

# Management Accounting (Product Costing)

## Theory

### Product Costing

The term product costing refers to an item produced in a manufacturing concern. For example a manufacturer of furniture who has a product range of four items, here product costing means the collection and collation of all costs, individually, which are relevant to each one of the four products in the product range.

### Job Costing

Job costing is carrying out work specifically at the request of a customer. A job is the production of a single product or batch of similar production units. All costs incurred in the product should be allocated to the product. Job costing is used by organisations that produce items in small quantities or batches readily identifiable products.

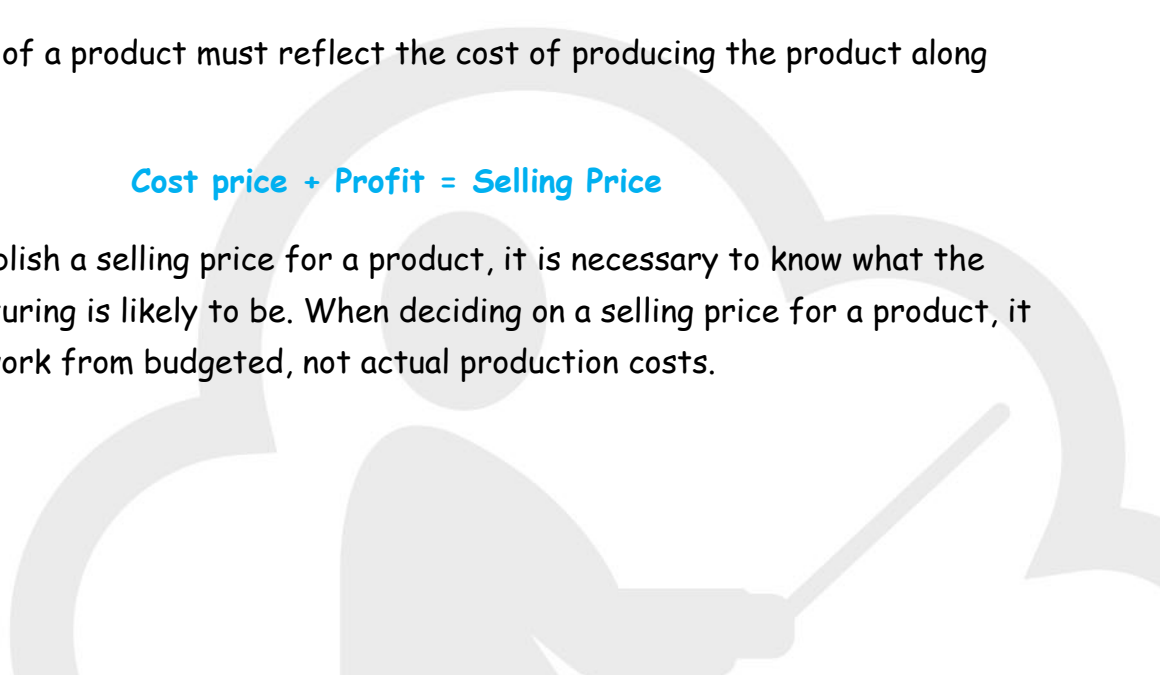
## Reasons for Product Costing

### Fixing Selling Prices

The selling price of a product must reflect the cost of producing the product along with a profit

$$\text{Cost price} + \text{Profit} = \text{Selling Price}$$

In order to establish a selling price for a product, it is necessary to know what the cost of manufacturing is likely to be. When deciding on a selling price for a product, it is necessary to work from budgeted, not actual production costs.



## **Control of Costs**

In order to control costs it is necessary to compare budgeted costs with actual costs, so the actual cost of producing each product needs to be established. Information taken from product costing is used by managers for planning and decision-making purposes.

## **Stock Valuation**

In order to complete trading and profit and loss accounts at the end of each accounting period, it is necessary to know the value of opening stock and closing stocks of finished goods.

