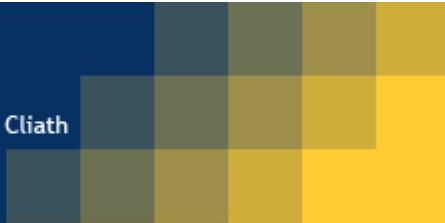




University College Dublin
An Coláiste Ollscoile, Baile Átha Cliath



Accountancy Subject Area

2022 – 2023

Management Accounting

ACC20020

Lecturer: Dr. Rebecca Maughan

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ACC 20020: 2022/23
Management Accounting
Module Outline

1. Module objectives

Managerial accounting is concerned with the provision of relevant information to parties within the firm to help improve planning and control activities and to assist in decision-making. In practice managerial accountants engage in activities such as implementing budgetary control, analysing past performance and providing relevant information for a variety of managerial decisions. The aim of this course is to develop knowledge and understanding of management accounting techniques to support management in planning, controlling, performance management and decision making.

At the end of this course, you should be able to:

- (i) Discuss the role, purpose and organizational context of Management Accounting
- (ii) Discuss the information needs of managers, and the role of management accounting information for strategic decision-making, planning and control of operations
- (iii) Discuss, explain, apply, undertake and critically evaluate fundamental managerial accounting practices with specific reference to budget setting, budgetary control, cost accounting and cost management, decision-making and cost-volume-profit analysis.
- (iv) Discuss and explain how management accounting information affects behaviour
- (v) Discuss and explain recent developments in management accounting.

Welcome to the module, and I wish you a very successful journey through the course.

2. Module coordinator

Dr. Rebecca Maughan

Room Q206
UCD Quinn School of Business
Phone: +353-1-7164753
e-mail: rebecca.maughan@ucd.ie

3. Questions and Lecturer availability:

Queries relating to course material should be asked in class. This is to ensure that all students can benefit from the discussion.

Office hours are both in person and virtually. In person office hours are Mondays 1.30 to 2.30 pm **during teaching weeks**. Virtual office hours will be held on Tuesdays at 10 to 11, please email for a Zoom appointment. Any changes to this will be communicated on Brightspace.

In general, when sending emails, please use your UCD email account and refer to the course code 'ACC20020' in the subject heading.

4. Course Organisation

This course comprises twelve one –hour plenary and twelve small group two-hour sessions. Lectures will be mainly devoted to:

1. Discussion and exploration of assigned reading material;
2. Presentation and analysis of selected problem material

It will be assumed that you have adequately prepared the problem and the reading material for each session to enable you to participate actively in the class discussions.

5. Course Material

A pack of essential problem material is available on Brightspace

Additional material will be provided during the year on Brightspace. Notes may sometimes be updated in class.

Recommended text is:

Authors and year	Title	Publisher and ISBN
Drury, C.	Management and Cost Accounting, 11 th edition	Cengage Learning ISBN: 9781473748873

6. Assessment and Grading

The course will be assessed by a 1 hour mid-semester (20%) and a 2 hour final examination (80%).

The date, time and location for the mid-semester exam:

Date	Time	Location
Thursday, 30 March	6.30 pm	Blackrock Exam Centre

Please note that the mid-semester examination is held under UCD exam regulations to ensure that students can avail of the maximum amount of professional accountancy exemptions. Students will only be entitled to resit the mid-semester exam when their circumstance meet UCD's extenuating circumstance policy - https://www.ucd.ie/t4cms/extenuating_circumstances_student_guide.pdf

Holidays or other personal travel during the academic year are unlikely to be approved as extenuating circumstances.

7. Summary Course Outline

Introduction to Management Accounting (Week 1 to 2)		
	The Role, Purpose and Organizational Context of Management Accounting. Contemporary Developments in Management Accounting. Cost Information and Behaviour.	
Planning and Control (Weeks 2 to 5)		
	The Budgeting Process	

	Standard Costing and Variance Analysis	
Cost Accounting and Management (Weeks 6 to 8)		
	Cost Allocation	
	Costing Systems	
	Activity Based Costing (ABC)	
Decision Making 1 (Weeks 8 to 10)		
	Cost –Volume-Profit (CVP) Analysis	
	Scarce Resources	
Decision Making 2 (Weeks 10 to 12)		
	Relevant Information	
	Risk and Uncertainty	

Note: The schedule of topics is provisional. Changes may be made depending on progress etc. Any changes will be announced in class and on Brightspace.

8. Timetable

Current scheduling is as follows:

Plenaries:

Day	Start Time	Length
Mon	9:00	50 mins
Mon	10:00	50 mins

Small Group Sessions:

9. Acknowledgements

Day	Start Time	Length	Tutor
Mon	11:00	110mins	Rebecca Maughan
Mon	15:00	110mins	Fiona Harrigan
Tue	11:00	110mins	Daniel Watkins
Tue	15:00	110mins	Daniel Watkins
Wed	09:00	110mins	Claire Fay
Wed	11:00	110mins	Fiona Harrigan
Wed	14:00	110mins	Clare Fay
Wed	14:00	110mins	Fiona Harrigan
Thu	11:00	110mins	Daniel Watkins

Many thanks to Ms. Clare Fay for her additions to the question pack.

Management Accounting

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Learning Outcomes

- Discuss the role, purpose and organizational context of Management Accounting
- Discuss the information needs of managers, and the role of management accounting information for strategic decision-making, planning and control of operations
- **Discuss, explain, apply, undertake and critically evaluate** fundamental managerial accounting practices with specific reference to budget setting, budgetary control, cost accounting and cost management, decision-making and cost-volume-profit analysis.
- Discuss and explain how management accounting information affects behaviour
- Discuss and explain recent developments in management accounting.

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Course Themes

- The Role, Purpose and Organizational Context of Management Accounting
- Contemporary Developments in Management Accounting.
- Cost Information and Behaviour.
- Information for Planning and Control
 - Budget process
 - Standard costing and variance analysis
- Cost Accounting and Cost Management
 - Traditional approaches to costing
 - Modern approaches to costing
- Information for Decision Making

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Your Role

- Read your module outline
- Attend assigned lectures – on time and turn off phones
- **Keep up with course work**
- Complete assignments
- KEY DATE – Mid-semester test - Thursday, 30 March at 6.30 pm in the Blackrock Exam Centre

4

Study Strategy

- Effective study strategies for accounting usual involve a combination of reading the notes and textbook, working through the examples and then attempting questions yourself.
- DO NOT check the solution until you've made a really good attempt at the question.
- A good attempt at question may mean you have to check the notes/slides/textbook again or come back to it another day.
- Once you are feeling confident about a topic test your knowledge using a past exam paper question.
- Check your exam preparedness by sitting one of the past final exam papers within the 2 hour limit.

5

How to Tackle a “Hard” Subject

- **Find a seed of motivation**
- **Overcome the pain in the brain**
 - Use the [Pomodoro technique](#):
 - Turn off all distractions (no phone or computer).
 - Set a timer for 25 minutes.
 - Focus intently for those 25 minutes.
 - Reward yourself for at least five minutes when you're done (music, talking with a friend, getting coffee).
- **Realize it's perfectly normal to *not* understand something on your first try**
- **Build a collection of neural “chunks”**

Barbara Oakley, How to Get Excited About Topics That Bore You, HBR, July 2017.
<https://hbr.org/2017/07/how-to-get-excited-about-topics-that-bore-you>

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Learning Supports

- Pack – Blackboard or Hardcopy
- Textbook:

Authors and year	Title	Publisher and ISBN
Drury, C.	Management and Cost Accounting, 11 th edition	Cengage Learning ISBN: 978-1-4080-4180-2

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Question Time

- Queries relating to course material are best asked in class.
- In-person office hours are Mondays 1.30 to 2.30 pm during teaching weeks.
- Virtual office hours usually 10 to 11 Tuesdays during teaching weeks. Any changes communicated on Brightspace.

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Contact Details

Module Co-ordinator:
Rebecca Maughan
Room 206
Quinn School of Business
rebecca.maughan@ucd.ie

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Overview of Management Accounting

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What is Accounting?

- Information system
- Geared to users' needs
- To assist in making informed decisions and evaluations

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Distinctions between Financial and Management Accounting

- User focus - external/internal
- Time focus - historic/future
- Constraints - regulations/cost-benefit
- Frequency - periodic/as required
- Perspective - total organization/segments

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Finance / Management accounting

Types of Accounting Information

- Financial accounting
 - financial information (e.g. Income Statement)
 - users (e.g. shareholders, lenders, suppliers)
- Management accounting
 - financial and non-financial information
 - traditional examples - budget variances, market share
 - more recent developments include the balance score card, KPIs, KSFs, social, environmental and sustainability accounting
 - users (internal management)

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Key Success Factors (KSFs)

- KSFs are measures of those aspects of the firm's performance that are critical to its competitive advantage and, therefore, to its success
- Many of these KSFs are financial, but many are non-financial

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Key Success Factors

- Cost efficiency
- Quality
- Customer service
- Flexibility
- Innovation
- People
- Environmental Impact

Impact on information required from MAS

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Traditional objectives of Management Accounting

- Provide information for:
 - planning (e.g. budgets)
 - control (e.g. variance analysis)
 - decision making (e.g. pricing, outsourcing)
- Evaluate managerial performance (comparison of actual vs budget)

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Expanded Objectives of Management Accounting

- Supports the strategies of the organization and solution of strategic business problems
- Supports the management control system
- Supports organizing and coordination of operations
- Supports motivation of employees
- Communicates up-to-date information
- Supports the evaluation of efficiency and effectiveness of policies

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The Roles of Management Accountants

Traditionally provision of information for:

- Problem solving (e.g. lease or buy)
- Scorekeeping (e.g. preparation of monthly sales reports)
- Attention directing (e.g. interpreting why a department exceeded its cost budget)

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The Role of MA in a Competitive Global Environment

Companies need information to assist them:

- develop long-term plans and monitor their implementation
- manage their social and environmental impacts/become a sustainable organisation
- reduce costs (by eliminating wasteful activities)
- focus on customer needs (e.g. quality)
- analyze their competitive position (e.g. market share)

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Environmental Management Accounting (EMA)

- "EMA involves the identification, collection, analysis, reporting and interpretation of physical information on the use, flow and fate of the environmental aspects of a company's activities (e.g., emissions, raw materials and biodiversity) and monetary information (e.g., environment-related costs.) (Burritt *et al.*, 2002, Burritt *et al.*, 2019 Gunarathne *et al.*, 2022).
- EMA constitutes an important part of sustainability accounting and can be viewed as an innovative and evolving management accounting area that encompasses a wide range of tools whose purpose is to support environmentally beneficial decision-making (Schaltegger, 2018; Ferreira *et al.*, 2010).
- EMA tools can be specific i.e., they deal with a single environmental domain such as energy accounting, water management accounting and waste accounting or integrative i.e., they deal with a combination of environmental domains to link and balance several environmental aspects such as environmental capital budgeting (Gunarathne *et al.*, 2022). Integrative tools often require inputs from several specific EMA tools. Both specific and integrative tools require the support of environmental accounting infrastructure such as the creation and use of environmental cost accounts (Gunarathne *et al.*, 2022)."

