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# ACCA QUALIFICATION

## COURSE NOTES

ACCA  
F2

FIA  
FMA

**MANAGEMENT  
ACCOUNTING**

**JUNE 2012 EXAMINATIONS**



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# Paper F2

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## Paper F2

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## FORMULAE

## Regression analysis

$$a = \frac{\sum y}{n} - \frac{b \sum x}{n}$$

$$b = \frac{n \sum xy - \sum x \sum y}{n \sum x^2 - (\sum x)^2}$$

$$r = \frac{n \sum xy - \sum x \sum y}{\sqrt{(n \sum x^2 - (\sum x)^2)(n \sum y^2 - (\sum y)^2)}}$$

## Economic order quantity

$$= \sqrt{\frac{2C_0D}{C_h}}$$

## Economic batch quantity

$$= \sqrt{\frac{2C_0D}{C_h(1 - \frac{D}{R})}}$$

**Present Value Table**

Present value of 1 i.e.  $(1 + r)^{-n}$

Where  $r$  = discount rate  
 $n$  = number of periods until payment

Periods (n)	Discount rate (r)										
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	1
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	2
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	3
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	4
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	5
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	6
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	7
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	8
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	9
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	10
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	11
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	12
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	13
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	14
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	15
(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	1
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694	2
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579	3
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482	4
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402	5
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335	6
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279	7
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233	8
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194	9
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162	10
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135	11
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112	12
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093	13
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078	14
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065	15

**Annuity Table**

Present value of an annuity of 1 i.e.  $\frac{1 - (1 + r)^{-n}}{r}$

Where  $r$  = discount rate  
 $n$  = number of periods

Periods (n)	Discount rate (r)										
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	1
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	2
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	3
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	4
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	5
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355	6
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868	7
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	8
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759	9
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	10
11	10.37	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495	11
12	11.26	10.58	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814	12
13	12.13	11.35	10.63	9.986	9.394	8.853	8.358	7.904	7.487	7.103	13
14	13.00	12.11	11.30	10.56	9.899	9.295	8.745	8.244	7.786	7.367	14
15	13.87	12.85	11.94	11.12	10.38	9.712	9.108	8.559	8.061	7.606	15
(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	1
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528	2
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106	3
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589	4
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991	5
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326	6
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605	7
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837	8
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031	9
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192	10
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327	11
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439	12
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533	13
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611	14
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675	15

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## Chapter 1

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# ACCOUNTING FOR MANAGEMENT

## 1 Introduction

The purpose of management accounting is to assist management in running the business in ways that will improve the performance of the business.

## 2 Data and information

One way of assisting management is to provide them with good information to help them with their decisions.

The information can be provided to them in different ways, but is usually in the form of reports. For example, a report analysing costs of producing each of several products may assist management in deciding which products to produce.

It is the management accountant who will be expected to provide the information, and in order to do so he/she needs to collect data. **Data** consists of the facts that are gathered and stored. Data has no clear meaning until it is processed – analysed and sorted – into **information**.

## 3 What makes good information?

**Good quality information should:**

- ◆ have a purpose and be relevant for the purpose
- ◆ be timely
- ◆ be understandable (to the manager using it)
- ◆ be accurate
- ◆ be complete (but not excessive)
- ◆ be communicated to the right person
- ◆ be communicated by an appropriate channel (for example, be printed or be sent electronically)

## 4 The main managerial processes

The main areas of management accounting are:

- ◆ **Costing**

Cost accounting is identifying the cost of producing an item (or providing a service) in order to, for example, assist in deciding on a selling price.

- ◆ **Planning**

e.g. plan how many staff will be required in the factory next year

- ◆ **Decision making**

e.g. decide on what selling price to charge for a new product

- ◆ **Control**

e.g. check month-by-month whether the company is over or under spending on wages

## 5 The different levels of planning

- ◆ **strategic planning**

long-term plans (e.g. 5 to 10 years) for the business

e.g. what new offices to open? / what new products to launch?

- ◆ **tactical planning**

medium-term, more detailed, plans – usually involving producing budgets for the next year

e.g. how many staff to employ next year?

- ◆ **operational planning**

short-term planning and decisions

e.g. which supplier to choose for a purchase next week



# TEST

## QUESTION 1

The following statements relate to financial accounting and to cost accounting:

- (i) The main users of financial accounting information are external to an organisation.
- (ii) Cost accounting is that part of financial accounting which records the cash received and payments made by an organisation.

Which of the following statements are true?

- A Statements (i) and (ii) are both correct.
- B Only statement (i) is correct.
- C Only statement (ii) is correct.

## QUESTION 2

Data is information that has been processed in such a way as to be meaningful to its recipients.

Is this statement true or false?

- A True
- B False

## QUESTION 3

The following statement refers to a quality of good information:

The cost of producing information should be greater than the value of the benefits of that information to management.

Is this statement true or false?

- A True
- B False

## Chapter 2

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# SOURCES OF DATA

## 1 Introduction

The management accountant needs data in order to be able to process it into information.

This chapter lists various sources of data and also various sampling techniques.

## 2 Primary and secondary sources of data

Primary data are data that have been collected for the specific purpose.

Secondary data are data that have been collected for some other purpose but which we then use for our purposes.

## 3 Internal and external sources data

Internal data are data collected from our own records. These are the main source of primary data.

External data are data collected from elsewhere – e.g. the internet, government statistics, financial newspapers. These will be secondary data.

## 4 Sampling

It is common to collect data from a sample rather than from the whole population. Data from the sample are used as representative of the whole population.

## 5 Sampling methods

You should be aware of the following methods of sampling:

- ◆ random sampling
  
  
- ◆ systematic sampling
  
  
- ◆ stratified sampling

- ◆ multistage sampling
- ◆ cluster sampling
- ◆ quota sampling

## TEST

### QUESTION 1

Which of the following are examples of secondary data?

- (i) A count of the number of invoices that we are issuing each week
- (ii) The average wage of the population taken from government census results
- (iii) The average wage paid to our employees
- (iv) The sales for the month as reported on a website

- A (i) and (ii)
- B (iii) and (iv)
- C (i) and (iii)
- D (ii) and (iv)

### QUESTION 2

A sample of people is taken with the same proportion of individuals in separate age bands as in the population as a whole.

This is an example of which type of sampling?

- A Random sampling
- B Systematic sampling
- C Stratified sampling
- D Cluster sampling

### QUESTION 3

It was decided to take a sample by selecting the 12<sup>th</sup> item and thereafter every 20<sup>th</sup> item.

This is an example of which type of sampling?

- A Random sampling
- B Systematic sampling
- C Stratified sampling
- D Cluster sampling

### QUESTION 4

Which of the following statements about stratified sampling is true?

- A The sample will not be representative
- B The structure of the sample will not reflect that of the population
- C Knowledge is needed of each item in the population
- D The sample is chosen entirely at random





## Chapter 3

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# PRESENTING INFORMATION

## 1 Introduction

The management accountant has to provide information to management to help them make decisions, and it is important that the information is presented to them in a form that is easy for them to use.

This may be in the form of a report, or a table of figures, or as a chart or graph.

Although you will not be required to produce any of these, it is important that you are aware of the various formats available.

## 2 Tables

These are a way of presenting actual numbers in a format that is easy to understand.

e.g.

<i>Year</i>	<i>Sales \$'000's</i>
2006	2.7
2007	3.2
2008	4.8
2009	5.1
2010	5.2

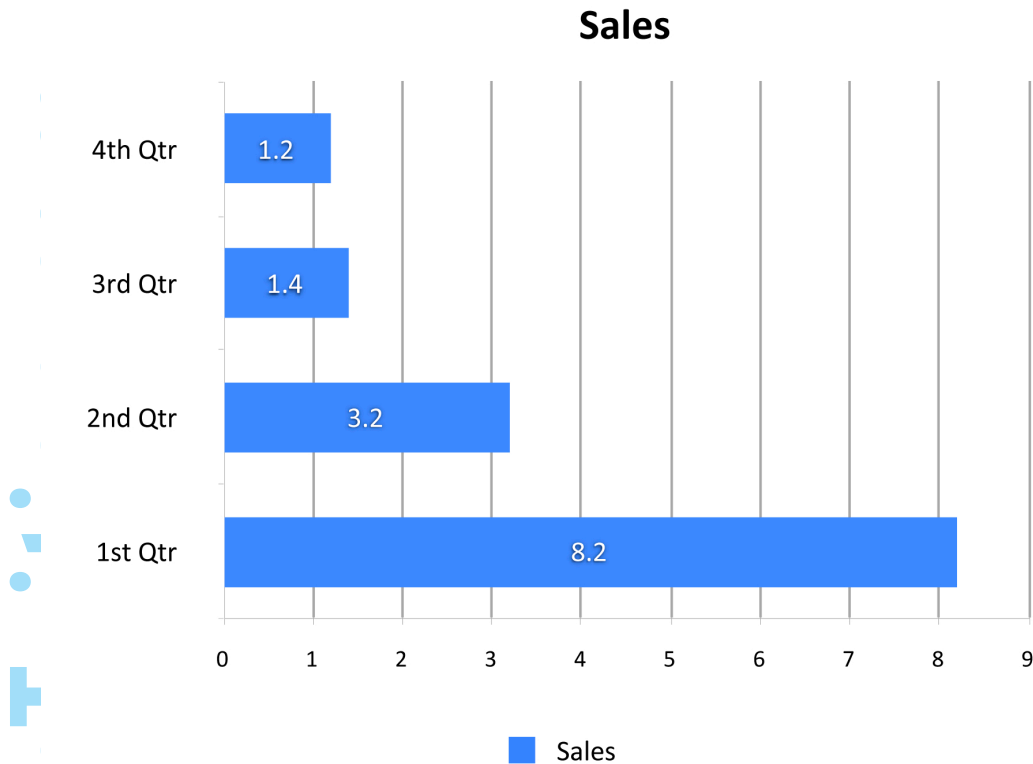
## PRESENTING INFORMATION

### 3 Charts and graphs

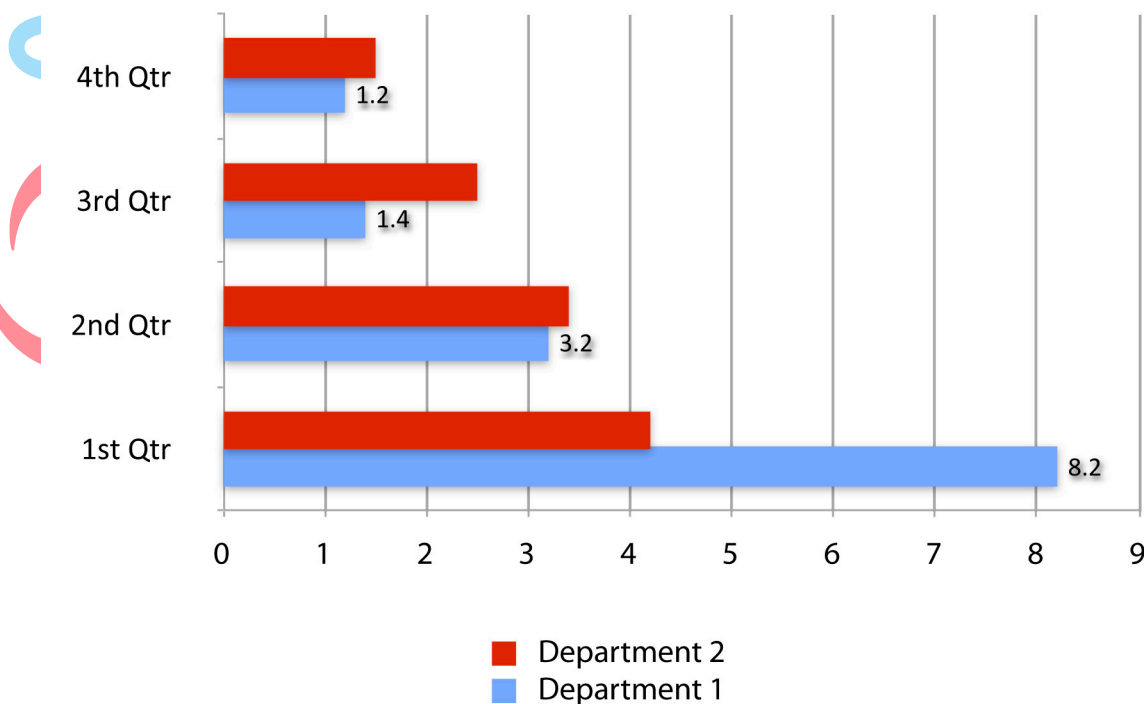
In many cases, management do not need to see the actual numbers (and indeed the actual numbers may confuse them). Often a chart or graph can present the information more clearly.

**Simple bar chart:**

e.g.

**Component bar chart:**

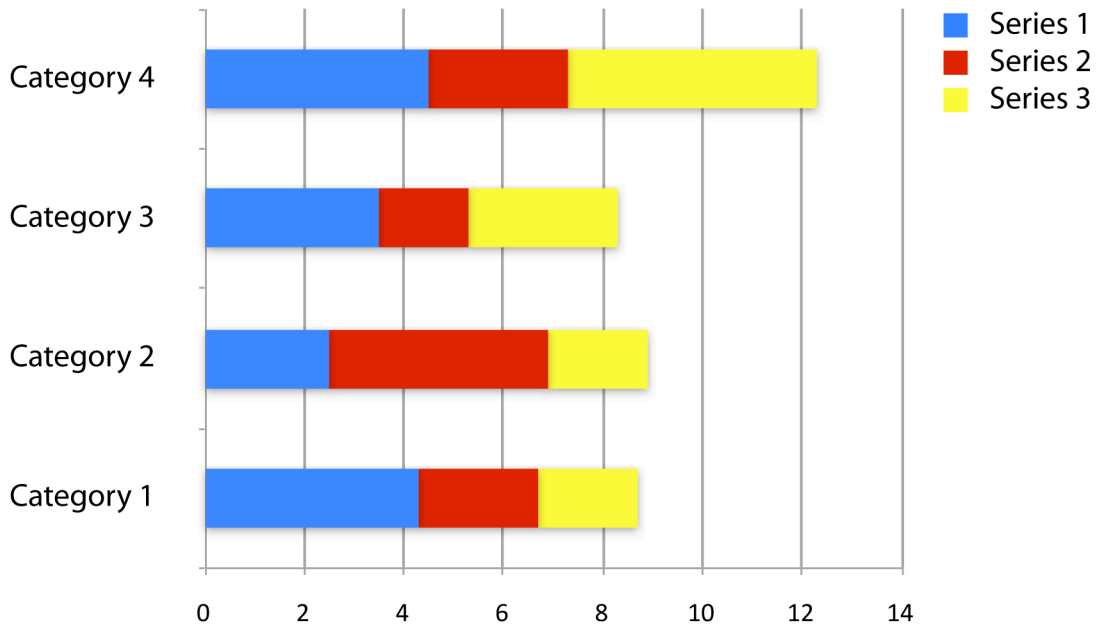
e.g.



PRESENTING INFORMATION

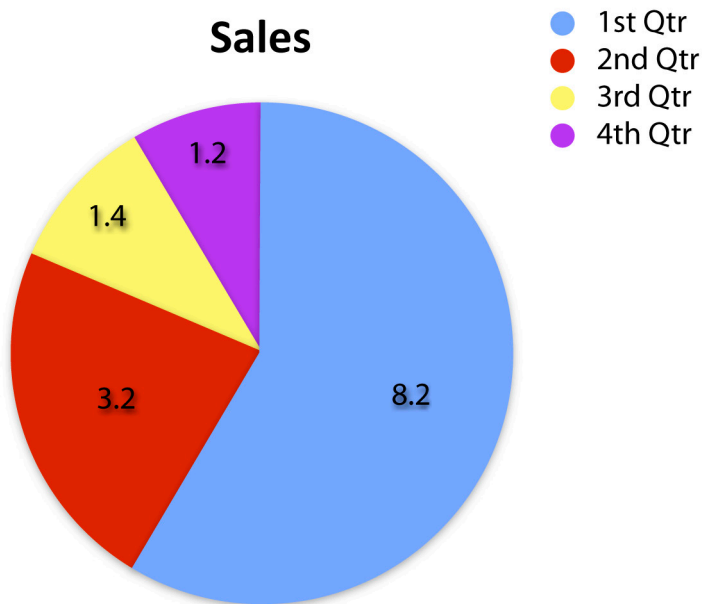
**Compound bar chart:**

e.g.



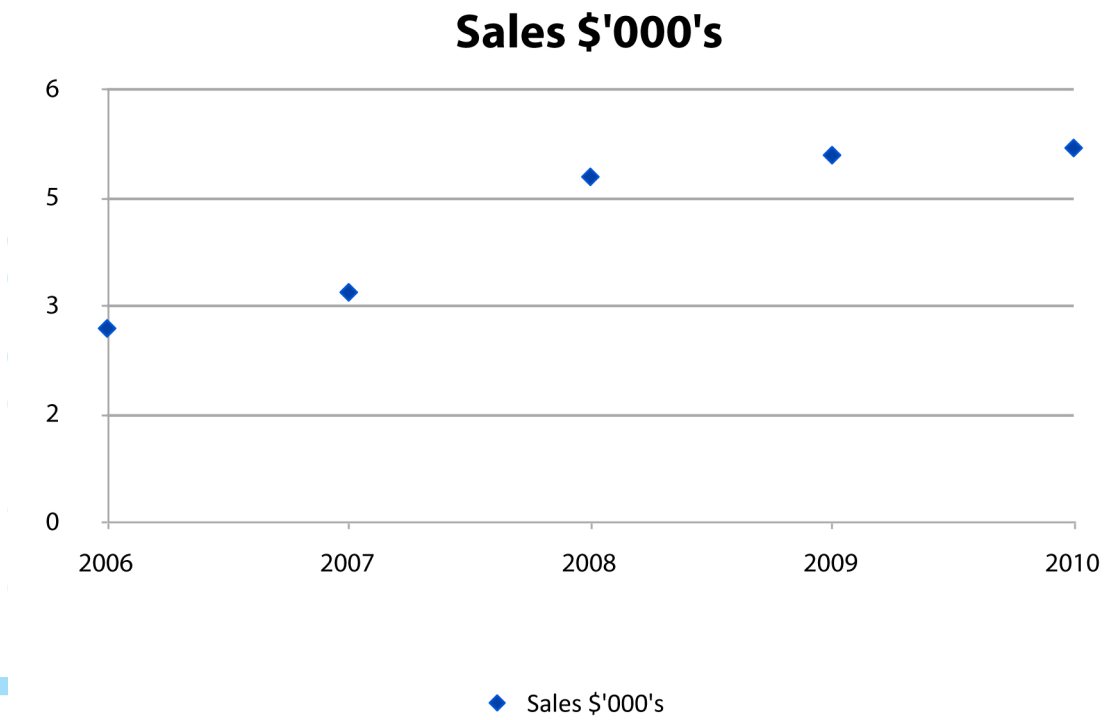
**Pie chart:**

e.g.



**Scatter graph:**

e.g.







## COST CLASSIFICATION

**Non-production costs**

Other costs required to run the business.

**EXAMPLE 4**

Non-manufacturing/production costs

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**TOTAL COSTS = PRODUCTION COSTS + NON-PRODUCTION COSTS**

**2 Cost behaviour**

It is expected that costs will increase as production increases (i.e. as output increases) but the exact way in which costs behave with output may differ.

**EXAMPLE 5**

Types of behaviour

(a) Variable cost

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(b) Fixed cost

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(c) Stepped fixed cost

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(d) Semi variable/fixed cost

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**Linear assumption**

For this examination we will assume that total variable costs vary linearly with the level of production (or that the variable cost per unit remains constant). In practice this may not be the case, but we will not consider the effect of this until later examinations.

**Behaviour of manufacturing costs**

With the linear assumption all costs can be categorised as either fixed or variable. This fits together with previous definitions:

**Direct costs**

By their nature direct costs will be variable costs.

**Indirect costs/overheads**

Overheads can be fixed or variable

	<i>Fixed</i>	<i>Variable</i>
Direct costs	X	√
Production overheads	√	√
Non-manufacturing costs	√	√

**Semi-variable costs**

It is necessary to determine the fixed and variable elements of semi-variable costs. A method known as '**High-Low**' can be used to establish the fixed and variable elements. This technique is best illustrated by the use of an example.

