



1. Anderson Ltd. manufacture gearboxes for use in cars. At the start of the year, the management of Anderson Ltd. estimated that its costs would be:

	% of sales value
Direct labour	8
Direct material	50
Variable production overhead	8
Fixed production overhead	12
Administration overhead	5

This was based on the following:

80 employees

2000 hours worked by each employee

40 000 gearboxes manufactured in the year as budgeted production

£200 unit selling price.

You have recently been employed by the company to establish a standard costing system. At the end of the year you were able to extract the following information:

- labour costs £4.40/hour
- 32 000 units sold
- £210/unit selling price
- 160 000 hours were worked
- variable production overheads were £640 000
- fixed production overheads were £810 000
- administration costs were £350 000
- raw material prices were 10% higher than expected
- total expenditure on raw material was £3.696 M
- there were no opening or closing stocks of raw materials.

- (a) You are required to prepare an operating statement for the year, using a standard absorption costing system.

Calculations should proceed according to the following headings suffixing 'A' for Adverse and 'F' for Favourable where appropriate. Resulting quantities required for the statement are then entered in the 'Operating Statement for the Year' sheet shown on page 6.

(All working must be shown.)

***(Budgeted) Costs***

	Unit cost £
Direct labour	
Direct materials	
Variable overhead	
Fixed overhead	
Admin. overhead	
Total	
Selling price	
Standard profit (per unit)	
Budgeted profit	
Sales price variance	
Sales quantity variance	

(These last three entries are added to the 'Operating Statement for the Year' on the final sheet of the calculations.)

## **Cost Variances**

### ***Labour Variances***

Standard hours =

Standard cost/hour =

Rate variance =

Standard time =

Actual time =

Time variance =

Efficiency variance =

(Add rate and efficiency variances to 'Operating Statement for the Year' on the final sheet of the calculations.)

### ***Material Variances***

Material price =

Material usage – standard =

– actual =

Material usage variance =

(Add price and usage variances to 'Operating Statement for the Year' on the final sheet of the calculations.)

***Variable overheads***

Standard cost =

Actual cost =

Expenditure variance =

Efficiency variance =

(Add expenditure and efficiency variances to 'Operating Statement for the Year' on the final sheet of the calculations.)

***Fixed overheads***

Expenditure variance =

Volume variance =

(Add these variances to 'Operating Statement for the Year' on the final sheet of the calculations.)

***Admin overhead*** (treat as fixed)

Expenditure variance =

Volume variance =

(Add these variances to 'Operating Statement for the Year' on the final sheet of the calculations.)

*Operating Statement for the Year*

£'000

£'000

**Budgeted Profit**

Sales variance – price  
                                  – quantity

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**Cost variances**

Labour           – rate  
                                  – efficiency

Material       – price  
                                  – usage

Variable       – expenditure  
                                  – efficiency

Fixed           – expenditure  
                                  – volume

Admin          – expenditure  
                                  – volume

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**Actual Profit**

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- (b) Give reasons/explanations why the variances in (a) above have occurred for the following:
- (i) material price
  - (ii) labour efficiency
  - (iii) fixed overhead expenditure.
- (c) The accountant suggests that a standard marginal costing system may be more suitable. He asks you to outline the strengths and weaknesses of both systems and recommend the most suitable.
- (d) The Board of Anderson Ltd. want to adopt 'ideal' standards because they feel it will encourage harder work. You are asked to produce a brief report giving your views.

2. (a) For the following categories of activities assign an appropriate cost driver from the list provided against each activity in TABLE 1.

Cost Drivers:

- Cost of Inspection/Test
- Machine use hours
- Direct Labour Hours
- Number of Purchase Orders
- Number of Production Runs
- Material Delivery/Invoices.

Activities to produce product	Cost Drivers
Activity Centre 1 Machining	
Activity Centre 2 Machining	
Product Assembly	
<b>Materials Procurement Activities</b>	
Product Materials Purchased	
Material Reception/Storage	
Materials Issued/Production Run	
<b>Support Activities</b>	
Production Planning	
Machine Setting Up/Tooling	
Statistical Quality Control	

TABLE 1



(b) TABLE 2 shows the cost drivers, the quantity and unit cost of the cost driver, and total activity cost.

