ACTIVITY BASED COSTING QUESTIONS AND ANSWERS

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QUESTION 1

The Gadget Co produces three products, A, B and C, all made from the same material. Until now, it has used traditional absorption costing to allocate overheads to its products. The company is now considering an activity based costing system in the hope that it will improve profitability. Information for the three products for the last year is as follows:

	A	B	C
Production and sales volumes (units)	15,000	12,000	18,000
Selling price per unit	$7.50	$12	$13
Raw material usage (kg) per unit	2	3	4
Direct labour hours per unit	0·1	0·15	0·2
Machine hours per unit	0·5	0·7	0·9
Number of production runs per annum	16	12	8
Number of purchase orders per annum	24	28	42
Number of deliveries to retailers per annum	48	30	62

The price for raw materials remained constant throughout the year at $1·20 per kg. Similarly, the direct labour cost for the whole workforce was $14·80 per hour. The annual overhead costs were as follows:

	$
Machine set up costs	26,550
Machine running costs	66,400
Procurement costs	48,000
Delivery costs	54,320

Required:

(a) Calculate the full cost per unit for products A, B and C under traditional absorption costing, using direct labour hours as the basis for apportionment. (5 marks)

(b) Calculate the full cost per unit of each product using activity based costing. (9 marks)

(c) Using your calculation from (a) and (b) above, explain how activity based costing may help The Gadget Co improve the profitability of each product. (6 marks

SUGGESTED SOLUTION

(a) Cost per unit under full absorption costing

Total annual overhead costs:	**$**
Machine set up costs	26,550
Machine running costs	66,400
Procurement costs	48,000
Delivery costs	54,320
	195,270

Overhead absorption rate:

	A	**B**	**C**	**Total**
Production volumes	15,000	12,000	18,000	
Labour hours per unit	0·1	0·15	0·2	
Total labour hours	1,500	1,800	3,600	6,900

Therefore, overhead absorption rate = $195,270/6,900 = $28·30 per hour

Cost per unit:

	A **$**	**B** **$**	**C** **$**
Raw materials ($1·20 x 2/3/4kg)	2·4	3·6	4·8
Direct labour ($14·80 x 0·1/0·15/0·2hrs)	1·48	2·22	2·96
Overhead ($28·30 x 0·1/0·15/0·2 hrs)	2·83	4·25	5·66
Full cost per unit	6·71	10·07	13·42

(b) Cost per unit using ABC costing

Cost drivers:

Cost pools	$	Cost driver
Machine set up costs	26,550	36 production runs (16 + 12 + 8)
Machine running costs	66,400	32,100 machine hours (7,500 + 8,400 + 16,200)
Procurement costs	48,000	94 purchase orders (24 + 28 + 42)
Delivery costs	54,320	140 deliveries (48 + 30 + 62)
	195,270	

Cost per machine set up	$26,550/36 = $737·50
Cost per machine hour	$66,400/32,100 = $2·0685
Cost per order	$48,000/94 = $510·6383
Cost per delivery	$54,320/140 = $388

Allocation of overheads to each product:

	A	B	C	Total
	$	$	$	$
Machine set up costs	11,800	8,850	5,900	26,550
Machine running costs	15,514	17,375	33,510	66,400
Procurement costs	12,255	14,298	21,447	48,000
Delivery costs	18,624	11,640	24,056	54,320
	58,193	52,163	84,913	195,270
Number of units produced	15,000	12,000	18,000	
	$	$	$	
Overhead cost per unit	3·88	4·35	4·72	

Total cost per unit	A	B	C
	$	$	$
Materials	2·4	3·6	4·8
Labour	1·48	2·22	2·96
Overheads	3·88	4·35	4·72
	7·76	10·17	12·48

(c) Using activity-based costing

When comparing the full unit costs for each of the products under absorption costing as compared to ABC, the following observations can be made:

Product A

The unit cost for product A is 16% higher under ABC as opposed to traditional absorption costing. Under ABC, it is $7·76 per unit compared to $6·71 under traditional costing. This is particularly significant given that the selling price for product A is $7·50 per unit. This means that when the activities that give rise to the overhead costs for product A are taken into account, product A is actually making a loss. If the company wants to improve profitability it should look to either increase the selling price of product A or somehow reduce the costs. Delivery costs are also high, with 48 deliveries a year being made for product A. Maybe the company could seek further efficiencies here. Also, machine set up costs are higher for product A than for any of the other products, due to the larger number of production runs. The reason for this needs to be identified and, if possible, the number of production runs needs to be reduced.

