

ACCOUNTING FOR DECISION MAKING

Professional 1
June 1999

MARKING SCHEME

The logo for CIPFA, featuring the letters 'CIPFA' in a serif font. The letter 'I' is stylized with a decorative flourish that loops over the top of the 'P'.

Question 1 (Quaffers Plc)

(a) **Option 1:**

Recharge per staff nos.:

$$\frac{2,500,000}{1,000} = \text{£}2,500 \text{ per person}$$

Recharge to divisions:

WS	WI	WTCs
2,000,000	250,000	250,000

2

Option 2:

Firstly determine total costs of each activity:

	Staff cost (£)	Direct costs (£)	Apportioned office supplies (£) ¹	Total (£)
Recruitment	450,000	300,000	62,500	812,500
Disciplinaries	216,000	50,000	30,000	296,000
Staff grievances	108,000		15,000	123,000
Staff leavers	90,000		12,500	102,500
Appraisals	90,000		12,500	102,500
Internal courses	306,000	50,000	42,500	398,500
Personnel administration	360,000	50,000	50,000	460,000
Queries	180,000		25,000	205,000
	<u>1,800,000</u>	<u>450,000</u>	<u>250,000</u>	<u>2,500,000</u>
	3	1	3	

Note ¹: Apportioned on staff cost data as office supplies likely to be used by staff, but other appropriate bases acceptable.

Secondly, re-apportion costs of 'facility sustaining activities' (FSAs), namely Personnel administration, to other activities and determine the cost drivers:

	Cost c/f £	FSAs apportioned ¹ £	Total £	Cost driver ²	CDR
Recruitment	812,500	183,211	995,711	recruits	995,711/450
Disciplinaries					
Grievances	521,500	117,593	639,093	staff nos.	639,093/1,000
Appraisals					
Leavers	102,500	23,113	125,613	leavers	125,613/550
Courses	398,500	89,858	488,358	training days	488,358/3500
Queries	205,000	46,225	251,225	time spent	251,225/100%
	<u>2,040,000</u>	<u>460,000</u>	<u>2,500,000</u>		

Note 1: FSAs apportioned pro-rata to cost of activities. Other methods could be suitable eg proportional to staff costs. 1½

Note 2: It is unlikely that other cost drivers could be adequately justified other than those listed. (½ mark each) 2½

Thirdly, resulting apportionment's to each business division:

	WS (£)	WI (£)	WTC (£)
Per recruit (£2,212.69)	929,330	11,064	55,317
Per staff member (£639.09)	511,275	63,909	63,909
Per leaver (£228.39)	114,193	5,710	5,710
Per training day (£139.53)	418,592	30,697	39,069
% (70/20/10)	175,858	50,245	25,122
Total	<u>2,149,248</u>	<u>161,625</u>	<u>189,127</u>

3

(16)

(b)

- Comment on results could include:
 - Little difference in results between the two methods may suggest simpler method more valid as will be cheaper to administer (comment consistent with students' own figures required).

1

- Advantage of ABC approach would be enhanced awareness of causes of costs and how they can be influenced and so may promote more effective cost management. *1*

 - possible developments might include:
 - use of service level agreement: brief mention required of their potential role. *1*

 - use of retainer fees for advice services. *1*

 - breaking activities into greater detail (examples needed)
 - e.g. different types of recruitment
 - training activities
 - disciplinarys*2*

 - identifying better cost drivers (examples needed)
 - e.g. disciplinarys need to relate to the activity rather than being spread across all staff. Other similar areas such as grievances, payroll, etc.*1½*

 - considering whether reciprocal services should be accounted for by briefly outlining repeated distribution/specified order of closure methods and their costs/benefits. *1½*
- (9)*
- N.B. Other valid comments attract credit, with general pros and cons of ABC methodology *(25)*

Question 2 (Whynose plc)

(a) **Option 1:** Normal selling price less variable distribution costs.

