

## Chapter 3 Solutions

### Solution 3.1

#### A) Explain the following terms

**Overhead** is the term used when referring to indirect costs. Overhead costs are therefore costs incurred by a company which cannot be directly allocated to a specific cost unit; i.e. there is an element of sharing involved. If a company wishes to find the cost, of a cost centre or cost unit, the overhead incurred must be apportioned using some fair base. For example, electricity costs which are incurred lighting and heating a building would be shared out or apportioned using floor space.

A **Cost Centre** is a location, person or item of equipment for which costs may be ascertained, related to cost units and used for control purposes. Typical examples could include a slicing machine or the canning department or a solicitor.

A **cost unit** is a quantitative unit of product or service in relation to which costs are ascertained. Typical examples could be a loaf of bread, a litre of paint, or a meal served.

#### B) Why and how overhead cost is apportioned

One reason why overhead may need to be apportioned is because management need to be aware of the level of expenditure on overheads. If left uncontrolled, the amount spent can increase year on year, eroding significant proportions of gross profit and reducing competitiveness. Therefore it is important to know both the overhead expenditure per cost centre or department and the overhead costs per unit. Analysing overhead costs per cost centre or department helps in the overall control of overhead within an organisation.

The process by which overheads are divided between several cost centres in a 'fair' proportion is referred to as cost apportionment. Each overhead type is examined and a suitable base for sharing out the cost is established. For example, the best way of sharing out property rental cost can be justified as 'floor space' or square metres occupied, because each cost centre occupies floor space within the property. Cost is apportioned by dividing the total overhead cost of rent by the total floor space and multiplying by the space used by the cost centre.

## Solution 3.2

### *Apportionment of overhead for Heather's Dept Stores Ltd*

		<b>Dept 1</b>	<b>Dept 2</b>	<b>Dept 3</b>	<b>Total</b>
		€	€	€	€
Rent	<i>Floor area</i>	266,667	320,000	213,333	800,000
Electricity	<i>Floor area</i>	50,000	60,000	40,000	150,000
Insurance	<i>Floor area</i>	66,667	80,000	53,333	200,000
Administration	<i>Employees</i>	100,000	75,000	25,000	200,000
Personnel	<i>Employees</i>	40,000	30,000	10,000	80,000
Marketing	<i>Turnover</i>	40,000	57,143	22,857	120,000
General expenses	<i>Turnover</i>	16,667	23,810	9,524	50,000
Depreciation	<i>Turnover</i>	3,333	4,762	1,905	10,000
Canteen costs	<i>Employees</i>	10,000	7,500	2,500	20,000
Total overhead cost		<u>593,333</u>	<u>658,214</u>	<u>378,452</u>	<u>1,630,000</u>

## Solution 3.3

*Note: the cost of equipment depreciation was omitted from the text book - it should read €6,000.*

### Overhead Statement

	Basis	Outdoor €	Indoor €	Swim €	Admin services €	IT services €	Total €
Apportioned	----	51,650	31,925	27,955	12,395	20,325	144,250
Light and heat	<i>Floor</i>	5,000	1,500	2,500	500	500	10,000
Rent and rates	<i>Floor</i>	1,250	375	625	125	125	2,500
Equipment depreciation	<i>Value</i>	300	300	720	1,080	3,600	6,000
Employee benefits	<i>Employees</i>	1,800	900	450	900	450	4,500
		<b>60,000</b>	<b>35,000</b>	<b>32,250</b>	<b>15,000</b>	<b>25,000</b>	<b>167,250</b>
<i>Re-apportionment of service centres</i>							
Computer services		6,250	6,250	6,250	6,250	(25,000)	0
Admin. services		8,500	5,313	7,438	(21,250)		0
Total overhead		<b>74,750</b>	<b>46,563</b>	<b>45,938</b>	<b>0</b>	<b>0</b>	<b>167,250</b>

## Solution 3.4

### a) Overhead absorption rate

An overhead absorption rate is a rate calculated in absorption costing when sharing overhead costs to cost units. It is found by dividing the overhead cost of a cost centre by a base or activity level. The base for example can be machine hours, labour hours, a percentage of direct labour or the number of units produced in the cost centre.

*Illustration:* If the overhead in a cost centre amounted to €100,000 and the operating hours amounted to 10,000 hours the overhead absorption rate would be calculated as follows:

$$\frac{\text{Overhead}}{\text{Operating hours}} = \frac{\text{€100,000}}{10,000 \text{ hours}} = \text{€10 per operating hour}$$

In this illustration a product would be charged €10 of overhead for every operating hour used.