## **Stock Valuation**

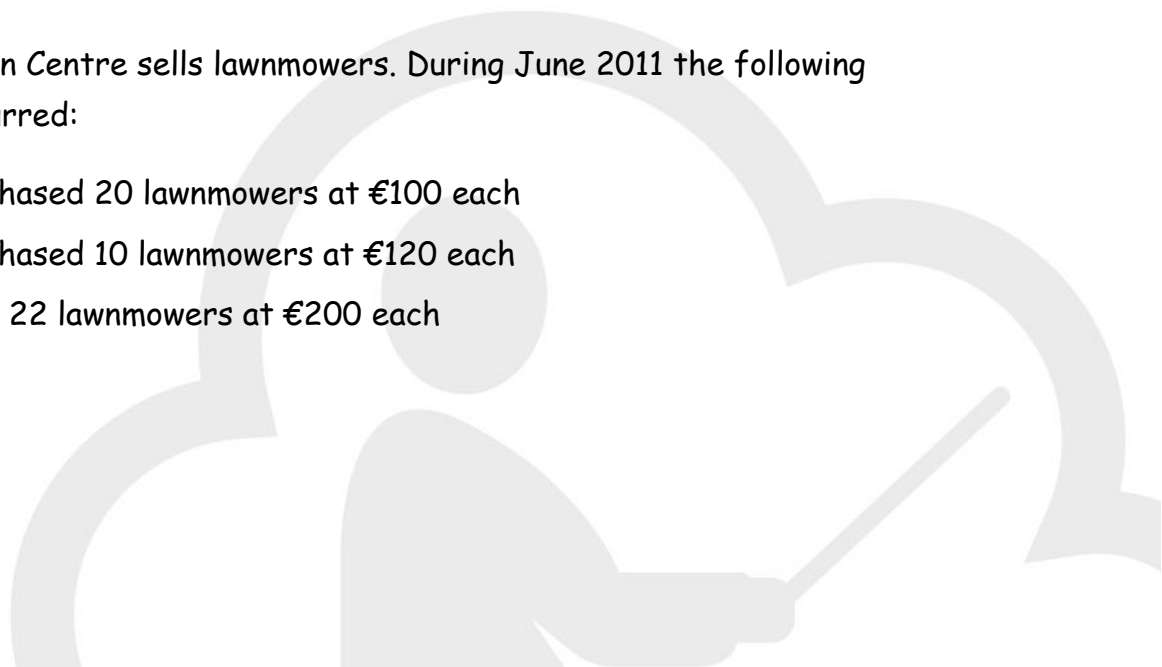
The valuation of stock is an important matter in both financial and cost accounting. This is because stocks should be valued at cost or, if lower, at net realisable value. Cost will normally be lower than net realisable value, so normally stocks will be valued at cost.

Over of undervaluing stock distorts profit. Problems arise when stock is bought at different prices during the year. The First In, First Out (FIFO) system overcomes this problem as the first items purchased are the first items sold. Therefore, closing stock will be valued at the most recent price.

### **Example 1**

Ashbourne Garden Centre sells lawnmowers. During June 2011 the following transactions occurred:

May 6	Purchased 20 lawnmowers at €100 each
May 18	Purchased 10 lawnmowers at €120 each
May 31	Sold 22 lawnmowers at €200 each



There is a closing stock of 8 lawnmowers. The question is whether we value them at €100 or €120 each.

Using FIFO we assume the first items received into stock are the first to be issued out of stock. So in this example, closing stocks would be valued at €120 per unit.

**Let's take a look at a question:**

### Q20.1

The following is the stock card of Joyce Ltd for one of their products:

Date	Receipts of Units	Cost per Unit	Issued Units
Aug 1 Opening stock	100	€40	
Aug 2 Receipts	200	€50	
Aug 7 Receipts	400	€52	
Aug 10 Issued			300
Aug 15 Receipts	120	€48	
Aug 20 Receipts	100	€50	
Aug 29 Issued			550

You are asked to;

- Calculate using FIFO the value of stock issued during August
- Calculate the closing stock valuation at 31 August



Value of Stock issued			
10 - Aug	300 units issued	100 units x €40 (Aug 1)	€ 4,000.00
		200 units x €50 (Aug 3)	€ 10,000.00
29 - Aug	550 units issued	400 units x €52 (Aug 7)	€ 20,800.00
		120 units x €48 (Aug 15)	€ 5,760.00
		30 units x €50 (Aug 20)	€ 1,500.00
			<b>€ 42,060.00</b>

Value of Closing Stock			
Receipts (units)	100	Issued (units)	300
	200		550
	400		
	120		
	100		
	920	minus	850
		70 units closing stock	
Therefore, 70 units x €50 = €3,500			



## Absorption Costing

When costing a product, we must include both direct and indirect costs. The direct costs can be allocated precisely to a product. However, the indirect/fixed costs cannot be allocated directly and so management divides them up in a fair way.

Absorption costing includes indirect/fixed costs when calculating the cost of a product. It is sometimes referred to as full costing.