Need to establish variable distribution cost using the high low method (linear regression also acceptable but unnecessary as only two output observations)

$$\begin{aligned}
 y &= a + bx \\
 12,800 &= a + b(6,000) \\
 11,600 &= a + b(5,000) \\
 1,200 &= 1,000b \\
 \Rightarrow b &= 1.20 \\
 \Rightarrow a &= 5,600
 \end{aligned}$$

2

	£
Normal price	18.00
Distribution costs	<u>1.20</u>
Proposed transfer price	16.80

1

Option 2: Standard variable (less distribution costs) cost plus 40% mark-up.

Need to establish other variable costs. From table of figures these include part of the direct costs and maintenance costs; using the high low method:

$$\begin{aligned}
 y &= a + bx \\
 48,500 &= a + b(6,000) \\
 44,300 &= a + b(5,000) \\
 4,200 &= 1,000b \\
 b &= 4.20 \\
 a &= 23,300
 \end{aligned}$$

2

	£
Standard variable cost	4.20
Mark-up (40%)	<u>1.68</u>
	5.88

1

Option 3: full cost:

Requires determination of total fixed cost for absorption purposes. From analysis above fixed costs are £28,900 (5,600 + 23,300) plus other costs (10,000 + 2,000 + 12,000 + 6,000) = £58,900 a month = £706,800 a year.

Total fixed cost = £706,800		1½
	£	
Fixed costs per unit 706,800/86,000	= 8.219	1
Variable cost per unit (from above)	<u>5.40</u>	
	13.62	½

(It is also acceptable to derive full cost from the two month's data, namely 85,900 + 91,300/11,000 units = £16.11)

(9)

(b) (i) Reports should cover the following issues:

- Division W only has surplus capacity expected of 14,000 units. Consequently any price exceeding its variable cost of £5.40 (or £4.20 internally) should be acceptable to W for those 14,000 units 1
 - But transferring all 20,000 Semions to Y would result in lost sales of 6,000 units on the external market and the minimum transfer price for those sales should be £16.80 (the foregone sales income less variable distribution costs saved) 1
 - If the transfer price were set at £16.80, Division Y would buy Semions from overseas at £11 a unit which would be the best for the company overall 1
 - Similarly the standard variable cost + 40% transfer price (£5.88) should be acceptable to both divisions for the first 14,000 units but not for W for the extra demand of 6,000 units, in which case Y should buy from overseas 1½
 - Division W may though feel that they run the risk of forgoing opportunities of winning higher priced orders in the year if they commit to this internal transfer much below the normal external selling price 1
 - A market price based transfer price or full cost price (£16.80 or £13.62) would encourage Y to buy all the units from abroad. But only 6,000 units (of 20,000 units required) are available overseas and so they will wish to buy 14,000 internally. At a transfer price of £13.62, W would only transfer its spare capacity to Y, but at £16.46 W would sell all 20,000 required to Y as the net benefit is no different to selling them externally. 2½
 - Clarity of explanation (given intended audience) and report presentation. 1
- (9)

(b) (ii)

- ‘Correct’ transfer prices, which lead to profit maximising behaviour from a corporate perspective, require the analysis of aggregated cost information from both divisions involved. So, in effect, some level of central involvement is required to ensure that the ‘correct’ price is arrived at. This will undermine divisional autonomy. 2
- Where the supplying division has spare capacity the transfer price should be set with reference to the marginal cost, which will undermine the scope for the supplying division to meet its own divisional profit target even if it enhances the chances of the receiving division meeting its profit targets. It may be that central involvement will be required to ensure the supplying division sets such a price, which would be both a further blow to divisional autonomy, and result in a final performance report for the supplying division that it will probably believe does not represent its true contribution to corporate profitability. 2
- Logical, consistent advice regarding appropriate transfer price, with appropriate rationale. If numbers come out correctly in a) and b) the advice should be: 2
 - Transfer price should reflect opportunity costs. So where W has spare capacity, the first 14,000 units, the transfer price should be at least £4.20 (variable cost, there being no opportunity cost). To meet the demand for the other 6,000 units the transfer price should be £16.80 (the marginal cost plus lost contribution on external sales). Division Y should buy first 14,000 units from W, though at £4.20 W would be indifferent about supplying to Y, and so a transfer price above this but up to £11 (the external price) ought to be negotiable. When the transfer price is raised to £16.80, Y would buy 6,000 units from abroad, which is the best outcome for the company.
- Clarity of explanation, and ‘selling’ of proposed solution as part of well presented report. 1

(7)

(25)

Question 3 (Hoedown plc)

(a) Firstly need to identify the fixed and variable costs from the data and notes in the question.