**EXAMPLE 6**

The total costs of a business for differing levels of output are as follows:

<i>Output (units)</i>	<i>Total Costs (\$'000)</i>
200	30
1,000	110

- (a) What are the fixed and variable elements of the total cost using the High-Low method?  
 (b) Describe the relationship between the output and costs in the form of a linear equation.



## COST CLASSIFICATION

A better approximation of the fixed and variable elements can be obtained using Regression Analysis. This will be considered in a later chapter of these notes.

**Typical cost card for a cost unit**

	\$/unit
Direct costs:	
- Direct materials (2kg @ \$1.50/kg)	3.00
- Direct labour (3 hrs @ \$4/hr)	<u>12.00</u>
Prime cost	15.00
Indirect costs	
- Variable overheads	2.00
- Fixed overheads	<u>3.00</u>
Full product cost	<u>20.00</u>

**3 Responsibility centres**◆ **Cost centres:**

Cost centres are areas where costs are collected e.g. individual departments or individual machines

◆ **Profit centres:**

Profit centres are where both costs and revenues are collected. Many companies will have separate divisions and make the divisional manager responsible for the profit of that division.

◆ **Revenue centres:**

Here, the manager is only responsible for the revenues of his division or department – not for the costs.

◆ **Investment centres:**

This is like a profit centre except that the manager also has the responsibility for new capital investment (i.e. the purchase of new machines etc.). You will see in a later chapter that more thought needs to be given as to how to measure the performance of a manager of an investment centre.

## Test

### QUESTION 1

An organisation has the following total costs at two activity levels:

Activity level (units)	16,000	22,000
Total costs (\$)	135,000	170,000

Variable cost per unit is constant within this range of activity but there is a step up of \$5,000 in the total fixed costs when the activity exceeds 17,500 units.

**What is the total cost at an activity of 20,000 units?**

- A \$155,000
- B \$158,000
- C \$160,000
- D \$163,000

### QUESTION 2

**Which one of the following should be classified as indirect labour?**

- A Assembly workers on a car production line
- B Bricklayers in a house building company
- C Machinists in a factory producing clothes
- D Forklift truck drivers in the stores of an engineering company.

### QUESTION 3

A manufacturing organisation incurs costs relating to the following:

- (1) Commission payable to salespersons.
- (2) Inspecting all products.
- (3) Packing the products at the end of the manufacturing process prior to moving them to the warehouse.

**Which of these costs are classified as production costs?**

- A (1) and (2) only
- B (1) and (3) only
- C (2) and (3) only
- D (1), (2) and (3)

### QUESTION 4

**What would be the most appropriate cost unit for a cake manufacturer? Cost per:**

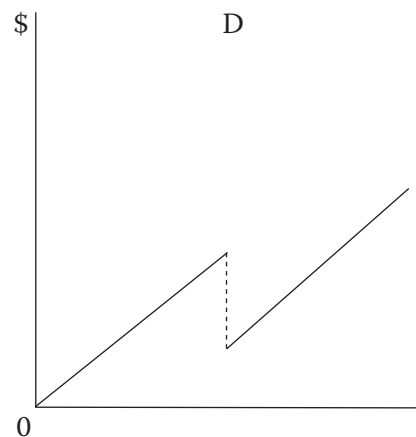
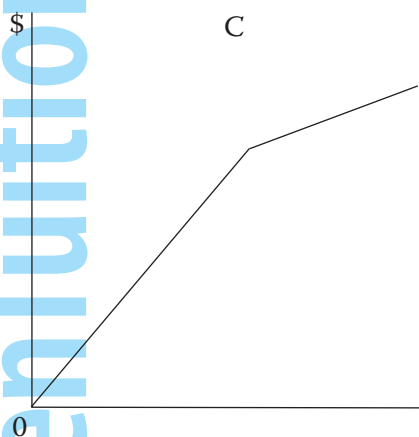
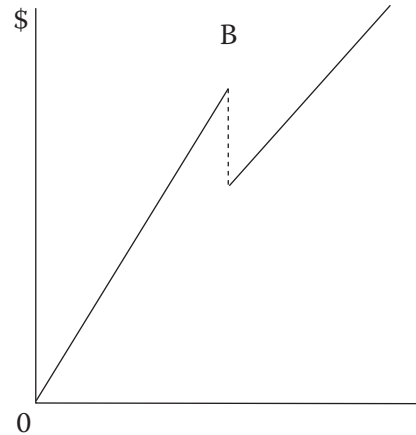
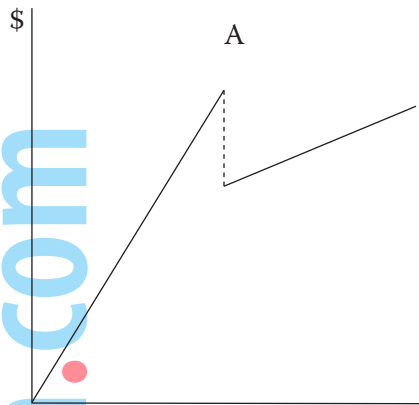
- A Cake
- B Batch
- C Kg
- D Production run

## COST CLASSIFICATION

## QUESTION 5

Up to a given level of activity in each period the purchase price per unit of a raw material is constant. After that point a lower price per unit applies both to further units purchased and also retrospectively to all units already purchased.

Which of the following graphs depicts the total cost of the raw materials for a period?



## QUESTION 6

In an organisation manufacturing a number of different products in one large factory, the rent of that factory is an example of a direct expense when costing a product.

Is this statement true or false?

- A True
- B False

**QUESTION 7**

An organisation operates a piecework system of remuneration, but also guarantees its employees 80% of a time-based rate of pay which is based on \$20 per hour for an eight hour working day. Three minutes is the standard time allowed per unit of output. Piecework is paid at the rate of \$18 per standard hour.

**If an employee produces 200 units in eight hours on a particular day, what is the employee's gross pay for that day?**

- A \$128
- B \$144
- C \$160
- D \$180

**QUESTION 8**

A semi-variable cost is one that, in the short term, remains the same over a given range of activity but beyond that increases and then remains constant at the higher level of activity.

**Is this statement true or false?**

- A True
- B False

**QUESTION 9**

**Which of the following are indirect costs?**

- (i) The depreciation of maintenance equipment
- (ii) The overtime premium incurred at the specific request of a customer
- (iii) The hire of a tool for a specific job

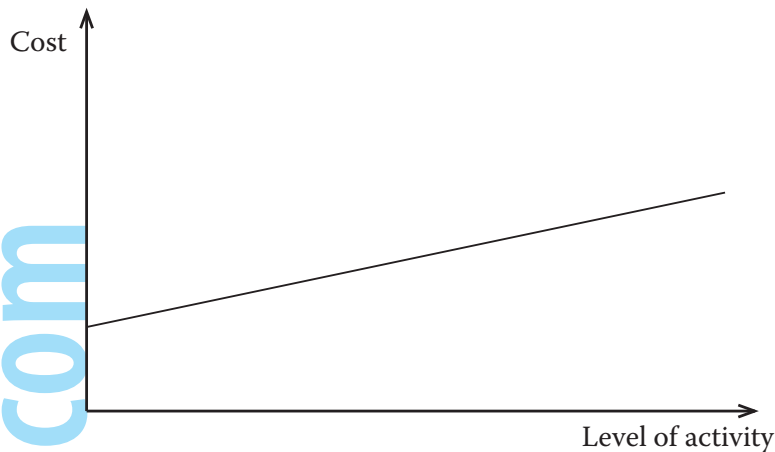
- A Item (i) only
- B Items (i) and (ii) only
- C Items (ii) and (iii) only
- D All of them



## COST CLASSIFICATION

## QUESTION 10

The following is a graph of cost against level of activity



To which one of the following costs does the graph correspond?

- A Electricity bills made up of a standing charge and a variable charge
- B Bonus payment to employees when production reaches a certain level
- C Salesman's commission payable per unit up to a maximum amount of commission
- D Bulk discounts on purchases, the discount being given on all units purchased

## QUESTION 11

Which of the following costs are part of the prime cost for a manufacturing company?

- A Cost of transporting raw materials from the supplier's premises
- B Wages of factory workers engaged in machine maintenance
- C Depreciation of lorries used for deliveries to customers
- D Cost of indirect production materials



## Chapter 5

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# INVENTORY CONTROL

## 1 Introduction

There are many approaches in practice to ordering goods from suppliers. In this chapter we will consider one particular approach – that of ordering fixed quantities each time.

For example, if a company needs a total of 12,000 units each year, then they could decide to order 1,000 units to be delivered 12 times a year. Alternatively, they could order 6,000 units to be delivered 2 times a year. There are obviously many possible order quantities.

We will consider the costs involved and thus decide on the order quantity that minimises these costs (the *economic order quantity*).

## 2 Costs involved

The costs involved in inventory ordering systems are as follows:

- ◆ the purchase cost
- ◆ the reorder cost
- ◆ the inventory-holding cost

### Purchase cost

This is the cost of actually purchasing the goods. Over a year the total cost will remain constant regardless of how we decide to have the items delivered and is therefore irrelevant to our decision.

(Unless we are able to receive discounts for placing large orders – this will be discussed later in this chapter)

### Re-order cost

This is the cost of actually placing orders. It includes such costs as the administrative time in placing an order, and the delivery cost charged for each order.

If there is a fixed amount payable on each order then higher order quantities will result in fewer orders needed over a year and therefore a lower total reorder cost over a year.

### Inventory holding cost

This is the cost of holding items in inventory. It includes costs such as warehousing space and insurance and also the interest cost of money tied up in inventory.

Higher order quantities will result in higher average inventory levels in the warehouse and therefore higher inventory holding costs over a year.





## INVENTORY CONTROL

## 4 The EOQ formula

A more accurate and time-saving way to find the EOQ is to use the formula that is provided for you in the exam.

The formula is:

$$EOQ = \sqrt{\frac{2C_o D}{C_H}}$$

Where  $C_o$  = fixed costs per order

$D$  = annual demand

$C_H$  = the inventory holding cost per unit per annum

(Note: you are not required to be able to prove this formula)

### EXAMPLE 2

For the information given in Example 1,

- (a) use the EOQ formula to calculate the Economic Order Quantity.
- (b) calculate the total inventory costs for this order quantity.







## INVENTORY CONTROL

Alternatively, if we do know the maximum demand over the lead time and want to be certain of not running out of inventory then the re-order level needs to be equal to the maximum possible demand over the lead time.

**EXAMPLE 7**

Demand from customers is uncertain and is between 70 and 120 units per week.  
The lead time is also uncertain and is between 3 and 4 weeks.

**What should the re-order level be if we are to never run out of inventory?**

Although our answer to example 7 (a re-order level of 480 units) will mean that if the very worst should happen then we will still have enough units to fulfil demand, much of the time the demand will be lower than the maximum and/or the lead time will be shorter than the maximum.

If the demand over the lead time is less than the re-order level then it will mean we still have some units in inventory when the new delivery arrives.

It therefore means that the maximum inventory level will be the maximum number left in inventory, plus the number of units delivered.

The maximum number left in inventory is the re-order level less the minimum demand over the lead time.

**EXAMPLE 8**

Demand from customers is uncertain and is between 70 and 120 units per week.  
The lead time is also uncertain and is between 3 and 4 weeks.

We have a re-order quantity of 1,000 units each time.

**What is the maximum inventory level?**

## Test

### QUESTION 1

The purchase price of an inventory item is \$25 per unit. In each three month period the usage of the item is 20,000 units.

The annual holding costs associated with one unit equate to 6% of its purchase price. The cost of placing an order for the item is \$20.

**What is the Economic Order Quantity (EOQ) for the inventory item to the nearest whole unit?**

- A 730
- B 894
- C 1,461
- D 1,633

### QUESTION 2

A company always determines its order quantity for a raw material by using the Economic Order Quantity (EOQ) model.

**What would be the effects on the EOQ and the total annual holding cost of a decrease in the cost of ordering a batch of raw material?**

- |   | EOQ    | Annual holding cost |
|---|--------|---------------------|
| A | Higher | Lower               |
| B | Higher | Higher              |
| C | Lower  | Higher              |
| D | Lower  | Lower               |

### QUESTION 3

Sky Limited wishes to minimise its inventory costs. At the moment its reorder quantity is 1,000 units. Order costs are \$10 per order and holding costs are \$0.10 per unit per month. Sky Limited estimates annual demand to be 15,000 units.

**What is the optimal reorder quantity (to the nearest 100 units)?**

- A 500 units
- B 1,000 units
- C 1,200 units
- D 1,700 units

### QUESTION 4

A company uses 9,000 units of a component per annum. The component has a purchase price of \$40 per unit and the cost of placing an order is \$160. The annual holding cost of one component is equal to 8% of its purchase price.

**What is the Economic Order Quantity (to the nearest unit) of the component?**

- A 530
- B 671
- C 949
- D 1,342

## INVENTORY CONTROL

## QUESTION 5

A company determines its order quantity for a component using the Economic Order Quantity (EOQ) model.

**What would be the effects on the EOQ and the total annual ordering cost of an increase in the annual cost of holding one unit of the component in inventory?**

	EOQ	Total annual ordering cost
A	Lower	Higher
B	Higher	Lower
C	Lower	No effect
D	Higher	No effect

## QUESTION 6

The demand for a product is 12,500 units for a three month period. Each unit of product has a purchase price of \$15 and ordering costs are \$20 per order placed.

The annual holding cost of one unit of product is 10% of its purchase price.

**What is the Economic Order Quantity (to the nearest unit)?**

- A 577
- B 1,816
- C 1,866
- D 1,155





## Chapter 6

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# ACCOUNTING FOR LABOUR

## 1 Introduction

This chapter details various methods by which labour may be paid (remuneration methods), and also looks at various ratios which can be useful in relation to labour.

## 2 Remuneration methods

There are three basic remuneration methods – time work, piecework, and bonus schemes.

### Time work

Wages are paid on the basis of hours worked.

For example, if an employee is paid at the rate of \$5 per hour and works for 8 hours a day, the total pay will be \$40 for that day.

Employees paid on an hourly basis are often paid extra for working overtime.

For example, an employee is paid a normal rate of \$5 per hour and works 4 hours overtime for which he is paid at time-and-a-half.

The amount paid for the overtime will be  $4 \times 1.5 \times \$5 = \$30$ .

### Piecework

Wages are paid on the basis of units produced.

For example an employee is paid \$0.20 for every unit produced, with a guaranteed minimum wage of \$750 per week.

In week 1, they produce 5,000 units and so the pay will be  $5,000 \times \$0.20 = \$1,000$  for the week.

In week 2, they only produce 3,000 units, for which the pay would be  $3,000 \times \$0.20 = \$600$ . However, since this is below the guaranteed minimum the employee will receive \$750 for the week.

### Bonus (or incentive) schemes

There are many different ways in which a bonus scheme can operate, but essentially in all cases the employee is paid a standard wage but in addition receives a bonus if certain targets are achieved,

Bonus schemes will be revisited later in these course notes.

## 3 Labour ratios

There are various ratios that can be useful for management when managing labour. You should be aware of the following:

### Idle time ratio

Idle time is time for which the employee is being paid but during which they are not actually working (e.g. because the machine on which they work had broken down).

$$\text{Idle time ratio} = \frac{\text{Idle hours}}{\text{Total hours}} \times 100\%$$

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**Labour turnover ratio:**

This measures the rate at which employees are leaving the company.

$$\text{Labour turnover rate} = \frac{\text{Replacements}}{\text{Average number of employees}} \times 100\%$$

**Labour efficiency ratio:**

This measures whether we are working faster or slower than expected.

$$\text{Efficiency ratio} = \frac{\text{expected (or standard) hours to make output}}{\text{actual hours taken}} \times 100\%$$

**Labour capacity ratio:**

This measures whether we were able to obtain more or less working hours than we originally budgeted on being available.

$$\text{Capacity ratio} = \frac{\text{actual hours worked}}{\text{budgeted hours}} \times 100\%$$

**Labour production volume ratio:**

This measures whether we were able to produce more or less than we expected to produce based on the budgeted hours available.

$$\text{Production volume ratio} = \frac{\text{expected (or standard) hours to make output}}{\text{budgeted hours}} \times 100\%$$

**TEST****QUESTION 1**

An employee is paid on a piecework basis as follows:

1 to 500 units	-	\$0.50 per unit
501 to 1000 units	-	\$0.75 per unit
1001 to 1500 units	-	\$1.00 per unit

Only the additional units qualify for the higher rates, and rejected units do not qualify for payment.

During one day an employee produced 1200 units of which 32 were rejected.

**How much did the employee earn for the day?**

- A  \$825
- B  \$1200
- C  \$793
- D  \$1168

**QUESTION 2**

A company had 80 direct production workers at the beginning of last year and 60 direct production workers at the end of last year. During the year a total of 45 employees had left the company.

**The labour turnover rate for last year was:**

- A  21.4%
- B  35.7%
- C  64.3%
- D  75.0%

**QUESTION 3**

**Which of the following types of workers would be classified as indirect labour?**

- A  Painters in a decorating company
- B  Machine repairers in a factory making desks by machine
- C  Machine operators in a factory making desks by machine
- D  Assembly workers in a factory making calculators

## ACCOUNTING FOR LABOUR

## THE FOLLOWING INFORMATION RELATES TO QUESTIONS 4 AND 5

A company budgeted on producing 20,000 units and taking 8,000 hours.  
They actually produced 25,000 units and took 11,000 hours.

## QUESTION 4

What was the capacity ratio?

- A 110.0%
- B 72.7%
- C 90.9%
- D 137.5%

## QUESTION 5

What was the efficiency ratio?

- A 110.0%
- B 72.7%
- C 90.9%
- D 137.5%





## ACCOUNTING FOR OVERHEADS

In practice it would be up to the Management Accountant to decide on the most appropriate basis.

In examinations it will be made obvious to you which basis to use, but read the question carefully.

#### 4 Second problem – more than one department in the factory.

In this situation we need first to **allocate** and **apportion** the overheads between each department. We can then **absorb** the overheads in each department separately in the same way as before.

**EXAMPLE 3**

X plc produces desks and chairs in the same factory. The factory has two departments, assembly and finishing.

Each desk uses 3 kg of wood at a cost of \$4 per kg., and takes 4 hours to produce – 3 hours in assembly and 1 hour in finishing.

Each chair uses 2 kg of wood at a cost of \$4 per kg, and takes 1 hour to produce – ½ hour in assembly and ½ hour in finishing.

All labour is paid at the rate of \$2 per hour.

Fixed costs of production are estimated to be \$700,000 p.a.. Of this total, \$100,000 is the salary of the supervisors – \$60,000 to Assembly supervisor, and \$40,000 to Finishing supervisor.

The remaining overheads are to be split 40% to Assembly and 60% to Finishing.

The company expects to produce 30,000 desks and 20,000 chairs.

(Overheads to be absorbed on a labour hour basis)

**Calculate the cost per unit for desks and for chairs**







**Inter-Service Work Done**

The problem is a little more complicated if there is more than one service cost centre and where they do work for one another. The way to deal with this is the reciprocal method.

The reciprocal method can be carried out in one of two ways:

- ◆ either the continuous or repeated distribution (tabular) method; or
- ◆ the algebraic method.

**EXAMPLE 6**

	<i>Production Depts</i>		<i>Service Centres</i>	
	<i>X</i>	<i>Y</i>	<i>Stores</i>	<i>Maintenance</i>
	\$	\$	\$	\$
Allocated and apportioned overheads	70,000	30,000	20,000	15,000
Estimated work done by the service centres for other departments:				
Stores	50%	30%	-	20%
Maintenance	45%	40%	15%	-

**Reapportion service department costs to departments using:**

- (a) **repeated distribution method; and**
- (b) **algebraic method.**

## ACCOUNTING FOR OVERHEADS

## Test

## QUESTION 1

A factory consists of two production cost centres (A and B) and two service cost centres (X and Y). The total allocated and apportioned overhead for each is as follows:

A	B	X	Y
\$95,000	\$82,000	\$46,000	\$30,000

It has been estimated that each service cost centre does work for other cost centres in the following proportions:

	A	B	X	Y
Percentage of service cost centre X to	50	50	–	–
Percentage of service cost centre Y to	30	60	10	–

The reapportionment of service cost centre costs to other cost centres fully reflects the above proportions.