Product B

The difference between the activity based cost for B as opposed to the traditional cost is quite small, being only $0·10. Since the selling price for B is $12, product B is clearly profitable whichever method of overhead allocation is used. ABC does not really identify any areas for concern here.

Product C

The unit cost for C is 7% lower under ABC when compared to traditional costing. More importantly, while C looks like it is making a loss under traditional costing, ABS tells a different story. The selling price for C is $13 per unit and, under ABC, it costs $12·48 per unit. Under traditional absorption costing, C is making a loss of $0·42 per unit. Identifying the reason for the differences in C, it is apparent that the number of production runs required to produce C is relatively low compared to the volumes produced. This leads to a lower apportionment of the machine set up costs to C than would be given under traditional absorption costing. Similarly, the number of product tests carried out on C is low relative to its volume.

ABC is therefore very useful in identifying that C is actually more profitable than A, because of the reasons identified above. The company needs to look at the efficiency that seems to be achieved with C (low number of production runs less testing) and see whether any changes

can be made to A, to bring it more in line with C. Of course, this may not be possible, in which case the company may consider whether it wishes to continue to produce A and whether it could sell higher volumes of C.
Source:https://www.acowtancy.com/exam-centre/acca-f5/a1-activity-based-costing/ba50d753-ce03-ca3a-f701-60eb6cfb5555

QUESTION 2

Brick by Brick (BBB) is a building business that provides a range of building services to the public. Recently they have been asked to quote for garage conversions (GC) and extensions to properties (EX) and have found that they are winning fewer GC contracts than expected. BBB has a policy to price all jobs at budgeted total cost plus 50%. Overheads are currently absorbed on a labour hour basis. BBB thinks that a switch to activity based costing (ABC) to absorb overheads would reduce the cost associated to GC and hence make them more competitive.

You are provided with the following data:

Overhead category	Annual overheads $	Activity driver	Total number of activities per year
Supervisors	90,000	Site visits	500
Planners	70,000	Planning documents	250
Property related	240,000	Labour hours	40,000
Total	400,000		

A typical GC costs $3,500 in materials and takes 300 labour hours to complete. A GC
requires only one site visit by a supervisor and needs only one planning document to be raised. The typical EX costs $8,000 in materials and takes 500 hours to complete. An EX requires six site visits and five planning documents. In all cases labour is paid $15 per hour.

Required:

(a) Calculate the cost and quoted price of a GC and of an EX using labour hours to absorb the overheads.(5 marks)
(b) Calculate the cost and the quoted price of a GC and of an EX using ABC to absorb the overheads. (5 marks)
(c) Assuming that the cost of a GC falls by nearly 7% and the price of an EX rises by about 2% as a result of the change to ABC, suggest possible pricing strategies for the two products that BBB sells and suggest two reasons other than high prices for the current poor sales of the GC.(6 marks)

(d) One BBB manager has suggested that only marginal cost should be included in budget cost calculations as this would avoid the need for arbitrary overhead allocations to products. Briefly discuss this point of view and comment on the implication for the amount of mark-up that would be applied to budget costs when producing quotes for jobs. (4 marks)

SUGGESTED SOLUTION

(a) Costs and quoted prices for the GC and the EX using labour hours to absorb overheads:

			GC $	EX $
Materials			3,500	8,000
Labour	300hrs x $15/hr		4,500	
		500hrs x $15/hr		7,500
Overheads	300hrs x $10/hr (W1)		3,000	
		500hrs x $10/hr		5,000
Total cost			11,000	20,500
Quoted price			16,500	30,750

(W1). Overhead absorption rate is calculated as $400,000/40,000hrs = $10/hr

(b) Costs and quoted prices for the GC and the EX using ABC to absorb overheads:

			GC $	EX $
Materials			3,500	8,000
Labour	300hrs x $15/hr		4,500	
		500hrs x $15/hr		7,500
Overheads				
– Supervisor	(W2)/(W3)		180	1,080
– Planners	(W2)/(W3)		280	1,400
– Property	(W2)/(W3)		1,800	3,000
Total cost			10,260	20,980
Quoted price			15,390	31,470