- materials and direct labour are variable due to constant unit cost 1/2
- labour-related divisional overhead is similarly variable 1/2
- other divisional overhead is fixed due to the unit cost profile 1
- the notes in the question indicate that both factory overhead and selling and admin overhead are fixed even though the unit cost data may seem to suggest they are to some extent variable items 2

NB: Above assumptions made implicitly should gain the same credit.

As a result, unit variable costs are:

	£
Materials	10
Direct Labour	12
Labour overhead	6
	<u>28</u>

1

Optimum price determination:

Price (£)	VC (£)	Unit Contribution (£)	Demand (000's)	Total Cont'n (£)
72	28	44	720	31,680,000
75	28	47	680	31,960,000
80	28	52	600	31,200,000

1

Optimum price is therefore to leave it unchanged at £75, giving annual contribution of £31,960,000.

2

But there is little difference between expected contribution levels at each price option and so there should be other factors worth taking into account before settling on the price such as:

- cost behaviour assumptions e.g. will fixed costs really be constant for each demand option? 1
- strategic considerations such as competition, organisational objectives etc. 1

Other relevant discursive points attract credit up to a maximum of 2 marks (10)

(b) **Arbreville order**

There is spare capacity for this job and so need to identify marginal costs: 1

	£
Variable cost per unit	28
Transportation costs, etc.	20
	<hr style="width: 50%; margin: 0 auto;"/> 48

1

Lefleur order:

As for Arbreville order i.e. £48 per unit marginal costs.

Also extra labour costs of £6 per unit. 1

In addition, there is foregone contribution from sales to regular UK customers of 20,000 units, at £47 per unit $(75-28) = 940,000$. 1

So total marginal cost of the order is $940,000 + 1,620,000 (30,000 \times 54) = £2,560,000$, implying minimum unit price of 85.34 (rounded up). 1

(5)

(c)

- Memo headed to 'All Staff' from 'Finance Director', clearly explained, using examples to illustrate principles. 1

General principle that unplanned ad hoc 'special orders' should be evaluated in terms of their incremental (marginal) costs. That is, at the point they are received the extra costs of fulfilling the order need to be determined, and this determines the minimum price for the order, this representing the price such that the company would be no better or no worse off if they accepted the order. 1

- All available costs need to be identified as do the relevant costs, such as extra overseas transportation costs. Where there is 'spare capacity', and the order can be accommodated without affecting regular work, this defines the minimum price. 1

- Where the acceptance of such a 'special order' affects the firm's ability to fulfill regular UK work this should be taken into account in evaluating the overseas

order. For example, if it means that UK orders are not fulfilled the contribution lost from a UK order should at least be recovered from the price charged to overseas customers. Alternatively, if the overseas order is accommodated by lengthening the delivery time the qualitative effect of this in terms of relationships with regular customers need to be considered.

2

- The result of this is that the Arbreville can be priced at anything above £48 to earn a contribution, so last year's order would have earned some contribution. The order from Lefleur would have needed pricing at £85.33 to break even on this job, and so with a price of £80 this job was some way from breaking even, due to the foregone contribution from regular customers.

2

- Another issue to consider when pricing such an order is whether planned domestic demand is forthcoming. The danger, if not, is that fixed overheads will not be absorbed from planned output and while these are not incremental costs for any overseas special orders (and therefore not part of the 'minimum price') it may be advisable to evaluate whether the final price agreed for special orders can recover such under-absorbed overhead.