**After the reapportionment of service cost centre costs has been carried out, what is the total overhead for production cost centre A?**

- A \$124,500
- B \$126,100**
- C \$127,000
- D \$128,500

## QUESTION 2

**The process of cost apportionment is carried out so that**

- A costs may be controlled
- B cost units gather overheads as they pass through cost centres
- C whole items of cost can be charged to cost centres
- D common costs are shared among cost centres

## QUESTION 3

**A cost centre is**

- A A unit of product or service in relation to which costs are ascertained
- B An amount of expenditure attributable to an activity
- C A production or service location, function, activity or item of equipment for which costs are accumulated
- D A centre for which an individual budget is drawn up

## ACCOUNTING FOR OVERHEADS

## QUESTION 4

A company manufactures two products L and M in a factory divided into two cost centres, X and Y. The following budgeted data are available:

	<i>Cost centre</i>	
	<i>X</i>	<i>Y</i>
Allocated and apportioned fixed overhead costs	\$88,000	\$96,000
Direct labour hours per unit:		
Product L	3.0	1.0
Product M	2.5	2.0

Budgeted output is 8,000 units of each product. Fixed overhead costs are absorbed on a direct labour hour basis.

**What is the budgeted fixed overhead cost per unit for Product M?**

- A \$10
- B \$11
- C \$12
- D \$13

## QUESTION 5

A company operates a job costing system. Job number 1203 requires \$300 of direct materials and \$400 of direct labour. Direct labour is paid at the rate of \$8 per hour. Production overheads are absorbed at a rate of \$26 per direct labour hour and non-production overheads are absorbed at a rate of 120% of prime cost.

**What is the total cost of job number 1203?**

- A \$2,000
- B \$2,400
- C \$2,840
- D \$4,400

## QUESTION 6

The management accountant of Warsaw Limited has already allocated and apportioned the fixed overheads for the period although she has yet to reapportion the service centre costs. Information for the period is as follows:

	<i>Production departments</i>		<i>Service departments</i>		<i>Total</i>
	<i>1</i>	<i>2</i>	<i>Stores</i>	<i>Maintenance</i>	
Allocated and apportioned	\$17,500	\$32,750	\$6,300	\$8,450	\$65,000
Work done by:					
Stores	60%	30%	-	10%	
Maintenance	75%	20%	5%	-	

**What are the total overheads included in production department 1 if the reciprocal method is used to reapportion service centre costs?**

- A \$27,618
- B \$28,171
- C \$28,398
- D \$28,453

## Chapter 8

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# THE MANAGEMENT ACCOUNTANT'S PROFIT STATEMENT – ABSORPTION COSTING

## 1 Introduction

In the previous chapter we stated that the cost per unit is normally calculated in advance using estimated or budgeted figures. This is for several reasons. For instance, we need an estimate of the cost before we can fix a selling price. In addition, the estimated cost per unit provides a benchmark for control purposes. The Management Accountant can check regularly whether or not units are costing more or less than estimated and attempt to take corrective action if necessary.

As a result, the Management Accountant's Profit Statement (or Operating Statement) takes a different form than that of the Financial Accountant's Income Statement

The statement is usually prepared monthly, and its objective is to show whether the profit is higher or lower than that expected, and to list the reasons for any differences.

The statement starts with the profit that should have been made if all the costs had been the same as on the standard cost card.

It then lists all the reasons for any differences in profit (or **variances**) to end with the actual profit.

However, in calculating the budgeted profit for individual months, absorption costing causes a problem when the expected production in a month differs from that used to absorb fixed overheads for the cost card.

This problem is illustrated in the following example

## 2 Illustration

### EXAMPLE 1

X plc produces one product – desks.

Each desk is budgeted to require 4 kg of wood at \$3 per kg, 4 hours of labour at \$2 per hour, and variable production overheads of \$5 per unit.

Fixed production overheads are budgeted at \$20,000 per month and average production is estimated to be 10,000 units per month.

The selling price is fixed at \$35 per unit.

There is also a variable selling cost of \$1 per unit and fixed selling cost of \$2,000 per month.

During the first two months X plc expects the following levels of activity:

	<i>January</i>	<i>February</i>
Production	11,000 units	9,500 units
Sales	9,000 units	11,500 units

- (a) Prepare a cost card using absorption costing  
(b) Set out budget Profit Statements for the months of January and February.

### 3 Hourly absorption rates

The previous example assumed that fixed overheads were absorbed on a unit basis. A popular question in the exam is to be asked to calculate the amount of any over or under - absorption when fixed overheads are absorbed on an hourly basis

#### EXAMPLE 2

Y plc budgets on working 80,000 hours per month and having fixed overheads of \$320,000. During April, the actual hours worked are 78,000 and the actual fixed overheads are \$315,500.

Calculate:

- (a) the overhead absorption rate per hour.
- (b) the amount of any over or under-absorption of fixed overheads in April





## Chapter 9

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# THE MANAGEMENT ACCOUNTANT'S PROFIT STATEMENT – MARGINAL COSTING

## 1 Overview

Some businesses only want to know the variable cost of the units they make, regarding fixed costs as period costs. The variable cost is the extra cost each time a unit is made, fixed costs being effectively incurred before any production is started.

The variable production cost of a unit is made up of:

	\$
Direct materials	X
Direct labour	X
Variable production overheads	<u>X</u>
Marginal cost of a unit	<u>X</u>

### Marginal costing

Variable production costs are included in cost per unit (i.e. treated as a *product cost*).

Fixed costs are deducted as a period cost in the profit statement.

## 2 Contribution

Contribution is an important concept in marginal costing. Contribution is an abbreviation of “contribution towards fixed costs and profit”.

It is the difference between selling price and all variable costs (including non-production variable costs), usually expressed on a per unit basis.

	\$	\$
Selling price:		X
Less: Variable production costs	X	
Variable non-production costs	<u>X</u>	<u>(X)</u>
Contribution		<u>X</u>

**Note:** Contribution takes account of all variable costs. Marginal cost takes account of variable production costs only and inventory is valued at marginal cost.

**EXAMPLE 1**

X plc produces one product – desks.

Each desk is budgeted to require 4 kg of wood at \$3 per kg, 4 hours of labour at \$2 per hour, and variable production overheads of \$5 per unit.

Fixed production overheads are budgeted at \$20,000 per month and average production is estimated to be 10,000 units per month.

The selling price is fixed at \$35 per unit.

There is also a variable selling cost of \$1 per unit and fixed selling cost of \$2,000 per month.

During the first two months, X plc expects the following levels of activity:

	<i>January</i>	<i>February</i>
Production	11,000 units	9,500 units
Sales	9,000 units	11,500 units

All other results were as budgeted.

- Prepare a cost card using marginal costing**
- Set out Profit Statements for the months of January and February.**

**EXAMPLE 2**

Prepare a reconciliation of absorption and marginal costing profits

	<i>January</i>	<i>February</i>
	\$	\$
Absorption costing		
Marginal costing	_____	_____
Difference	_____	_____

The difference in profit arises from the different inventory valuations which are the result of the difference in treatment of the fixed production overheads.

**Effects**

The delay in charging some production overheads under absorption costing leads to the following situations.

**EXAMPLE 3**

**Required**

Compare profits under marginal and absorption costing for the following situations

- (a) **Production > Sales**
- (b) **Production < Sales**
- (c) **Production = Sales**

## Test

### QUESTION 1

A company manufactures and sells a single product. In two consecutive months the following levels of production and sales (in units) occurred:

	<i>Month 1</i>	<i>Month 2</i>
Sales	3,800	4,400
Production	3,900	4,200

The opening inventory for Month 1 was 400 units. Profits or losses have been calculated for each month using both absorption and marginal costing principles.

Which of the following combination of profits and losses for the two months is consistent with the above data?

	<i>Absorption costing profit/(loss)</i>		<i>Marginal costing profit/(loss)</i>	
	<i>Month 1</i>	<i>Month 2</i>	<i>Month 1</i>	<i>Month 2</i>
	\$	\$	\$	\$
A	200	4,400	(400)	3,200
B	(400)	4,400	200	3,200
C	200	3,200	(400)	4,400
D	(400)	3,200	200	4,400

### QUESTION 2

The following budgeted information relates to a manufacturing company for next period:

	<i>Units</i>		<i>\$</i>
Production	14,000	Fixed production costs	63,000
Sales	12,000	Fixed selling costs	12,000

The normal level of activity is 14,000 units per period.

Using absorption costing the profit for next period has been calculated as \$36,000.

What would the profit for next period be using marginal costing?

- A \$25,000
- B \$27,000
- C \$45,000
- D \$47,000

### QUESTION 3

A company uses an overhead absorption rate of \$3.50 per machine hour, based on 32,000 budgeted machine hours for the period. During the same period the actual total overhead expenditure amounted to \$108,875 and 30,000 machine hours were recorded on actual production.

By how much was the total overhead under or over absorbed for the period?

- A Under absorbed by \$3,875
- B Under absorbed by \$7,000
- C Over absorbed by \$3,875
- D Over absorbed by \$7,000

## THE MANAGEMENT ACCOUNTANT'S PROFIT STATEMENT – MARGINAL COSTING

## QUESTION 4

Glossop Limited reported an annual profit of \$47,500 for the year ended 31 March 2000. The company uses absorption costing. One product is manufactured, the Rover, which has the following standard cost per unit.

	\$
Direct material (2 kg at \$5/kg)	10
Direct labour (4 hours at \$6.50/hour)	26
Variable overheads (4 hours at \$1 /hour)	4
Fixed overheads (4 hours at \$3/hour)	<u>12</u>
	<u>52</u>

The normal level of activity is 10,000 units although actual production was 11,500 units. Fixed costs were as budgeted.

Inventory levels at 1 April 1999 were 400 units and at the end of the year were 600 units.

**What would be the profit under marginal costing?**

- A  \$44,300
- B  \$45,100
- C  \$49,900
- D  \$50,700

## QUESTION 5

A company absorbs overheads on machine hours which were budgeted at 11,250 with overheads of \$258,750. Actual results were 10,980 hours with overheads of \$254,692.

**Overheads were**

- A  under absorbed by \$2,152
- B  over absorbed by \$4,058
- C  under absorbed by \$4,058
- D  over absorbed by \$2,152

## QUESTION 6

The production overhead of department P is absorbed using a machine hour rate. Budgeted production overheads for the department were \$280,000 and the actual machine hours were 70,000. Production overheads were under absorbed by \$9,400.

**If actual production overheads were \$295,000 what was the overhead absorption rate per machine hour?**

- A  \$4.00
- B  \$4.08
- C  \$4.21
- D  \$4.35

**QUESTION 7**

Tesla has the following data relating to overheads.

	<i>Budget</i>	<i>Actual</i>
Fixed overheads	\$15,000	\$14,000
Units of production	10,000	10,100
Direct labour hours	20,000	19,500

Overheads are absorbed on the basis of labour hours.

**Which of the following statements is true?**

- A Overheads will be under absorbed by \$1,000 due to the lower than expected expenditure.
- B Overheads will be over absorbed by \$1,150 due to the unexpected increase in production.
- C Overheads will be under absorbed by \$625 due to lower than expected expenditure and lower than expected labour hours.
- D Overheads will be over absorbed by \$625 due to lower than expected expenditure and lower than expected labour hours.

**QUESTION 8**

Grove Limited reported an annual profit of \$47,500 for the year ended 31 March 2000. The company uses absorption costing. One product is manufactured, the Rover, which has the following standard cost per unit.

Direct material (2 kg at \$5/kg)	10
Direct labour (4 hours at \$6.50/hour)	26
Variable overheads (4 hours at \$1/hour)	4
Fixed overheads (4 hours at \$3/hour)	12
	<u>52</u>

The normal level of activity is 10,000 units although actual production was 11,500 units. Fixed costs were as budgeted. Inventory levels at 1 April 1999 were 400 units and at the end of the year were 600 units.

**What were the budgeted fixed overheads for the year ended 31 March 2000 and the actual under or over absorption?**

	<i>Budgeted Overheads</i>	<i>Under/over absorbed</i>
A	\$120,000	\$18,000 over absorbed
B	\$120,000	\$18,000 under absorbed
C	\$138,000	\$18,000 over absorbed
D	\$138,000	\$18,000 under absorbed

## THE MANAGEMENT ACCOUNTANT'S PROFIT STATEMENT – MARGINAL COSTING

## QUESTION 9

A company produces a single product for which cost and selling price details are as follows.

	<i>\$ per unit</i>	<i>\$ per unit</i>
Selling price		28
Direct material	10	
Direct labour	4	
Variable overhead	2	
Fixed overhead	<u>5</u>	
		<u>21</u>
Profit per unit		<u>7</u>

Last period, 8,000 units were produced and 8,500 units were sold. The opening inventory was 3,000 units and profits reported using marginal costing were \$60,000. The profits reported using an absorption costing system would be

- A \$47,500
- B \$57,500
- C \$59,500
- D \$62,500

## QUESTION 10

A company made 17,500 units at a total cost of \$16 each. Three quarters of the costs were variable and one quarter fixed. 15,000 units were sold at \$25 each. There were no opening inventories.

**By how much will the profit calculated using absorption costing principles differ from the profit if marginal costing principles had been used?**

- A The absorption costing profit would be \$10,000 less
- B The absorption costing profit would be \$10,000 greater
- C The absorption costing profit would be \$30,000 greater
- D The absorption costing profit would be \$40,000 greater







### 3 Process T-Accounts

If a T-account is shown in the examination, then the entries are as follows:

*Debit* the Process Account with each cost incurred

*Credit* the Process Account with the unit cost previously calculated.

It is normal and useful to have 2 columns in the Process Account – one for units and one for \$'s

#### EXAMPLE 2

Prepare a Process Account for the information in example 1.

Process Account			
<i>units</i>	\$	<i>units</i>	\$

## 4 Problem areas

There are three problem areas that can occur in the examinations

- ◆ Losses

Some of the units started in a process may not end up as finished output due to loss or damage

- ◆ Work-in-progress

At the start and end of a period there may be some units in the process that are only partly finished and which need more work in the next process

- ◆ Joint Products

More than one product may be produced in the same process.

These problems will be covered in the following chapters.













## Chapter 12



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# PROCESS COSTING – WORK-IN-PROGRESS

## 1 Introduction

At the end of a process there may be some units that have been started but not completed. These are known as **closing work-in-progress**. They are still there at the start of the next period, waiting to be finished. They are therefore **opening work-in-progress** of the next period.

## 2 Equivalent units

In our costings we still wish to calculate the cost of a finished unit. For costing purposes we assume the work done on 100 units that are only half finished is equivalent to 50 fully finished units. Therefore, 100 units each 50% finished is regarded as 50 equivalent complete units.

## 3 Closing Work-in-Progress (no opening Work-In-Progress)

When we have closing work-in-progress, we calculate a cost per unit for each category of cost, using equivalent units. The total cost per unit is the sum of these separate costs.

### EXAMPLE 1

During January the following costs were incurred in a process:

Materials (1,000 units)	\$5,000
Labour	\$2,760
Overheads	\$3,440

During the month, 800 units were finished and transferred to the next process.

The remaining 200 units were WIP and were complete as follows:

Materials	100%
Labour	60%
Overheads	30%

- calculate the cost per unit;
- value the finished output and the WIP;
- prepare Process Account.

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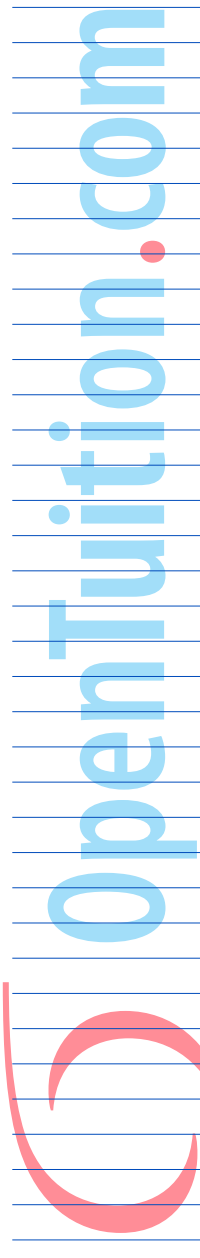
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## 6 Weighted average

One problem with the FIFO approach is that completed units are valued at two different costs depending on whether or not they were opening work-in-progress.

The **weighted average** approach values all finished units at an average cost.

### EXAMPLE 3

During July, the following costs were incurred

Materials (30,000 units)	\$24,900
Labour and overheads	\$20,075

At the beginning of July, there were 15,000 units of work in progress valued as follows:

Materials (100% complete)	\$9,000
Labour and overheads (40% complete)	\$1,250

At the end of July, there were 5,000 units of work-in-progress. They were 100% complete for materials and 50% complete for labour and overheads.

- calculate how many units were completed during July
- calculate the cost per unit
- value the finished items and the closing work-in-progress
- prepare a Process Account.

(Note: use the weighted average approach and assume no losses)

**Test****QUESTION 1**

Information relating to two processes (X and Y) was as follows:

<i>Process</i>	<i>Normal loss as % of input</i>	<i>Input litres</i>	<i>Output litres</i>
X	8	65,000	58,900
Y	5	37,500	35,700

**For each process, was there an abnormal loss or an abnormal gain?**

- |   | Process X     | Process Y     |
|---|---------------|---------------|
| A | Abnormal gain | Abnormal gain |
| B | Abnormal gain | Abnormal loss |
| C | Abnormal loss | Abnormal gain |
| D | Abnormal loss | Abnormal loss |

**QUESTION 2**

A company manufactures and sells one product which requires 8 kg of raw material in its manufacture. The budgeted data relating to the next period are as follows:

	<i>Units</i>
Sales	19,000
Opening inventory of finished goods	4,000
Closing inventory of finished goods	3,000
	<i>Kg</i>
Opening inventory of raw materials	50,000
Closing inventory of raw materials	53,000

**What is the budgeted raw material purchases for next period (in kg)?**

- A 141,000
- B 147,000
- C 157,000
- D 163,000

**QUESTION 3**

A company operates a process in which no losses are incurred. The process account for last month, when there was no opening work-in-progress, was as follows:

**Process Account**

	\$		\$
Costs arising	624,000	Finished output (10,000 units)	480,000
	<u>624,000</u>	Closing work-in progress (4,000 units)	<u>144,000</u>
			624,000

The closing work-in-progress was complete to the same degree for all elements of cost.

**What was the percentage degree of completion of the closing work-in-progress?**

- A 12%
- B 30%
- C 40%
- D 75%

**QUESTION 4**

A company which operates a process costing system had work-in-progress at the start of last month of 300 units (valued at \$1,710) which were 60% complete in respect of all costs. Last month a total of 2,000 units were completed and transferred to the finished goods warehouse. The cost per equivalent unit for costs arising last month was \$10.

The company uses the FIFO method of cost allocation.

**What was the total value of the 2,000 units transferred to the finished goods warehouse last month?**

- A \$19,910
- B \$20,000
- C \$20,510
- D \$21,710

**QUESTION 5**

**In process costing, if an abnormal loss arises, the process account is generally**

- A debited with the scrap value of the abnormal loss units
- B debited with the full production cost of the abnormal loss units
- C credited with the scrap value of the abnormal loss units
- D credited with the full production cost of the abnormal loss units

## PROCESS COSTING – WORK-IN-PROGRESS

**QUESTION 6**

Burgess operates a continuous process into which 3,000 units of material costing \$9,000 was input in a period. Conversion costs for this period were \$11,970 and losses, which have a scrap value of \$1.50, are expected at a rate of 10% of input. There were no opening or closing stocks and output for the period was 2,900 units.

**What was the output valuation?**

- A \$20,271
- B \$20,520
- C \$20,970
- D \$22,040

**QUESTION 7**

Process B had no opening stock. 13,500 units of raw material were transferred in at \$4.50 per unit. Additional material at \$1.25 per unit was added in process. Labour and overheads were \$6.25 per completed unit and \$2.50 per unit incomplete.

**If 11,750 completed units were transferred out, what was the closing stock in Process B?**

- A \$6,562.50
- B \$12,250.00
- C \$14,437.50
- D \$25,375.00

**THE FOLLOWING INFORMATION RELATES TO QUESTIONS 8 AND 9:**

A company operates a process costing system using the first-in-first-out (FIFO) method of valuation. No losses occur in the process. All materials are input at the commencement of the process. Conversion costs are incurred evenly through the process.