(W2)

	Costs	Number of drivers	Cost per driver
Supervisor	90,000	500	180
Planners	70,000	250	280
Property	240,000	40,000	6

(W3)

	Supervisor	Planner	Property
Cost per driver (W2)	$180	$280	$6
GC	180 x 1 = 180	280 x 1 = 280	6 x 300 = 1,800
EX	180 x 6 = 1,080	280 x 5 = 1,400	6 x 500 = 3,000

(c) The pricing policy is a matter for BBB to decide. They could elect to maintain the current 50% mark-up on cost and if they did the price of the GC would fall by around 7% in line with the costs. This should make them more competitive in the market.

They could also reduce the prices by a little less than 7% (say 5%) in order to increase internal margins a little.

It is possible that the issue lies elsewhere. If the quality of the work or the reputation and reliability of the builder is questionable then reducing prices is unlikely to improve sales. It is conceivable that BBB has a good reputation for EX but not for GC, but more likely that a poor reputation would affect all products. Equally poor service levels or lack of flexibility in meeting customer needs may be causing the poor sales performance. These too will not be 'corrected' by merely reducing prices.

It is also possible that the way salesmen discuss or sell their products for the GC is not adequate so that in some way customers are being put off placing the work with BBB.

BBB is in competition and it perhaps needs to reflect this in its pricing more (by 'going rate pricing') and not seek to merely add a mark-up to its costs.

BBB could try to penetrate the market by pricing some jobs cheaply to gain a foothold. Once this has been done the completed EX or GC could be used to market the business to new customers.

The price of the EX would also need consideration. There is no indication of problems in the selling of the EX and so BBB could consider pushing up their prices by around 2% in line with the cost increase. On the figures in my answer the price goes up for a typical extension to $31,470 from $30,750 a rise of $720. This does not seem that significant and so might not lose a significant number of sales.

The reliability and reputation of a builder is probably more important than the price that they charge for a job and so it is possible that the success rate on job quotes may not be that price sensitive.

(d) Marginal costs are those costs that are incurred as a consequence of the job being undertaken. In this case they would include only the materials and the labour. If overheads are included then this is known as total absorption costing.

Overheads are for many businesses fixed by nature and hence do not vary as the number of jobs changes. In a traditional sense any attempt to allocate costs to products (by way of labour hours for example) would be arbitrary with little true meaning being added to the end result. The overhead absorption rate (OAR) is merely an average of these costs (over labour hours) and is essentially meaningless. This switch (to marginal costing) would also avoid the problem of the uncertainty of budget volume. Budget volume is needed in order to calculate the fixed cost absorption rate.

The marginal cost (MC) is more understandable by managers and indeed customers and a switch away from total absorption cost (TAC) could have benefits in this way. Clearly if overheads are going to be excluded for the cost allocations then they would still have to be covered by way of a bigger margin added to the costs. In the end all costs have to be paid for and covered by the sales in order to show a profit.

A more modern viewpoint is that activity causes costs to exist. For example, it is the existence of the need for site visits that gives rise to the need for a supervisor and therefore, for his costs. If the activities that drive costs are identified, more costs can then be directly traced to products, hence eradicating the need for arbitrary apportionment of many overhead costs. This has the benefit of all costs being covered, rather than the potential shortfall that can arise if marginal cost plus pricing is used.

In the long run businesses have to cover all costs including fixed overheads in order to make a profit, whichever pricing strategy is adopted.

QUESTION 3

Jola Publishing Co publishes two forms of book. The company publishes a children's book (CB), which is sold in large quantities to government controlled schools. The book is produced in only four large production runs but goes through frequent government inspections and quality assurance checks.The paper used is strong, designed to resist the damage that can be caused by the young children it is produced for. The book has only a few words and relies on pictures to convey meaning.

The second book is a comprehensive technical journal (TJ). It is produced in monthly production runs, 12 times a year. The paper used is of relatively poor quality and is not subject to any governmental controls and consequently only a small number of inspections are carried out. The TJ uses far more machine hours than the CB in its production.