Maughan, 2023

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Environmental Management Accounting

- Financial and non-financial information
- Supports internal environmental management processes.
- The areas of application:
 - product pricing
 - budgeting
 - investment appraisal
 - calculating costs, and
 - savings from environmental projects or setting quantified performance targets.
- Techniques include carbon accounting, waste and energy accounting, full-cost accounting, shadow accounts, the sustainable balanced scorecard

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Lean Mgt Accounting

- Provide accurate, timely, and understandable information to motivate the lean transformation throughout the organization, and for decision-making leading to increased customer value, growth, profitability, and cash flow.
- Support the lean culture by providing information that is relevant and actionable, and empowers continuous improvement at every level of the organization.
- Present lean management accounting financial statements that fully comply with generally accepted accounting principles, external reporting regulations, and internal reporting requirements.
- Use lean tools to eliminate waste from the accounting processes while maintaining thorough financial control

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Ethics

- Ethical principles can provide a useful guide for defining **how employers and employees should behave**
- Both employers and employees should consider the impact of their actions on a variety of **stakeholders**
 - Shareholders, bondholders, creditors
 - Board of directors, management, employees
 - Competitors, customers, suppliers
 - Government, communities
 - Society-at-large
- **Ethical issues ≠ legal issues**

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What do we mean by “ethics”?

- Distinguishing –
 - Right from wrong
 - What is good from what is bad
 - What constitutes desirable conduct in society from the undesirable
- Examining the moral standards held by individuals or society
- **Not** about religious beliefs or what we feel is right though these often inform our moral codes

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Ethical Issues in Business

- Conflicts of interest
- Fraud and theft
- Late payments
- Bribery and corruption
- Data protection
- Gifts and hospitality
- Bullying and harassment

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Ethical Principles in Management Accounting

- Integrity
- Objectivity
- Professional competence and due care
- Confidentiality
- Professional behaviour.

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References

- Burritt, R.L., Hahn, T. and Schaltegger, S. (2002), "Towards a comprehensive framework for environmental management accounting – links between business actors and environmental management accounting tools", *Australian Accounting Review*, Vol. 12 No. 27, pp. 39-50.
- Burritt, R.L., Herzig, C., Schaltegger, S. and Viere, T. (2019), "Diffusion of environmental management accounting for cleaner production: evidence from some case studies", *Journal of Cleaner Production*, Vol. 224, pp. 479-491.
- Gamarathne, N., Lee, K. H., and Kaluarachchige, P. K. H. (2022). "Tackling the integration challenge between environmental strategy and environmental management accounting." *Accounting, Auditing & Accountability Journal*. <https://doi.org/10.1108/AAAJ-03-2020-4452>
- Ferreira, A., Moulaing, C. and Hendro, B. (2010), "Environmental management accounting and innovation: an exploratory analysis", *Accounting, Auditing and Accountability Journal*, Vol. 23 No. 7, pp. 920-948.
- Maughan, R. (2023), "Adopting and adapting sustainability accounting: fit and faith in a family business", *Accounting, Auditing & Accountability Journal*, Vol. 36 No. 9, pp. 1-31. <https://doi.org/10.1108/AAAJ-02-2020-4410>
- Schaltegger, S. (2018), "Linking Environmental Management Accounting: A Reflection on (Missing) Links to Sustainability and Planetary Boundaries", *Social and Environmental Accountability Journal*, Vol. 38 No.1, pp.19-29

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Cost Information and Behaviour

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The Need for Cost Information

- Preparation of financial plans (budgets)
- Evaluation of performance
- Pricing decisions
- Customer focus decisions
- Make or buy decisions
- Valuation of inventories for financial reporting and taxation

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Cost Object

- A cost object is anything for which a measurement of costs is desired
- Examples:
 - The cost of issuing an insurance policy
 - The cost of running a sales department
 - The cost of producing a mobile phone
 - The cost of repairing faulty products

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Cost Collection System

- A cost collection system normally accounts for costs in two broad stages:
 - Accumulates costs by classifying them into certain categories (e.g. labour, materials and overheads).
 - Assigns costs to cost objects.

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Different Costs for Different Purposes

- Inventory valuation
- Decision making and planning
- Control
- Different concepts for different purposes

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Inventory Valuation

- Product cost is comprised of:
 - direct materials
 - direct labour
 - manufacturing overhead (indirect cost)
 - factory light and heat, insurance of factory buildings, supervisors' salaries, repairs, etc.

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Direct Costs and Indirect Costs

- Direct costs can be specifically identified with a particular cost object (e.g. a product, a department, a service)
- Indirect costs cannot be identified specifically with a particular cost object

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Traditional cost system

- Product costs:
 - Direct materials xxx
 - Direct labour xxx
 - Prime cost xxx
 - Manufacturing overhead xxx
 - Total manufacturing cost xxx
 - Non-manufacturing overheads xxx
 - Total cost xxx

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Product Costs and Period Costs

- Product cost: the cost necessary to complete a product (direct materials, direct labour and manufacturing overhead)
- Period cost: all non-manufacturing expenditures (e.g. selling and distribution)

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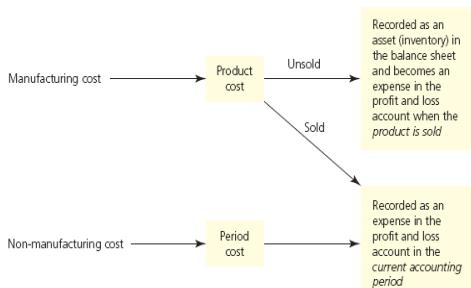
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Environmental Costs

- Common environmental costs for an organisation:
 - waste and effluent disposal
 - water consumption
 - energy
 - transport and travel
 - consumables and raw materials
 - environmental taxes

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Example

- Product costs = €100,000
- Period costs = €80,000
- 50% of the output for the period is sold and there are no opening inventories.
- Production cost (product costs) 100,000
- Less closing stock (50%) 50,000
- Cost of goods sold (50%) 50,000
- Period costs (100%) 80,000
- Total costs recorded as an expense for the period 130,000

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Cost Behaviour

- Cost behaviour: how costs change with activity
- Knowledge of cost behaviour essential for
 - planning (preparing budgets)
 - control (determining what costs should be at operating level achieved)
 - decision making (e.g. make or buy; pricing)

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Classification by Behaviour

- Need to predict costs and revenues at different activity levels for many decisions. For example contribution per unit = selling price - **variable cost** used extensively in CVP and relevant costing.
- Variable costs vary in direct proportion with activity.
- Fixed costs remain constant over wide ranges of activity.
- Stepped or semi-fixed costs are fixed within specified activity levels, but they eventually increase or decrease by some constant amount at critical activity levels.
- Semi-variable costs include both a fixed and a variable component (e.g. telephone charges).
- *NB Time - the classification of costs depends on the time period involved. In the short term some costs are fixed, but in the long term all costs are variable.*

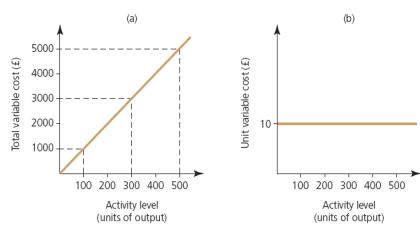
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Complete Worksheet One

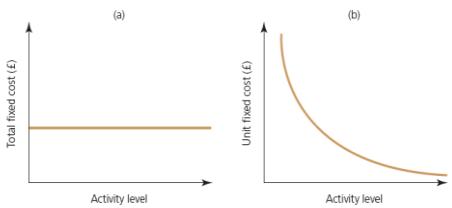
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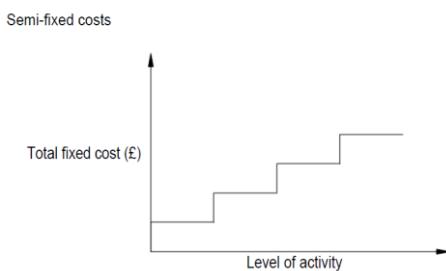
(a) = total variable costs to volume
 (b) = per unit variable cost

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(a) = total fixed costs to volume
 (b) = per unit fixed cost

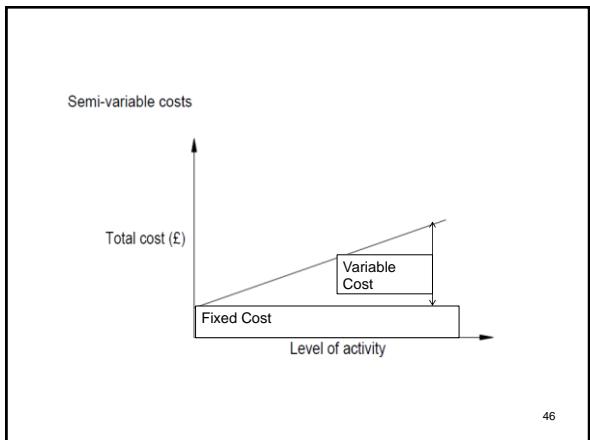
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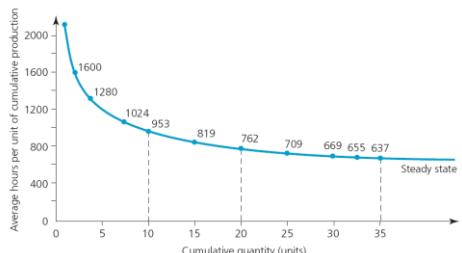
- Complete Worksheet Two
 - Prepare mind maps for:
 - cost information
 - cost behaviour
-
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- ## Learning Curve
- Familiarity with tasks improves performance and reduces the labour cost per unit
 - This reduction is generally predictable and can be modelled
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Learning Curve