### b) The main bases used in calculating overhead absorption rates are

- Number of units
- Direct machine (operating) hours
- Direct labour hours
- Percentage direct labour cost
- Percentage direct material cost
- Percentage prime cost

### c) Appropriate bases

- i. *Accounting services.* Rate per direct labour hour
- ii. *Hairdressers.* Rate per direct labour hour or number of clients
- iii. *Automated manufacturing business.* Rate per machine hour
- iv. *Hotels.* Rate per unit or rate per hour
- v. *Leisure centres.* Rate per operating hour or rate per client

## Question 3.5

### Part a) Overhead statement

		Accommodation Catering		H&F	Golf	Admin.	Total
		€	€	€	€	€	€
		1,276,550	31,780	24,810	191,610	145,100	1,669,850
Power	Floor area	21,000	7,500	12,000	3,000	4,500	48,000
Insurance	Asset €	37,000	11,000	19,200	18,400	4,400	90,000
Depreciation	Asset €	92,500	27,500	48,000	46,000	11,000	225,000
Employee							
Benefits	Employees	60,000	30,000	22,500	7,500	15,000	135,000
Total overhead		1,487,050	107,780	126,510	266,510	180,000	2,167,850
Re-apportioned Admin.		90,000	54,000	18,000	18,000	(180,000)	0
<b>Total overhead</b>		<b>1,577,050</b>	<b>161,780</b>	<b>144,510</b>	<b>284,510</b>	<b>0</b>	<b>2,167,850</b>

### Part b) Overhead absorption rates

	Accommodation	Catering	H&F	Golf
Overhead	<u>€1,577,050</u>	<u>€161,780</u>	<u>€144,510</u>	<u>€284,510</u>
Base	25,500	21,500	6,500	9,000
Rate	=€61.845 per bed night	=€7.524 per meal	=€22.232 per hour	=€31.612 per round

### Part c) Selling price for stag party booking

Note: the question in the text book was missing direct cost information and should have contained the following piece.

	Accommodation	Catering
<b>Average direct cost</b>	<b>€1.20 per bed night</b>	<b>€4.30 per meal</b>

	Quantity	Cost	Total
Direct costs			
Accommodation	2	€1.20	€2.40
Catering	2	€4.30	€8.60
Overhead costs			
Accommodation	2	€ 61.85	€ 123.69
Catering	2	€ 7.52	€ 15.05
Fitness	2	€ 22.23	€ 44.46
Golf	3	€ 31.61	<u>€ 94.84</u>
Cost per person			€ 289.04
Number of people			x 8
			€ 2,312.32
Profit margin (2,312.32 / 60 x 40)			<u>€ 1,541.55</u>
Selling price			<u>€ 3,853.87</u>

*If you did question without the direct costs the answer would have been:*

	<b>Quantity</b>	<b>Cost</b>	<b>Total</b>
Accommodation	2	€ 61.85	€ 123.69
Catering	2	€ 7.52	€ 15.05
Fitness	2	€ 22.23	€ 44.46
Golf	3	€ 31.61	<u>€ 94.84</u>
Cost per person			€ 278.04
Number of people			x 8
			€ 2,224.32
Profit margin (2224.32 / 60 x 40)			<u>€ 1,482.88</u>
Selling price			€ 3,707.21

### Question 3.6

#### Part a)

A pre-determined overhead absorption rate is calculated in advance based on budgeted figures for both overhead cost and the activity level.

Budgeted Overhead

Budgeted Activity Level

#### Part b)

If a company recovers overhead using a predetermined overhead absorption rate there is likely to be an under or over absorption of overhead at the end of an accounting period. This is because the predetermined overhead absorption rate is based on estimates (budgeted overhead and budgeted activity level). The actual overhead and actual activity level are unlikely to occur exactly as planned in the budget.

#### Simple illustration:

Budgeted overhead in the cost centre amounted to €10,000 and the budgeted direct labour hours amounted to 5,000 hours. Actual overhead amounted to €11,000 when 5,100 direct labour hours were actually used.

The predetermined overhead absorption rate would be calculated as follows:

<u>Budgeted Overhead</u>	<u>€10,000</u>	= €2 per labour hour
Budgeted Labour Hours	5,000 hours	

Under/Over Absorption:

Actual overhead	€1,000
Absorbed overhead (5,100 x €2)	<u>€10,200</u>
Under absorbed	€ 800

Both the actual overhead and actual activity level were higher than estimated.