Under absorption costing, fixed overheads such as rent and rates and other indirect costs are absorbed into the cost of a product. The process of absorbing overhead costs into product costs is referred to as overhead recovery. This is done by, allocation, apportionment and absorption.

### The Three A's

- Allocation - this is charging overheads to different cost centres
- Apportionment - this is charging shared overheads between different cost centres in a fair way e.g. between production, assembly and service cost centres. Reapportionment is dividing the service centres overheads between the production and assembly cost centres in order to recover the overhead in the cost production.
- Absorption - this is the process by which shared overheads are divided between cost centres.

### Basis for apportionment

Indirect Cost	Basis of Apportionment
Rent	Floor space
Building Insurance	Floor space
Heating	Cubic capacity
Insurance on machine	Book value of machine
Depreciation	Value of assets
Supervisor/canteen	Number of employees
Indirect labour	Direct labour
Material handling	Weight or size

## Absorption Rates

These are calculated by taking overheads for a particular cost centre and dividing it by the number of units of the absorption base.

**Rate per unit**  $\frac{\text{Cost Centre Budgeted Overhead}}{\text{Number of Units}}$

**Direct labour rate**  $\frac{\text{Cost Centre Budgeted Overhead}}{\text{Number of labour hours}}$

**Machine hour rate**  $\frac{\text{Cost Centre Budgeted Overhead}}{\text{Number of machine hours}}$

**Prime cost percentage overhead rate**  $\frac{\text{Cost Centre Budgeted Overhead} \times 100}{\text{Prime Cost}}$

**Prime Cost = direct materials and direct labour + direct expenses**

<b>Product Costing Statement</b>		
Sales	X	
Less: Direct materials	X	
Direct Labour	X	
Production overheads	X	( X )
<b>Gross Profit</b>		<b>X</b>
Less Administration expenses	X	
Selling and distribution	X	( X )
<b>Net Profit</b>		<b>X</b>

Let's take a look at an example.

**Q20.2**

Joyce Ltd had the following budgeted figures for the coming year:

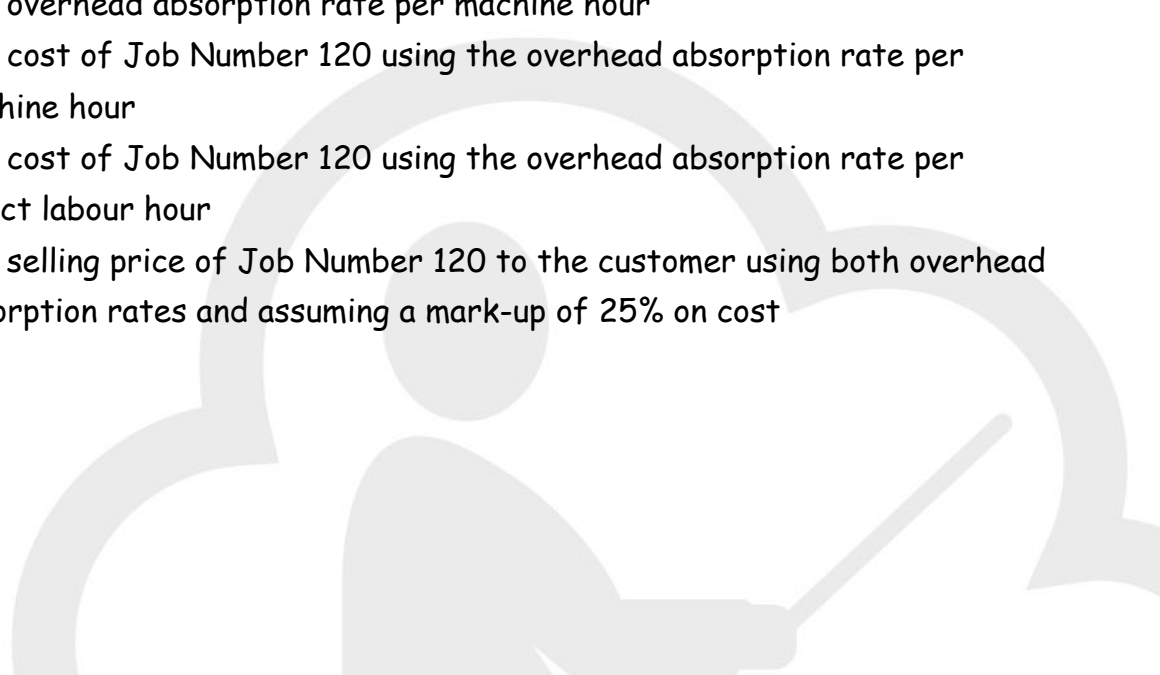
Direct materials	€250,000
Direct labour	€80,000
Factory overheads	€100,000

For the coming year, the company had also budgeted 10,000 labour hours and 20,000 machine hours.