The following data relate to last period:

	<i>Units</i>	<i>Degree of completion</i>
Opening work in progress	2,000	60%
Total number of units completed	14,000	
Closing work in progress	3,000	30%
		\$
Costs arising:		
Materials	51,000	
Conversion	193,170	

**QUESTION 8**

What was the total number of units input during last period?

- A 12,000
- B 13,000
- C 15,000
- D 17,000

**QUESTION 9**

What was the value of the closing work in progress for last period?

- A \$21,330
- B \$21,690
- C \$22,530
- D \$22,890



## Chapter 13

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# PROCESS COSTING – JOINT PRODUCTS

## 1 Introduction

Sometimes, one process may produce several products. In this case we need to decide on a cost per unit for each of the products. These products, produced in the same process, are known as **joint products**.

Joint products refer to our main products with full sales value. However, there may be an additional product (or products) which is produced incidentally and has a relatively low sales value (effectively a waste product). This is known as a **by-product**.

## 2 Accounting treatment

- ◆ Any sale proceeds of a by-product are subtracted from the joint costs of the process.
- ◆ The net total cost of the process is then split between the joint products.
- ◆ For the examination, there are two ways of splitting the joint costs:
  - » The physical units basis
  - » The market value at the point of separation basis.

### 3 Physical units basis

Under this method, the same cost per unit is applied to all the joint products

#### EXAMPLE 1

During August, the following costs were incurred in a process:

Materials (3,500 kg)	\$5,000
Labour and overheads	\$2,300

The production from the process was as follows:

	kg	
Product A	1,000	selling price \$5 per kg
Product B	2,000	selling price \$2 per kg
by-product X	500	scrap value \$0.20 per kg

Calculate a cost per kg and profit per kg for A and B using the physical units basis.



## 5 Net-realisable value approach

The market value approach is not always possible. This is because the products will often require further work (and therefore costs) after leaving the process. We have to use the net realisable value at a point of separation as an approximation to the market value.

The net realisable value is the final market value less costs incurred after leaving the joint process.

### EXAMPLE 3

During September the following costs were incurred in a process:

Materials (3,500 kg)	\$5,000
Labour and overheads	\$2,300

The production from the process was as follows:

	kg	
Product A	1,000	selling price \$8.40 per kg
Product B	2,000	selling price \$4.50 per kg
by-product X	500	scrap value \$0.20 per kg

All the output of A and B incurred further processing at a cost of \$4.80 per kg for A and \$2.20 per kg for B.

Calculate a cost per kg for A and B *using the net realisable value approach*.

**TEST****QUESTION 1**

Two products P and Q are created from a joint process. P can be sold immediately after split-off. Q requires further processing into product X before it is in a saleable condition. There are no opening inventories and no work in progress of products P, Q or X. The following data are available for last period:

		\$
Total joint production costs		350,000
Further processing costs of product Q		66,000
<b>Product</b>	<b>Production units</b>	<b>Closing inventory units</b>
P	420,000	20,000
X	330,000	30,000

Using the physical unit method for apportioning joint production costs, what was the cost value of the closing inventory of product X for last period?

- A \$16,640
- B \$18,625
- C \$20,000
- D \$21,600

**QUESTION 2**

What is a by-product?

- A A product produced at the same time as other products which has no value
- B A product produced at the same time as other products which requires further processing to put it in a saleable state
- C A product produced at the same time as other products which has a relatively low volume compared with the other products
- D A product produced at the same time as other products which has a relatively low value compared with the other products

**QUESTION 3**

In process costing, a joint product is

- A a product which is later divided into many parts
- B a product which is produced simultaneously with other products and is of similar value to at least one of the other products
- C a product which is produced simultaneously with other products but which is of a greater value than any of the other products
- D a product produced jointly with another organisation

## QUESTION 4

Heath Ltd manufactures three joint products, W, X and Y in a common process. The cost and production data for March is as follows.

	\$
Opening stock	40,000
Direct materials input	80,000
Conversion costs	100,000
Closing stock	20,000

Output and sales were as follows.

	<i>Production Units</i>	<i>Sales units</i>	<i>Sales price \$ per unit</i>
W	20,000	15,000	4
X	20,000	15,000	6
Z	40,000	50,000	3

If costs are apportioned between joint products on a market value basis, what was the cost per unit of product X in March?

- A \$3.00
- B \$3.38
- C \$3.75
- D \$4.62

## Chapter 14

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# ALTERNATIVE COST ACCOUNTING

## 1 Introduction

This chapter briefly explains four more recent developments in costing which are improvements on the traditional techniques that we have been dealing with in the previous chapters.

You will not be required to perform any calculations – they will come in a later examination – but you are required to be aware of the ideas.

## 2 Activity based costing (ABC)

ABC deals with the way we charge overheads to the different products that we make.

You will remember from an earlier chapter that the traditional way is to take the total overheads and calculate an absorption rate – often a rate per labour hour – and then to charge this to the individual products on the basis of the number of hours each product takes to make.

With ABC, we identify the area where overheads are being incurred and then decide what is the reason or cause for these overheads. For example, one area where overheads may be incurred is in the department that receives the raw materials for production. We may decide that the reason we are incurring these overheads is the number of deliveries received (we call this the cost driver).

We then charge the different products with this part of the overheads on the basis of the number of deliveries received for each of the products we are making.

Not only does this result in more accurate costings but more importantly we can then investigate whether it is possible to have fewer deliveries received (by ordering more raw materials each time) and therefore potentially reduce the total overhead and save costs.

## 3 Target costing

Target costing is particularly useful when a new product is being launched.

There are basically 4 steps involved:

First, we decide on a realistic selling price for the new product. We do this by looking at the prices competitors charge or maybe by using market research.

Secondly, we decide on our objective. For example, maybe we require all our products to generate a profit of 40% of the selling price.

Thirdly, we put the two together and calculate the maximum cost that we can allow in order to achieve our objective – this is the target cost.

For example, suppose we identify that a realistic selling price for our new product is \$100, and we require a profit of 40% on selling prices. This would result in a target cost of \$60.

Fourthly, we estimate the actual cost of production, and if this is above the target cost we look for ways of reducing the cost to the target cost.

The most important way of achieving this is by examining the design of the product and looking to see if we can change the design in ways that will reduce the costs without needing a reduction in the selling price.

## 4 Life-cycle costing

Traditional costing tends to budget costs over just the short term – usually over the coming year. However this can create problems. Many new products will have low sales initially, but sales will rise as the products become popular. If sales are low in the early years, then overheads per unit are likely to be high, giving high unit costs. Whereas in later years, when sales are higher, the overheads per unit are likely to be lower, giving lower unit costs.

Life-cycle costing tries to take account of all costs and all production over the entire life of the product which can lead to much more sensible decisions regarding, for example, the pricing policy.

## 5 Total quality management

Poor quality costs a company money. This can be for two reasons – firstly, if the workers are not performing well there is high wastage and excess labour costs if they work slowly. Secondly, if poor quality goods are delivered to customers then there is the cost of replacing faulty goods, or guarantee work, and of lost goodwill.

There is a much greater focus these days on improving quality and reducing the costs associated with poor quality. This can involve such things as employing better skilled workers, training employees better, and also the cost of greater quality control procedures to try and avoid delivering poor quality goods to the customers.

Total quality management involves getting the entire workforce motivated to improve quality, and assessing the costs and benefits involved in improving quality.



## Chapter 15

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# BUDGETING

## 1 Introduction

Budgeting is an essential tool for management accounting for both planning and controlling future activity. In this chapter we will discuss the benefits of budgeting, the types of budget, and the preparation of budgets.

## 2 What is budgeting

Most companies prepare budgets – generally once a year they budget for the coming year.

Although this usually includes a forecast Income Statement for the year, the budget is actually a set of plans.

For example, a manufacturing company needs to plan their material and labour requirements for the coming year. In order to do this they will generally have to forecast their expected sales units for the year i.e. a sales budget. Then they will be in position to budget their production units for the year i.e. a production budget. Once they have budgeted how many units to produce they are in a position to estimate how much material and how much labour they will require i.e. a materials usage budget and a labour budget.

None of the budgets so far mentioned will be in money terms – they will be expressed in units of production, or kg of material, or hours of labour – but they each represent a plan for the year.

When all the individual budgets (or **functional budgets**) have been prepared, then it will be possible to cost them out in money terms and prepare a forecast Income Statement.

## 3 Benefits of budgeting

Planning

Controlling

Co-ordination

## Authorising and delegating

## Evaluation of performance

## Communicating and motivating

### 4 Principal budget factor

As previously discussed, the budget needs to be prepared in stages – for example we normally will need to know the budget production (in units) before we can budget how much material will be needed (in kg).

- The first thing that the person in charge of the budget process must do is decide where to start! For most companies the starting point will be a sales budget. Once it has been decided how many units the company expects to sell it is then possible to produce a production budget and so on.

However, this will not always be the starting point. Suppose, for example, that the company is a manufacturer of desks for which wood is the main material. Suppose also that during the coming year there is expected to be only a limited supply of wood available. In this situation the starting point will be to budget the amount of wood available, then budget how many units the company is capable of producing (a production budget) and then how many they expect to sell (a sales budget).

In general terms, the first budget to be prepared should be whatever factor it is that limits the growth of the company – it may be the level of demand (so a sales budget will be prepared first) or, as for the example in the previous paragraph, it may be the availability of raw material (so a material budget will be prepared first).

The factor that limits the company is known as the **principal budget factor**. The management accountant needs to identify the principal budget factor and it is this factor that will be budgeted first.



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## 6 Type of budgets

### Fixed budget

### Flexed budget

### Flexible budget

#### EXAMPLE 2

A company has prepared the following fixed budget for the coming year.

Sales	10,000 units
Production	10,000 units
	\$
Direct materials	50,000
Direct labour	25,000
Variable overheads	12,500
Fixed overheads	<u>10,000</u>
	<u>\$97,500</u>

Budgeted selling price \$10 per unit.

At the end of the year, the following costs had been incurred for the actual production of 12,000 units.

	\$
Direct materials	60,000
Direct labour	28,500
Variable overheads	15,000
Fixed overheads	<u>11,000</u>
	<u>\$114,500</u>

The actual sales were 12,000 units for \$122,000

- Prepare a flexed budget for the actual activity for the year
- Calculate the variances between actual and flexed budget, and summarise in a form suitable for management.

(Use a marginal costing approach)

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**TEST****QUESTION 1**

Which of the following best describes a flexible budget?

- A A budget which shows variable production costs only.
- B A monthly budget which is changed to reflect the number of days in the month.
- C A budget which shows sales revenue and costs at different levels of activity.
- D A budget that is updated halfway through the year to incorporate the actual results for the first half of the year.

**QUESTION 2**

The following statements relate to aspects of budget administration:

Statement (1): An important task of a budget committee is to ensure that budgets are properly coordinated.

Statement (2): A budget manual is the document produced at the end of the budget setting process.

Which of the following is true?

- A Only statement (1) is correct.
- B Only statement (2) is correct.
- C Both statements are correct.

**QUESTION 3**

The following statements refer to spreadsheets:

- (i) A spreadsheet is the most suitable software for the storage of large volumes of data.
- (ii) A spreadsheet could be used to produce a flexible budget.
- (iii) Most spreadsheets contain a facility to display the data in a graphical form.

Which of these statements are correct?

- A (i) and (ii) only
- B (i) and (iii) only
- C (ii) and (iii) only
- D (i), (ii) and (iii)

**QUESTION 4**

Which of the following best describes a principal budget factor?

- A A factor that affects all budget centres.
- B A factor that is controllable by a budget centre manager.
- C A factor which limits the activities of an organisation.
- D A factor that the management accountant builds into all budgets.





## Chapter 16

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# BEHAVIOURAL ASPECTS OF BUDGETING

## 1 Introduction

In the previous chapter we looked at how budgets are prepared. In this chapter we will consider how the budget can affect the behaviour of managers.

## 2 Motivation

An important use of budgets is for them to become the targets for managers. This will only work if our managers are motivated to attempt to achieve (or to perform better than) the targets that have been set.

It is therefore important that consideration is given as to how best to motivate the managers.

## 3 Factors that influence motivation

The main factors influencing how well the managers will be motivated are:

- (a) to what extent they were involved in preparing the budgets and therefore in setting the targets
- (b) how easy or difficult will it be for the managers to achieve the targets
- (c) how the managers will be rewarded for achieving their targets (or punished for not achieving them!)

We will consider each of these factors briefly in the following paragraphs.

## 4 Participation in the preparation of budgets

There are two basic approaches to the way budgets are prepared:

- (a) one approach is for top management to prepare the budgets and then to impose them on their managers. This is known as **top-down budgeting**
- (b) the alternative approach is to get the managers to prepare their own budgets and for top management to then approve them (after obviously due discussion). This is known as **bottom-up budgeting**.

The second approach – bottom-up budgeting – is a **participative** approach and is regarded as being more motivational for the managers because they were involved in setting their own targets. The danger is that they deliberately budget targets that are easy for them to achieve – it is up to top management to be aware of this and to question the managers well before approving the budgets.

## 5 The impact of targets

It is important that the targets are demanding of the managers – the purpose of them is to help improve the performance of the business – but at the same time they need to be achievable by the managers. If the manager feels that it is simply not possible to achieve his or her target, then there is the danger that they just stop trying completely.

## 6 Incentive schemes

The most common way of motivating managers to improve is to reward them - the level of the reward being dependent on the degree to which they achieve, or better, their targets.

The reward can be given in several ways, such as the following:

- (a) the promise of promotion
- (b) an increase in salary
- (c) a cash bonus
- (d) a bonus given in shares in the company



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**3 Problems with the high-low approach**









## 7 Coefficient of determination

The **coefficient of determination** is the square of the coefficient of correlation ( $r^2$ ).

It is a measure of how much of the variation in the dependent variable is 'explained' by the variation of the independent variable.





**TEST****QUESTION 1**

Regression analysis is being used to find the line of best fit ( $y = a + bx$ ) from eleven pairs of data. The calculations have produced the following information:

$\Sigma x = 440$ ,  $\Sigma y = 330$ ,  $\Sigma x^2 = 17,986$ ,  $\Sigma y^2 = 10,366$ ,  $\Sigma xy = 13,467$  and  $b = 0.69171$

What is the value of 'a' in the equation for the line of best fit (to 2 decimal places)?

- A 0.63
- B 0.69
- C 2.33
- D 5.33

**QUESTION 2**

Which of the following is NOT a feasible value for the correlation coefficient?

- A +1.4
- B +0.7
- C 0
- D -0.7

**QUESTION 3**

The correlation coefficient between advertising expenditure and sales revenue is calculated to be 0.85.

Which of the following statements is true?

- A There is a weak relationship between advertising expenditure and sales revenue
- B 85% of the variation in sales revenue can be explained by the corresponding variation in advertising expenditure
- C 72% of the variation in sales revenue can be explained by the corresponding variation in advertising expenditure
- D Sales revenue will increase by 85% more than advertising expenditure will increase

**QUESTION 4**

X Ltd has recorded the following data for two recent periods.

<i>Transport costs</i>	<i>Deliveries made</i>
\$	
9,680	840
9,860	930

The transport costs for a particular period could be represented by:

- A  $\$10.60 \times \text{number of deliveries}$
- B  $\$11.52 \times \text{number of deliveries}$
- C  $\$8,000 - (\$2 \times \text{number of deliveries})$
- D  $\$8,000 + (\$2 \times \text{number of deliveries})$

QUESTION 5

Berry has recorded the following costs over the last six months:

<i>Month</i>	<i>Total cost</i> <i>'000</i>	<i>Units produced</i> <i>'000</i>
1	74	3
2	72.75	1.75
3	73.25	2
4	75	2.5
5	69.5	1.5
6	72.75	2

Using the high - low method what would be the total cost equation?

- A Total cost = 61,250 + 5.5 × Quantity
- B Total cost = 65,000 + 3 × Quantity
- C Total cost = 70,250 + 1.25 × Quantity
- D Total cost = 71,000 + 1 × Quantity

## Chapter 18

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# TIME SERIES ANALYSIS

## 1 Introduction

Managers often wish to look at the trend of costs or sales over time as a basis for forecasting the future. It is unlikely in practice that past results will follow a smooth pattern for various reasons.

Of particular interest to us in this chapter are seasonal variations which we can attempt to identify.

## 2 Definitions

**Time series:** a set of observations taken at equal intervals of time e.g. monthly

**Variations in observations:**

**Trend:**

the underlying pattern of a time series when the short term fluctuations have been smoothed out.

**Cyclical Variations:**

the wave-like appearance of a number of time series graph when taken over a number of years. Generally this corresponds to the influence of booms and slumps in the industry.

**Seasonal variations:**

the regular rise and fall over shorter periods of time. For example, umbrella sales are likely to be higher than average every winter and lower than average every summer.

**Random (residual) variations:**

these are other, unpredictable variations.









**EXAMPLE 2**

Sales of tea were 8,200 packets in 2008, 9,000 packets in 2009 and 9,400 packets in 2010.

Calculate the quantity index for 2009 and 2010 using 2008 as a base year.

### 3 Laspeyre and Paasche index numbers

In order, for example, to measure the overall effect of inflation, it is more sensible to consider the change in price of a typical 'shopping basket' of goods rather than looking at just one item.

To make sure that we are only measuring the effect of price inflation, it is important to compare the same shopping basket in terms of quantities.

The Laspeyre price index uses base period quantities, whereas the Paasche price index uses current period quantities.

$$\text{Laspeyre price index} = \frac{\sum (p_1 \times q_0)}{\sum (p_0 \times q_0)} \times 100$$

$$\text{Paasche price index} = \frac{\sum (p_1 \times q_1)}{\sum (p_0 \times q_1)} \times 100$$



## INDEX NUMBERS

## EXAMPLE 3

Below are stated the quantities and unit prices for a typical 'shopping basket' in each of the year 2008, 2009, and 2010.

	2008		2009		2010	
	quantity	price p.u.	quantity	price p.u.	quantity	price p.u.
Coffee	20	\$4.00	15	\$4.50	15	\$4.80
Sugar	15	\$0.60	18	\$0.70	20	\$1.00
Bread	30	\$0.80	35	\$1.00	40	\$1.10

Calculate price index numbers for 2009 and 2010, with 2008 as a base year, using:

- (a) Laspeyre  
(b) Paasche

## 4 Advantages and disadvantages

Laspeyre price index

Paasche price index

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**TEST****QUESTION 1**

In a time series analysis, the additive model is used to forecast sales and the following seasonal variations apply:

Quarter	1	2	3	4
Seasonal variation	+5.8	-8.4	+10.2	?

**The seasonal variation for quarter 4 is:**

- A +7.6
- B -8.1
- C -7.6
- D +8.1

**QUESTION 2**

- 5 years ago an item was costing \$10.
- The relevant index number 5 years ago was 125.
- The same index now stands at 220.

**What is the current cost of the item?**

- A \$5.68
- B \$17.60
- C \$22.00
- D \$12.50

**QUESTION 3**

In 2008 a company purchased 10,000 kg of material for a total cost of \$25,000.

In 2011 they purchased 12,000 kg of the same material and paid a total of \$38,000.

**What is the 2011 price index for this material (with 2008 as base year)?**

- A 120
- B 152
- C 127
- D 118

**QUESTION 4**

In 2009 a company purchased 20,000 kg of material at a total cost of \$32,000.

The relevant index number in 2009 was 185.

In 2011 the index number was 220 and the company purchased 13,000 kg of material.

**What is the total cost of the material purchased in 2011 (to the nearest \$'00)?**

- A \$38,100
- B \$17,500
- C \$24,700
- D \$20,800

# Chapter 20

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# INTEREST

## 1 Introduction

The purpose of this chapter and the next chapter is to consider a key area for management accountants – the appraisal of capital investments.

In this chapter we will look at interest on capital and continue in the next chapter with the use of these techniques in investment appraisal.

## 2 Simple interest

A sum of money invested or borrowed is known as the **principal**.

When money is invested it earns interest; similarly when money is borrowed, interest is payable.

With **simple interest**, the interest is receivable or payable each year, but is not added to the principal.

### EXAMPLE 1

A man invests \$200 on 1 January each year. On 31 December each year simple interest is credited at 15% but this interest is put in a separate account and does not itself earn interest.

**Find the total amount standing to his credit on 31 December following his fourth payment of \$200.**

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## INTEREST

## 4 Effective Rate

For simplicity, the previous compound interest examples have assumed that interest is calculated only once a year.