For two products A and B it is found that:

- The direct labour hours for products A and B are the same.
- It takes approximately four times as many machining hours in both cost centres to produce product B as product A.
- Product A requires one quarter of the materials purchased for B.
- Product A requires one third of the total Delivery notes/invoices.
- Product A has issued one third of the total materials issued per production run.
- Product A has issued one half of the planning per production run of that required by Product B.
- Product B requires twice as many machine set-ups as product A.
- The products have the same number of quality control inspections.

If the company produces 50 000 each of products A and B:

- (i) Complete TABLE 2 to determine the cost driver unit costings in column 5 for the activities of column 1. Show also the product quantity splits in column 4 of each activity for product A and B (e.g. quantity of cost driver Activity Centre 1 is shown as split 100 000 product A and 400 000 product B).
- (ii) Determine the overhead activity cost allocations to products A and B (using the activity proportions calculated in column 4) by completing TABLE 3.
- (iii) Determine the total overhead allocations to products A and B.
- (iv) Find the per unit product overhead cost allocations for each product.

Activity involved to Produce Product	Allocated Cost of Activity £	Activity Cost Driver	Quantity of Cost Drivers	Cost Driver Unit cost/rate per Cost Driver £
Activity Centre 1 Machining	750 000	Machine Use hours	500 000 (100 000 prod A 400 000 prod B)	
Activity Centre 2 Machining	500 000	Machine Use hours	250 000	
Product Assembly	400 000	Direct labour hours	100 000	
<b>Materials Procurement Activities</b>				
Product Materials Purchase	600 000	Purchase Orders	5000	
Product Material Reception/Storage	240 000	Number of Invoices or Material Delivery Notes	3000	
Materials Issued/Production Run	225 000	Number of Production runs	1500	
<b>Support Activities</b>				
Production Run Planning	150 000	Number of Production runs	1500	
Machine Setting Up/Tooling	30 000	Setting up/tooling labour hours	750	
Statistical Quality Control	10 000	Sample inspection and Test Cost	400	
<b>Total</b>				

TABLE 2

Activity	Product A £		Product B £	
	Activity Centre 1 Machining	1.5 · 100 000	150 000	1.5 · 400 000
Activity Centre 2 Machining				
Product Assembly				
<b>Materials Procurement Activities</b>				
Product Materials Purchase				
Product Material Reception/Storage				
Materials Issued/Production Run				
<b>Support Activities</b>				
Production Run Planning				
Machine Setting Up/Tooling				
Statistical Quality Control				
<b>Total</b>				

TABLE 3

3. (i) The board of a company decides that the strategic objectives of the company should be:

to become established as the best in its field  
to be the largest in its market.

Comment briefly on what the length of time should be to achieve these objectives.

- (ii) State how the strategic and sometimes medium term objectives of a company may differ in an important aspect from operational planning. Give some examples of strategic planning activities and operational planning.
- (iii) State briefly how the type of business a company is engaged in might determine the importance of the type of planning that would be required for:
- (a) an oil exploration company
  - (b) a clothing retailer.

4. Carling Ltd is a manufacturer of industrial drills. It has £1M earmarked for capital investment in the current year and the Board has identified two projects (each requiring an initial outlay of £1M) from which it will choose.

The company's capital structure at present is:

	<i>£M</i>
<i>Ordinary shares</i>	<i>3</i>
<i>5% Preference shares</i>	<i>4</i>
<i>10% Debentures</i>	<i>7</i>
<i>Total capital</i>	<i>14</i>

The two rival projects have anticipated costs and income flows as follows:

	<i>Project 1</i>	<i>Project 2</i>
	<i>£'000</i>	<i>£'000</i>
<i>Cost</i>	<i>1000</i>	<i>1000</i>
<i>Income - Year 1</i>	<i>600</i>	<i>100</i>
<i>Year 2</i>	<i>200</i>	<i>150</i>
<i>Year 3</i>	<i>150</i>	<i>750</i>
<i>Year 4</i>	<i>250</i>	<i>450</i>
<i>Year 5</i>	<i>350</i>	<i>150</i>
<i>Year 6</i>	<i>200</i>	<i>200</i>
<i>Total income</i>	<i>1750</i>	<i>1800</i>

- (a) The Board is considering funding the investment by either a £1M shares issue or a £1M 10% debenture issue. You are asked to explain which method you would choose.
- (b) You are asked to evaluate the two projects using:
- (i) the payback method (by plotting the data)
  - (ii) the DCF/NPV technique (assume a 12% cost of capital).
- (c) A Board member asks whether risk and uncertainty should be taken into account. You are asked to write a brief report outlining the arguments for and against the suggestion.
5. Using the data from TABLES 1, 2 and 3 below, plot the following graphs:

On one set of axes plot the 2 curves of:

‘total sales revenue’ against ‘volume of sales’

‘total costs’ against ‘volume of sales’.

The ‘volume of sales’ should be on the  $x$ -axis (values from 20 to 26).

(ii) On a second set of axes plot the 3 graphs:

- ‘marginal cost’ against ‘volume of sales’
- ‘marginal revenue’ against ‘volume of sales’
- ‘price’ against ‘volume of sales’.

Again the ‘volume of sales’ should be on the  $x$ -axis (values from 20 to 26).

Price £	Volume of Sales	Total sales revenue £	Marginal revenue £
80	20	800	
76	21	836	36
72	22	864	28
68	23	884	20
64	24	896	12
60	25	900	4
56	26	896	-4

TABLE 1

Price £	Volume of Sales	Total costs £	Marginal cost £
80	20	720	
76	21	728	8
72	22	740	12
68	23	756	16
64	24	776	20
60	25	800	24
56	26	828	28

TABLE 2

Price £	Volume of Sales	Total sales revenue £	Total cost £	Profit £
80	20	800	720	80
76	21	836	728	108
72	22	864	740	124
68	23	884	756	128
64	24	896	776	120
60	25	900	800	100
56	26	896	828	68

TABLE 3



- (a) From your graphs determine the maximum profit and optimum volume of sales.
- (b) What do you notice about:
- the marginal cost and marginal revenue lines
  - total cost and total revenue curves at maximum profit.
6. (i) Imagine you are the manager of a pension fund that invests large amounts of money in companies, most of which are listed on the London Stock Exchange. Returns on your investments provide the funds to pay the pension beneficiaries. State the proportions of fixed interest securities (i.e. debentures, preference shares, etc.) and ordinary shares you would choose with a view to minimising the risk to funds and maximising returns. State briefly the reasons for your investment strategy.

State a source from which you would get information on which to base your investment strategy.

- (iii) State a possible consequence of other fund managers thinking in a similar vein to yourself.
- (iv) Select 5 listed London Stock Market companies from different sectors (such as Banking, Information Technology, Media, Chemicals, Construction, Retailers, Transport, Mining, Oil & Gas, Pharmaceuticals, Property, etc.) in which you intend to invest substantial amounts of capital with a view to seeking a return on your investment. Briefly give reasons for your selections.

7. Prepare a cash budget for January 2006 to March 2006 with the following information given.

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Sales	1400	1000	800	1000	1000	1200	1000
Production	1250	1200	1000	800	1500	1750	1400

Cash balance at 1 January 2006 = £5500

Selling price = £16.00  $\frac{1}{2}$  received in the production month being considered.  
 $\frac{1}{2}$  received two months later  
 (e.g. in January receive  $\frac{1}{2}$  of January's plus  $\frac{1}{2}$  of November's)

Direct labour = £5.00 paid same month of production

Direct materials = £5.00 paid the month before production

Variable costs = £4.00  $\frac{1}{2}$  paid in the month before production  
 $\frac{1}{2}$  paid in the month of production  
 (e.g. for January, pay  $\frac{1}{2}$  in December plus  $\frac{1}{2}$  in January)

Fixed costs = £1500 per month.