The details of a customer's Job Number 120 are as follows:

Direct materials	€8,000
Direct labour hours	150 hours
Machine hours	250 hours

**You are asked to calculate:**

- The overhead absorption rate per direct labour hour
  - The overhead absorption rate per machine hour
  - The cost of Job Number 120 using the overhead absorption rate per machine hour
  - The cost of Job Number 120 using the overhead absorption rate per direct labour hour
  - The selling price of Job Number 120 to the customer using both overhead absorption rates and assuming a mark-up of 25% on cost
- 

<b>Direct labour rate</b>	
Budget ed overhead	= $\frac{100,000}{10,000}$ = €10 per hour
Number of labour hours	10,000
<b>Machine hour rate</b>	
Budget ed overhead	= $\frac{100,000}{20,000}$ = €5 per hour
Number of machine hours	20,000
<b>Direct labour rate</b>	
Direct labour	= $\frac{80,000}{10,000}$ = €8 per hour
Number of labour hours	10,000

<b>Cost of Job 120</b>			
	<b>Machine Hour</b>	<b>Labour Hour</b>	
Direct materials	€ 8,000.00	€ 8,000.00	
Direct labour (€8 x 150 hours)	€ 1,200.00	€ 1,200.00	€8 x 150 hours
Overheads (€5 x 250 hours)	€ 1,250.00	€ 1,500.00	€10 x 150 hours
<b>Cost price</b>	<b>€ 10,450.00</b>	<b>€ 10,700.00</b>	
Mark-up 25%	€ 2,612.50	€ 2,675.00	
<b>Selling price</b>	<b>€ 13,062.50</b>	<b>€ 13,375.00</b>	

## Under/Over-Absorption of Overheads

When we are pricing a job, the costs involved may be based on future budgeted figures, the actual costs incurred may be different.

- Actual overheads greater than budgeted overheads = under-absorbed (loss)
- Actual overheads less than budgeted overheads = over-absorbed (profit)

If overheads are under-absorbed, the business has under-priced the job.

If overheads are over absorbed, the business has overpriced the job.



Let's take a look at another example.

**Q20.3**

James Ltd predicts that its fixed overheads costs for the next six months will be €70,000 and that production will be 10,000 cans of paint, incurring 25,000 direct hours.

The actual number of cans of paint produced in the period is:

January	4,900	April	7,100
February	5,600	May	5,400
March	6,900	June	7,500

You are asked to:

- Calculate the fixed overhead absorption rate per unit
- Calculate the fixed overhead absorption rate per direct labour hour
- Calculate the under/over-absorbed overhead, if the actual overhead incurred is €44,000 if per unit rate is used
- State whether there is a loss or a profit

Rate per Unit	
Budget ed overhead	= $\frac{70,000}{10,000}$ = €7 per unit
Number of unit s	10,000
Direct Labour rate	
Budget ed overhead	= $\frac{70,000}{25,000}$ = €2.80 per hou
Number of labour hours	25,000

Under/ Over-absorbed							
	Jan	Feb	Mar	Apr	May	June	
Act ual overheads	44000	44000	44000	44000	44000	44000	44000
Absorbed overhead	34300	39200	48300	49700	37800	52500	
Under/ Over-absorbed	-9700	-4800	4300	5700	-6200	8500	
	Loss	Loss	Profit	Profit	Loss	Profit	

## Recap

---

### **What is absorption costing/product costing/full costing?**

- It is a method of costing a product in which all fixed and variable costs are apportioned to cost centres (departments) where they are accounted for (absorbed) using absorption rates
- This method ensures that all the incurred costs are recovered from the selling price
- It is used in evaluation and planning overall business strategies

### **What is the purpose of product costing**

- To establish a selling price for the purpose of tendering

### **Why is product costing carried out?**

- To control costs, i.e. to compare budget costs with actual costs
- To help planning and decision making
- In order to establish a selling price for the product or service
- To figure out the value of closing stock in order to prepare final accounts

### **3 Ways of absorbing costs**

- The rate per unit
- The rate per direct labour hour
- The rate per machine hour