However in practice interest may be calculated on a monthly or even daily basis. The same formula can still be used, but we need to distinguish between the nominal and annual percentage rates.

There are usually two rates quoted by financial institutions. The first is the **nominal rate** and the other, the rate actually earned, is known as the **effective** or the **annual percentage rate (APR)**.

### EXAMPLE 4

A credit card company charges a nominal rate of 2% per month.

**If a customer has purchased \$100 worth of goods on his credit, calculate the amount she will owe after one year, and also the annual percentage rate (APR)**

## 5 Discounting

In the previous example we calculated the future value of cash flows by adding on (or compounding) the interest.

We can do the same exercise in reverse to calculate the amount now that is equivalent to future flows, by removing interest.

This exercise is known as **discounting** and the equivalent amount is known as the **present value**.

### EXAMPLE 5

**What amount now is equivalent to \$800 in 4 years time, with interest at 10% p.a.?**







**TEST****QUESTION 1**

A man invests \$600 for a period of 8 years.

Interest is compounded at the rate of 5% per annum for the first 3 years, and 6% per annum for the remaining 5 years.

**How much will he have at the end of 8 years (to the nearest \$)?**

- A \$956
- B \$870
- C \$912
- D \$929

**QUESTION 2**

A credit card company charges interest at the rate of 1.5% per month.

**What is the effective annual rate of interest (or APR)?**

- A 17.80%
- B 18.00%
- C 19.56%
- D 21.36%

**QUESTION 3**

**What is the present value of \$3,000 receivable in 15 years time, with interest at 8% per annum?**

- A \$825
- B \$1,040
- C \$945
- D \$2,760

**QUESTION 4**

**What is the present value of \$2,000 per annum, first receivable in 3 years time and thereafter each year for a total of 8 years, with interest at 5% per annum (to the nearest \$'00)?**

- A \$11,700
- B \$10,000
- C \$12,900
- D \$11,200

**QUESTION 5**

**What is the present value of \$6,000 per annum first receivable immediately, and thereafter in perpetuity, with interest at 9.5% per annum?**

- A \$63,158
- B \$66,000
- C \$69,158
- D \$60,000





## INVESTMENT APPRAISAL

## 4 Payback Period

One problem with basing decision on the net present value of a project is that the cash flows are only estimates, and if the estimate are wrong then the decision could be wrong.

It is likely to be the earlier cash flows that are the most certain whereas the further into the future that we are estimating the more uncertain the cash flows are likely to be.

The **payback period** is the number of years it takes to get back the original investment in cash terms. The shorter the payback period, the more certain we are that the project will actually pay for itself.

The **discounted payback period** is exactly the same except that it takes into account the time value of money by measuring how many years it takes to get back the original investment looking at the discounted cash flow each year.

### EXAMPLE 3

A new project will cost \$100,000 and will last for 5 years with no scrap value.

The project is expected to generate operating cash flows each year as follows:

Year 1	20,000
Year 2	30,000
Year 3	40,000
Year 4	50,000
Year 5	30,000

The cost of capital is 10%

- Calculate the payback period
- Calculate the discounted payback period



## INVESTMENT APPRAISAL

**TEST****THE FOLLOWING INFORMATION RELATES TO QUESTIONS 1 TO 4**

A company is considering investing in a new machine that will cost \$270,000 and will last for 4 years with a scrap value at the end of 4 years of \$20,000.

It is expected to generate operating cash inflows each year as follows:

Year 1:	\$50,000
Year 2:	\$180,000
Year 3:	\$100,000
Year 4:	\$50,000

The cost of capital is 12% per annum.

**QUESTION 1**

What is the net present value of the machine (to the nearest \$'000)?

- A \$21,110
- B \$31,640
- C \$32,450
- D \$33,830

**QUESTION 2**

What is the Internal Rate of Return of the machine (to the nearest %)?

- A 16%
- B 17%
- C 18%
- D 19%

**QUESTION 3**

What is the payback period for the machine?

- A Within 1 year
- B Within 2 years
- C Within 3 years
- D Within 4 years

**QUESTION 4**

What is the discounted payback period for the machine?

- A Within 1 year
- B Within 2 years
- C Within 3 years
- D Within 4 years





## Chapter 22

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# VARIANCE ANALYSIS

## 1 Introduction

In earlier chapters we looked at the layout of the management accountant's profit statements.

Unlike the financial accountant, the purpose for the management accountant is to explain (usually monthly) why the actual profit is different from the budgeted profit.

If the reasons for the difference can be identified, the information can be used for control purposes e.g. an overspend in one month can be investigated and attempts made to correct any problem for future months.

## 2 Total variances

### EXAMPLE 1

A company has prepared the following standard cost card:

	<i>\$ per unit</i>
Materials (4 kg at \$4.50 per kg)	18
Labour (5 hrs at \$5 per hr)	25
Variable overheads (5 hrs at \$2 per hr)	10
Fixed overheads (5 hrs at \$3 per hr)	15
	<u>\$68</u>

Budgeted selling price \$75 per unit.

Budgeted production	8,700 units
Budgeted sales	8,000 units

There is no opening inventory

The actual results are as follows:

Sales:	8,400 units for \$613,200
Production:	8,900 units with the following costs:

Materials (35,464 kg)	163,455
Labour (Paid 45,400hrs; worked 44,100 hrs)	224,515
Variable overheads	87,348
Fixed overheads	134,074

**Prepare a flexed budget and calculate the total variances**

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### 3 Analysis of cost variances

The total variance that we have calculated for materials indicates that the actual expenditure on materials was not \$18 per unit. However, this could be either because we used the wrong amount of materials (which should have been 4 kg per unit) or that we paid the wrong price (which should have been \$4.50 per kg). More likely of course, it would be a combination of the two.

We will therefore analyse this and the other variances in as much detail as possible.

#### EXAMPLE 2

Using the data from example 1, analyse each of the cost variances.

**Materials**

**Labour**



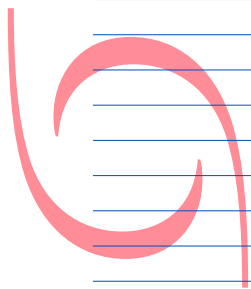
## 4 Sales Variances

Although we have already calculated the sales variances in example 1, you may be asked to calculate them independently.

### EXAMPLE 3

Using data from example 1, calculate the Sales price variance and the Sales volume variance

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## Test

### QUESTION 1

A company's budgeted sales for last month were 10,000 units with a standard selling price of \$20 per unit and a standard contribution of \$8 per unit. Last month actual sales of 10,500 units at an average selling price of \$19.50 per unit were achieved.

**What were the sales price and sales volume contribution variances for last month?**

	Sales price variance (\$)	Sales volume contribution variance (\$)
A	5,250 Adverse	4,000 Favourable
B	5,250 Adverse	4,000 Adverse
C	5,000 Adverse	4,000 Favourable
D	5,000 Adverse	4,000 Adverse

**THE FOLLOWING INFORMATION RELATES TO QUESTIONS 2 AND 3:**

A company uses standard costing and the standard variable overhead cost for a product is:

6 direct labour hours @ \$10 per hour.

Last month when 3,900 units of the product were manufactured, the actual expenditure on variable overheads was \$235,000 and 24,000 hours were actually worked.

### QUESTION 2

**What was the variable overhead expenditure variance for last month?**

- A \$5,000 Adverse
- B \$5,000 Favourable
- C \$6,000 Adverse
- D \$6,000 Favourable

### QUESTION 3

**What was the variable overhead efficiency variance for last month?**

- A \$5,000 Adverse
- B \$5,000 Favourable
- C \$6,000 Adverse
- D \$6,000 Favourable

### QUESTION 4

When a manufacturing company operates a standard marginal costing system there are no fixed production overhead variances.

**Is this statement true or false?**

- A True
- B False



## VARIANCE ANALYSIS

## QUESTION 5

A company operates a standard costing system. The variance analysis for last month shows a favourable materials price variance and an adverse labour efficiency variance.

The following four statements, which make comparisons with the standards, have been made:

- (1) Inferior quality materials were purchased and used.
- (2) Superior quality materials were purchased and used.
- (3) Lower graded workers were used on production.
- (4) Higher graded workers were used on production.

Which statements are consistent with the variance analysis?

- A** (1) and (3)  
**B** (1) and (4)  
**C** (2) and (3)  
**D** (2) and (4)

## QUESTION 6

A company operates a standard absorption costing system. The standard fixed production overhead rate is \$15 per hour.

The following data relate to last month:

Actual hours worked	5,500
Budgeted hours	5,000
Standard hours for actual production	4,800

What was the fixed production overhead capacity variance?

- A** \$7,500 Adverse  
**B** \$7,500 Favourable  
**C** \$10,500 Adverse  
**D** \$10,500 Favourable

## QUESTION 7

A company uses standard absorption costing. The following data relate to last month:

	<i>Budget</i>	<i>Actual</i>
Sales and production (units)	1,000	900
	Standard	Actual
	\$	\$
Selling price per unit	50	52
Total production cost per unit	39	40

What was the adverse sales volume profit variance last month?

- A** \$1,000  
**B** \$1,100  
**C** \$1,200  
**D** \$1,300

**QUESTION 8**

A company operates a standard marginal costing system. Last month actual fixed overhead expenditure was 2% below budget and the fixed overhead expenditure variance was \$1,250.

**What was the actual fixed overhead expenditure for last month?**

- A \$61,250
- B \$62,475
- C \$62,500
- D \$63,750

**QUESTION 9**

Last month 27,000 direct labour hours were worked at an actual cost of \$236,385 and the standard direct labour hours of production were 29,880. The standard direct labour cost per hour was \$8.50.

**What was the labour efficiency variance?**

- A \$17,595 Adverse
- B \$17,595 Favourable
- C \$24,480 Adverse
- D \$24,480 Favourable

## Chapter 23

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# PERFORMANCE MEASUREMENT OVERVIEW

## 1 Introduction

This chapter introduces the idea of performance measurement and its importance for the management accountant.

## 2 The Mission Statement

This statement expresses the overall purpose of the organisation.

It will generally contain four elements:

- ◆ a **purpose** why the company exists
- ◆ a **strategy** the range of activities in which the business intends to compete, and how it intends to compete
- ◆ **policies and standards** guidelines which help staff decide what to do to carry out the strategy
- ◆ **values** the beliefs and moral principles which lie behind the firm's culture

Here is an example of an actual mission statement:

*“McDonalds’ vision is to be the world’s best quick service restaurant experience. Being the best means providing outstanding quality, service, cleanliness, and value, so that we make every customer in every restaurant smile”*

## 3 Goals and Objectives

Having decided on the company's mission, it is then necessary to have goals and objectives.

**Goals** are statements of general intentions, whereas **objectives** are more specific.

An example of a goal is: to improve profits

An example of an objective is: to increase the profit by 20% within 2 years.

## 4 Critical Success Factors and Key Performance Indicators

Having decided on the objectives of the business, it is important that we measure how well they are achieving these objectives.

There are two parts to this. First they must decide what are the **critical success factors** (CSF's) – the performance requirements that are most fundamental to being successful.

For example, two of McDonalds' CSF's could be quality, and speed of service.

Secondly, they must then decide how they are going to measure their performance in these areas. For this they need **key performance indicators** (KPI's) – aspects to which they can actually put numbers to, that indicate whether they are doing better or worse.

For example, McDonalds might decide to measure quality by asking customers to complete a

form scoring the quality between 1 to 5, and then recording the average score. They could decide to measure speed of service by keeping records of the time taken to serve each customer and recording the average service time in minutes.

As you will see in later chapters, it is important that a company has a range of KPI's – both financial (measuring, for example, profitability) and non-financial (measuring, for example, quality).



## Chapter 24



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# FINANCIAL PERFORMANCE MEASUREMENT

## 1 Introduction

Financial statements are prepared to assist users in making decisions. They therefore need interpreting, and the calculation of various ratios makes it easier to compare the state of a company with previous years and with other companies.

In this chapter we will look at the various ratios that you should learn for the examination.

## 2 The main areas

When attempting to analyse the financial statements of a company, there are several main areas that should be looked at:

**Profitability**

**Liquidity**

**Gearing**

We will work through an example to illustrate the various ratios that you should learn under each heading.

## FINANCIAL PERFORMANCE MEASUREMENT

## 3 Worked example

## EXAMPLE 1

## Statements of Financial Position as at 31 December

	2007		2006	
	\$	\$	\$	\$
<b>ASSETS</b>				
Non-current assets		1,341		826
Current assets				
Inventory	1,006		871	
Receivables	948		708	
Cash	<u>360</u>		<u>100</u>	
		<u>2,314</u>		<u>1,679</u>
		<u>3,655</u>		<u>2,505</u>
<b>EQUITY AND LIABILITIES</b>				
Share capital and reserves		2,190		1,401
Non-current liabilities		500		400
Current liabilities		<u>965</u>		<u>704</u>
		<u>3,655</u>		<u>2,505</u>

## Income statement for the year ended 31 December

	2007	2006
	\$	\$
Revenue	7,180	5,435
Cost of sales	<u>5,385</u>	<u>4,212</u>
Gross profit	1,795	1,223
Distribution costs	335	254
Administrative expenses	<u>670</u>	<u>507</u>
Profit from operations	790	462
Finance costs	<u>50</u>	<u>52</u>
Profit before taxation	740	410
Company tax expense	<u>262</u>	<u>144</u>
Profit after taxation	<u>478</u>	<u>266</u>

You are required to calculate the profitability, liquidity and gearing ratios.

**Profitability**

$$\text{Return on capital employed} = \frac{\text{Profit before interest and tax}}{\text{Total long term capital}}$$

(= capital + reserves + long-term liabilities)

$$\text{Net profit margin} = \frac{\text{Profit before interest and tax}}{\text{Revenue}}$$

$$\text{Asset turnover} = \frac{\text{Revenue}}{\text{Total long term capital}}$$

NB: ROCE = asset turnover × net profit margin

$$\text{Gross profit margin} = \frac{\text{Gross profit}}{\text{Revenue}}$$

### Liquidity

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Quick ratio (or acid test)} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$$

$$\text{Inventory days} = \frac{\text{Inventory}}{\text{Cost of sales}} \times 365 \text{ days}$$

$$\text{Average collection period (receivables days)} = \frac{\text{Trade receivables}}{\text{Revenue}} \times 365 \text{ days}$$

$$\text{Average payment period (payables days)} = \frac{\text{Trade payables}}{\text{Purchases}} \times 365 \text{ days}$$

**Gearing**

$$\text{Gearing} = \frac{\text{Non-current liabilities}}{\text{Share capital and reserves}} \%$$

**4 Limitations of ratio analysis**

You must learn the various ratios, however, it is important that you are able to discuss briefly the relevance of the various ratios, and also their limitations.

Very few of the ratios mean much on their own – most are only useful when compared with the ratios for previous years or for similar companies.

Many of the ratios use figures from the Statement of Financial Position. These only represent the position at one point in time, which could be misleading. For example, the level of receivables could be unusually high at the year end, simply because a lot of invoicing was done just before the year end. Perhaps more sensible in that sort of case would be to use the average for the year. Normally in the examination you will be expected simply to use Statement of Financial Position figures at the end of the year, but do be prepared to state the problem if relevant.



## FINANCIAL PERFORMANCE MEASUREMENT

**TEST****THE FOLLOWING INFORMATION RELATES TO QUESTIONS 1 TO 5.**

The accounts of Lola plc for year ended 31 December 2010 include the following information:

Revenue	7,200
Gross profit	2,376
Net profit	1,080
Inventory	300
Trade receivables	624
Cash	1,608
Trade payables	1,890

**QUESTION 1**

Calculate the net profit percentage.

- A 33%
- B 66%
- C 15%
- D 85%

**QUESTION 2**

Calculate the gross profit percentage.

- A 33%
- B 66%
- C 15%
- D 85%

**QUESTION 3**

Calculate the receivables payment period (all sales are on credit).

- A 211 days
- B 95 days
- C 49 days
- D 32 days

**QUESTION 4**

Calculate the current ratio.

- A 1.18
- B 1.34
- C 0.49
- D 0.75

**QUESTION 4**

Calculate the quick ratio.

- A 1.18
- B 1.34
- C 0.49
- D 0.75



## Chapter 25



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# NON-FINANCIAL PERFORMANCE MEASUREMENT

## 1 Introduction

In the previous chapter we looked at various measures of financial performance. However it is important to have a range of performance measures considering non-financial and well as financial matters. This is particularly important in the case of service businesses where such things as quality are of vital importance if the business is to grow in the long-term.

In this chapter we will consider the various areas where performance measures are likely to be needed.

Various authors have summarised the areas in different ways – two well-known ones are Fitzgerald and Moons Building Blocks, and Kaplan and Nortons Balance Scorecard. You will not be tested specifically on Fitzgerald and Moon, or on Kaplan and Norton, but you should be aware of the areas that they consider important and be able to suggest performance indicators under the various headings.

## 2 Fitzgerald and Moon

Fitzgerald and Moon focussed on performance measures for service businesses and suggested the following areas as needing performance indicators:

- ◆ Financial performance
- ◆ Competitive performance
- ◆ Quality
- ◆ Flexibility
- ◆ Resource utilisation
- ◆ Innovation

### 3 Kaplan and Nortons Balance Scorecard

Kaplan and Norton also stated the importance of having a range of performance measures and forming a balance between them. They grouped them under the following headings, which they called perspectives:

- ◆ Customer satisfaction perspective
  
- ◆ Process efficiency (or internal business) perspective
  
- ◆ Growth (or innovation and learning) perspective
  
- ◆ Financial perspective

### 4 Value for money

Of importance to all businesses, but especially for state organisations such as health care, is the concept of getting value for money.

To achieve value for money, three areas should be considered:

- ◆ Economy
  - Paying a ,fair' price for resources
  
- ◆ Effectiveness
  - Being successful at what we are trying to achieve
  
- ◆ Efficiency
  - Using resources well – getting as much out as possible for what goes in

**TEST****QUESTION 1**

Which of the following is not one of the dimensions of performance measurement included in Fitzgerald and Moon's building blocks?

- A Competitive performance
- B Innovation
- C Learning
- D Quality

**QUESTION 2**

Which of the following key performance indicators would not be an indicator of quality for a railway company?

- A The percentage of trains arriving at their destination within 15 minutes of the scheduled arrival time.
- B The number of accidents per 1,000 journeys.
- C A survey of customer satisfaction.
- D The number of complaints received per 1,000 passengers.

**QUESTION 3**

As one of its key performance indicators, a restaurant measures the amount of food that is wasted.

Under which perspective would this appear on a balanced scorecard?

- A Financial Success
- B Customer Satisfaction
- C Process Efficiency
- D Growth

**QUESTION 4**

Which of the following is not a perspective associated with the balanced scorecard?

- A Financial success
- B Quality
- C Growth
- D Process Efficiency









## DIVISIONAL PERFORMANCE MEASUREMENT

**TEST****QUESTION 1**

Which of the following is not a feature of the Return on Investment performance measure?

- A It motivates the division manager to try to better the company's target rate of return.
- B It enables the comparison of the performance of divisions of different sizes.
- C It motivates the manager to improve the return of the division.
- D It is an accounts based measure of performance

**QUESTION 2**

Which of the following items should not be included in the calculation of the controllable profit of a profit centre?

- (i) The revenue of the division
- (ii) An allocation of head office expenses
- (iii) Depreciation on machines
- (iv) Wages of employees in the division

- A (i), (ii) and (iii)
- B (ii), (iii) and (iv)
- C (ii) and (iii)
- D (i) and (iv)

**THE FOLLOWING INFORMATION RELATES TO QUESTIONS 3 AND 4**

An investment division currently has net assets of \$500,000 and is earning profits of \$70,000 per annum. The divisional manager is considering a new investment which will cost \$20,000 and will generate additional profits of \$2,200 per annum. The company has a cost of finance of 10%.