Use the grid on page 8 to illustrate your answers.

	January	February	March
Opening balances			
Receipts (1)			
Receipts (2)			
TOTAL INCOME			
Direct labour			
Direct materials			
Variable costs (1)			
Variable costs (2)			
Fixed costs			
TOTAL COSTS			
NET TOTAL FOR MONTH			

- (a) State what factors need to be considered when tendering an estimate for a contract.
- (b) Before tendering as a contractor supplying materials and equipment specified by the client, state briefly some checks that should be made prior to compiling the tender in order to determine any contract clauses, contingencies or unforeseen circumstances that may affect future profits.
- (c) Prepare a tender/estimate for the installation of 20 steel street lamps in 5 streets of a small town to replace ageing concrete lamp standards, using the following information.

The holes for the lamp standards have to be excavated using manual labour. The old concrete lamps need to be removed using a lorry mounted crane or 'Hiab', which also serves as an extendable high platform.

The old lamps are first disconnected by the Supply Authority, which does not form part of the contract. Removal of old standards to contractor depot is part to the contract. The new lamp standards consist of the lanterns (lights) complete with the ballast, ignitor, capacitor and lamp already fitted. The main materials then are the column, the lantern, the cable to wire it, a photo-electric cell, tarmas and the concrete. The lamps are supplied by the contractor to the client's specification. The lamp standards have to be erected then concreted (6 metre columns specified require a 1.3 m buried root depth) then the luminaires/lanterns fixed to the top and connected to the connection box at the base of the column. In order to keep the street lighting disruption to a minimum during lamp standard replacement, arrangements are made with the supply authority to disconnect old standards and connect the 'tails' (i.e. loose cable one end of which is connected to the lamp standard to be used to connect to the supply cable) of new standards.

Connection and disconnection by the Supply Authority is not part of the project tender. This means that the new standards have to be wired ready for connection. In order to do this holes have to be excavated adjacent to the old standards to accommodate the new standards and they have to be concreted with tails brought out before connection can take place.

When connection is complete, the old concrete standards are removed and temporarily stored for disposal in the contractor's depot and the holes of both new and old standards reinstated. Generally the new standards can be placed within 2 metres adjacent to the old standards.

A mobile crane or 'Hiab' lifts the columns and sets them in the holes and is also used as a platform for working at height. The lanterns, which contain an infra-red detector for automatic switch-on are pre-wired by the contractor to avoid damage during installation and are attached at height using the 'Hiab' lorry mounted crane to the columns after column installation. Cables and wiring are passed from the lantern and threaded down the column to the connection box at the bottom. The lamp standards have to be connected at the base connection box by cable 'tails' to an existing lighting cable run along the pavement. Identification of existing underground cables is performed by the Supply Authority and drawings passed on to the contractor prior to work commencing. Connection, made by the Supply Authority, is arranged by the client.

Students may assume that the lamps are delivered to the contractor storage depot and are paid for or enter a cost for purchase and delivery in their tender.

Students are at liberty to assign their own labour, ordinary and overtime rates and costs/values for:

- materials, such as concrete, cabling and accessories and paving stone replacement or tarmac reinstatement
- hire of equipment, such as cranes, HIABs, concrete mixers, etc. or other hired equipment
- times for excavating and the size of excavations
- cable measuring, cutting, laying, connecting and testing of lantern and column cable connections prior and post erection
- contractor overheads, including depot security, management, clerical (wages, etc.) and contract manager's time compiling tender document and so on
- any contingencies (e.g. bad weather, vehicle breakdown, vandalism, strikes, difficult terrain, etc, production of As-Built drawings detailing position of new lights and connections underground etc, if any)
- any other contractor costs that the student may consider

necessary. Costs can be calculated without considering VAT.

Students should endeavour to use sufficient labour to complete the work within three to four weeks and without interruption of street lighting availability.

All assumptions on which the tender is based regarding quantity of labour and type, duration of manpower employed, times for excavation, positioning and concreting of new standards, removal of old standards, etc. should be stated.