### Ordinary Level Q20.4

#### 8. Absorption Costing

Fastpac Ltd, a manufacturing company has two departments Production and Packing. The budgeted overheads for the two departments for the coming year are as follows:

Department	€	€
	Fixed	Variable
Production	30,000	18,000
Packing	7,000	9,000

Fastpac Ltd estimates (budgets) Direct Labour Hours for each Department for the coming year as follows:

	Direct Labour Hours
Production	5,000 hrs
Packing	2,000 hrs

- (a) Calculate the **overhead absorption rate** (both **Fixed and Variable**) for each **Department** based on **Direct Labour Hours**.
- (b) The details of customer's **Job No. 671** are as follows:

Direct Materials	€1,250
Direct Labour	€460
Hours in Production	3
Hours in Packing	2

Calculate the **total cost** of **Job No. 671**.

- (c) Calculate the **selling price** of **Job No. 671** if the mark up on cost is 20%.
- (d) State **two reasons** why a business needs to calculate the cost price of a product.

**(80 marks)**

**8. Marginal Costing**

**[40]**

**(a) Production Dept:**

Fixed	$\frac{30,000}{5,000}$	= €6 per hour	[10]
Variable	$\frac{18,000}{5,000}$	= €3.60 per hour	[10]

**Packing Dept:**

Fixed	$\frac{7,000}{2,000}$	= €3.50 per hour	[10]
Variable	$\frac{9,000}{2,000}$	= €4.50 per hour	[10]

**(b) Job No 671**

**[24]**

Direct Materials	1,250 .00	[4]
Direct Labour	460.00	[4]
Production overheads		
Fixed $3 \times 6$	18.00	[3]
Variable $3 \times 3.60$	10.80	[3]
Packing overheads		
Fixed $2 \times 3.50$	7.00	[3]
Variable $2 \times 4.50$	<u>9.00</u>	[3]
	<u>1,754.80</u>	[4]

**(c) Selling Price of Job No. 671**

**[10]**

$$\begin{array}{r} \text{Cost: } 1754.80 \\ + 20\% \quad \underline{350.96} \\ \hline 2,105.76 \end{array}$$

**(d) Two reasons**

**[6]**

- (i) To be able to calculate a selling price.
- (ii) To see if it will be possible to make a profit producing the product.

## Higher Level Q20.5

### 8. Stock Valuation, Product Costing, Under and Over Absorption

#### (a) Stock Valuation

Blue Ltd is a retail store that buys and sells one product. The following information relates to the purchases and sales of the firm for the year 2012.

Period	Purchases on credit	Credit Sales	Cash Sales
01/01/2012-30/04/2012	4,000 @ €5 each	1,000 @ €9 each	1,500 @ €12 each
01/05/2012-31/08/2012	2,500 @ €6 each	1,200 @ €11 each	1,300 @ €13 each
01/09/2012-31/12/2012	1,700 @ €8 each	1,400 @ €11 each	1,200 @ €14 each

On 1/1/2012 there was opening stock of 4,500 units @ €5 each.

#### Required:

- Calculate the value of closing stock using 'First in/First out' (FIFO) method.
- Prepare a trading account for the year ending 31/12/2012.

#### (b) Product Costing

The following is the budgeted yearly overhead details of Grace Ltd, manufacturers of computer equipment which has three production departments.

Production departments	Budgeted Overheads	Budgeted Labour Hours	Wage Rate per hour
Manufacturing	€180,000	36,000 hours	€4
Assembly	€99,000	18,000 hours	€2.50
Finishing	€36,000	4,500 hours	€3.75

Budgeted general administration costs for the year €1,170,000

#### Details of Job Number 666

Direct Material 30 kgs at €10.20 per kg

Direct Labour Hours	Manufacturing	20 hours
	Assembly	6 hours
	Finishing	4 hours

All orders are priced using a profit margin of 25%.

#### Required:

- Calculate the overhead absorption rates for each department.
- Calculate the selling price of Job Number 666.

#### (c) Under and Over Absorption

The information set out below refers to the budgeted and actual costs of Hake Manufacturing Ltd.