The directors are concerned about the performance of the two books and are wondering what the impact would be of a switch to an activity based costing (ABC) approach to accounting for overheads. They currently use absorption costing, based on machine hours for all overhead calculations. They have accurately produced an analysis for the accounting year just completed as follows:

Required:

(a) Explain why the overhead allocations have changed in the way indicated above. (8 marks)

(b) Briefly explain the implementation problems often experienced when ABC is first introduced. (4 marks)

The directors are keen to introduce ABC for the coming year and have provided the following cost and selling price data:

1. The paper used costs $2 per kg for a CB but the TJ paper costs only $1 per kg. The CB uses 400g of paper for each book, four times as much as the TJ uses.

2. Printing ink costs $30 per litre. The CB uses one third of the printing ink of the larger TJ. The TJ uses 150ml of printing ink per book.

3. The CB needs six minutes of machine time to produce each book, whereas the TJ needs 10 minutes per book. The machines cost $12 per hour to run.

4. The sales prices are to be $9·30 for the CB and $14·00 for the TJ

As mentioned above there are three main overheads, the data for these are:

Overhead	Annual cost for the coming year
	$
Property costs	2,160,000
Quality control	668,000
Production set up costs	52,000
Total	2,880,000

The CB will be inspected on 180 occasions next year, whereas the TJ will be inspected just 20 times.

Jola Publishing will produce its annual output of 1,000,000 CBs in four production runs and approximately 10,000 TJs per month in each of 12 production runs.

Required:

(c) Calculate the cost per unit and the margin for the CB and the TJ using machine hours to absorb the overheads. (5 marks)

(d) Calculate the cost per unit and the margin for the CB and the TJ using activity based costing principles to absorb the overheads. (8 marks)

SUGGESTED SOLUTION

(a) The first thing to point out is that the overhead allocations to the two products have not changed by that much. For example the CB has absorbed only $0·05 more overhead. The reason for such a small change is that the overheads are dominated by property costs (75% of total

overhead) and the 'driver' for these remains machine hours once the switch to ABC is made. Thus no difference will result from the switch to ABC in this regard.

The major effect on the cost will be for quality control. It is a major overhead (23% of total) and there is a big difference between the relative number of machine hours for each product and the number of inspections made (the ABC driver). The CB takes less time to produce than the TJ, due to the shortness of the book. It will therefore carry a smaller amount of overhead in this regard. However, given the high degree of government regulation, the CB is subject to 'frequent' inspections whereas the TJ is inspected only rarely. This will mean that under ABC the CB will carry a high proportion of the quality control cost and hence change the relative cost allocations.

The production set up costs are only a small proportion of total cost and would be, therefore, unlikely to cause much of a difference in the cost allocations between the two products. However this hides the very big difference in treatment. The CB is produced in four long production runs, whereas the TJ is produced monthly in 12 production runs. The relative proportions of overhead allocated under the two overhead treatments will be very different. In this case the TJ would carry much more overhead under ABC than under a machine hour's basis of overhead absorption.

(b) There are many problems with ABC, which, despite its academic superiority, cause issues on its introduction.

– Lack of understanding. ABC is not fully understood by many managers and therefore is not fully accepted as a means of cost control.
– Difficulty in identifying cost drivers. In a practical context, there are frequently difficulties in identifying the appropriate drivers. For example, property costs are often significant and yet a single driver is difficult to find.
– Lack of appropriate accounting records. ABC needs a new set of accounting records, this is often not immediately available and therefore resistance to change is common. The setting up of new cost pools is needed which is time consuming.

(c) Cost per unit calculation using machine hours for overhead absorption

	$CB		$TJ
Paper (400g at $2/kg)	0·80	(100g at $1/kg)	0·10
Printing (50ml at $30/ltr)	1·50	(150ml at $30/ltr)	4·50
Machine cost (6 mins at $12/hr)	1·20	(10 mins at $12/hr)	2·00
Overheads (6 mins at $24/hr) (W1)	2·40	(10 mins at $24/hr)	4·00
Total cost	5·90		10·60
Sales price	9·30		14·00
Margin	3·40		3·40

(W1) Workings for overheads:

Total overhead	$2,880,000
Total machine hours (1,000,000 x 6 mins) + (120,000 x 10 mins) = Which is	 7,200,000 mins 120,000 hours

$$\text{Cost per hour} = \frac{\$2{,}880{,}000}{120{,}000 \text{ hrs}} = \$24/\text{hr}$$