**QUESTION 3**

If the performance of the divisional manager is measured on the basis of Return on Investment, will he:

- A invest in the new machine
- B not invest in the new machine

**QUESTION 4**

If the performance of the divisional manager is measured on the basis of Residual Income, will he:

- A invest in the new machine
- B not invest in the new machine



# Paper F2

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## ANSWERS TO EXAMPLES

### Chapter 1

No Examples

### Chapter 2

No Examples

### Chapter 3

No Examples

### Chapter 4

#### Example 6

	<i>units</i>	<i>cost</i>
High	1,000	110,000
Low	200	30,000
Difference	800	80,000

Therefore, variable cost =  $\frac{80,000}{800} = \$100$  per unit

Using in 'high',	total cost	=	\$110,000
	variable cost		
	(1,000 × \$100)		\$100,000
Therefore,	fixed cost	=	\$10,000

Therefore,  $y = 100x + 10,000$

### Chapter 5

#### Example 1

Order quantity	Number of order	(\$20 per order) Reorder cost p.a. (a)	Average inventory	(10% × \$25 = \$2.50 p.u.) Stockholding cost p.a. (b)	Total inventory (a + b)
500	80	1,600	250	625	2225
750	53.33	1,067	375	938	2005 *
1000	40	800	500	1250	2050
1250	32	640	625	1563	2203

#### Example 2

$$EOQ = \sqrt{\frac{2C_o D}{C_H}} = \sqrt{\frac{2 \times £20 \times 40,000}{£2.50}} = 800 \text{ units}$$

\$

Reorder cost:  $= \frac{40,000}{800} = 50 \times \$20 = 1,000$

## ANSWERS TO EXAMPLES

$$\text{Inventory holding cost} = \frac{800}{2} = 400 \times \$2.50 = 1,000$$

$$\text{Total inventory costs} \quad \underline{\underline{\$2,000\text{p.a.}}}$$

**Example 3**

Order quantity = EOQ = 800 units:

	\$	
Purchase cost: 40,000 × \$25	1,000,000	
Inventory costs	2,000	
	\$1,002,000	p.a.

Order quantity = 5,000 units

		\$
Purchase cost:	40,000 × 99% × \$25	990,000
Inventory costs:		
Reorder:	$\frac{40,000}{5,000} = 8 \times \$20 =$	160
Inventory holding:	$\frac{5,000}{2} = 2,500 \times 99\% \times \$2.50 =$	6,188
		\$996,348p.a.

Order quantity = 10,000 units

		\$
Purchase cost:	40,000 × 98.5% × \$25	985,000
Inventory costs:		
Reorder:	$\frac{40,000}{10,000} = 4 \times \$20 =$	80
Inventory holding:	$\frac{10,000}{2} = 5,000 \times 98.5\% \times \$2.50 =$	12,313
		\$997,393p.a.

Order quantity of 5,000 units is the best option.

**Example 4**

$$\text{EBQ} = \sqrt{\frac{2C_o D}{C_H \left(1 - \frac{D}{R}\right)}} = \sqrt{\frac{2 \times 200 \times 50,000}{3 \left(1 - \frac{50,000}{500,000}\right)}} = 2,722 \text{ units}$$

		\$
Reorder costs:	$= \frac{50,000}{2,722} \times £200 =$	3,674
Inventory holding cost	$= \frac{2,722}{2} \left(1 - \frac{50,000}{500,000}\right) \times \$3 =$	3,675
		Total inventory costs \$7,349p.a.

**Example 5**Re-order level = demand over the lead time = 5 × 100 = **500 units****Example 6**

Demand of the lead time = 500 units (see answer 5)

Safety inventory 100 units

Re-order level **600 units****Example 7**Re-order level = maximum lead time × maximum demand = 4 × 120 = **480 units**

## ANSWERS TO EXAMPLES

**Example 8**

Re-order level = 480 units (see answer 7)

Minimum demand over lead time = minimum lead time x minimum demand per week = 3 x 70 = 210 units

Therefore, maximum inventory left when the new order arrives = 480 - 210 = 270 units

The new delivery will be of 1,000 units, therefore the maximum inventory = 270 + 1,000 = **1,270 units**

**Chapter 6**

No Answers

**Chapter 7****Example 1**

	<i>\$ p.u.</i>
Material (3kg × \$4)	12
Labour (4hrs × \$2)	8
Overheads (\$700,000 ÷ 50,000)	14
	<u>\$34</u>

**Example 2**

Total overheads	<u>\$700,000</u>	
Total labour hours		
Desks (30,000 × 4hr)	120,000	
Chairs (20,000 × 1 hr)	20,000	
	<u>140,000hrs</u>	
Overhead absorption rate:	$\frac{\$700,000}{140,000 \text{ hr}}$	= \$5 per hour

Costs cards:

	<i>Desks</i>		<i>Chairs</i>
Materials (3kg × \$4)	12	(2kg × \$4)	8
Labour (4hrs × \$2)	8	(1hr × \$2)	2
Overheads (4kg × \$5)	20	(1hr × \$5)	5
	<u>\$40</u>		<u>\$15</u>

## ANSWERS TO EXAMPLES

**Example 3**

<i>Total overheads:</i>	<b>Total</b>	<b>Assembly</b>	<b>Finishing</b>
Supervisors	100,000	60,000	40,000
Other	600,000	240,000	360,000
(40:60)			
	<u>\$700,000</u>	<u>\$300,000</u>	<u>\$400,000</u>

Total hours:

Desks (30,000 × 3 hr; 30,000 × 1 hr)	90,000	30,000
Chairs (20,000 × ½ hr; 20,000 × ½ hr)	10,000	10,000
	<u>100,000 hrs</u>	<u>40,000 hrs</u>
O.A.R	<u>\$3 per hr</u>	<u>\$10 per hr</u>

Cost cards:

	<u>desk</u>	<u>chair</u>
Materials	12	8
Labour	8	2
Overheads:		
Assembly	9	1.50
Finishing	<u>10</u>	<u>5.00</u>
	19	6.50
	<u>\$39</u>	<u>\$16.50</u>

**Example 4**

	<b>Total</b>	<b>Processing</b>	<b>Packing</b>	<b>Canteen</b>
Factory rent (cubic space)	20,000	12,500	6,250	1,250
Factory Heat (cubic space)	5,000	3,125	1,563	312
Supervisors	25,000	15,000	10,000	–
Depreciation (NBV equipment)	7,000	3,000	3,000	1,000
Canteen	18,000	–	–	18,000
Welfare (No of employees)	5,000	2,500	2,000	500
	<u>\$80,000</u>	<u>\$36,125</u>	<u>\$22,813</u>	<u>\$21,062</u>

**Example 5**

	<b>Processing</b>	<b>Packing</b>	<b>Canteen</b>
Already apportioned	36,125	22,813	21,062
Recharge canteen (no. of employees)	11,701	9,361	(21,062)
	<u>\$47,826</u>	<u>\$32,174</u>	<u>–</u>

ANSWERS TO EXAMPLES

**Example 6**

Repeated distribution method

	<i>X</i>	<i>Y</i>	<i>Stores</i>	<i>Maintenance</i>
Already allocated	70,000	30,000	20,000	15,000
Recharge stores	10,000	6,000	<u>(20,000)</u>	<u>4,000</u>
			-	19,000
Recharge maintenance	8,550	7,600	2,850	<u>(19,000)</u>
				-
Recharge stores	1,425	855	<u>(2,850)</u>	570
			-	
Recharge maintenance	257	228	85	(570)
				-
Recharge stores	43	25	<u>(85)</u>	17
			-	
Recharge maintenance	8	7	2	<u>(17)</u>
				-
Recharge stores	<u>1</u>	<u>1</u>	<u>(2)</u>	
	<u>\$90,284</u>	<u>\$44,716</u>	<u>-</u>	

Algebraic method

Stores:  $S = 20,000 + 0.15M$  (1)

Maintenance  $M = 15,000 + 0.20S$  (2)

Replace M in (1):  $S = 20,000 + 2,250 + 0.03S$

$0.97S = 22,250$

$S = 22,250 / 0.97 = \mathbf{\$22,938}$

Replace S in (2):  $M = 15,000 + 0.20 \times 22,938$

$M = \mathbf{\$19,588}$

	<i>X</i>	<i>Y</i>	<i>Stores</i>	<i>Maintenance</i>
Already allocated	70,000	30,000	20,000	15,000
Recharge stores:				
(\$22,938)	11,469	6,881	(22,938)	4,588
Recharge maintenance:				
(\$19,588)	<u>8,815</u>	<u>7,835</u>	<u>2,938</u>	<u>(19,588)</u>
	<u>\$90,284</u>	<u>\$44,716</u>	<u>-</u>	<u>-</u>

**Chapter 8**

**Example 1**

(a) Cost cards:

Materials (4kg × \$3)	<i>\$ p.u</i> 12
Labour (4hrs × \$2)	8
Var. overheads	5
Fixed overheads	
(\$20,000/10,000)	<u>2</u>
	<u>\$27p.u</u>
Selling price	<u>\$35p.u</u>
Standard profit	<u>\$8p.u</u>

## ANSWERS TO EXAMPLES

## (b) Income Statements

	<i>January</i>	<i>February</i>
Sales	(9,000 × \$35) <u>315,000</u>	(11,500 × \$35) <u>402,500</u>
Cost of sales:		
Opening inventory	–	(2,000 × \$27) 54,000
Materials	(11,000 × \$12) 132,000	(9,500 × \$12) 114,000
Labour	(11,000 × \$8) 88,000	(9,500 × \$8) 76,000
Variable o/h	(11,000 × \$5) 55,000	(9,500 × \$5) 47,500
Fixed o/h	(11,000 × \$2) <u>22,000</u>	(9,500 × \$2) <u>19,000</u>
	297,000	310,500
Less: Closing inventory	(2,000 × \$27) <u>(54,000)</u>	<u>–</u>
	<u>243,000</u>	<u>310,500</u>
Standard Gross Profit	(9,000 × \$8) 72,000	(11,500 × \$8) 92,000
Adjustment for over/(under) absorption of fixed overheads	2,000	(1,000)
[ Actual fixed o/h's: 20,000 Absorbed: 22,000 ]	<u>74,000</u>	[ Actual: 20,000 Absorbed: 19,000 ] <u>91,000</u>
Less: selling costs		
Variable	(9,000 × \$1) (9,000)	(11,500 × \$1) (11,500)
Fixed	<u>(2,000)</u>	<u>(2,000)</u>
Actual Net Profit	<u>\$63,000</u>	<u>\$77,500</u>

## Example 2

- (a)  $\text{Overhead absorption rate} = \frac{320,000}{80,000} = \$4 \text{ per hour}$
- (b) Amount absorbed = 78,000 × \$4 = \$312,000  
 Actual overheads = \$315,500  
 Amount under absorbed = 315,500 – 312,000 = \$3,500

## Chapter 9

## Example 1

## (a) Cost card

	<i>\$ p.u</i>
Materials (4kg × \$3)	12
Labour (4hrs × \$2)	8
Var. overheads	<u>5</u>
Marginal cost	<u>\$25 p.u</u>
Selling price	\$35 p.u
Marginal cost	(25)
Variable selling cost	<u>(1)</u>
Standard profit	<u>\$9 p.u</u>



ANSWERS TO EXAMPLES

(b) Income Statements

		<i>January</i>		<i>February</i>
Sales	(9,000 × \$35)	<u>315,000</u>	(11,500 × \$35)	<u>402,500</u>
Less: Cost of sales:				
Opening inventory		–	(2,000 × \$25)	50,000
Materials	(11,000 × \$12)	132,000	(9,500 × \$12)	114,000
Labour	(11,000 × \$8)	88,000	(9,500 × \$8)	76,000
Variable o/h	(11,000 × \$5)	<u>55,000</u>	(9,500 × \$5)	<u>47,500</u>
		275,000		287,500
Less: Closing inventory	(2,000 × \$25)	<u>(50,000)</u>		–
		<u>225,000</u>		<u>287,500</u>
		90,000		115,000
Less: Variable selling costs	(9,000 × \$1)	<u>(9,000)</u>	(11,500 × \$1)	<u>(11,500)</u>
Contribution		81,000		103,500
Less: Fixed costs				
Production		(20,000)		(20,000)
Selling		(2,000)		(2,000)
Actual Net Profit		<u>\$59,000</u>		<u>\$81,500</u>

Example 2

	<i>January</i>	<i>February</i>
Absorption costing	63,000	77,500
Marginal costing	<u>59,000</u>	<u>81,500</u>
Difference	<u>4,000</u>	<u>(4,000)</u>
Fixed overheads in inventory value:		
Opening inventory (2,000 × \$2)	–	(4,000)
Closing inventory (2,000 × \$2)	<u>4,000</u>	–
	<u>4,000</u>	<u>(4,000)</u>

**Chapter 10**

Example 1

Materials	20,000
Labour	10,000
Overheads	<u>8,000</u>
	<u>\$38,000</u>

Cost per unit  $\frac{\$38,000}{2,000 \text{ u}} = \mathbf{\$19}$

Example 2

Process Account					
	<i>Units</i>	<i>\$</i>		<i>Units</i>	<i>\$</i>
Materials	2,000	20,000	Transfer out	2,000	38,000
Labour		10,000	(2,000 u × \$19)		
Overheads		8,000			
	<u>2,000</u>	<u>38,000</u>		<u>2,000</u>	<u>38,000</u>

## Chapter 11

### Example 1

	<i>kg</i>	<i>\$</i>
Materials	1,000	12,000
Labour		7,000
Overheads		8,000
	<u>1,000</u>	<u>27,000</u>
Normal loss (10%)	(100)	
	<u>900</u>	<u>\$27,000</u>

$$\text{Cost per kg} = \frac{\$27,000}{900 \text{ kg}} = \mathbf{\$30}$$

#### Process Account

	<i>kg</i>	<i>\$</i>		<i>kg</i>	<i>\$</i>
Materials	1,000	12,000	Normal loss	100	–
Labour		7,000	Transfer out	900	27,000
Overheads		8,000	(at \$30)		
	<u>1,000</u>	<u>27,000</u>		<u>1,000</u>	<u>27,000</u>

### Example 2

	<i>kg</i>	<i>\$</i>
Materials	3,000	30,000
Labour		12,000
Overheads		10,800
	<u>3,000</u>	<u>52,800</u>
Normal loss (10%)	(300)	×\$5 (1,500)
	<u>2,700</u>	<u>\$51,300</u>

$$\text{Cost per kg} = \frac{\$51,300}{2,700 \text{ kg}} = \mathbf{\$19}$$

#### Process Account

	<i>kg</i>	<i>\$</i>		<i>kg</i>	<i>\$</i>
Materials	3,000	30,000	Normal loss	300	1,500
Labour		12,000	(at \$5)		
Overheads		10,800	Transfer out	2,700	51,300
	<u>3,000</u>	<u>52,800</u>	(at \$19)		
				<u>3,000</u>	<u>52,800</u>

#### Loss Account

	<i>kg</i>	<i>\$</i>		<i>kg</i>	<i>\$</i>
Normal loss	300	1,500	Cash	300	1,500
	<u>3,000</u>	<u>1,500</u>		<u>3,000</u>	<u>1,500</u>

## ANSWERS TO EXAMPLES

**Example 3**

	<i>kg</i>	<i>\$</i>
Materials	1,000	9,000
Labour		18,000
Overheads		13,500
	<u>1,000</u>	<u>40,500</u>
Normal loss (10%)	<u>(100)</u>	<u>(900)</u>
	<u>900</u>	<u>\$39,600</u>

$$\text{Cost per kg} = \frac{\$39,600}{900 \text{ kg}} = \$44$$

## Process Account

	<i>kg</i>	<i>\$</i>		<i>kg</i>	<i>\$</i>
Materials	1,000	9,000	Normal loss	100	900
Labour		18,000	Transfer out	850	37,400
Overheads		13,500			
	<u>1,000</u>	<u>40,500</u>	Abnormal loss (at \$44)	50	2,200
				<u>1,000</u>	<u>40,500</u>

## Loss Account

	<i>kg</i>	<i>\$</i>		<i>kg</i>	<i>\$</i>
Normal loss	100	900	Cash	150	1,350
Abnormal loss	50	2,200	I/S a/c		1,750
	<u>150</u>	<u>3,100</u>		<u>150</u>	<u>3,100</u>

**Example 4**

	<i>kg</i>	<i>\$</i>
Materials	2,000	18,000
Labour		36,000
Overheads		27,000
	<u>2,000</u>	<u>81,000</u>
Normal loss (10%)	<u>(200)</u>	<u>(1,800)</u>
	<u>1,800</u>	<u>\$79,200</u>

$$\text{Cost per kg} = \frac{\$79,200}{1,800 \text{ kg}} = \$44$$

## Process Account

	<i>kg</i>	<i>\$</i>		<i>kg</i>	<i>\$</i>
Materials	2,000	18,000	Normal loss	200	1,800
Labour		36,000	Transfer out	1,840	80,960
Overheads		27,000			
Abnormal Gain	40	1,760			
	<u>2,040</u>	<u>82,760</u>		<u>2,040</u>	<u>82,760</u>

Loss Account

	kg	\$		kg	\$
Normal loss	200	1,800	Abnormal Gain	40	1,760
I.S.		1,400	Cash	160	1,440
	<u>200</u>	<u>3,200</u>		<u>200</u>	<u>3,200</u>

## Chapter 12

### Example 1

(a)	<i>Materials</i>		<i>Labour</i>		<i>Overheads</i>	
Cost		<u>\$5,000</u>		<u>\$2,760</u>		<u>\$3,440</u>
Equivalent costs:						
Finished		800		800		800
W.I.P.	(100%)	<u>200</u>	(60%)	<u>120</u>	(30%)	<u>60</u>
		<u>1,000</u>		<u>920</u>		<u>860</u>
Cost per unit	$\frac{5,000}{1,000} = \$5$		$\frac{2,760}{920} = \$3$		$\frac{3,440}{860} = \$4$	

Total cost per unit = 5 + 3 + 4 = \$12

(b) Finished output: 800 × \$12 = \$9,600

W.I.P.:

Materials:	200 u × 100% × \$5	= 1,000
Labour:	200 u × 60% × \$3	= 360
Overheads:	200 u × 30% × \$4	= 240
		<u>\$1,600</u>

(c) Process Account

	u	\$		u	\$
Materials	1,000	5,000	Finished	800	9,600
Labour		2,760	WIP c/f	200	1,600
Overheads		3,440			
	<u>1,000</u>	<u>11,200</u>		<u>1,000</u>	<u>11,200</u>

### Example 2

(a)	Units	
W.I.P. b/f	u	u
Started	15,000	40,000
	30,000	(balancing figure)
		WIP c/f
		5,000
	<u>45,000</u>	<u>45,000</u>

(b) Units started and finished in July  
= units finished – W.I.P b/f  
= 40,000 – 15,000 = **25,000 units**

ANSWERS TO EXAMPLES

		<b>Materials</b>		<b>Lab &amp; o/h's</b>
Cost in July		<u>\$24,900</u>		<u>\$20,075</u>
Equivalent units:				
Finished W.I.P b/f (15,000u)	(0%)	–	(60%)	9,000
Started and finished (25,000u)		25,000		25,000
Start W.I.P. c/f (5,000u)	(100%)	<u>5,000</u>	(50%)	<u>2,500</u>
		<u>30,000</u>		<u>36,500</u>
Cost per unit		$\frac{24,900}{30,000} = \mathbf{\$0.83}$		$\frac{20,075}{36,500} = \mathbf{\$0.55}$

Total cost p.u. = \$0.83 + \$0.55 = **\$1.38**

(c) **Finished units** (40,000)

W.I.P b/f (15,000 units)	
Cost b/f (9,000 + 1,250)	10,250
Cost of finishing:	
Labour & o/h (15,000 × 60% × \$0.55)	<u>4,950</u>
	15,200
Started and finished in July (25,000 × \$ 1.38)	<u>34,500</u>
	<u>\$49,700</u>
W.I.P c/f (5,000 units)	
Materials (5,000 × 100% × \$0.83)	4,150
Labour o/h (5,000 × 50% × \$0.55)	<u>1,375</u>
	<u>\$5,525</u>

(d)

Process Account					
	<i>u</i>	\$		<i>u</i>	\$
W.I.P. b/f	15,000	10,250	Transferred out	40,000	49,700
Materials	30,000	24,900	WIP c/f	5,000	5,525
Labour & o/h		20,075			
	<u>45,000</u>	<u>55,225</u>		<u>45,000</u>	<u>55,225</u>

**Example 3**

(a)

	Units	
	<i>u</i>	<i>u</i>
W.I.P. b/f	15,000	Finished
Started	30,000	WIP c/f
	<u>45,000</u>	<u>45,000</u>

(b)