Budgeted	Direct Labour Hours	Machine Hours	Total Overhead
Department A	7,000	32,000	€160,000
Department B	48,000	7,000	€33,600
Department C	22,000	---	€46,200
Actual	Direct Labour Hours	Machine Hours	Total Overhead
Department A	9,000	37,000	€175,000
Department B	40,000	12,000	€29,000
Department C	27,000	---	€50,000

#### Required:

(a) **Stock Valuation**

Purchases in units	Unit Cost	Purchases at cost €
4,000	€5	20,000
2,500	€6	15,000
<u>1,700</u>	€8	<u>13,600</u>
<b>8,200</b>		<b>48,600</b>

<u>Credit Sales</u>				<u>Cash Sales</u>				<u>Total Sales</u>	
Units		€		Units		€	Units	€	
1,000	@ €9	9,000		1,500	@ 12	18,000	2,500	27,000	
1,200	@ €11	13,200		1,300	@ 13	16,900	2,500	30,100	
1,400	@ €11	<u>15,400</u>		1,200	@ 14	<u>16,800</u>	2,600	<u>32,200</u>	
3,600		<u><b>37,600</b></u>		4,000		<u><b>51,700</b></u>	7,600	<u><b>89,300</b></u>	

**Closing Stock in Units** = Opening Stock 4,500 + Purchases 8,200 – Sales 7,600 = 5,100 units [6]

**Closing Stock Valuation:**

Units	@	€	=	€	[ ]
1,700	@	€8	=	13,600	[2]
2,500	@	€6	=	15,000	[2]
<u>900</u>	@	€5	=	<u>4,500</u>	[2]
<u><b>5,100</b></u>				<u><b>33,100</b></u>	[4]

**Trading account for the year ending 31/12/2012**

	€	
Sales	89,300	[3]
Less Cost of sales		
Opening Stock	22,500	[2]
Add Purchases	<u>48,600</u>	[3]
	71,100	
Less Closing Stock	<u>33,100</u>	[2]
Gross Profit	<u>(38,000)</u>	
	<u><b>51,300</b></u>	[4]

(b) (i)

	<u>Manufacturing</u>	<u>Assembly</u>	<u>Finishing</u>
<u>Budgeted Overheads</u>	<u>€180,000</u>	<u>€99,000</u>	<u>€36,000</u>
Direct Labour Hours	36,000	18,000	4,500
	<b>€5 per DLH</b> [2]	<b>€5.50 per DLH</b> [2]	<b>€8.00 per DLH</b> [2]



(ii)

<b>Selling Price of Job Number 666</b>			
		€	€
Direct materials	(30 x 10.20)		306.00 [5]
Direct Labour			
Manufacturing	(20 x 4.00)	80.00 [2]	
Assembly	(6 x 2.50)	15.00 [2]	
Finishing	(4 x 3.75)	15.00 [2]	110.00
Budgeted Overheads			
Manufacturing	(20 x 5.00)	100.00 [3]	
Assembly	(6 x 5.50)	33.00 [3]	
Finishing	(4 x 8.00)	32.00 [3]	165.00
General Administration overhead	(30 x 20)		600.00 [3]
Total Cost [75%]			1,181.00 [3]
Profit [25% of selling price]			393.67
Net Selling Price 100%			<u>1,574.67</u> [4]

(c)

(i) **Under and over absorption of costs**

	Dept A	Dept B	Dept C
	<u>€160,000</u>	<u>€33,600</u>	<u>46,200</u>
	32,000	48,000	22,000
	= € 5 per M.H [2]	= €0.70 per L.H [2]	= €2.10 per L.H [2]

(ii)

	Dept A €	Dept B €	Dept C €	Total €
Actual overhead incurred	175,000 [1]	29,000 [1]	50,000 [1]	254,000
Absorbed overhead	<u>185,000 [1]</u>	<u>28,000 [1]</u>	<u>56,700 [1]</u>	<u>269,700</u>
Over/Under absorption	<u>10,000</u>	<u>(1,000)</u>	<u>6,700</u>	<u>15,700</u>

**Actual Absorbed Overheads**

Dept A Actual machine hours x Machine Hour rate	= 37,000 x €5.00	= €185,000
Dept B Actual labour hours x Labour Hour rate	= 40,000 x €0.70	= €28,000
Dept C Actual labour hours x Labour Hour rate	= 27,000 x €2.10	= €56,700

[2]

In department A, the costs incurred were €10,000 less than expected/budgeted and therefore profits are €10,000 greater than expected.

In department B, the costs incurred were €1,000 more than expected/budgeted and therefore profits are €1,000 less than expected.

In department C, the costs incurred were €6,700 less than expected/budgeted and therefore profits are €6,700 greater than expected.

Overall, the costs incurred were €15,700 less than expected/budgeted and therefore profits are €15,700 greater than expected.