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Methods of Estimating Cost Components

- Methods commonly used to split costs into their fixed and variable components:
 - Engineering
 - Inspection of Accounts
 - Graphical
 - High- Low
 - Least squares

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Illustration of High-Low Method

Month	Electricity Cost	Activity (production units)
Jan*	€5,100	75,000
Feb	€5,300	78,000
Mar	€5,600	80,000
Apr*	€5,950	92,000

Required:

1. Express cost function in form: $Y = A + BX$
(where Y = Total cost, A = Fixed cost, B = Unit variable cost and X = Level of activity)
2. Estimate costs for May if 100,000 units are produced

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Solution

	Units	Costs
* High (Apr)	92,000	€5,950
* Low (Jan)	<u>75,000</u>	<u>€5,100</u>
Difference	17,000	€ 850
∴ VC per unit = €850/17,000 = €0.05		
TC = FC + VC		
FC = TC - VC		
FC = €5,950 - 92,000 (€0.05)		
FC = €1,350		
∴ Y = €1,350 + €0.05X		
Estimated costs for May: Y = €1,350 + 100,000 (€0.05) = €6,350		

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Shortcomings of High-Low Method

While the high-low method is quick and provides a rough estimate of costs, it has some shortcomings

- It only considers two data points (which may be outliers)
- It does not provide any statistical information on the accuracy of the cost information obtained

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Budgeting

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Overview of Planning and Control Process

- Establish mission and objectives
- Undertake a position analysis
- Identify and assess strategic options
- Select strategic options and formulate long-term (strategic) plans
- Prepare budgets
- Perform and collect information on actual performance
- Identify variances between planned (budgeted) and actual performance
- Respond to variances and exercise control
- Revise plans (and budgets) if necessary

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Complete Worksheet Four

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What Is A Budget?

- A budget is a plan of action expressed in quantitative terms for a specified period
- It is an aid to coordinating what needs to be done to implement that plan
- A budget can cover both financial and non financial aspects of the plan (e.g. a sales budget for next year can be both in revenue [€] and number of units)
- Wide global usage of budgets across all kinds of organizations (commercial and not-for-profit)

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Features of Budgetary Control

- Identify strategic objectives
- Establish budgets
- Measure actual performance
- Compare actual performance with budget
- Establish variances
- Analyze the variances
- Take corrective action if necessary

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Benefits of Budgeting

- Compels planning:
 - by forcing managers to consider how conditions might change and what steps should be taken now.
 - by encouraging managers to consider problems before they arise.
- Promotes coordination and communication:
 - by compelling managers to examine relationships between their own operation and those of other departments.
 - By ensuring that everyone in the organization has a clear understanding of the part they are expected to play in achieving the annual budget.
 - by ensuring appropriate individuals are made accountable for implementing the budget.

Cont'd.....
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Benefits of Budgeting

- Motivates managers and employees:
 - by focusing on participation
 - by providing a challenge/target.
- Aids control:
 - by comparison of actual with budget (attention directing/management by exception).
- Provides a framework for evaluating performance

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Budget Setting Process

1. Establish responsibility for the budget-setting process
2. Communicate budget guidelines to relevant managers
3. Identify any key or limiting factor
4. Prepare the budget for the area of the limiting factor
5. Prepare draft budgets for all other areas
6. Review and coordinate budgets
7. Prepare the master budgets
8. Communicate the budgets to all interested parties
9. Monitor actual performance relative to the budget

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Types of Budget

- The Operating Budget is comprised of:
 - the revenues budget and
 - all the various cost budgets culminating in
 - the Budgeted Income Statement
- The Financial Budget is comprised of:
 - the capital expenditure budget
 - the cash budget
 - the budgeted balance sheet
- Master Budget: all the budgets combined

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Operating Budgets Production Budget (units)

Sales	X
+ Budgeted closing stock	X
Total needs	X
- Opening stock	X
Production requirement	X

↓

Impacts on

- Materials purchase budget
- Direct labour budget
- Manufacturing overhead budget

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Operating Budgets

Production Budget €s

- If sales figure is only give in monetary terms use the **Cost of Sales** information to calculate the **Purchases** figure:

Opening Stock X
 Plus Purchases X **Need to deduce**
 Less Closing Stock (X)

 = Cost of Sales X

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Operating Budgets

Materials Purchase Budget (kgs)

Production requirement X
 + Budgeted closing stock X
 Total needs X
 - Opening stock (X)
 Purchase requirements X

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Inventories Budget

	Jan €000	Feb €000	Mar €000	Apr €000	May €000	June €000
Opening balance	30	30	30	25	25	25
Purchases	30	31	26	35	31	32
Inventories used	(30)	(31)	(31)	(35)	(31)	(32)
Closing balance	30	30	25	25	25	25

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Cash Budget - estimating future **CASH** payments and receipts

	Jan €000	Feb €000	Mar €000	Apr €000	May €000	June €000
Receipts						
Receivables	60	52	55	55	60	55
Payments						
Payables	(30)	(30)	(31)	(26)	(35)	(31)
Salaries and wages	(10)	(10)	(10)	(10)	(10)	(10)
Electricity			(14)			(9)
Other overheads	(2)	(2)	(2)	(2)	(2)	(2)
Van purchase			11			
Total payments	(42)	(42)	(68)	(38)	(47)	(52)
Cash surplus	18	10	(13)	17	13	3
Opening balance	12	30	40	27	44	57
Cash balance	30	40	27	44	57	60
						67

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Cash Budget Preparation

1. Estimate sales and prepare a **receipts** schedule.
2. Estimate purchases and prepare a **payments** schedule.
3. Estimate various expenses and prepare **payments** schedules.
4. Include estimates for **payments** for fixed assets, **proceeds** from the sale of fixed assets, loans **received** or **repaid** and equity received or dividends paid
5. **EXCLUDE** non cash items such as depreciation, increases or decreases in the bad debt provision

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Order of Budget Preparation (Assuming no limiting factors)

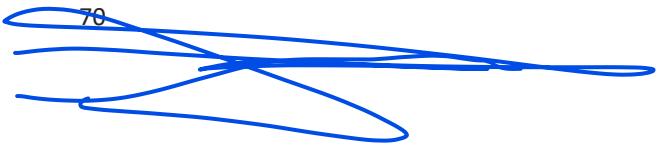
- Step 1 Prepare the Sales Budget (units and revenues)
 - Step 2 Prepare the Production Budget (units)
(Sales Budget + Closing Inventory - Opening Inventory)
 - Step 3 Prepare the Direct Materials Usage Budget and Direct Materials Purchase Budget
 - Step 4 Prepare the Direct Labour Budget
- Cont'd.....

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Order of Budget Preparation (Assuming no limiting factors)

- Step 5 Prepare the Manufacturing Overhead Budget
- Step 6 Prepare the Ending Inventories Budget
- Step 7 Prepare the Cost of Goods Sold Budget
- Step 8 Prepare the Nonmanufacturing Costs Budget
- Step 9 Prepare the Budgeted Income Statement
- Step 10 Prepare the Capital Expenditure Budget
- Step 11 Prepare the Cash Budget
- Step 12 Prepare the Budgeted Balance Sheet

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Behavioural Aspects of Budgeting

- Over-emphasis on short-term financial results
- Non-financial aspects may be overlooked
- 'Spend it or we will lose it'
- Budget padding (building in slack)
- Participative versus imposed budgeting
- Innovations may be shelved or postponed due to omission from the budget
- If bonuses are at stake, sales managers may:
 - sell to marginal customers
 - cut prices too deeply
 - overload distributors with goods and take them back later

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Fixed and Flexible Budgets

Comparison of budget with actual results:

- **Fixed basis:** actual results compared with original budget
- **Flexible basis:** actual results compared with a budget amended to take account of the actual level of activity
- If the level of sales and production turn out to be higher than budgeted, it would be wrong to evaluate the production manager on the basis of the original cost budgets for materials, labour, etc.
- The budget needs to be revised (flexed) to what should have been spent, based on the actual level of activity experienced

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Example

Budgeted

- Units of output (production & sales) = 1,000
- Sales price = 100
- Raw materials = $40m * €1$ per meter
- Labour = 2.5 hrs at €8 per hour
- Fixed Overheads = €20,000

Actual

- Units of output (production & sales) = 900
- Sales price = 102.22
- Raw materials = $41.413m * 99c$ per meter
- Labour = 2.39 hrs at €8.14 per hour
- Fixed overheads = €20,700

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	Original budget	Flexed budget	Actual
Units of Output (production and sales)	1,000	900	900
	€	€	€
Sales revenue	100,000	90,000	92,000
Raw materials	(40,000)	(36,000) (36,000m)	(36,900) (37,272m)
Labour	(20,000)	(18,000) (2,250 hr)	(17,500) (2,150 hr)
Fixed overheads	(20,000)	(20,000)	(20,700)
Operating profit	20,000	16,000	16,900

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Issues With Traditional Budgeting

- Time consuming and bureaucratic
- Incremental (start with last year's budget)
- Short term
- Focus on financial measures
- Soon out-of-date
- Negative impact on entrepreneurship
- Often divorced from strategy
- Focus on line items

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Modern Budgeting Approaches

- Beyond Budgeting
- Zero Based Budgeting:
 - Encourages a more questioning approach
 - Costly to implement
 - May make employees feel threatened

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Modern Budgeting Approaches

- Activity Based Budgeting
 - Budgets prepared according to cost-driving activity
 - Aims to authorize only the supply of those resources that are needed to perform activities required to meet budgeted production and sales volumes
 - More accurate budgets
 - Closer links between costs and management responsibilities

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--> Big data and budgeting (nothing interesting)

- Prepare a mind map for budgets.



