,140	*1*
Overheads (89,680 x 25%)			22,420	*½*	To Process 2	14,300	11.40	163,020	*1*
	15,000	-	165,060			15,000	-	165,060	

Workings

Issue of P **£**

10,000 kg x £6.10 = 61,000
4,200 kg x £5.80 = 24,360
800 kg x £5.40 = 4,320
15,000 89,680

Cost of 1 Unit = Process Cost - Normal Loss / Normal Units Processed

= £165,060 - £900 / 14,400 kg = £11.40

Process 2

	Kgs	Per Kg £	Cost £			Kgs	Per Kg £	Cost £	
Material Q	5,700	-	69,230	*1½*	Normal Loss (5,700 + 14,300 x 2%)	400	2.00	800	*1*
Labour			48,704		To Finished Stock	19,750	15.00	296,250	*1*
Overheads (69,230 x 20%)			13,846	*½*					
From Process 1	14,300	11.40	163,020						
Abnormal Gain	150	15.00	2,250	*1*					
	20,150	-	297,050			20,150	-	297,050	

Workings

Issues of Q **£**

3,500 kg x £12.30 = 43,050
2.200 kg x £11.90 = 26,180
5,700 kg 69,230

$$\text{Cost of Unit 1} = \frac{£294{,}800 - £800}{19{,}600 \text{ kg}} = £15.00$$

(10)

(b)

(i) Mean loss of 615 kg is 15 kg more than the expected loss of 600 kg.
15 kg = 10% (0.10) of the Standard Deviation. From statistical table 0.10 = .4602
Therefore probability loss would be in excess of 600 kg =1.0000 – 0.4602 = 0.5398 = 54%

3 marks awarded: 1 mark if calculated incorrectly, but the approach is explained

(ii) 3% of 15,000 kg = 450 kg, which is 165 kg less than the mean loss. 165 kg equates to 1.1 Standard Deviations. From statistical table 1.1 = .1357
Probability loss less than 3% = 0.1357 = 13.6%

3 marks awarded: 1 mark if calculated incorrectly, but the approach is explained

(iii) 550 kg is 65 kg less than the mean = 0.43 Standard Deviations. From statistical table 0.43 = .3336

650 kg is 35 kg more than the mean = 0.23 Standard Deviations. From statistical table 0.23 = .4090

Probability loss would be outside 550 – 650 kg = .3336 + .4090 = .7426.
Therefore probability inside this range is 1.0000 - .7426 = .2574 = 25.7%

4 marks awarded: 1 mark if calculated incorrectly, but the approach is explained

(10)

(c)

Arguments for LIFO

- produces realistic production costs,
- in times of rising prices the cost of material consumption is higher than adopted by FIFO, thus reflecting in lower reported profits, which conforms to the accounting concept of prudence.

Arguments against LIFO

- not acceptable for taxation purposes,
- not recommended by SSAP 9,
- produces unrealistically low stock values, when prices are continuously rising.

1 mark for each acceptable point, providing at least two arguments for and against are given up to a maximum of 5 marks

(25)

Question 5

(a)

Time allocation of Specialist Worker

Activity	Current Allocation		Target Allocation	
	Hours per year	**%**	**Hours per year**	**%**
Hired Out	500	24.0	1,000	48.0
Core Time	600	28.9	600	28.9
Holiday	240	11.6	240	11.6
Training	136	6.5	136	6.5
Sickness	40	1.9	40	1.9
Non-Core Time	564	27.1	64	3.1
Totals	2,080	100.0	2,080	100.0

2 marks for identifying six different activities
1 mark for correct current allocation of hours
1 mark for correct target allocation of hours
1½ marks for correct current % allocation of hours
1½ marks for correct target % allocation of hours
1 mark for presentation
(8)

(b)

Calculation of current hourly hire charge

$$= \frac{\text{Cost of employing worker x 3}}{\text{Actual working hours}}$$ *½ mark for formula*

$$= \frac{\text{40 hrs x 52 wks x £10 x 1.20 x 3}}{\text{1,664 hrs (i)}}$$ *1½*

= £45 per hour *2 marks for correct calculation*

(i) Actual working hours

	hours	hours
Total paid		2,080
less		
Holiday	240	
Training	136	
Sickness	40	416
		1,664

(4)

(c)

	£	
Increased income from hire charges 500 hrs x £40.50 (£45 less 10%)	20,250	*1*
less reduced income on current hire hours 500 hrs x £4.50 (£45 x 10%)	2,250	*1*
Total increased income	18,000	
less additional costs:		
Cover: £6 x 1.2 (on-costs) x 1.50 (O/T rate) x 500 hrs	5,400	*2*
Increased hourly rate: 2,080 hrs x £2 per hr x 1.2 on-costs	4,992	*1*
advertising	4,000	*1*
Total additional costs	14,392	
Increase in annual profit	3,608	*2*

(8)

(d)

The Coefficient of Correlation provides a measure of the association between two variables.

1 mark for explanation

- The Coefficient of Correlation could be calculated to establish the relationship between advertising and demand for the specialist worker.
- If the C of C is near 1.0 (it cannot be in excess of 1.0), then it could be concluded that advertising increases demand.
- The nearer to 1.0, the stronger the relationship. If the C of C was over 0.8 it could be reasonable to say that the advertising budget was being effective.
- It should be realised that the C of C is a statistical calculation and that a strong correlation could just be coincidental.
- A C of C calculation for each of several months should be undertaken, which would make it a sound base for assessing effectiveness, as any coincidence would be smoothed out.

1 mark for each valid point, up to a maximum of 4 marks
(5)

(25)