Cost per unit calculations under ABC

	CB $		TJ $
Paper (400g at $2/kg)	0·80	(100g at $1/kg)	0·10
Printing (50ml at $30/ltr)	1·50	(150ml at $30/ltr)	4·50
Machine cost (6 mins at $12/hr)	1·20	(10 mins at $12/hr)	2·00
Overheads (W2)	2·41	(W2)	3·88
Total cost	5·91		10·48
Sales price	9·30		14·00
Margin	3·39		3·52

(W2) Working for ABC overheads

	Total	CB	TJ
	$	$	$
Property costs	2,160,000	1,800,000	360,000
Quality control	668,000	601,200	66,800
Production set up	52,000	13,000	39,000
Total	2,880,000	2,414,200	465,800
Production level		1,000,000	120,000
Cost per unit		2·41	3·88

alternative:

No of drivers	Cost/driver	CB	TJ
120,000	18/hr	1·80	3·00
200	3340	0·6012	0·56
16	3250	0·013	0·325
Cost per unit		2·41	3·88

The above overheads have been split on the basis of the following activity levels

	Driver	CB	TJ
Property costs	Machine hours	100,000	20,000
Quality control	Inspections	180	20
Production set up	Set ups	4	12

A cost per driver approach is also acceptable.

QUESTION 4

Triple Limited makes three types of gold watch – the Diva (D), the Classic (C) and the Poser (P). A traditional product costing system is used at present; although an activity based costing (ABC) system is being considered. Details of the three products for a typical period are:

	Hours per unit		Materials	Production
	Labour hours	Machine hours	Cost per unit ($)	Units
Product D	½	1½	20	750
Product C	1½	1	12	1,250
Product P	1	3	25	7,000

Total production overheads are $654,500 and further analysis shows that the total production overheads can be divided as follows:

	%
Costs relating to set-ups	35
Costs relating to machinery	20
Costs relating to materials handling	15
Costs relating to inspection	30
Total production overhead	100

The following total activity volumes are associated with each product line for the period as a whole:

	Number of Set ups	Number of movements of materials	Number of inspections
Product D	75	12	150
Product C	115	21	180
Product P	480	87	670
	670	120	1,000

Direct labour costs $6 per hour and production overheads are absorbed on a machine hour basis. The overhead absorption rate for the period is $28 per machine hour.

Required:

(a) Calculate the cost per unit for each product using traditional methods, absorbing overheads on the basis of machine hours.

(b) Calculate the cost per unit for each product using ABC principles (work to two decimal places).

(c) Explain why costs per unit calculated under ABC are often very different to costs per unit calculated under more traditional methods. Use the information from Triple Limited to illustrate. (4 marks)

(d) Discuss the implications of a switch to ABC on pricing and profitability. (6 marks)

SUGGESTED SOLUTION

1 TRIPLE Limited

(a) Traditional cost per unit

	D	C	P
	$	$	$
Material	20	12	25
Labour ($6/hour)	3	9	6
Direct costs	23	21	31
Production overhead ($28/machine hour)	42	28	84
Total production cost /unit	65	49	115

(b) ABC cost per unit

(i) Total overheads

These were given at $654,500

(ii) Total machine hours (needed as the driver for machining overhead)

Product	Hours/unit	Production units	Total hours
D	1½	750	1,125
C	1	1,250	1,250
P	3	7,000	21,000
Total machine hours			23,375

(iii) Analysis of total overheads and cost per unit of activity

Type of overhead	Driver	%	Total overhead $	Level of driver activity	Cost/driver
Set-ups	Number of set ups	35	229,075	670	341.90
Machining	Machine hours	20	130,900	23,375	5.60
Materials handling	Material movements	15	98,175	120	818.13
Inspection	Number of inspections	30	196,350	1,000	196.35
		100	**654,500**		

(iv) Total overheads by product and per unit

	Product D		Product C		Product P		Total	
Overhead	Activity	$ Cost	Activity	$ Cost	Activity	$ Cost	Activity	$ Cost
Set-ups	75	25,643	115	39,319	480	164,113	670	229,075
Machining	1,125	6,300	1,250	7,000	21,000	117,600	23,375	130,900
Material Handling	12	9,817	21	17,181	87	71,177	120	98,175
Inspection	150	29,453	180	35,343	670	131,554	1,000	196,350
Total overhead cost		77,213		98,843		484,444		654,500
Units produced		750		1,250		7,000		
Costs per unit		$94.95		$79.07		$69.21		

(v) Cost per unit

	D $	C $	P $
Direct costs (from (a))	23.00	21.00	31.00
Overheads (from (iv))	94.95	79.07	69.21
	117.95	100.07	100.21

C.