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13.02.23:

Standard Costing and Variance Analysis

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What Is A Standard Cost?

- Predetermined target cost which should be attained under efficient operating conditions
- The difference between the standard cost and the actual cost is called a variance

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Purpose of Standard Costing

- Cost control using variance analysis
- Gauging performance of a business unit
- Promotion of cost consciousness
- Provision of information for pricing
- Provision of product costs for inventory valuation
- Facilitates management by exception

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Standard Costing System

1. Establish standard costs
2. Measure actual performance
3. Comparison of actual v standard
4. Variances established
5. Investigation of variances
 - What is the problem?
 - Who is responsible?
 - What corrective action is required?

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- Prepare a mind map for standard cost.



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Example of Raw Material Variances

Standard material cost per unit: 2 kgs @ €5 per kg = €10
Material purchased: 10,000 kgs @ €5.50 per kg
Material used in production 8,000 kgs
Production: 3,200 units

Calculate:

1. Materials price variance (MPV)
2. Materials quantity variance (MQV)

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Material Variances - MPV

$$\begin{aligned} \text{MPV} &= (\text{AP} - \text{SP}) \times \text{AQ}^* \\ &= (\text{€}5.50 - \text{€}5) \times 10,000 \text{ kgs} \\ &= \text{€}5,000 \text{ Adverse} \end{aligned}$$

AP = Actual price paid per kg

SP = Standard price per kg

AQ* = Actual quantity of material purchased

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"Adverse" -> negative impact on business
=> we have to include the impact on business too ("adverse/unfavorable [a/u]" or "favorable[f]")

85

Material Variances - MQV

$$\begin{aligned} \text{MQV} &= (\text{AQ} - \text{SQ}) \times \text{SP} \\ &= (8,000 \text{ kgs} - 6,400 \text{ kgs}) \times \text{€}5 \\ &= \text{€}8,000 \text{ Adverse} \end{aligned}$$

AQ = Actual quantity of material used

SQ = The amount of material which should have been used for the output achieved (i.e. 3,200 units x 2 kgs = 6,400 kgs)

SP = Standard price per kg

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Possible Causes of Variances

- Material price variances
 - Unanticipated change in market conditions
 - Extra quantity discounts may be received
 - Purchase of inferior quality materials
- Material quantity variances
 - Wastage due to use of inferior quality materials
 - Use of higher quality materials than allowed for
 - Higher/lower level of worker efficiency than expected

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Example of Labour Variances

Standard labour cost per unit: 3 hours @ €8 per hr

Actual:

Wages paid for October	€76,500
Hours worked	9,000
Production (units)	3,200

Calculate:

1. Labour rate variance (LRV)
2. Labour efficiency variance (LEV)

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$$\text{LRV} = (\text{AR}-\text{SR}) \times \text{AH} = ((75,500/9,000)-8.00) \times 9000 \\ = 4,500 \text{ A}$$

88

Labour Variances - LRV

$$\begin{aligned}\text{LRV} &= (\text{AR} - \text{SR}) \times \text{AH} \\ &= (\text{€8.50} - \text{€8}) \times 9,000 \\ &= \text{€4,500 Adverse}\end{aligned}$$

AR = Actual labour rate per hour
(€76,500/9,000 hrs = €8.50)

SR = Standard labour rate per hour

AH = Actual hours worked

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Labour Variances - LEV

$$\begin{aligned}\text{LEV} &= (\text{AH} - \text{SH}) \times \text{SR} \\ &= (9,000 \text{ hrs} - 9,600 \text{ hrs}) \times \text{€8} \\ &= \text{€4,800 Favourable}\end{aligned}$$

AH = Actual hours worked

SH = Standard hours for the output achieved
(3,200 units produced x 3 hrs)

SR = Standard rate per hour

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Possible Causes of Variances

- Labour rate variance
 - Use of a higher/lower grade of labour than that specified in the standard
 - Wage rate increase
- Labour efficiency variance
 - Use of inferior quality materials
 - Use of higher quality materials than that specified in the standard
 - Machine breakdowns
 - Change in work practices

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Example of Variable Overhead Variances

Standard variable overhead per unit: 3 hrs @ €2 per hr

Actual:

Variable overheads for October	€17,100
Hours worked	9,000
Production (units)	3,200

Calculate:

1. Variable overhead spending variance (VOSV)
2. Variable overhead efficiency variance (VOEV)

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Variable Overhead Spending Variance VOSV

$$\begin{aligned} \text{VOSV} &= (\text{AR} - \text{SR}) \times \text{AH} \\ &= (\text{€1.90} - \text{€2}) \times 9,000 \\ &= \text{€900 Favourable} \end{aligned}$$

AR = Actual variable overhead rate per hr
(€17,100/9,000 hrs = €1.90)

SR = Standard variable overhead rate per hr
AH = Actual hours worked

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Variable Overhead Efficiency Variance VOEV

$$\begin{aligned} \text{VOEV} &= (\text{AH} - \text{SH}) \times \text{SR} \\ &= (9,000 - 9,600) \times €2 \\ &= €1,200 \text{ Favourable} \end{aligned}$$

AH = Actual hours worked

SH = Standard hours for the output achieved
(3,200 units x 3 hrs)

SR = Standard variable overhead rate per hr

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Possible Causes of Variances

- Variable overhead spending variance
 - Change in market prices
 - Using a different grade of indirect labour than that included in the standard
- Variable overhead efficiency variance

Note: This variance is a measure of the extra overhead (or savings) incurred because actual labour hours differ from standard hours. Therefore the causes are the same as for the Labour Efficiency Variance.

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Example of Fixed Overhead Expenditure Variance

Budgeted fixed overhead for the year	€300,000
Actual fixed overhead for the year	€320,000

Calculate:

Fixed overhead expenditure variance

Variance €20,000 Adverse

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Possible Causes of Variance

- Inaccurate budget estimates
- Unanticipated changes in costs (e.g. insurance)

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Example of Sales Variances

Budgeted selling price €40
Budgeted variable cost €32
Budgeted contribution € 8

Budgeted sales: 10,000 units
Actual sales: 9,000 units @ €42

Calculate:

1. Sales price variance; 2. Sales volume variance

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Sales Price Variance - SPV

$$\begin{aligned} \text{SPV} &= (\text{AP} - \text{BP}) \times \text{AQ} \\ &= (\text{€42} - \text{€40}) \times 9,000 \\ &= \text{€18,000 Favourable} \end{aligned}$$

AP = Actual price
BP = Budgeted price
AQ = Actual quantity sold

99

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Sales Volume (Quantity) Variance - SVV

$$\begin{aligned} \text{SVV} &= (\text{AQ} - \text{BQ}) \times \text{Contribution per unit} \\ &= (9,000 - 10,000) \times €8 \\ &= €8,000 \text{ Adverse} \end{aligned}$$

AQ = Actual quantity sold

BQ = Budgeted sales quantity

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Complete Worksheet Five

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Reconciliation of Budgeted Profit With Actual Profit

Budgeted profit	€ 100,000
Sales volume var.	€ 8,000 A
Sales price var.	€18,000 F 10,000 F
Materials price var.	€ 5,000 A
Materials quantity var.	€ 8,000 A
Labour rate var.	€ 4,500 A
Labour efficiency var.	€ 4,800 F
Variable O/H spending var.	€ 900 F
Variable O/H efficiency var.	€ 1,200 F
Fixed O/H expenditure var.	€20,000 A 30,600 A
Actual profit	€ 79,400

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Problems with Standard Costing

- Standards can quickly become outdated
- Factors beyond the control of the manager may affect a variance
- Difficult to demarcate management responsibilities
- No incentive to achieve beyond the standard
- Standards may create perverse incentives

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Cost Accumulation Systems

*Lifecycle Costing
Process Costing
Job Costing*

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Process Costing

- Used where a company produces many units of a single product for long periods at a time.
- Accumulate costs for an entire period and divide by the number of units produced during the period.
- Broad, average unit cost figure that applies to homogeneous units

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Lifecycle costs

- Lifecycle costing is a technique which requires the full environmental consequences, and, therefore, costs, arising from production of a product to be taken account across its whole lifecycle, 'from cradle to grave'.

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Features of Job Costing

- For unique jobs (services/build to order)
- Need to collect cost information for each job for pricing purposes / evaluation
- Examples:
 - dental practice
 - construction
 - car repairs
 - consultancy

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Job Cost Record (Job sheet)

- Direct material (Source document: materials requisition)
- Direct labour (Source document: time card)
- Overhead (Recovered using a predetermined overhead recovery rate)

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Tracing Costs to Jobs

- Direct materials/direct labour can be directly traced to individual jobs
- Overheads (indirect costs) cannot be directly traced to individual jobs
- A two-stage procedure is required to trace overheads to products

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Job Costing Example

A dentist estimates that her total overheads for next year will be €49,500 and that 1,500 hours of treatment time will be worked. The direct labour cost of an hour's treatment will be €50. If a patient spends 30 minutes receiving treatment and requires €25 of direct materials, what will the total cost of this treatment be?

$$\text{OHAR} = €49,500 / 1,500 \text{ hrs} = €33 \text{ per hr}$$

Job Cost:

Direct materials	€25
Direct labour (50% x €50)	€25
O/H (50% x €33)	€16.50
Total	€66.50

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Mark Up and Margin

- *Margin* (also known as gross margin) is sales minus the cost of goods sold.
 - If a product sells for €100 and costs €70 to manufacture, its margin is €30. Or, stated as a percentage, the margin percentage is 30% (calculated as the margin divided by sales).
- *Markup* is the amount by which the cost of a product is increased in order to derive the selling price.
 - A markup of €30 on the €70 cost gives the €100 sales price. Or, stated as a percentage, the markup percentage is 42.9% (calculated as the markup amount divided by the product cost).

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- Prepare a mind map for Job Costing.



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Accounting for Overheads

- Allocation
- Apportionment
- Absorption

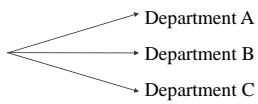
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Cost Allocation

- Tracing costs directly to a cost objective (e.g. departments)
- Example: Supervisors' salaries

- Salaries



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Cost Apportionment

- Used for indirect costs in relation to a cost objective (e.g. department)
- What is an appropriate base for apportioning rent?