	<b>Materials</b>	<b>Lab &amp; o/h's</b>
Costs		
W.I.P b/f	9,000	1,250
In July	<u>24,900</u>	<u>20,075</u>
	<u>\$33,900</u>	<u>\$21,325</u>
Equivalent units:		
W.I.P b/f (15,000u)	15,000	15,000
Started & finished (25,000u)	<u>25,000</u>	<u>25,000</u>
Finished in July	40,000	40,000
Start W.I.P. c/f (5,000u)	(100%) <u>5,000</u>	(50%) <u>2,500</u>
	45,000	42,500

## ANSWERS TO EXAMPLES

$$\text{Cost per unit} \quad \frac{33,900}{45,000} = \$0.75 \quad \frac{21,325}{42,500} = \$0.50$$

$$\text{Total cost p.u.} = \$0.75 + \$0.50 = \$1.25$$

(c) Finished units (40,000 × \$1.25) \$50,000

W.I.P c/f (5,000 units)

Materials (5,000 × 100% × \$0.75)	3,750
Labour o/h (5,000 × 50% × \$0.50)	<u>1,250</u>
	<u>\$5,000</u>

(d)

Process Account					
	<i>u</i>	\$		<i>u</i>	\$
W.I.P. b/f	15,000	10,250	Transferred out	40,000	50,000
Materials	30,000	24,900	WIP c/f	5,000	5,000
Labour & o/h		20,075			
	<u>45,000</u>	<u>55,225</u>		<u>45,000</u>	<u>55,000</u>

(Note: The difference of \$225 is due to rounding the costs p.u. to 2 decimal places)

## Chapter 13

### Example 1

Total joint costs:	\$
Materials	5,000
Labour & o/h	<u>2,300</u>
	7,300
Less: proceeds of by-product (500 kg × \$0.20)	<u>(100)</u>
Started & finished (25,000 u)	<u>\$7,200</u>

Production of joint products:	<b>kg</b>
A	1,000
B	<u>2,000</u>
	<u>3,000 kg</u>

$$\text{Cost per kg} \quad \frac{7,200}{3,000} = \$2.40$$

(for A and B)

### Example 2

Total joint costs:	\$
Materials	5,000
Labour o/h	<u>2,300</u>
	7,300
Less: Proceeds of by-product (500 kg × \$0.20)	<u>(100)</u>
	<u>\$7,200</u>

## ANSWERS TO EXAMPLES

Sales value of production of joint products:

	\$
A (1,000kg × \$5)	5,000
B (2,000kg × \$2)	4,000
	<u>\$9,000</u>

Allocation of joint costs to production:

	\$
A $\frac{5,000}{9,000} \times 7,200$	4,000 for 1,000 kg
B $\frac{4,000}{9,000} \times 7,200$	3,200 for 2,000 kg

Cost per kg:

A $\frac{4,000}{1,000}$	= \$4.00 per kg
B $\frac{3,200}{2,000}$	= \$1.60 per kg

**Example 3**

Total joint costs:	\$
Materials	5,000
Labour o/h	<u>2,300</u>
	7,300
Less: Proceeds of by-product (500 kg × \$0.20)	<u>(100)</u>
	<u>\$7,200</u>

Net realisable value of production

	\$
A 1,000 kg × (\$8.40 – \$4.80) =	3,600
B 2,000 kg × (\$4.50 – \$2.20) =	<u>4,600</u>
	<u>\$8,200</u>

Allocation of joint costs to production:

	\$
A $\frac{3,600}{8,200} \times 7,200$	3,161
B $\frac{4,600}{8,200} \times 7,200$	4,039
	<u>\$7,200</u>

Cost per kg:

A $\frac{3,161}{1,000}$	= \$3.16 per kg
B $\frac{4,039}{2,000}$	= \$2.02 per kg

## Chapter 14

No Answers

## Chapter 15

No Answers

## Chapter 16

No Answers

## Chapter 17

### Example 1

	<i>units</i>	<i>\$</i>
High	420	2,400
Low	300	2,160
Difference	<u>120</u>	<u>\$240</u>

$$\text{Variable cost} = \frac{\$240}{120} = \$2 \text{ per unit}$$

In 'high'

Total cost	2,400
Variable cost (420u × \$2)	<u>840</u>
Fixed cost	<u>\$1,560</u>

$$y = 1,560 + 2x$$

### Examples 2 & 3

<i>x</i>	<i>y</i>	<i>xy</i>	<i>x</i> <sup>2</sup>	<i>y</i> <sup>2</sup>
1	40	40	1	1,600
4	65	260	16	4,225
2	45	90	4	2,025
7	80	560	49	6,400
6	70	420	36	4,900
5	70	350	25	4,900
3	50	150	9	2,500
<u>28</u>	<u>420</u>	<u>1,870</u>	<u>140</u>	<u>26,550</u>

$$b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2} = \frac{(7 \times 1,870) - (28 \times 420)}{(7 \times 140) - (28 \times 28)} = \frac{1,330}{196} = 6.7857$$

$$a = \frac{\sum y}{n} - \frac{b\sum x}{n} = \frac{420}{7} - \frac{6.7857 \times 28}{7} = 60 - 27.1428 = 32.8572$$

$$y = 32.86 + 6.79x$$

or:  $y = 32,857 + 67.9x$

(if *x* and *y* are actual units and \$'s)

Coefficient of correlation:



ANSWERS TO EXAMPLES

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{(n\sum x^2 - (\sum x)^2)(n\sum y^2 - (\sum y)^2)}} = \frac{7 \times 1,870 - 28 \times 420}{\sqrt{(7 \times 140 - 28^2)(7 \times 26,550 - 420^2)}}$$

$$= \frac{+1330}{\sqrt{196 \times 9,450}} = +0.98$$

## Chapter 18

### Example 1

	Actual sales	4 ¼ average	TREND (centered average)	Seasonal variation
2000	1	80		
	2	87	84.75	
	3	82	87.25	-4.00
	4	90	89.25	+1.75
2001	1	90	90.63	-0.63
	2	95	92.00	+1.50
	3	93	95.00	-3.88
	4	102	98.75	+1.12
2002	1	105	103.00	+0.75
	2	112	105.50	+4.75
	3	103	107.25	
	4	116	109.00	

	1	2	3	4
2000			-4.00	+1.75
2001	-0.63	+1.50	-3.88	+1.12
2002	+0.75	+4.75		
	<u>+0.12</u>	<u>+6.25</u>	<u>-7.88</u>	<u>+2.87</u>
average	<u>+0.06</u>	<u>+3.13</u>	<u>-3.94</u>	<u>+1.44</u>

### Example 2

	Actual sales	TREND	Seasonal variation
2000	1	80	
	2	87	
3	82	86.00	95.3%
4	90	88.25	102.0%

## ANSWERS TO EXAMPLES

2001	1	90	90.63	99.3%
	2	95	93.50	101.6%
	3	93	96.88	96.0%
	4	102	100.88	101.1%

2002	1	105	104.25	100.7%
	2	112	107.25	104.4%
	3	103		
	4	116		

	1	2	3	4
2000			95.3	102.0
2001	99.3	101.6	96.0	101.1
2002	100.7	104.4		
average	100%	103%	95.7%	101.6%

## Chapter 19

### Example 1

$$2007: \frac{2.50}{2.40} \times 100 = \mathbf{104.2}$$

$$2008: \frac{2.60}{2.40} \times 100 = \mathbf{108.3}$$

### Example 2

$$2009: \frac{9,000}{8,200} \times 100 = \mathbf{109.8}$$

$$2010: \frac{9,400}{8,200} \times 100 = \mathbf{114.6}$$

(a) **Laspeyre**

2009 index

	$q_0$	$p_0$	$p_1$	$p_0q_0$	$p_1q_0$
Coffee	20	\$4.00	\$4.50	80.00	90.00
Sugar	15	\$0.60	\$0.70	9.00	10.50
Bread	30	\$0.80	\$1.00	24.00	30.00
				<u>113.00</u>	<u>130.50</u>

$$2009 \text{ index} = \frac{130.50}{113.00} \times 100 = \mathbf{115.5}$$

ANSWERS TO EXAMPLES

2010 index

	$q_0$	$P_0$	$P_1$	$P_0q_0$	$P_1q_0$
Coffee	20	\$4.00	\$4.80	80.00	96.00
Sugar	15	\$0.60	\$1.00	9.00	15.00
Bread	30	\$0.80	\$1.10	24.00	33.00
				<u>113.00</u>	<u>144.00</u>

$$2010 \text{ index} = \frac{144.00}{113.00} \times 100 = 127.4$$

(b) Paasche

2009 index

	$q_1$	$P_0$	$P_1$	$P_0q_1$	$P_1q_1$
Coffee	15	\$4.00	\$4.50	60.00	67.50
Sugar	18	\$0.60	\$0.70	10.80	12.60
Bread	35	\$0.80	\$1.00	28.00	35.00
				<u>98.80</u>	<u>115.10</u>

$$2009 \text{ index} = \frac{115.00}{98.80} \times 100 = 116.5$$

2010 index

	$q_1$	$P_0$	$P_1$	$P_0q_1$	$P_1q_1$
Coffee	15	\$4.00	\$4.80	60.00	72.00
Sugar	20	\$0.60	\$1.00	12.00	20.00
Bread	40	\$0.80	\$1.10	32.00	44.00
				<u>104.00</u>	<u>136.00</u>

$$2010 \text{ index} = \frac{136.00}{104.00} \times 100 = 130.8$$

Chapter 20

Example 1

		<i>Capital Account</i>	<i>Interest Account</i>
Payment	– 1 Jan year 1	200	
Interest	– 31 Dec year 1		30
Payment	– 1 Jan year 2	<u>200</u>	
		400	
Interest	– 31 Dec year 2		60
Payment	– 1 Jan year 3	<u>200</u>	
		600	
Interest	– 31 Dec year 3		90
Payment	– 1 Jan year 4	<u>200</u>	
		800	
Interest	– 31 Dec year 4		120
		<u>800</u>	<u>300</u>

Total \$1,100

## ANSWERS TO EXAMPLES

**Example 2**

	\$
Now payment	500
Year 1 interest	50
	550
Year 2 interest	55
	605
Year 3 interest	60.5
	\$665.50

(or  $\$500 \times (1.1)^3 = \$665.50$ )

**Example 3**

$$\begin{aligned} A &= P(1+r)^n \\ &= 800 \times (1.06)^5 \\ &= \mathbf{\$1070.58} \end{aligned}$$

**Example 4**

$$\begin{aligned} \text{Amount owed after 12 months} &= P(1+r)^n \\ &= 100(1.02)^{12} \\ &= \mathbf{\$126.82} \end{aligned}$$

$$\text{APR} = \text{actual interest over the year} = \frac{26.82 \times 10\%}{100} \times 100\% = \mathbf{26.82\%}$$

**Example 5**

\$x now will become  $\$x(1.10)^4$  in 4 years

$$\begin{aligned} \text{Therefore } x(1.10)^4 &= 800 \\ x &= \frac{800}{(1.10)^4} \\ &= \mathbf{\pounds 546.41} \end{aligned}$$

**Example 6**

$$\text{P.V.} = 2,500 \times \frac{1}{(1.13)^{12}} = \mathbf{\pounds 577}$$

or using tables,

$$\text{P.V.} = 2,500 \times 0.231 = \mathbf{\$577}$$

**Example 7**

$$\text{Present value} = 500 \times 4.968 = \mathbf{\$2,484}$$

**Example 8**

	Discount factor at 8%
1-9	6.247
less: 1-3	(2.577)
4-9	3.670

$$\text{Present value} = 1,000 \times 3.670 = \mathbf{\$3,670}$$

## ANSWERS TO EXAMPLES

## Example 9

$$\begin{aligned} \text{Present value} &= \frac{A}{r} \\ &= \frac{5,000}{0.12} \\ &= \$41,667 \end{aligned}$$

## Chapter 21

## Example 1

		<i>d.f. @ 10%</i>	<i>PV.</i>
0	(80,000)	1.000	(80,000)
1	20,000	0.909	18,180
2	30,000	0.826	24,780
3	40,000	0.751	30,040
4	20,000	0.683	13,660
			<u>N.P.V. 6,660</u>

The net present value is positive and therefore we should invest in the project.

## Example 2

		<i>d.f. @ 15%</i>	<i>PV.</i>
0	(80,000)	1.000	(80,000)
1	20,000	0.870	17,400
2	30,000	0.756	22,680
3	40,000	0.658	26,320
4	20,000	0.572	11,440
			<u>N.P.V. (2,160)</u>

$$\text{I.R.R.} = 10\% + \frac{6,660}{6,660 + 2,160} \times 5\% = 13.78\%$$

## Example 3

	<i>Cash inflow</i>	<i>Cumulative Cash inflow</i>	<i>Discounted cash inflow</i>	<i>Cumulative discounted cash inflow</i>
1	20,000	20,000	18,180	18,180
2	30,000	50,000	24,780	42,960
3	40,000	90,000	30,040	73,000
4	20,000	140,000	34,150	107,150
5	30,000	170,000	18,630	125,780

$$\text{Payback period} = 3 + \frac{10,000}{50,000} = 3.2 \text{ years (or within 4)}$$

$$\text{Discounted payback period} = 3 + \frac{27,000}{34,150} = 3.79 \text{ years (or within 4)}$$

## Chapter 22

### Example 1

	<i>Original Fixed Budget</i> \$	<i>Flexed Budget</i> \$	<i>Actual</i> \$	<i>Variances</i>	
Sales (units)	8,000	8,400	8,400		
Production (units)	8,700	8,900	8,900		
Sales	600,000	630,000	613,200	16,800	(A)
Materials	156,000	160,200	163,455	3,255	(A)
Labour	217,500	222,500	224,515	2,015	(A)
Variable o/h	87,000	89,000	87,348	1,652	(F)
Fixed o/h	130,500	133,500	134,074	574	(A)
	591,600	605,200	609,392		
Closing inventory	(47,600)	(34,000)	(34,000)		
	544,000	571,200	575,392		
Profit	\$56,000	\$58,800	\$37,808	20,992	(A)

### Example 2

#### Materials *Expense variance*

Actual purchases	at actual cost	163,455
35,464kg		
	at standard cost	
	(\$4.50)	159,588
		<u>\$3,867</u> (A)

#### *Usage variance*

Actual usage	35,464
Standard usage for actual production	
(8,900 u × 4kg)	35,600
	<u>136kg</u>
	at a standard cost (\$4.50) = <b>\$612 (F)</b>

#### Labour *Rate of Pay variance*

Actual hours paid at actual cost	224,515
45,400 hours at standard cost (\$5)	227,000
	<u>\$2,485</u> (F)

#### *Idle Time Variance*

Actual hours paid	45,400
Actual hours worked	44,100
	<u>1,300</u> hrs
	at a standard cost (\$5) = <b>\$6,500 (A)</b>

#### *Efficiency variance*

Actual hours worked	44,100
Standard hours for actual production	
(8,900 u × 5hrs)	44,500
	<u>400</u> hrs
	at a standard cost (\$5) = <b>\$2,000 (F)</b>

ANSWERS TO EXAMPLES

<b>Variable overheads</b>	<i>Expenditure variance</i>	
Actual hours worked	at actual cost	87,348
44,100	at standard cost	<u>88,200</u>
		<u>\$852 (F)</u>

	<i>Efficiency variance</i>	
Actual hours worked		44,100
Standard hours for actual production (8,900u × 5hrs)		<u>44,500</u>
		<u>400 hrs</u>
	at a standard cost (\$2) = <b>\$800 (F)</b>	

<b>Fixed overheads</b>	<i>Expenditure variance</i>	
Actual total		134,074
Original budget total		<u>130,500</u>
		<u>\$3,574 (A)</u>

	<i>Capacity variance</i>	
Actual hours worked		44,100
Budget hours (8,700u × 5hrs)		<u>43,500</u>
		<u>600 hrs</u>
	at a standard cost (\$3) = <b>\$1,800 (F)</b>	

	<i>Efficiency variance</i>	
Actual hours worked		44,100
Standard hours for actual production (8,900u × 5hrs)		<u>44,500</u>
		<u>400 hrs</u>
	at a standard cost (\$3) = <b>\$1,200 (F)</b>	

**Example 3**

Sales price variance		\$
Actual sales at actual selling price		613,200
Actual sales at standard selling price (8,400u × \$75)		630,000
		<u>\$16,800 (A)</u>

Sales volume variance		
	units	
actual sales	8,400	
budgeted sales	8,000	
	400 u × \$7	= <b>\$2,800 (F)</b>
Profit	(Standard profit per unit)	

**Example 4**

Sales volume variance		
	units	
actual sales	8,400	
budgeted sales	8,000	
	400 u × \$22	= <b>\$8,800(F)</b>
Profit	(Standard contribution per unit)	

## ANSWERS TO EXAMPLES

Fixed overhead expenditure variance

	\$
Actual total fixed overheads	134,074
Budgeted total fixed overheads (8,700u × \$15)	130,500
	\$3,574 (A)

(This is the **only** fixed overhead variance if marginal costing is being used)**Chapter 23**

No Examples

**Chapter 24****Example 1**

		2007	2006
Net profit margin	$(\frac{790}{7,180})$	11%	8.5%
Gross profit margin	$(\frac{1,795}{7,180})$	25%	22.5%
Return on capital	$(\frac{790}{2,690})$	29.4%	25.7%
Asset turnover	$(\frac{7,180}{2,690})$	2.67	3.02
Current ratio	$(\frac{2,314}{965})$	2.4	2.4
Quick ratio (or acid test)	$(\frac{1,308}{965})$	1.36	1.15
Inventory days	$(\frac{1,006}{5,385} \times 365)$	68.2 days	75.5 days
Receivables days	$(\frac{948}{7,180} \times 365)$	48.2 days	47.5 days
Payables days	$(\frac{965}{5,385} \times 365)$	65.4 days	61.0 days
Gearing ratio	$(\frac{500}{2,190})$	22.8%	28.6%



## ANSWERS TO EXAMPLES

**Chapter 25**

No Examples

**Chapter 26****Example 1**

$$\text{ROI} = \frac{50,000}{400,000} \times 11\% = 12.5\%$$

**Example 2**

Profit	50,000
Less: Notional interest (10% × \$400,000)	<u>(40,000)</u>
R.I.	<u>\$10,000</u>



## Paper F2

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# ANSWERS TO MULTIPLE CHOICE TESTS

## Answers to test in chapter 1

- 1 B
- 2 B
- 3 B

## Answers to test in chapter 2

- 1 C
- 2 C
- 3 B
- 4 C

## Answers to test in chapter 3

No Test

## Answers to test in chapter 4

- 1 C

Variable cost per unit:  $[(170,000 - 5,000) - 135,000] \div (22,000 - 16,000) = \$5$

Total fixed cost (below 17,500 units):  $[135,000 - (16,000 \times 5)] = \$55,000$

Total cost for 20,000 units:  $55,000 + 5,000 + (20,000 \times 5) = \$160,000$

- 2 D

- 3 C

- 4 B

Cost per cake would be very small and therefore not an appropriate cost unit. The most appropriate cost unit would be cost per batch.

- 5 B

- 6 B

- 7 D

$200 \text{ units} \times (3 \div 60) \times 18 = \$180$

- 8 B

False, this is a stepped fixed cost

- 9 A

Depreciation is an indirect cost because it does not relate directly to the number of units produced. Items (ii) and (iii) can be traced directly to specific cost units therefore they are direct expenses.

- 10 A

The depicted cost has a basic fixed element which is payable even at zero activity. A variable element is then added at a constant rate as activity increases. Therefore the correct answer is A.

- 11 A

Option A is a part of the cost of direct materials.

Options B and D are production overheads. Option C is a selling and distribution expense.

## ANSWERS TO MULTIPLE CHOICE TESTS

**Answers to test in chapter 5**

1 C

$$\{[2 \times 20 \times (4 \times 20,000)] \div [0.06 \times 25]\}^{0.5} = 1,461 \text{ units}$$

2 D

3 A

The formula for the economic order quantity (EOQ) is

$$\text{EOQ} = \sqrt{\frac{2C_o D}{CH}}$$

with  $C_o = £10$

$$D = 15,000 \div 12 = 1,250$$

$$CH = £0.10$$

$$\text{EOQ} = \sqrt{\frac{2 \times £10 \times 1,250}{£0.10}} = \sqrt{250,000} = 500 \text{ units}$$

4 C

5 A

6 D

**Answers to test in chapter 6**

1 C 1200 – 32 = 1168 units will be paid for.

They will be paid as follows:

$$500 \text{ at } \$0.50 = 250$$

$$500 \text{ at } \$0.75 = 375$$

$$168 \text{ at } \$1.00 = 168$$

$$\underline{1168 \text{ units}} \quad \underline{\$793}$$

2 B During the year the number of employees fell by  $80 - 60 = 20$ .

45 employees had left, and so  $45 - 20 = 25$  were replaced.