Comment

The overhead costs per unit are summarised below together with volume of production.

Product	D	C	P
Volume	750	1,250	7,000
Conventional overheads	$42	$28	$84
ABC overheads	$95	$79	$69

The result of the change to Activity Based Costing is clear, the overhead cost of D and C have risen whilst that of P has fallen.

This is in line with the comments of many who feel that ABC provides a fairer unit cost better reflecting the effort required to make different products. This is illustrated here with product P which may take longer to make than D or C, but once production has started the process is simple to administer. This may be due to having much longer production lines.

Products D and C are relatively minor volume products but still require a fair amount of administrative time by the production department; ie they involve a fair amount of `hassle`. This is explained by the following table of `activities per 1,000 units produced`.

	Set-ups	Materials movements	Inspections
D	100	16	200
C	92	17	144
P	69	12	96

This table highlights the problem.

- Product P has fewer set-ups, material movements and inspections per 1,000 units than or C
- As a consequence product P's overhead cost per unit for these three elements has fallen
- The machining overhead cost per unit for P is still two or three times greater than for products D or C, but because this overhead only accounts for 20% of the total overhead this has a small effect on total cost.
- The overall result is P's fall in production overhead cost per unit and the rise in those figures for D and C

(d) Pricing and Profitability

Switching to ABC can, as in this case, substantially change the costs per unit calculations. Consequently if an organisation's selling prices are determined by a version of cost-plus pricing then the selling prices would alter.

In this case the selling price of D and C would rise significantly, and the selling price of P would fall.

This, at first glance may be appealing however:

– Will the markets for D and C tolerate a price rise? There could be competition to consider. Will customers be willing to pay more for a product simply because Triple Ltd has changed its cost allocation methods?

– Product P is a high volume product. Reducing its selling price will have a dramatic effect on revenue and contribution. One would have to question whether such a reduction would be compensated for by increased volumes.

Alternatively, one could take the view that prices are determined by the market and therefore if Triple Ltd switches to ABC, it is not the price that would change but the profit or margin per unit that would change.

This can change attitudes within the business. Previously high margin products (under a traditional overhead absorption system) would be shown as less profitable.

Salesmen (possibly profit motivated) can begin to push the sales of different products seeking higher personal rewards. (Assuming commission based on profits per unit sold)

It must always be remembered that if overheads are essentially fixed then they should be ignored in business decision making. Switching to ABC can change reported profits per unit but it is contribution per unit that is perhaps more important.

QUESTION 5

Duff Co manufactures three products, X, Y and Z. Demand for products X and Y is relatively elastic whilst demand for product Z is relatively inelastic. Each product uses the same materials and the same type of direct labour but in different quantities. For many years, the company has been using full absorption costing and absorbing overheads on the basis of direct labour hours. Selling prices are then determined using cost plus pricing. This is common within this industry, with most competitors applying a standard mark-up.

Budgeted production and sales volumes for X, Y and Z for the next year are 20,000 units, 16,000 units and 22,000 units respectively.

The budgeted direct costs of the three products are shown below:

Product	X	Y	X
	$ Per Unit	$ Per Unit	$ Per Unit
Direct Materials	25	28	22
Direct labour ($ 12 per hour)	30	36	24

In the next year, Duff Co also expects to incur indirect production costs of $1,377,400, which are analyzed as follows:

Cost pools	$	Cost drivers
Machine set up costs	280,000	Number of batches
Material ordering costs	316,000	Number of purchase orders
Machine running costs	420,000	Number of machine hours
General facility costs	361,000	Number of machines hours
Total	1,377,400	

The following additional data relate to each product:

Product	X	Y	Z
Batch size (units)	500	800	400
No of purchase orders per batch	4	5	4
Machine hours per unit	1.5	1.25	1.4

Duff Co wants to boost sales revenue in order to increase profits but its capacity to do this is limited because of its use of cost plus pricing and the application of the standard mark-up. The finance director has suggested using activity based costing (ABC) instead of full absorption costing, since this will alter the cost of the products and may therefore enable a different price to be charged.