- Rent

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Cost Apportionment (Cont'd)

Cost	Basis of apportionment to departments
Light and heat	?
Medical services	?
Staff canteen	?
Insurance of plant	?

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Dealing with Overheads for Product Costing

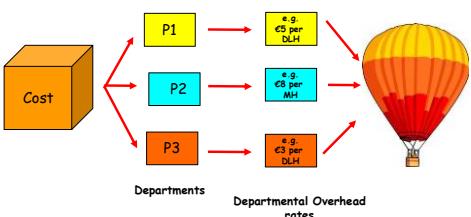
- Direct materials and direct labour can be traced directly to products
- Overhead requires a blanket or departmental overhead absorption rate
- Departmental overhead absorption requires a two stage procedure
 - Costs traced to departments
 - Costs absorbed into products using departmental overhead rates

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Overheads to Products – Two Stages

Stage 1: OH traced to Dept's Stage 2: OH assigned to products



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Complete Worksheet Six

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Absorption of Overhead into Products

Department P1 overhead rate (assuming this is a labour-intensive department)

$$= \frac{\text{Budgeted overhead}}{\text{Budgeted labour hours}}$$

$$= \frac{\text{€}500,000}{100,000 \text{ DLH}}$$

Overhead rate = € 5 per DLH

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Absorption of Overhead into Products

- Department P2 overhead rate (assuming this is a machine-intensive department)

$$= \frac{\text{Budgeted overhead}}{\text{Budgeted machine hours}}$$

$$= \frac{\text{€}160,000}{20,000 \text{ machine hours}}$$

= € 8 per MH

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Blanket versus Departmental Overhead Rates

Assume budgeted overheads for next year of €1.2 million and budgeted labour hours of 60,000, analyzed as follows:

	Dept. A	Dept. B	Dept. C
O/H	€400,000	€600,000	€200,000
DLH	10,000	40,000	10,000
OHAR	€40	€15	€20

The blanket overhead rate is €1.2 m/60,000 hours
= €20 per DLH

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Using the Blanket Rate

- Assume that the following labour hours are required for product X:
 - Department A: 3 hours
 - Department B: 3 hours
 - Department C: 1 hour

If we use the blanket rate, the overhead charged to product X will be:

$$7 \text{ hours} \times €20 = €140$$

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Using Departmental Rates

Department A: 3 hrs x €40	= € 120
Department B: 3 hrs x €15	= € 45
Department C: 1 hr x €20	= € <u>20</u>
Total	€ 185

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Why Use Budgeted Rather Than Actual Overhead Rates?

- To facilitate price quotations for jobs
- To enable the preparation of interim (e.g. monthly) financial statements
- Actual overheads will not be available until the end of a period (month, quarter, year)

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Normal Versus Actual Costing

- Both methods use actual direct material and direct labour costs
- The difference arises ONLY in the treatment of manufacturing overhead costs
- Where budgeted overhead rates are used, this is referred to as 'normal costing'
- Where actual overhead rates are used, this is referred to as 'actual costing'

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Problems of Using Budgeted (Predetermined) Overhead Rate

- Estimating overhead costs
- Estimating the volume of activity
- Overabsorption / underabsorption arises where overhead absorbed using the budgeted rate is different from the actual overhead incurred

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Examples of Under/Overabsorption of Overheads

Budgeted o/h for 2009	= €500,000
Budgeted activity for 2009	= 100,000 DLH
∴ Budgeted O/H rate	= €5 per DLH

Assume the following actuals for 2009:

Overheads	= €550,000
Activity	= 90,000 DLH

What is the amount of the under/overabsorption of overheads?

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Under/Overabsorption of Overheads (Cont'd)

Actual overhead (2009) = €550,000

Overhead absorbed

(90,000 hrs x €5) = €450,000

Overhead underabsorbed = €100,000

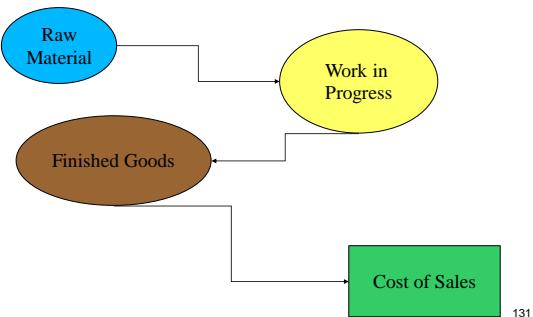
This is written off as a debit to the cost of goods sold account.

If the overhead is over absorbed, it is credited to the cost of goods sold account.

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Flow of costs



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Flow of Costs

- Movement of costs through the company and ledgers.
- Most applicable to a manufacturing firm (in a services firm most costs are incurred and charged to expense at the same time).
- Includes inventory costs (e.g. cost of raw materials) and factors in other processes to which a cost is attached such as labour and overhead.

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- Prepare mind maps for the concepts of:
 - Cost allocation
 - Cost apportionment
 - Cost absorption
 - Normal costing
 - Actual costing



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Activity-Based Techniques

- ABC
- ABCM

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Critical Questions for Any Business

- How profitable are our products/services?
- How profitable are our customers?
- How can we become more efficient, effective and profitable?
- What are our high-cost activities, and what opportunities exist for cost reduction?

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Activity-Based Costing (ABC)

- Background
 - Dissatisfaction with traditional product costing systems
- The traditional method
 - Overheads assigned to products on basis of production volume (using labour hours)
- Limitations of traditional system
 - Declining significance of direct labour content
 - Many support costs transaction driven
 - Treatment of non-production overheads

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What is ABC?

- Method of assigning overheads to products to give more accurate product cost information for
 - pricing decisions
 - strategic marketing decisions
 - customer profitability analysis
- System which recognizes that activities consume resources and products consume activities

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Important ABC Definitions

- **Process:** A network of related and interdependent activities such as:
 - the lending process in a bank
- **Activity:** An element of work such as:
 - receiving a loan application
 - credit analysis
 - loan approval
- **Drivers:** Factors that cause the activity:
 - number of loan applications
 - number of loans analyzed
 - number of loans reviewed by credit committee

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Stages in ABC Process

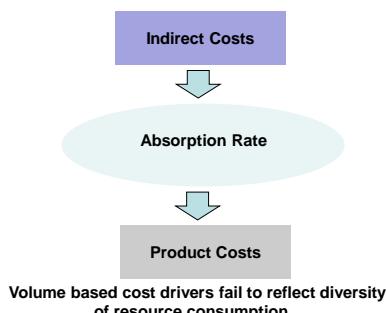
1. Identify activities
2. Trace costs to activities (cost pools)
3. Establish cost drivers, e.g.

Activity cost pools	Cost drivers
Purchase materials	Number of orders
Inspect items	Number of inspections
Provide ATM services	Number of ATM transactions
Set up machines	Set-up hours

4. Use cost drivers to assign overheads to products/services

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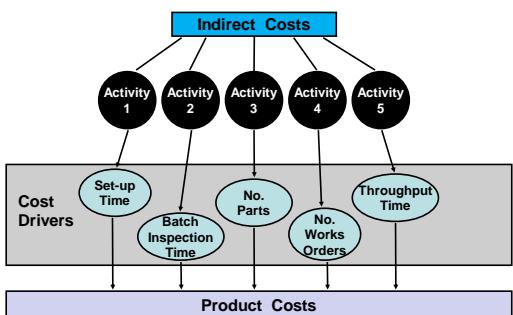
Traditional Product Costing



Volume based cost drivers fail to reflect diversity of resource consumption

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Activity Based Product Costing



Understanding activities and cost drivers creates a meaningful link between products and the resources they consume

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ABC Example

Annual production: Product X: 10,000 units
Product Y: 10,000 units

Each unit requires 1 DLH

Set-up costs: €55,000 per year

Number of set-ups: 22 per year

Product X: Produced in 20 batches (500 units per batch)

Product Y: Produced in 2 batches (5,000 units per batch)

- How are set-up costs assigned
 - under traditional costing?
 - under ABC?

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Traditional Costing

$$\begin{aligned}\text{Overhead rate} &= \frac{\text{€55,000}}{20,000 \text{ DLH}} \\ &= \text{€2.75 per DLH}\end{aligned}$$

$$\begin{aligned}\text{Assigned to: Product X: } &10,000 \times \text{€2.75} \\ &= \text{€27,500}\end{aligned}$$

$$\begin{aligned}\text{Product Y: } &10,000 \times \text{€2.75} \\ &= \text{€27,500}\end{aligned}$$

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ABC Calculation

$$\begin{aligned}\text{Cost driver rate for set-ups: } &\frac{\text{€55,000}}{22} \\ &= \text{€2,500 per set-up}\end{aligned}$$

$$\text{Product X: } 20 \times \text{€2,500} = \text{€50,000}$$

$$\text{Product Y: } 2 \times \text{€2,500} = \text{€ 5,000}$$

Overhead assigned using:

	Traditional	ABC
X	€27,500	€50,000
Y	€27,500	€ 5,000

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Where ABC Is Appropriate

- Significant amount of overhead
- High and low volume products
- Some products making greater demands on support activities than others

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ABC - Areas of Application

- Product costing for strategic decisions
- Environmental ABC
- Cost management (ABCM)
 - Cost reduction through activity management
- Performance management
 - Cost driver rates
 - Activity times (set-up times, lead times, etc.)
- Customer profitability analysis
- Budgeting (ABB)

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Environmental ABC

- Environmental costs are often hidden in general overhead
- Using ABC, environmental costs are removed from overhead costs and traced to products and services using environmental cost drivers

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Activity-Based Cost Management (ABCM)

	€000
Customer order processing	
Conventional analysis	
Salaries	290
Office equipment depreciation	84
Travel and accommodation	158
Stationery and office supplies	31
Telephone	29
	<u>592</u>
ABC analysis	
Vetting of customer (credit worthiness, etc.)	90
Order taking	114
Customer agreements	38
Quotations and pricing	105
Customer liaison	91
Problem/error resolution	84
Expediting	70
	<u>592</u>

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Customer Profitability Analysis

The Kanthal Case (Cooper and Kaplan)

- 70% of customers breaking even
- 20% of customers generating 225% of profits
- 10% of customers losing 125% of profits

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Problems With ABC

- Staff time and effort
- Staff resistance
- Cost of collecting data
- Benefits difficult to quantify
- Difficulty of developing suitable cost drivers

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ABC Questions

- How are overheads traced to products under traditional costing?
- How are overheads traced to products under ABC?
- Why should managers be concerned about product over or undercosting?
- Give examples where ABC information is useful.