## Question 3.7

### Part a) Apportion overhead cost

	Basis	Functions	Accom.	Restaur.	Maint.	Admin.	Total
		€	€	€	€	€	€
Insurance of property	Sq mts	7,000	2,800	1,400	3,500	6,300	21,000
Insurance (liability)	No.emp	6,000	4,000	5,000	2,000	3,000	20,000
Heat and light	Kw hrs	12,000	14,000	6,000	2,000	6,000	40,000
Depreciation	Assets	27,000	8,000	5,000	5,000	15,000	60,000
Advertising	Sales	8,000	20,000	12,000	0	0	40,000
Indirect labour	Given				40,000	50,000	90,000
Indirect materials	Given				30,000	20,000	50,000
<b>Total overheads</b>		<b>60,000</b>	<b>48,800</b>	<b>29,400</b>	<b>82,500</b>	<b>100,300</b>	<b>321,000</b>

### Part b) Re-apportion service centre costs

Re-apportion administration	No.emp	35,400	23,600	29,500	<u>11,800</u>	(100,300)	
					94,300		
Re-apportion maintenance	Maint hrs	<u>62,867</u>	<u>23,575</u>	<u>7,858</u>	(94,300)		
<b>Total Overhead</b>		<b>158,267</b>	<b>95,975</b>	<b>66,758</b>	<b>0</b>	<b>0</b>	<b>321,000</b>

### Part c) Overhead absorption rates

	Functions	Accommodation	Restaurant
<u>Total Overhead</u>	<u>€158,267</u>	<u>€95,975</u>	<u>€66,758</u>
Budget customer usage	1,200	15,000	20,000
Budget absorption rates	€ 131.889	€ 6.398	€ 3.338
	per hour	per night	per cover



#### Part d) Under / over absorption

	<b>Functions</b>	<b>Accommodation</b>	<b>Restaurant</b>
	€	€	€
Actual overhead	159,100	95,500	66,650
Absorbed overhead *	<u>160,904</u>	<u>95,335</u>	<u>67,593</u>
Under / over absorbed	1,804 over	165 under	943 over

\*

Actual usage by the  
rates from part c)      1,220x€131.889      14,900x€6.398      20,250x€3.338

## Question 3.8

### Hotel scenario – Comfort First

#### REPORT

#### Activity Based Costing for Comfort First

To: Mr. Bob Collins 31/12/xx

The following report has been prepared on activity based costing to assist you in your decision to implement this technique in Comfort First.

#### *What is ABC?*

Activity Based costing is a modern approach to dealing with overheads. It is a detailed approach to sharing overhead costs to cost units, by examining the activities involved and the amount of activity each cost unit consumes. The ideas behind ABC are that activities cause costs to be incurred, products/services or cost units create demand for these activities, and overhead costs are assigned to a product on the basis of a product/services consumption of that activity.

#### *How ABC works:*

- The major support activities of the organisation are identified.
- A cost pool (accumulates the cost of resources consumed when an activity takes place) is created for each activity identified.
- The significant factors influencing cost in each of the major activities i.e. cost drivers are identified.
- A rate is calculated for each activity by taking the total cost of a cost pool and dividing by the total of the cost driver.
- Overheads are charged to products or services on the basis of their usage of the activity.

Activities in your organisation could include making a reservation (driver being number of reservations), booking in a client (driver being number of bookings), preparing a bed room (minutes of preparation) and helping with luggage (number of items carried).

#### *The Benefits of ABC:*

- A correctly implemented ABC system will provide detailed, meaningful product costs. In your case detailed costs for each customer.
- ABC will incorporate the complexities demanded by each customer.
- ABC provides more accurate information for decision making.
- ABC will therefore result in better pricing decisions.
- Provides a new approach to cost control (control of activities) as attention is focused on the activities that drive the costs.
- Overheads are charged to products/clients on a more equitable basis taking into account the products/clients consumption of cost drivers.

I hope that the above is of use to you, but it should be born in mind that ABC can be expensive and time consuming to set up and administer. There should be quantifiable benefits to be achieved by your firm to justify its implementation. If I can be of further assistance to you, please contact me.

## **Retail scenario –EHS Electrical**

### **REPORT**

#### **Activity Based Costing for EHS Electrical**

To: Ms. Sally Russell 31/12/xx

The following report has been prepared on activity based costing to assist you in your decision to implement this technique in EHS Electrical.

#### *What is ABC?*

Activity Based costing is a modern approach to dealing with overheads. It is a detailed approach to sharing overhead costs to cost units, by examining the activities involved and the amount of activity each cost unit consumes. The ideas behind ABC are that activities cause costs to be incurred, products/services or cost units create demand for these activities, and overhead costs are assigned to a product on the basis of a product/services consumption of that activity.

#### *How ABC works:*

- The major support activities of the organisation are identified.

- A cost pool (accumulates the cost of resources consumed when an activity takes place) is created for each activity identified.
- The significant factors influencing cost in each of the major activities i.e. cost drivers are identified.
- A rate is calculated for each activity by taking the total cost of a cost pool and dividing by the total of the cost driver.
- Overheads are charged to products or services on the basis of their usage of the activity.