1

- One of the implications of this analysis is that differential prices are being set. This will only work when markets are properly segmented, which can be undertaken geographically as here. It is necessary to avoid the case whereby regular customers can transfer their demand so as to pay lower prices - this probably cannot happen when the markets are segmented geographically.

1

- It is also clear that the product provided to Lefleur is differentiated too and so there would be a case to charge for this differentially on this basis.

1

Other relevant points can attract credit.

(10)

(25)

Question 4 (Splash Leisure Ltd)

Report

To The Directors of Splash Leisure
From ...
Date ...
Subject Purchase of New Pump for Swimming Pool

- 1 I have appraised the cost of the two alternative suppliers. The calculations are shown on the attached spreadsheet. The TKZ Mechanics option would result in a cost over five years which is equivalent to £24,500 a year. This compares favourably with the hire option from Commercial Pumps which has a net cost after tax of £28,000 a year.
- 2 However, the annual equivalent cost of the TKZ option increases to £29,110 if the equipment is only needed for 3 years. In this scenario the Commercial Pumps option is more cost effective.
- 3 We do not know if the pool will be in use for just three more years or for the foreseeable future. The probability of the first is 60%, so presumably there is a 40% probability of the second. Using these figures it is possible to calculate an expected annual equivalent cost of £27,266. This is lower than the Commercial Pumps cost.
- 4 The “expected” value needs to be treated with care. It does not represent a cost which we would actually expect to incur. It is the weighted average of the costs for the 5 and 3 year periods. If we had to make this decision many times, then on average the cost of the TKZ option would be £27,266 and hence less costly than the alternative. However, we are making a one off decision, so we can only use the “expected” cost as a basis for making a decision if we are prepared to take the risk that the pool may close in three years (risk neutrality), leaving us £1,110 a year worse off than we would have been if we had hired from Commercial Pumps.
- 5 If we do not want to take this risk (risk aversion) we should hire from Commercial Pumps. This gives us certainty since we only pay an annual hire charge and can terminate the hire contract at any point. This approach would, of course involve foregoing the potential saving of £3,500 should the pool continue in use for five years.
- 6 My analysis depends on a number of assumptions:

- 6.1 That all the costs used will inflate at the same rate of inflation as was used by Splash Leisure in arriving at the 10% real required rate of return. If this were not the case then it would be necessary to calculate alternative discount rates for those figures expected to inflate at a different rate.
- 6.2 That the tax and capital allowance rates will be unchanged for the next five years.
- 6.3 That Splash Leisure will be liable for enough tax each year to be able to take advantage of the tax savings assumed in the appraisal. If this were not the case then an estimate would need to be made of when the company could be expected to get the benefits of these savings, which would then need to be discounted accordingly.
- 6.4 That the probability estimate of 60% is reliable. We should really investigate to see if it is based on any objective evidence or is merely an informed guess.
- 6.5 That the forecast disposal values of the pump after 3 and 5 years are accurate.
- 6.6 That there are no other differences in running cost between the two types of pump, such as power consumption.
- 6.7 That Commercial Pumps would allow the promotional scheme for payment in arrears to continue for the foreseeable future once it had been started.
- (a) Accurate calculation of 5 year capital allowances and savings (including 1 for balancing allowance) 2
 Accurate calculation of 3 year capital allowances and savings (including 1 for balancing allowance) 2
 Accurate calculation of annual tax saving on maintenance 1
 Correct timing of five year cash flows (half mark per line) 2
 Correct timing of three year cash flows (half mark per line) 2
 Accurate discounting and NPVs (5 and 3 years - 1 mark each) 2
 Accurate AECs (5 and 3 years - half mark each) 1
 Accurate calculation of expected annual equivalent cost 1
 Accurate calculation of net annual cost of hire option 1
 Report format 1
 (15)
- (b) Reasonable interpretation of the meaning of expected AEC 2

Accurate recognition of the different decisions arising from different attitudes to risk 4
(6)

(c) Assumptions - half mark each with extra half for discussion where appropriate.
(up to max of 4)

(Credit should be given for other valid assumptions not shown in the suggested answer.)