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Cost-Volume-Profit Analysis

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Cost-Volume-Profit Analysis (CVP)	Profit planning technique
	Examines financial impact of changing activity levels
	Provides information on RISK break-even point margin of safety
	Answers 'what if' questions

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?	How will costs and revenues be affected if we sell 1,000 more units?
	How will costs and revenues be affected if we increase occupancy by 5% in our hotel?
	How many units do we need to sell to break even?
	How many units do we need to sell to make a required profit?
	What price do we need to charge to make a required profit?

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CVP Terminology	
Break-even point (BEP)	<ul style="list-style-type: none"> • No profit, no loss
Unit contribution	<ul style="list-style-type: none"> • selling price - variable cost • represents the portion of sales revenue that is not consumed by variable costs and so contributes to the coverage of fixed costs.
Contribution margin ratio	<ul style="list-style-type: none"> • contribution/selling price

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Example

A product has the following selling price and variable cost:

Selling price: €50

Variable cost: €30

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Example

Unit contribution = €50 - €30 = €20

Contribution margin ratio (CMR) = €20/€50 = 40%

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CVP Methods - Calculating the Break-Even Point

1. Equation method:

$$S - VC - FC = 0$$

2. Contribution margin method:

$$BEP \text{ (units)} = \frac{\text{Fixed costs}}{\text{Unit contribution}}$$

3. CMR method:

$$BEP \text{ (€)} = \frac{\text{Fixed costs}}{\text{CMR}}$$

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Application of CVP Analysis Using the Three Methods

A company produces a single product with the following details:

Selling price per unit	€20
Variable cost per unit	€ 5
Annual fixed costs	€300,000

Calculate the BEP in units and euros.

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Equation Method

Let X = the units to break even

Then using the equation $S - VC - FC = 0$

$$20X - 5X - €300,000 = 0$$

$$15X = €300,000$$

$$X = 20,000 \text{ units}$$

If a profit is required, it will replace the zero in the equation.

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Unit Contribution Method

$$\begin{aligned} \text{BEP (units)} &= \frac{\text{Fixed costs}}{\text{Unit contribution}} \\ &= \frac{€300,000}{€15} \\ &= 20,000 \text{ units} \end{aligned}$$

If a profit is required, it is added to the fixed costs to obtain the required number of units.

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CMR Method

$$BEP (\text{€}) = \frac{\text{Fixed costs}}{\text{CMR}}$$

(Note that CMR = €15/€20 = .75)

$$\text{€}300,000/.75 = \text{€}400,000 \text{ (or 20,000 units)}$$

Again, if a profit is required, it is added to the fixed costs

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Uses of CM Ratio and BE sales volume

- Especially useful when the company sells a large number of different products - in other words a large sales mix. Take for example a shop selling 200 different items, or more. Each item carries its own selling price, and contribution margin per unit.
- Calculating all those contribution margins would be a huge job. And with a sales mix, the company would have to carefully track each and every product. It is much easier to consider the merchandise as a large group, and use the CM Ratio.

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Margin of Safety (MOS)

Shows by how much the expected (budgeted) sales can decline before a loss is made. The lower it becomes, the riskier the outcome.

$$\text{Margin of safety} = \frac{\text{Expected sales} - \text{BEP}}{\text{Expected sales}}$$

Illustration:

Assume budgeted sales for 2009: 25,000 units
Break-even point for 2009: 20,000 units

$$\text{MOS} = \frac{25,000 - 20,000}{25,000} = 20\%$$

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Converting After-Tax Profit to Before-Tax Profit

Formula: $\frac{\text{After-tax profit}}{1 - \text{tax rate}}$

Example:

Required after-tax profit €60,000

Tax rate 40%

Before-tax profit = $\frac{\text{€60,000}}{1 - .4}$ = €100,000

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Dealing With Taxation

Example:

A company produces a single product:

Selling price €50

Variable costs €20

Annual fixed costs €500,000

Tax rate 40%

How many units must it sell to make an after-tax return on sales of 9%?

\therefore Before-tax return = $.09/1 - .4 = .15$ (which is 15%)

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Solution

Let X = number of units required

$$50X - 20X - €500,000 = .15 (50X)$$

$$30X - 7.5X = €500,000$$

$$22.5X = €500,000$$

$$X = 22,222 \text{ units approx.}$$

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Multi-Product CVP

A company produces and sells three products:

	A	B	C
Selling price	€10	€40	€50
Variable cost	€ 5	€20	€20
Sales mix	20%	30%	50%

In addition, we are informed that annual fixed costs amount to €2.2 million.

Calculate the BEP in units for each product.

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Solution to Multi-Product CVP

	A	B	C
Unit contribution	€5	€20	€30
Sales mix	<u>20%</u>	<u>30%</u>	<u>50%</u>
Weighted contrib.	€1	€6	€15

Total weighted contribution = €22

BEP = €2,200,000/€22 = 100,000 units

BEP by product = A:20,000; B:30,000; C:50,000

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Complete Worksheet Eight

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Basic Assumptions in CVP Analysis

1. Selling price per unit is constant
2. Total costs can be separated into variable and fixed costs
3. Variable costs change in direct proportion to changes in sales volume
4. Total fixed costs remain constant over the relevant range
5. Sales mix remains constant
6. Constant technology and productivity
7. A certain world

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- Prepare a mind map for:
 - CVP



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Decision Making and Scarce Resources

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Decision Making and Limiting Factors

- Limiting factors restrict output
 - Examples of limiting factors?
- Objective is to concentrate on those products that yield largest **contribution per unit of scarce factor**

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Five Step Approach

1. Establish limiting factor
2. Calculate contribution per unit of output for each product.
3. Calculate contribution per unit of limiting factor.
4. Rank products in order of priority
5. Calculate the production quantities

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Complete Worksheet Nine

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Decision Making and Limiting Factors

- Assume machine capacity limited to 1,200 hours

<i>How to rank the products:</i>	A	B	C
Contrib. per unit	€12	€10	€6
Machine hrs per unit	5 hrs	2 hrs	1 hr
Estimated sales demand (units)	200	300	500
Contrib. per machine hour	€2.40	€5	€6
Ranking	3	2	1

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Optimal Production Plan (Hours available: 1,200)

Product	Hours used	Hours unused
C	(500 x 1 hr) = 500	700
B	(300 x 2 hrs) = 600	100
A	(20 x 5 hrs) = 100	Nil

∴ Optimal production plan:

Product	Units
A	20
B	300
C	500

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Illustration: Bayview Company

The following budget data are available about Bayview Company for 2009:

Product	R	S	T	W
Selling price (unit)	€40	€30	€25	€20
Variable cost (unit)	€20	€12	€10	€8
Fixed cost (unit)	€5	€6	€4	€5
Kgs of material F (units)	4kgs	6kgs	6kgs	3kgs
Max demand (units)	10,000	5,000	3,000	4,000

Assuming that supplies of material F are limited to 64,000 kgs in 2009, what number of units of each product should be produced and sold to maximize profits?

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Solution: Bayview Company

	R	S	T	W
Contribution margin	€20	€18	€15	€12
Kgs per unit	4	6	6	3
Contribution per kg	€5	€3	€2.50	€4
Ranking	1	3	4	2

Optimal Production Plan

Product	Kgs used	Kgs unused
R	10,000 x 4 kgs	24,000
W	4,000 x 3 kgs	12,000
S	2,000 x 6 kgs	Nil
T	Nil	

Answer: R: 10,000 S: 2,000 T: Nil W: 4,000

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Qualitative Factors

- It is important to remember the necessity of considering other qualitative factors before the production programme is determined.
- For example, customer goodwill may be lost, causing a fall in future sales, if the company is unable to supply a range of products to its regular customers.
- To satisfy these customers, the optimal production plan may be altered. This will result in the optimal contribution figure being reduced. The amount of the reduction is an example of opportunity cost.

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Decision Making and Relevant Information

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The Decision-Making Process

- Define the objectives
- Develop alternative courses of action
- Gather relevant data about the alternatives
- Consider qualitative factors
- Make a decision

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Cost Concepts for Decision Making

- Relevant costs
 - Future costs
 - Differ among alternative courses of action
- Sunk costs
 - Already incurred or committed
 - Will not change with the decision
- Opportunity cost
 - Benefit foregone as a result of some action
 - Relevant in decision making

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Quantitative and Qualitative Factors in Decision Making

What quantitative and qualitative factors should be considered in a make or buy decision regarding components?

- Quantitative factors:
 - Relevant cost of internal manufacture *versus* external purchasing cost
- Qualitative factors:
 - Reliability of the supplier
 - Quality of components supplied
 - Proximity of supplier

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Examples of Relevant Costs

Decision: Purchase monthly rail ticket or use your car. Which of the following are relevant costs in the decision?

- Car tax?
- Car insurance?
- Petrol cost?
- Cost of rail ticket?

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Illustration 1 - Relevant Costs

A company receives a special order to produce 100 units of Product X
Materials required:

- 2 kgs per unit
- None in stock
- Purchase price: €5 per kg

Labour required:

- 2 hours per unit
- Rate per hour: €5
- Company has spare labour capacity to do this job

Variable overheads: Calculated at €2 per unit

Special equipment required for this job: Cost of hire: €400

The customer states that his maximum offer is €2,200 for the job.

WOULD YOU ACCEPT?

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Solution to Illustration 1

Relevant costs

Materials (100 x 2kgs x €5)	€1,000
Labour (no incremental cost)	Nil
Variable overheads (100 x €2)	€ 200
Special equipment	€ 400
Total relevant costs	€1,600
Customer offer	<u>€2,200</u>
Difference	€ 600

Would you accept the offer?