The average number of employees was  $(80 + 60) / 2 = 70$ .

The labour turnover rate =  $25/70 = 35.7\%$

3 B

4 D actual hours worked = 11000

budgeted hours = 8000

Capacity ratio =  $11000 / 8000 = 137.5\%$

5 C actual hours worked = 11000

standard hours for the actual production =  $25000 / 20000 \times 8000$

$$= 10000$$

Efficiency ratio =  $10000 / 11000 = 90.9\%$

**Answers to test in chapter 7**

1 D

Total overhead to cost centre A:

Direct \$  
95,000

Proportion of cost centre X  $[46,000 + (0.10 \times 30,000)] \times 0.50$  24,500

Proportion of cost centre Y  $[30,000 \times 0.3]$  9,000

128,500

2 D

Costs are controlled using budgets and other management information, therefore option A is not correct.

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## ANSWERS TO MULTIPLE CHOICE TESTS

Option B describes overhead cost absorption and option C describes cost allocation.

3 C

Option A is the definition of a cost unit.

Option B describes the cost of an activity or cost centre.

Option D describes a budget centre. Although a budget centre may also be a cost centre at times, this is not always the case.

4 D

5 C

6 C

## Answers to test in chapter 8

No Test

## Answers to test in chapter 9

1 C

Month 1: Production > Sales; Absorption costing profit > Marginal costing profit

Month 2: Sales > Production; Marginal costing profit > absorption costing profit

A and C satisfy Month 1, C and D satisfy Month 2. Therefore C satisfies both.

2 B

Production > Sales; Absorption costing profit > Marginal costing profit

Marginal costing profit:  $\{36,000 - [2,000 \times (63,000 \div 14,000)]\} = \$27,000$

3 A

Actual cost	\$108,875
-------------	-----------

Absorbed cost (30,000 × 3.50)	\$105,000
-------------------------------	-----------

Under absorption	\$ 3,875
------------------	----------

4 B

Absorption costing profit	\$ 47,500
---------------------------	-----------

Add: fixed overhead included in opening inventory (\$12 × 400)	4,800
--	-------

Less: fixed overhead included in closing inventory (\$12 × 600)	<u>(7,200)</u>
---	----------------

Marginal costing profit	<u>45,100</u>
-------------------------	---------------

Remember that if closing inventory is greater than opening inventory then absorption costing will give the higher profit figure and the value of the additional fixed overhead included in inventory should be deducted from the absorption costing profit in order to obtain the marginal costing profit.

If you selected option C, you deducted the fixed overhead included in opening inventory and added the fixed overhead included in closing inventory instead of the other way round.

5 A

Budgeted overhead absorption rate =  $\frac{\$258,750}{11,250} = \$23$  per machine hour

Overhead absorbed = \$23 × 10,980 hours	\$ 252,540
Overhead incurred	<u>254,692</u>
Under-absorbed overhead	<u>2,152</u>

If you selected option B or C you calculated the difference between the budgeted and actual overheads and interpreted the result as an under or over absorption.

If you selected option D your calculations were correct but you misinterpreted the result as over absorbed.

## ANSWERS TO MULTIPLE CHOICE TESTS

6 B

	\$
Actual overheads	295,000
Under-absorbed overheads	9,400
Overheads absorbed for 70,000 hours at budgeted absorption rate (×)	285,600
70,000 × = \$285,600	
× = \$285,600/70,000	
= \$4.08	

Option A is incorrect because it is based on the budgeted overhead and the actual machine hours. Option C is incorrect because it is the actual overhead rate per machine hour.

If you selected option D you added the under-absorbed overhead by mistake, at the beginning of the calculation.

7 D

		\$
Overhead absorbed	$\frac{\$15,000}{20,000} \times 19,500$	14,625
Overhead incurred		14,000
Over-absorbed overhead		625

Statement A is untrue because lower expenditure is more likely to lead to over absorption, unless there is a corresponding reduction in the actual labour hours.

Statement B is incorrect because the absorption is based on labour hours, which were lower than budgeted despite the increase in production units.

If you selected statement C you performed the calculations correctly but misinterpreted the result as an under absorption.

8 A

Budgeted production = 10,000 units  
 Budgeted fixed overheads per unit = \$12  
 Budgeted fixed overheads = 10,000 × \$12 = \$120,000  
 It is therefore possible to eliminate options C and D at this stage.

	\$
Actual fixed overheads = budgeted fixed overheads	120,000
Absorbed overheads (11,500 × \$12)	(138,000)
Over-absorbed overheads	18,000

The correct answer is therefore A since absorbed overheads are greater than actual overheads which leads to an over absorption of fixed overheads.

9 B

Sales volume exceeded production volume by 500 units, therefore inventories reduced. The absorption costing profit will be lower than the marginal costing profit because fixed overheads were 'released' from inventory.

Profit difference = inventory reduction in units × fixed overhead per unit  
 = 500 × \$5 = \$2,500  
 Absorption costing profit = \$60,000 – \$2,500 = \$57,500

If you selected option A you based your calculation of the profit difference on the closing inventory of 2,500 units. Option C is calculated as \$7 profit per unit × 8,500 units sold, however, this takes no account of the actual level of fixed overhead cost.

If you selected option D you calculated the correct profit difference but you added it to the marginal costing profit instead of subtracting it.

10 B

Fixed costs per unit = \$16 / 4 = \$4  
 Units in closing inventory = 17,500 - 15,000 = 2,500 units  
 Profit difference = inventory increase in units × fixed overhead per unit  
 = 2,500 × \$4 = \$10,000

Inventories increased, therefore fixed overhead would have been carried forward in inventory using absorption costing and the profit would be higher than with marginal costing.

## ANSWERS TO MULTIPLE CHOICE TESTS

If you selected option A you calculated the correct profit difference, but misinterpreted the 'direction' of the difference.

If you selected option C or D you evaluated the inventory difference at variable cost and full cost respectively.

**Answers to test in chapter 10**

No Test

**Answers to test in chapter 11**

No Test

**Answers to test in chapter 12**

1 C

	<i>Normal loss</i> <i>litres</i>	<i>Actual loss</i> <i>litres</i>	<i>Abnormal loss</i> <i>litres</i>	<i>Abnormal gain</i> <i>litres</i>
Process X	5,200	6,100	900	–
Process Y	1,875	1,800	–	75

2 B

Budgeted production: (19,000 + 3,000 – 4,000)	= 18,000 units
Raw materials required for budgeted production: (18,000 × 8)	= 144,000 kg
Budgeted raw material purchases: (144,000 + 53,000 – 50,000)	= 147,000 kg

3 D

Cost per equivalent unit: (480,000 ÷ 10,000)	= \$48
Closing work in progress valuation: (4,000 × Degree of completion × 48)	= 144,000
Degree of completion = (144,000 ÷ 4,000 ÷ 48) = 0.75	= 75%

4 A

	\$
Value of 2,000 units transferred:	
1,700 units × 10	17,000
300 units × 0.40 × 10	1,200
Opening work in progress value	1,710
	<u>19,910</u>

5 D

The abnormal loss units are valued at their **full production cost** and **credited** to the process account, so that their occurrence does not affect the cost of good production. Therefore the correct answer is D.

Options A and C are incorrect because the scrap value of the abnormal loss is debited to the **scrap account** and credited to the **abnormal loss account**, it has no impact on the process account.

6 D

	\$
Material	9,000
Conversion costs	11,970
Less: scrap value of normal loss (300 × \$1.50)	<u>(450)</u>
Cost of process	<u>20,520</u>

$$\begin{aligned} \text{Expected output} &= 3,000 - (10\% \times 3,000) \\ &= 3,000 - 300 = 2,700 \text{ units} \end{aligned}$$

$$\text{Costs per unit} = \frac{\text{Input costs} - \text{scrap value of normal loss}}{\text{Expected output}} = \frac{\$20,520}{2,700} = \$7.60$$

$$\text{Costs of output} = 2,900 \times \$7.60 = \$22,040$$

If you selected option B, you calculated the input costs less the scrap value of normal loss. You forgot to calculate a cost per unit and then to multiply this by the actual output. If you selected option C, you simply calculated the input costs. You need to take account of scrap proceeds and to calculate a cost per unit also.

7 C

$$\text{Cost per unit in closing inventory} = \$(4.50 + 1.25 + 2.50) = \$8.25$$

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## ANSWERS TO MULTIPLE CHOICE TESTS

Number of units in closing inventory = 13,500 - 11,750 = 1,750 units  
 ∴ Value of closing inventory = 1,750 units × \$8.25 = \$14,437.50

Option A applies a unit rate of \$3.75, ie omitting the cost of the raw material transferred into the process. Option B applies a unit rate of \$7, omitting the additional material added. Option D applies a unit rate of \$14.50, ie all of the unit rates supplied in the question. The work in progress should be valued at the **rate per incomplete unit** in respect of labour and overheads.

- 8 C  
9 D

## Answers to test in chapter 13

- 1 C  
 Joint costs apportioned to Q:  $[330,000 \div (420,000 + 330,000)] \times 350,000 = \$154,000$   
 Closing inventory valuation (X):  $(30,000 \div 330,000) \times (154,000 + 66,000) = \$20,000$

- 2 D  
 A by-product is output of some value produced when manufacturing something else (the main product).  
 Option A is incorrect because a **by-product has some value**.  
 Option B is incorrect because this description could also apply to a joint product.  
 Option C is incorrect because the value of the product described could be relatively high, even though the output volume is relatively low.

- 3 B  
 Joint products are two or more products produced by the same process and separated in processing; each product has a sufficiently high saleable value to merit recognition as a main product.  
 A joint product may be subject to further processing, as implied in option A, but this is not the case for all joint products.

- 4 C  
 Determine total production cost

	\$'000
Opening inventory	40
Direct materials	80
Conversion costs	100
	220
Less closing inventory	20
Total production cost	200

Production costs are apportioned based on the sales value of units produced.

Production units		Sales value	Apportioned cost
		\$'000	\$'000
W	20,000 (× \$4)	80	(\$200,000 × (80/320))
X	20,000 (× \$6)	120	(\$200,000 × (120/320))
Y	40,000 (× \$3)	120	(\$200,000 × (120/320))
		320	200

Product X cost per unit = \$75,000/20,000 = \$3.75

If you selected option A you apportioned costs on the basis of units sold. Option B makes no adjustment for inventories and option D apportions costs on the basis of unit selling price, rather than sales value of output.

## Answers to test in chapter 14

No Test

## Answers to test in chapter 15

- 1 C  
2 A



## ANSWERS TO MULTIPLE CHOICE TESTS

3 C

4 C

**Answers to test in chapter 16**

No Test

**Answers to test in chapter 17**

1 C

$$\begin{aligned} a &= (\Sigma y \div n) - [(b\Sigma x) \div n] = (330 \div 11) - [(0.69171 \times 440) \div 11] \\ &= (30 - 27.6684) \\ &= 2.3316 \text{ (2.33 to 2 decimal places)} \end{aligned}$$

2 A

3 C

Correlation coefficient,  $r = 0.85$ Coefficient of determination,  $r^2 = 0.85^2 = 0.72$ 

The coefficient of determination tells us that 72% of the variation in sales revenue can be explained by the corresponding variation in advertising expenditure.

4 D

	<i>Deliveries</i>	<i>\$</i>
High activity	930	9,860
Low activity	<u>840</u>	<u>9,680</u>
Variable cost of	<u>90</u>	<u>180</u>

Variable cost per delivery  $\$180/90 = \$2$  per deliveryFixed costs =  $\$9,860 - (\$2 \times 930) = \$8,000$ 

Total costs = fixed costs + (variable cost per delivery  $\times$  number of deliveries)  
 =  $\$8,000 + (\$2 \times \text{number of deliveries})$

Therefore the correct answer is D.

If you selected options A or B you simply calculated the average cost at either of the two activity levels - but the fixed cost remains constant for each activity level.

If you selected option C you did the calculations correctly but forgot that variable costs must be added to fixed costs to derive the total cost.

5 B

	<i>Units</i>	<i>\$</i>
Highest production – month 1	3,000	74,000
Lowest production – month 5	<u>1,500</u>	<u>69,500</u>
	<u>1,500</u>	<u>4,500</u>

$$\text{Variable cost per unit} = \frac{4,500}{1,500} = \$3 \text{ per unit}$$

It is possible at this stage to eliminate options A, C and D since option B is the only one with a variable cost per unit of \$3. The fixed costs of \$65,000 can be proven as follows.

	<i>\$</i>
In month 1, total costs =	74,000
Variable costs ( $\$3 \times 3,000$ ) =	<u>9,000</u>
Fixed costs =	<u>65,000</u>

**Answers to test in chapter 18**

No Test

**Answers to test in chapter 19**

1 C The total of the seasonal variations should be zero.

2 B  $\$10 / 125 \times 220 = \$17.60$ 

3 C In 2008, the cost per kg was \$2.50.

## ANSWERS TO MULTIPLE CHOICE TESTS

In 2009, the cost per kg was \$3.17

The index for 2011 is  $3.17 / 2.5 \times 100 = 127$

- 4 C In 2009, the cost per kg was  $\$32,000 / 20,000 = \$1.60$   
 The cost per kg in 2011 is  $1.60 \times 220 / 185 = \$1.90$   
 The total cost is  $13,000 \times \$1.90 = \$24,700$

## Answers to test in chapter 20

- 1 D  $600 \times (1.05)^3 \times (1.06)^5 = \$929$   
 2 C  $(1 + 0.015)^{12} - 1 = 0.1956$   
 3 C  $3,000 \times 0.315 = \$945$   
 4 A The first receipt is in 2 years time and the last receipt is in 10 years time.  
 The 10 year annuity discount factor at 5% = 7.722  
 The 2 year annuity discount factor at 5% = 1.859  
 So the total factor for 3 to 10 is  $7.722 - 1.859 = 5.863$   
 $\$2,000 \times 5.863 = \$11,726$   
 5 C  $\$6,000 \times 1/0.095 = \$63,158 + \$6,000 = \$69,158$

## Answers to test in chapter 21

- 1 D
- |   |                   |       |               |
|---|-------------------|-------|---------------|
| 0 | (270,000)         | 1     | (270,000)     |
| 1 | 50,000            | 0.893 | 44,650        |
| 2 | 180,000           | 0.797 | 143,460       |
| 3 | 100,000           | 0.712 | 71,200        |
| 4 | 50,000            | 0.636 | 31,800        |
| 4 | 20,000            | 0.636 | 12,720        |
|   | Net present value |       | <u>33,830</u> |
- 2 C Discounting at 20%:
- |   |                   |       |                 |
|---|-------------------|-------|-----------------|
| 0 | (270,000)         | 1     | (270,000)       |
| 1 | 50,000            | 0.833 | 41,650          |
| 2 | 180,000           | 0.694 | 124,920         |
| 3 | 100,000           | 0.579 | 57,900          |
| 4 | 70,000            | 0.482 | 33,740          |
|   | Net present value |       | <u>(11,790)</u> |
- I.R.R. =  $12\% + 8\% \times 33830 / (33830 + 11790) = 17.93\%$
- 3 C  
 4 D

## Answers to test in chapter 22

- 1 A  
 Price variance:  $(0.50 \times 10,500) = \$5,250$  Adverse  
 Volume variance:  $(500 \times 8) = \$4,000$  Favourable
- 2 B
- |  |                |            |
|--|----------------|------------|
|  | \$             |            |
| Actual expenditure                                       | 235,000        |            |
| Actual hours $\times$ standard rate $(24,000 \times 10)$ | <u>240,000</u> |            |
| Expenditure variance                                     | <u>5,000</u>   | Favourable |
- 3 C

\$

## ANSWERS TO MULTIPLE CHOICE TESTS

	Actual hours × standard rate	240,000	
	Standard cost of actual production (3,900 × 6 × 10)	234,000	
	Efficiency variance	<u>6,000</u>	Adverse
4	B		
5	A		
6	B		

	Budgeted hours	5,000	
	Actual hours worked	<u>5,500</u>	
	Capacity variance	<u>500 hours × 15 = \$7,500</u>	Favourable

- 7 B  
8 A  
9 D

**Answers to test in chapter 23**

No Test

**Answers to test in chapter 24**

- 1 C  $1080/7200 \times 100\% = 15\%$   
2 A  $2376/7200 \times 100\% = 33\%$   
3 D  $624/7200 \times 365 = 32$  days  
4 B  $(300 + 624 + 1608) / 1890 = 1.34$   
5 A  $(624 + 1608) / 1890 = 1.18$

**Answers to test in chapter 25**

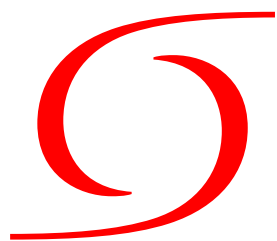
- 1 C  
2 C  
3 C  
4 B

**Answers to test in chapter 26**

- 1 A  
2 C  
3 B Current ROI =  $70,000/500,000 = 14\%$   
With the new machine, the ROI would fall to:  
 $(70,000 + 2,200) / (500,000 + 20,000) = 13.9\%$   
4 A Current RI =  $70,000 - (10\% \times 500,000) = \$20,000$   
With the new machine, the RI would increase to:  
 $72,200 - (10\% \times 520,000) = \$20,200$

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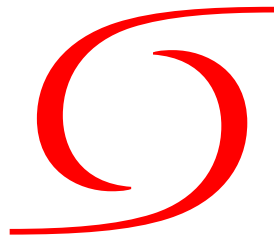
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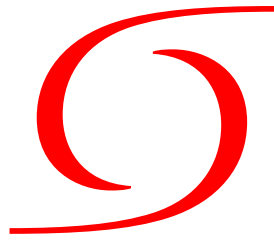
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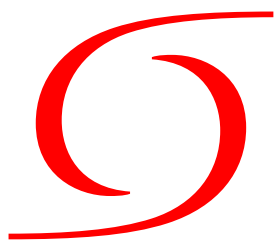
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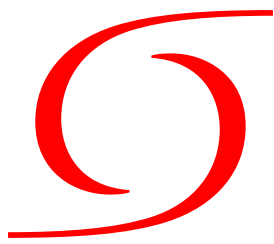
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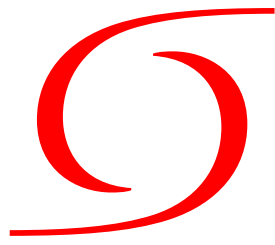


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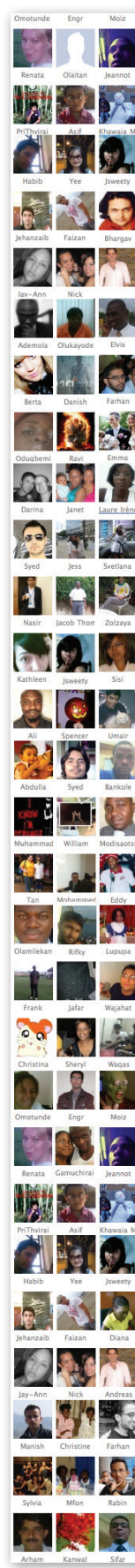
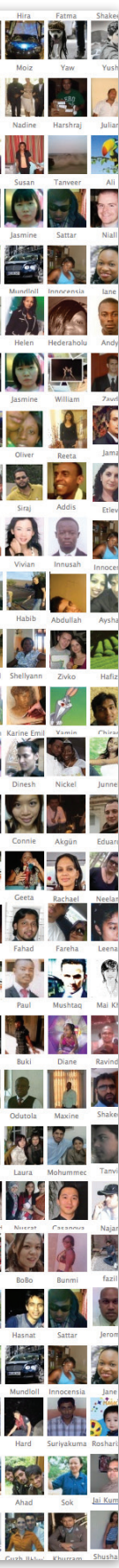
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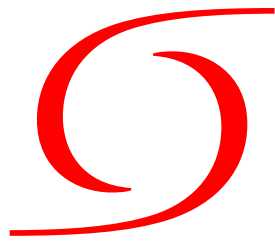
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