(25)

TKZ Mechanics

Capital allowances (assuming 5 years of use):

	Asset	Capital	Tax
Year	Value	Allowance	Saving
1	110,000	27,500	8,250
2	82,500	20,625	6,188
3	61,875	15,469	4,641
4	46,406	11,602	3,481
5	34,804	(196)	(59)

Capital allowances (assuming 3 years of use):

	Asset	Capital	Tax
Year	Value	Allowance	Saving
1	110,000	27,500	8,250
2	82,500	20,625	6,188
3	61,875	16,875	5,063

Cashflow assuming 5 years of use:

	Year					
	0	1	2	3	4	5
Capital	(110,000)					35,000
Maintenance		(10,000)	(10,000)	(10,000)	(10,000)	
Tax saving on maint. (see note)			3,000	3,000	3,000	3,000
Tax saving on capital		8,250	6,188	4,641	3,481	(59)
	(110,000)	(1,750)	(812)	(2,359)	(3,519)	37,941
PVF at 10%	1.0000	0.9091	0.8264	0.7513	0.6830	0.6209
PV	(110,000)	(1,591)	(671)	(1,772)	(2,403)	23,558
NPV	(92,879)					
AEC	(24,500)					

Cashflow assuming 3 years of use:

	Year			
	0	1	2	3
Capital	(110,000)			45,000
Maintenance		(10,000)	(10,000)	
Tax saving on maint. (see note)			3,000	3,000
Tax saving on capital		8,250	6,188	5,063
	(110,000)	(1,750)	(812)	53,063
PVF at 10%	1.0000	0.9091	0.8264	0.7513
PV	(110,000)	(1,591)	(671)	39,866
NPV	(72,396)			
AEC	(29,110)			

Note: tax saving on maintenance is shown in the year after the year when the maintenance payment is shown; the reason for this is that payment is made at the end of a year for maintenance in the following year, so the cost would be set against income in the following year for tax purposes.

Expected annual equivalent cost:

	AEC	Prob	
5 year scenario	(24,500)	40%	(9,800)
3 year scenario	(29,110)	60%	(17,466)
			<u>(27,266)</u>

Commercial Pumps (Sturtshire) ltd

Annual cost:

Hire charge	(40,000)
Less tax	(12,000)
Net annual cost	<u>(28,000)</u>

Question 5 (Blarton D.C.)

(a) Weighted Average Cost of Capital

Assuming that the authority borrows £350,000 at 7.25% the weighted average cost of capital in real terms will be 4.90%. The calculation is shown below.

	Market Value	Cost	Weighting	Weighted Cost
Irredeemable loan stock	1,100,000	7.73%	0.3188	2.46%
Other existing loans	2,000,000	7.00%	0.5797	4.06%
New loan	350,000	7.25%	0.1014	0.74%
Total	3,450,000			7.26%
Inflation adjustment	$\frac{1.0726}{1.0225}$	- 1 =	4.90%	
Note: cost of loan stock =	$\frac{85,000}{1,100,000}$	= 7.73%	(i.e. interest over market price)	

(b) Selection of a Discount Rate

Three alternative ways of choosing a discount rate have been suggested.

2.1 The test discount rate is the rate set by the Treasury for appraising central government investments. It does not represent the actual cost of borrowing for government. It is set on the basis of an economic analysis of the social cost of the public sector's use of capital. It is not really appropriate in this case since what we want to find out is whether the savings resulting from the new unit will cover the additional interest charges and loan re-payments that Blarton will face.

2.2 The marginal cost of capital will be 7.25% which would seem on the face of it to be the appropriate basis for appraisal. However, it is generally argued that an investor's capital should be seen as a single pool of money; it is therefore inappropriate to identify a specific lump of capital with a specific investment. One reason for this is that although we would need to borrow at 7.25% now to fund the new unit, we may be in a position to repay debt during the ten year life of the unit. If so, we would presumably repay this debt before the 7% debt. So it is not possible to say that this particular loan will actually be funding the unit over the full ten year period.