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Illustration 2 - Relevant Costs

- Oil Company has paid Irish Govt. €15m for oil exploration rights
- If oil is found, Oil Company must pay €24 for every barrel produced
- Company has spent €9m on drilling and has just struck oil
- Company estimates it will recover 10m barrels of oil
- Oil can be sold for €30 per barrel and will cost €3 a barrel to extract
- Govt. has imposed an additional fee of €2 a barrel to pay for insurance against oil spills

Should the company begin producing oil?

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Solution to Illustration 2

Decision to produce the oil should only be taken if incremental cash inflows exceed the incremental cash outflows:

Incremental cash inflows	€m
Income (10m barrels @ €30)	<u>300</u>
Incremental cash outflows	
Royalty to Govt (10m @ €24)	240
Production costs (10m @ €3)	30
Insurance levy (10m @ €2)	<u>20</u>
Overall cash surplus	€ 10

€24m spent on exploration rights and drilling costs is a sunk cost

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Illustration 3

Lex Company needs 1,000 motors for its car manufacture. It can buy these from Apex Motors for €1,250 each. Lex's plant can manufacture the motors for the following costs per unit:

Direct materials	€ 500
Direct labour	250
Variable manufacturing overhead	200
Fixed manufacturing overhead	350
Total	€ 1,300

If Lex buys the motors from Apex, 70% of the fixed manufacturing overhead applied will not be avoided.

1. Should Lex make or buy the motors?
2. What other factors should be considered in this decision?

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Determining the Relevant Cost of Materials

Where materials must be purchased Current purchase price

Where materials are in stock and:

1. Will be replaced if used on this order Replacement cost
2. Will be sold if not used on this order Current selling price
3. Will be dumped if not used now Nil opportunity cost
4. As in 3 but cost of disposal is €500 Saving of €500 if used

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Determining the Relevant Cost of Labour

- Where spare capacity exists and the existing labour force can accomplish additional work
 - *Nil incremental cost*
- Where additional labour (or overtime) is required to undertake a special order
 - *Relevant*

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DECISION MAKING AND UNCERTAINTY

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Risk and Uncertainty

Risk – several possible outcomes AND past experience which can be used to statistically predict possible outcomes

Uncertainty – several possible outcomes AND little previous statistical evidence

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Probability Distribution

	Student A probability	Student B probability
Outcome:		
Pass examination	0.9	0.6
Do not pass	<u>0.1</u>	<u>0.4</u>
	<u>1.0</u>	<u>1.0</u>

- Probability distributions provide more meaningful information than stating the most likely outcome (i.e. both students will pass).

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Product A probability distribution

(1) Outcome	(2) Estimated probability	(3) Weighted amount (col.1x col.2) €
Profits of €600 000	0.10	60 000
Profits of €700 000	0.20	140 000
Profits of €800 000	0.40	320 000
Profits of €900 000	0.20	180 000
Profits of €1 000 000	<u>0.10</u>	<u>100 000</u>
	<u>1.00</u>	<u>800 000</u> Expected value

200

200

Product B probability distribution

(1) Outcome	(2) Estimated probability	(3) Weighted amount (col. X col.2) €
Profits of €400 000	0.05	20 000
Profits of €600 000	0.10	60 000
Profits of €800 000	0.40	320 000
Profits of €1 000 000	0.25	250 000
Profits of €1 200 000	<u>0.20</u>	<u>240 000</u>
value	<u>1.00</u>	<u>890 000</u> Expected value

Which product should the company make?

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Product C probability distribution

Outcome (EV)	Estimated probability	Expected value €
Loss of €400 000	0.5	(200 000)
Profit of €2 200 000	0.5	<u>1 100 000</u> <u>900 000</u>

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Choosing the Product

Product C has a higher EV than either products B or C, but it is subject to greater uncertainty.

The standard deviation is often used to measure the dispersion of the possible outcomes:

$$\begin{array}{ll} \text{SD of A} & = €109\,540 \\ \text{SD of B} & = €214\,240 \\ \text{SD of C} & = €1\,300\,000 \end{array}$$

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Standard Deviation

- The standard deviation measures dispersion around the expected value
- Does not measure downside risk.
- Scale effect - SD of 200 with an EV of 2000 has the same relative variation as a SD of 2000 with an EV of 20000.

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Maximin, maximax and regret criteria

Can be applied where it is not possible to assign meaningful probabilities to alternative courses of action.

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Maximin/Maximax

Example

	Low demand	High demand
Machine A	€100 000	€160 000
Machine B	€10 000	€200 000

MaxMin - the largest payoff is selected based on the assumption that the worst possible outcome will occur.

Machine A = €100 000
Machine B = €10 000
Decision = Choose product A

Maxmax - the largest payoff is selected assuming the best possible outcome will occur.

Machine A = €160 000
Machine B = €200 000
Decision = Choose product B

4.

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Regret Criterion

Regret table

	Low demand occurs	High demand occurs
Choose machine A	0	40 000
Choose machine B	€90 000	0

The aim of the regret criterion is to minimize the maximum possible regret.

The maximum regret is €40 000 for A and €90 000 for B.

Therefore, choose A.

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Worksheet One – Cost Classification

Classify each of the following costs as variable, fixed, mixed, or step by writing an X under one of the following headings (Sales volume is the cost driver).

		Variable	Fixed	Mixed	Step
1.	Total selling costs				
2.	Supervisor salary				
3.	Raw materials used in production				
4.	Electricity consumption in a restaurant				
5.	Cost of goods sold in a bookstore				
6.	Salaries of employees who process claims in an insurance company.				
7.	Pulpwood in a paper mill				
8.	Salaries of an executive assistant in the corporate office				
9.	Total current manufacturing costs				
10.	The cost of vehicle rented on the basis of a daily charge plus €30 per mile				
11.	Production waste disposal costs				
12.	Extra emissions allowance for an electricity generator				

Worksheet Two – Cost behaviour

How do total costs change with changes in units of production?

Total Cost



Total Quantity

How do variable costs change with changes in units of production?

Why do variable costs behave in this way?

Variable Cost



Total Quantity

How do variable costs **per unit** change with changes in units of production?

Variable Cost **per unit**



Total Quantity

How do fixed costs change with changes in units of production?

Fixed Cost



Total Quantity

How do fixed costs **per unit** change with changes in units of production?

Why do fixed costs behave in this way?

Fixed Cost **per unit**



Total Quantity

Worksheet Three - Individual Field Trip: Fixed and Variable Costs

Visit a business of your choosing and look for fixed and variable costs. This can be at a place where you work (in which case you would have an insider's view) or at a place where you are a customer (in which case you will only be able to record what you observe). Some suggestions of where you might observe fixed and variable costs: a bank, a retail shop, a theatre, restaurant, doctor's office... just about ANY business. As you observe, try to put yourself in the place of the business owner/operator and think of which costs are fixed and which are variable.

Place you observed fixed and variable costs: _____

Nature of the business: _____

Name at least three fixed and three variable costs that you observed. For each, explain *why* you think the cost is fixed or variable:

Consider the concept of operating risk. Does the business you are observing have a high degree of operating risk? How do you know? How might the company benefit from more operating leverage?

Worksheet Four - Preparing a personal budget

What's coming in?	Weekly	Monthly
Grants		
Part time job		
Savings		
Money from home/guardians		
Other (awards, scholarships, etc)		
Total Income		
What's going out?		
Household		
Rent		
Rent Deposit		
Food		
Electricity		
Gas/Oil		
Broadband		
TV Licence		
Bin Charges		
Food		
At home		
At College		
Night out		
Travel		
Buses / trains / taxis		
Car costs		
Loan repayments		
Tax		
Insurance		
Fuel		
Parking		
College costs		

Fees (where applicable)		
Books		
Printing		
Photocopying		
Lab Equipment		
Class materials		
Fieldtrips		
Other		
Personal expenses		
Loan repayments		
Medicines and toiletries		
Social life costs		
Alcohol		
Cigarettes		
Clubs and societies		
Mobile phone		
Clothes		
Sporting pursuits		
Other		
Total Expenditure		
Balance (income less expenditure)		

How does this budget compare to a budget prepared for a business? What items would be different and what items would be the same?

Worksheet Five – Variance Table

Usually a minimum of two variances are computed for each product input/revenue. Complete the table below:

Input:		Variance 1	Variance 2
Direct material	Term	Price Variance	
	Formula	(AP-SP)*AQ (Actual price – standard price) *Actual quantity purchased	
	Impact on profit	Adverse = negative impact on profit Favourable = positive impact on profit	
Direct labour	Term		
	Formula		
	Impact on profit		
Manufacturing overhead - fixed	Term		
	Formula		
	Impact on profit		
Manufacturing overhead - variable	Term		

	Formula		
	Impact on profit		
Sales		Variance 1	Variance 2
	Term		
	Formula		
	Impact on profit		

Worksheet Six – Cost Allocation

Consider a house or apartment share, how should the following be shared?

Rent –

Electricity -

Broadband –

TV package -

Bin charges -

TV Licence -

Food -

Heating Costs -

Does the method you use to share costs matter? Why?

Will the method you select affect the total cost incurred?

Now think of the house as a company and each of the housemates as a product the firm manufactures. What are the common costs that a company incurs?

These common costs must be shared between products. How can these costs be shared (apportioned/allocated/absorbed)?

How will this allocation affect the profits of the entire firm, and the behaviour of the product manager?

Worksheet Seven – ABC

The following information is provided about the costs and activities involved in producing customised catering equipment. These are the **total annual budgeted figures** to produce 30,000 units.