Activities in your organisation could include making a sales pitch (driver being number of pitches), demonstrating a product (driver being number of demonstrations or demonstration minutes), processing payment (number of customers paying) and carrying product to customer vehicle (number of items carried).

*The Benefits of ABC:*

- A correctly implemented ABC system will provide detailed, meaningful product costs. In your case detailed costs for each product. This is particularly important as the organisation is introducing computer equipment into product range.
- ABC will incorporate the complexities demanded by each product. ABC will demonstrate if computer equipment is more complex than other products and charge a more reflective share of overhead cost.
- ABC provides more accurate information for decision making.
- ABC will therefore result in better pricing decisions.
- Provides a new approach to cost control (control of activities) as attention is focused on the activities that drive the costs.
- Overheads are charged to products/clients on a more equitable basis taking into account the products/clients consumption of cost drivers.

I hope that the above is of use to you, but it should be born in mind that ABC can be expensive and time consuming to set up and administer. There should be quantifiable benefits to be achieved by your firm to justify its implementation. If I can be of further assistance to you, please contact me.

### Question 3.9

**'Activity based approaches have been implemented in many manufacturing organisations in an attempt to provide the 'true' cost of products. The approach has little relevance in the service industry as product cost is not needed for stock valuation.'**

The first criticism is in relation to the comment that ABC will result in the true cost of a product. While many manufacturing organisations have introduced activity based approaches, it is not provide the 'true' cost of products. ABC still involves the arbitrary apportionment of overhead, and can be subjective. It may provide a more accurate or realistic figure for overhead, but it will not be a true figure.

The second criticism is in relation to the relevance of ABC to service organisations. While service organisations may not have tangible stock that requires stock valuation processes, (acceptable to accounting standards, there are significant benefits or reasons for implementing ABC in a service setting. ABC is not just a product costing system for stock valuation purposes, but an accurate approach to identifying costs associated with products and activities in an organisation. Decision making will be enhanced with more accurate and reflective costs. ABC is not just about pricing, it also provides a new and useful approach to cost control, often highlighting activities that are too costly or don't add value. Indeed research has shown that many service organisations have implemented ABC approaches.

## Question 3.10

### Part a) Cost pools and cost drivers

The costs associated with each activity are gathered together in cost pools. Cost pools are similar in principle to cost centres in traditional systems. Costs are pooled, or collected, on the basis of the activity that drives the costs, regardless of conventional departmental boundaries. All costs relating to the activity will be pooled together, cost pools could include handling customer complaints or payment processing.

The key idea behind ABC is to focus attention on what factors cause or drive costs. These factors are known as cost drivers. A cost driver is the event and factors which cause an activity to occur and to consume resources. Examples of cost drivers could be the number of customer complaints handled or the number of customer payments processed.

### Part b) Cost driver rates

Phone enquiries	3300 / 2200	€1.50 per call
Making a reservation	4500 / 3000	€1.50 per reservation
Allocating rooms	3500 / 2800	€1.25 per room
Processing accounts	5500 / 2750	€2.00 per account
Handling baggage	1300 / 650	€2.00 per customer
Investigating other complaints	3600 / 600	€6.00 per complaint

## Question 3.10

### ABC based product profit or loss

The first step is to calculate rates for each cost driver:

<b>Activity cost pool</b>	<b>Overhead cost</b>	<b>Divide by driver</b>	<b>Equals rate per driver</b>
Order processing	€ 1,500	10,000	€0.15 per item
Material movement	€ 19,875	26,500	€0.75 per € of material
Set-up time	€ 18,000	1,500	€12 per set-up hour
Printing	€ 19,800	1,100	€18 per printing hour
Binding	€ 3,750	250	€15 per binding hour
Packing	€ 2,700	300	€9 per packing hour
Quality checks	€ 2,100	350	€6 per hour

Then apply the rates to each product

	<b>Book</b>	<b>Calendar</b>	<b>T-shirt</b>
Direct material cost	€ 3.00	€ 2.00	€ 2.50
Overhead cost			
Order processing	€ 0.15	€ 0.15	€ 0.15
Material handling	€ 2.25	€ 1.50	€ 1.88
Set-up time	€ 2.00	€ 2.80	€ 1.20
Printing time	€ 3.00	€ 1.80	€ 0.90
Binding time	€ 0.75	€ 0.25	€ 0.00
Packing	€ 0.30	€ 0.30	€ 0.23
Quality checks	<u>€ 0.20</u>	<u>€ 0.40</u>	<u>€ 0.15</u>
Total cost	€ 11.65	€ 9.20	€ 7.00
Selling price	<u>€ 15.00</u>	<u>€ 9.00</u>	<u>€ 10.00</u>
Profit	€ 3.35	(€ 0.20)	€ 3.00