Required:

(a) Calculate the budgeted full production cost per unit of each product using Duff Co's current method of absorption costing. All workings should be to two decimal places. (3 marks)
(b) Calculate the budgeted full production cost per unit of each product using activity based costing. All workings should be to two decimal places. (11 marks)
(c) Discuss the impact on the selling prices and the sales volumes OF EACH PRODUCT which a change to activity based costing would be expected to bring about. (6 marks)

SUGGESTED SOLUTION

a) Full budgeted production cost per unit using absorption costing

Product	X	Y	Z	Total
Budgeted annual production (units)	20000	16000	22000	
Labour hours per unit	2.5	3	2	
Total labour hours	**50000**	**48000**	**44000**	**142000**

Overhead absorption rate = $1,377,400/142,000 = $9·70 per hour

Product	X	Y	Z
	$ per unit	$ per unit	$ per unit
Direct materials	25	28	22
Direct labour	30	36	24
Overhead ($9·70 x 2·5/3/2)	24.25	29.10	19.40
Full Cost per unit	**79.25**	**93.10**	**65.40**

b)

Full budgeted production cost per unit using activity based costing

Product	X	Y	Z	Total
Budgeted annual production (units)	20,000	16,000	22,000	
Batch size	500	800	400	
Number of batches (i.e. set ups)	40	20	55	115
Number of purchase orders per batch	4	5	4	
Total number of orders	160	100	220	480
Machine hours per unit	1·5	1·25	1·4	
Total machine hours	30,000	20,000	30,800	80,800

Cost driver rates:

Cost per machine set up	$280,000/115 = $2,434·78
Cost per order	$316,000/480 = $658·33
Cost per machine hour	($420,000 + $361,400)/80,800 = $9·67

Allocation of overheads to each product:

Product	X	Y	Z	Total
	$	$	$	
Machine set up costs	97,391	48,696	133,913	280,000
Material ordering costs	105,333	65,833	144,834	316,000
Machine running and facility costs	290,100	193,400	297,836	781,336*
Total	492,824	307,929	576,583	1,377,336
Number of units produced	20,000	16,000	22,000	
Overhead cost per unit	$24·64	$19·25	$26·21	
Total cost per unit:	$ per unit	$ per unit	$ per unit	
Direct materials	25	28	22	
Direct labour	30	36	24	
Overhead	24·64	19·25	26·21	
ABC cost per unit	79·64	83·25	72·21	

*A difference of $64 arises here as compared to the cost pool total of $781,400 because of rounding differences. This has been ignored.

c) When activity based costing is used, the cost for product X is very similar to that cost calculated using full absorption costing. This means that the price for product X is likely to remain unchanged because cost plus pricing is being used. Demand for product X is relatively elastic but since no change in price is expected, sales volumes are likely to remain the same if ABC is introduced.

However, the cost for product Y is almost $10 per unit less using ABC. This means that the price of product Y will go down if cost plus pricing is used. Given that demand for product Y is also elastic, like demand for product X, a reduced selling price is likely to give rise to increased sales volumes.

The cost of product Z is nearly $7 per unit more using ABC and the price of product Z will therefore go up if ABC is used. Given that demand for product Z is relatively inelastic, this means that sales volumes would be expected to be largely unchanged despite an increase in price.

QUESTION 7

15 A company makes two products using the same type of materials and skilled workers. The following information is available:

	Product A	Product B
Budgeted volume (units)	1,000	2,000
Material per unit ($)	10	20
Labour per unit ($)	5	20

Fixed costs relating to material handling amount to $100,000. The cost driver for these costs is the volume of material purchased.

General fixed costs, absorbed on the basis of labour hours, amount to $180,000.

Using activity-based costing, what is the total fixed overhead amount to be absorbed into each unit of product B (to the nearest whole $)?

A $113
B $120
C $40
D $105

B

Total material budget ((1,000 units x $10) + (2,000 units x $20)) = $50,000

Fixed costs related to material handling = $100,000

OAR = $2/$ of material

Product B = $2 x $20 = $40

Total labour budget ((1,000 units x $5) + (2,000 units x $20) = $45,000

General fixed costs = $180,000

OAR = $4/$ of labour

Product B = $4 x $20 = $80

Total fixed overhead cost per unit of Product B ($40 + $80) = $120