- 2.3 For this reason it is generally believed that the weighted average cost of capital is the best figure to use. Even this may change over ten years but it is accepted as the best assumption that can be made of the cost of capital over the full period of the investment, given the information currently available.

I therefore recommend that we use the weighted average cost of capital as a discount rate. The costs and savings resulting from the new unit have been estimated at current prices (i.e. in real terms) so it would be appropriate to adjust the nominal cost of capital by removing expected inflation to give a real rate of 4.9%. I propose that we round this to 5% as the discount rate to use.

(Examiner’s comment: the choice of discount rate is a complex area. Credit may be given for alternative conclusions if reasonable arguments are given in support of them.)

(c) **Net Present Value**

Using my recommended discount rate of 5%, the net present value of the new print unit can be calculated as follows:

	Year:	
	0	1 - 10
Capital cost	(350,000)	
Wages		(110,000)
Supplies and Services		(65,000)
Opportunity Cost of Premises		(10,000)
Saving of Payment to County		236,000
Net cash flow	(350,000)	51,000
Present value factor	1.00	7.722
Present values	(350,000)	393,822
Net present value	43,822	

- (d) The net present value calculated above is a positive figure. This means that the savings arising from not using the County Council's print service will not only cover the direct cost of the new print unit, but also the interest charges on the capital which will have been invested in it, and still leave a surplus.

So, from a financial point of view the proposal would seem to be attractive. However, there will be other factors to be considered before reaching a final decision. Not least of these will be the level of risk involved. At present we pay a charge per job. This represents a risk for the County Council in that our requirement for printing work might go up or down from its present level, with a corresponding impact on the financial position of their print unit.

If we run our own print unit, that risk is transferred to us. If printing requirements over the next ten years were to drop sufficiently to bring the annual charge by the County down by anything more than £5,675 ($£43,822 \div 7.722$), which is 2.4%, then the NPV would be negative. If we think this risk is acceptably small then we should establish the new unit. If on the other hand we think the risk is too large to accept we should continue to have printing done by the County Council.

Demand for printing could also increase. This would increase the relative benefit of running our own unit, so long as the level of demand did not exceed the capacity of the planned unit. (A further appraisal would be needed for higher levels of demand that would require further capital investment.)

Other risks of which we need to be aware are those associated with the running costs of the unit: costs for employees or supplies and services could be different from those used in the appraisal. There is also a risk that these costs will inflate at a rate different from the 2.25% used to calculate the discount rate.

Finally there is a risk that the authority's cost of capital will change over the period. Changes in interest rates are not likely to be a problem since the discount rate represents a real rather than a nominal cost of capital, and real rates of return tend to be fairly constant even when interest rates change. The real risk is that the authority might repay significant amounts of debt, or take on additional debt at different interest rates. Either of these developments could have significant effect on the weighted average cost of capital.

(a)	Cost of loan stock	2
	Weightings	1½
	Weighted costs	1½
	Weighted average	2
	Inflation adjustment	1
		(8)
(b)	Discussion of TDR	1
	Discussion of marginal cost of capital	1
	Explanation of reason for using weighted average	2
	Explain reason for inflation adjustment	1
		(5)
(c)	Correct treatment of overheads	1
	Correct treatment of opportunity cost of premises	1
	Correct net cash flows	1
	Correct discounting	1
	Use of cumulative PVF to speed up discounting	1
	Correct NPV	1
		(6)
(d)	Valid interpretation of NPV	2
	Identification of risks. Credit should be given for any valid risks identified but if the risk associated with activity levels is not mentioned the total should not exceed 2. Calculation to evaluate risk, such as given in the answer is not required but should be given credit. The model answer is fuller than is required for the full 4 marks.	4
		(6)

Note: calculations should be treated as correct if they make correct use of incorrect results from an earlier calculation which has already been penalised.

(25)