Note: There are many options to consider when tendering. For example, students may opt for excavation of all holes before commencement of new column installation as this will cut down on the duration of the Hiab hire. Alternatively students may consider it more profitable for the contractor to excavate so many holes for old and new standards, then install the new and remove the old standards before proceeding with more excavations. It should be remembered that the street lighting has to be maintained during the replacement of the standards and the Supply Authority will only disconnect two old and connect two new standards per day. It is recommended that the best way to execute the contract is to leave as few excavations open as possible and to leave as many columns in lighting as possible. Temporary reinstatement usually takes place after standard positioning and connection and permanent reinstatement of flags or tarmac in a street will be performed after street completion. If costs for materials are estimated (for such as paving stones or tarmac, etc.) allowance should be made for some wastage.

The tender should include labour materials, overheads and contingencies, and need not include financial arrangements between contractor and client. As the tender is a preamble to a project plan, these can be assumed to be interim payments with adjustments and final settlement and it is not necessary to prepare a cash budget, etc.

Constraints should be recognised, as for example the minimum time the Hiab will be required will be 2 weeks if it installs 2 new and removes 2 old standards per day. All such modes of working should be clearly stated and reasons briefly given for the assumptions on which the tender is costed, for the benefit of the client.

If a contractor has a long term arrangement as preferred contractor with a local authority or Highways Agency Area, there would usually be a rate or price agreed at the tender stage for the erection of a new column. There would also be a number of rates to cover the different lantern types and column sizes. Alternatively some contractors tender on a 'cost plus' basis where the client is charged the material and labour cost plus a percentage for the contractor's overheads and profit. This is the form the student's tender should take, which requires work activities, amounts of labour and rates to be specified and the costs of activities, equipment, contractor's overheads, etc. to be estimated. From this a project plan will emerge.

If a tender is pitched too high with profit it may lose out to another contractor. If too low, it will lose money. It's a fine line.

- (d) A Project plan is required to be prepared for the work tendered for in part (c) using Microsoft Project 2000 Software, or later, or any other suitable project software. Notes should accompany the project assignment describing the details and thinking behind the project form.

The project should show such features as:

- Gantt chart with tasks, dates, bar charts, etc. showing linked tasks with any lead or lag times
- critical path
- resources list completed
- resources usage
- task usage



- tracking Gantt chart
- resource fixed and task costs
- project % completion and cost report(s)
- tasks that can start simultaneously or prior to the finish of their predecessor, if any.

Task usage with associated costs (resource and task costs) should be simulated for the project at 100 % completion and reports produced.

Hard copies of the project assignment are required. CDs or floppy disks can also be submitted.

It should be noted that the critical path view must be saved as a separate project or as a screen dump figure pasted into, say, **Paint**, which is usually available in Microsoft Office (or Word) **Programs/Accessories** on the Start Menu. This is because, if resources are assigned to tasks the critical path is obscured and shows in normal task colour. Any views that may be lost in the course of completing the project must be saved at an appropriate time.

Alternatively students may wish to do a power point presentation of various views of their project.

It is worth using the first task as a repository for making notes about the project as one progresses. This is done by selecting **Project/Task Notes** which brings up a dialogue box into which can be typed notes and memos, such as “foreman is not assigned to task (a) because this task is performed on the same day as task (b) to which the foreman has already been assigned”, etc.

Leaving the resources dialogue box open and assigning resources will leave the same resources selected for repetitive tasks, which facilitates resource assignment. Alternatively, if there are many repetitive tasks, by holding down the ‘Control’ key each repetitive task can be highlighted and then by selecting the **Assign Resources** icon (or **Tools/Assign Resources**) and entering the resources data in the dialogue box all the tasks selected will be updated without having to select each task individually. This same technique can be applied to task progress tracking, by holding down the ‘Control’ key each repetitive task can be highlighted and then by selecting **Tools/Tracking/Update Task**, and entering the progress data (e.g. 100 %, actual duration and remaining duration) all the tasks will be updated without having to select each task individually.

Assessment will largely be based on the type and quality of the project program of work execution.