Colour	Activity Represented	Budgeted overhead €	Cost Driver	Budgeted Activity
	Assembly	150,000	No of units	30,000 Units
	Inspection	125,000	No of Inspections	5,000 Inspections
	Setups	55,000	No of set-ups	25,000 Set-ups
	Engineering changes	121,000	No of Chng orders	12,100 Change orders
	Machine Cost	20,000	No of Machine hrs	20,000 Machine hrs

Exercise 1

Traditional Costing

Step 1 Calculate the overhead rate using machine hours

Total budgeted overhead

Total budgeted machine
hours

Overhead rate

Step 2 Apply the overhead rate to individual job

Number of machine hours

Overhead rate

Applied overhead

Step 3 Job Cost Sheet

€

Direct materials

20kgs at €7.50 per kg 150

Direct labour

15hrs at €18 per hour 270

Applied overhead

Total Job Cost

Round 2 ABC

Step 1 Calculate the activity cost pool rates

Colour	Activity Represented	Budgeted o/h €	Cost Driver	Budgeted Activity	Cost Pool Rate
	Assembly	150,000	No of units	30,000 Units	
	Inspection	125,000	No of Inspections	5,000 Inspections	
	Setups	55,000	No of set-ups	25,000 Set-ups	
	Engineering changes	121,000	No of Chng orders	12,100 Change orders	
	Machine Cost	20,000	No of Machine hrs	20,000 Machine hrs	

Step 2 Apply rates to individual job

Colour	Count	Cost Pool Rate	Applied overhead
--------	-------	----------------	------------------

Step 3 Job Cost Sheet

€

Direct materials 20kgs at €7.50 per kg	150
Direct labour 15hrs at €18 per hour	270
Applied overhead	_____
Total Job Cost	_____

Worksheet Eight – Variance Table

How can we calculate a BEP when a company sells more than one product? For example, a company produces three (3) types of valves: truck valves, car valves, and motor-bike valves. The following data is available:

	Truck Valves	Car Valves	Motor-bike Valves
(A) Share of volume sold, %	30%	45%	25%
(B) Selling price per unit,	€10	€8	€7
(C) Variable costs per unit,	€7	€6	€5
(D) Contribution per unit, (B - C)	€3	€2	€2
(E) Contribution margin ratio (D ÷ B)	0.30	0.25	0.29
(F) Fixed costs total,	€10,000		

How do we know how much of each product needs to be sold to breakeven?

Will the weighted average contribution method work for the CMR method?

Can we prove that this is the correct BEP?

Worksheet Nine – Limiting Factors

A company produces products A,B,C,D. Next year materials are restricted to 38,000kg and labour to 21,000 hours

	A	B	C	D
Selling price per unit €	44	50	30	70
Costs per unit				
Direct materials (€2 per kg)	8	10	6	10
Direct labour (€5 per hour)	10	10	5	15
Variable overhead €	8	8	4	12
Fixed overhead €	10	10	5	15
Profit per unit €	8	12	10	18
Budgeted production and sales in units	2000	2500	2600	3000

Is there a limiting factor?

What is the contribution per limiting factor?

What is the optimal production plan?

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Section 1 Introduction to Management Accounting

What is Management Accounting?

Management accounting is concerned with the provision of information to managers inside an organisation. These managers are responsible for achieving the organisation's objectives and this involves planning and controlling its operations. In contrast, Financial Accounting is concerned with providing information to shareholders, lenders, creditors and others who are outside the organisation. The essence of accounting information, whether it is Management or Financial, is to assist the users in making informed judgements and decisions.

Management's Need for Information

Every organisation, large and small, has managers. These managers are responsible for the successful running of the business. The major objective may be to earn profits for the owners of the company by providing superior service at comparative prices in as many markets as possible. If this is the objective, top management will constantly consider a range of alternatives for expanding into new geographic markets.

Let us take an example of a chain of retail outlets selling a wide range of consumer products. After detailed consideration, top management decide to open a store in Hong Kong. Before the final decision is taken, management will have looked at the sales volumes, profit margins, and costs of the company's existing stores in similar markets. This information, supplied by the management accountant, is combined with expected sales volume data at the proposed new location in Hong Kong to estimate the profits that would be earned by the new store. Obviously we should be aware that information on expected future demand is always subject to an element of uncertainty. In general, virtually all-important alternatives considered by management in the planning process have some effect on revenues or costs, and managerial accounting information is essential in estimating those effects.

As part of the planning process, it is usual for companies to formalise plans by expressing them as budgets. A *budget* is a quantitative expression of a plan of action. Budgets are also an aid to coordinating and implementing plans. Without budgets, planning may not get the focus that is usually deserves.

While planning is one side of the coin, control is the other. In carrying out the control function, managers seek to ensure that the plan is being followed. Feedback, which signals whether operations are going according to plan, is the key to effective control. This information is usually provided by means of a performance report where actual results are compared with the budget and variances highlighted. For example, before the opening of the new Hong Kong store, the store's manager will be given sales volume, profit, and expenses targets. As the year progresses, periodic reports will be made in which the actual sales volume, profit, and expenses are compared with the targets. If the actual results fall below the targets set, top management is quickly made aware that the Hong Kong store needs more attention. Experienced personnel may be sent in to help the new manager, or top management may come to the conclusion that plans will have to be revised.

We should note that, although budgets aid planning and performance reports aid control, it is not accountants but other managers and their subordinates who evaluate accounting reports and actually plan and control operations. Accounting assists the managerial planning and control functions by providing prompt measurements of actual performance and by systematically pinpointing trouble spots.

Most organisations use managerial accounting information. For example, manufacturing firms use it to manage production costs. Similarly, retail businesses such as Carrefour use it to manage inventory levels. Companies in the service industries, such as those providing financial or other professional services, use such information to identify the most profitable services and to manage the costs of providing those services.

Management accounting is used in a wide variety of ways. Whatever the business, the organisation must know the cost of new products or services, the cost of making improvements in existing products or services, and the cost of finding a new way to produce the products or provide the services. Management accounting information is also used to determine prices, to change the range of products or services offered to improve profitability, to update manufacturing facilities, and to determine new marketing methods or distribution channels.

The Users of Accounting Information

Accounting is a language that communicates financial and non-financial information to people who have an interest in an organisation – managers, shareholders and potential investors, employees, lenders, suppliers, and the government. Managers, as previously mentioned, need information that will assist them in their decision-making and control activities. Shareholders require information on the value of their investment and the income that is derived from their shareholding. Employees require information on the financial stability of the business. Suppliers and lenders require information on a company's ability to meet its financial commitments. In addition, the tax authorities need information on the profits that are subject to taxation.

Differences between Financial and Management Accounting

The major differences between these two branches of accounting are:

- *Legal requirements.* There is a statutory requirement for public limited companies to produce annual financial accounts prepared according to prescribed accounting principles. Management accounting, by contrast, is entirely optional, and information should be produced only if it is considered that the benefits from the use of the information by management exceed the cost of collecting it.
- *Primary users.* Financial accounting is used by a variety of outside parties such as investors, lenders, creditors, and government agencies, and is also used by internal managers. Management accounting is solely for the use of internal managers at various levels of the organisation.
- *Time dimension.* Financial accounting reports what has happened in the past, such as the income statement for the last year, whereas management accounting has a future orientation. Decisions are concerned with future events, and management therefore requires details of expected future costs and revenues (i.e. budgets). Management will also make use of past information in assessing how the organisation has performed in relation to the targets set.
- *Report Frequency.* A detailed set of financial accounts is published annually and less detailed accounts are published semi-annually or quarterly. Management requires information quickly if it is to act on it and, consequently, management accounting reports may be prepared at daily, weekly or monthly intervals.

- *Range and detail of information.* Financial accounting reports provide an overview of the position and performance of the business over a time period. In contrast, management accounting focuses on small parts of the organisation, such as the profitability of individual products, services and customers. In addition, management accounting information measures the financial performance of the decentralised operating units, such as divisions and departments. As well as reporting financial information, management accounting reports may also include non-financial information that reflects the critical success factors of the organisation. Critical success factors are measures of those aspects of an organisation's performance essential to its competitive advantage and, therefore, to its success, such as on-time deliveries to customers, product quality and innovation. These metrics of non-financial performance are known as leading indicators that can reflect the drivers of future performance.

The main differences between Financial and Management Accounting are summarised in Exhibit 1.1.

Exhibit 1.1. Summary Comparison of Financial and Management Accounting

	Financial	Management
Legal requirements	Governed by accounting standards and company law	Not governed by accounting standards or legislation
Primary users	External	Internal
Time dimension	Historical (past)	Future emphasis
Report frequency	Annually, semi-annually or quarterly	As required by managers
Range of information	Summarised	Detailed

Criticisms of Management Accounting

Management accounting has, over a number of years, been subject to a number of criticisms. There have been suggestions that a decline has occurred in the relevance and usefulness of management accounting. The criticisms can be summarised into three broad areas: product costing, cost control and performance measurement.

- *Product costing.* The accurate calculation of the cost of manufacturing a product or offering a service is a vital input to the pricing decision. If the cost calculation is inaccurate, then a business may be selling its products at a price that is below its costs

or, alternatively, its price may be too high resulting in a loss of market share. When calculating the overhead that is charged to products many organisations have used a volume-based method, such as €10 per hour of labour worked on the product. The assumption being made is that the overhead is caused by one factor only, namely volume of production. However, it may be that there are other factors which impact on the company's overheads such as the demands made on support services such as materials purchasing or quality testing. These support services are not driven by the volume of production but by the number of purchase orders or the number of quality inspections. A more recently developed approach to improve the accuracy of costing of products and services is called activity-based costing (ABC) and this topic will be covered in detail in a later section.

- *Cost control.* The importance of controlling costs is vital for companies operating in a highly competitive environment since price may be an important element of success. Many companies use the budget as a means of controlling costs where the actual spending on elements of cost such as salaries, travel, stationery and entertainment is compared with the budget. Any over-spending is critically examined so that it can be speedily brought under control. This approach to cost control places the emphasis on elements of cost. The question asked is how much did the company spend on costs such as salaries compared with the budget. Surely a more important question is why was the money spent? On investigation we may discover that some of the activities for which salaries are paid are unnecessary or are being performed inefficiently. This type of analysis is unlikely to happen with the traditional approach to cost control.
- *Performance Measurement.* Management accounting has been accused of placing too much emphasis on short-term results. This is the tendency by managers to place a major focus on the achievement of maximum profits in the immediate accounting period, due in part to the expectations of the stock market. The reaction of the management is to take action to improve short-term profitability that may seriously damage the long-term viability of the business. Typical examples include cutbacks on staff training and advertising, delayed spending on equipment maintenance and reduced emphasis on quality. In response to this type of dysfunctional behaviour by management a new approach to performance measurement has been developing since the early 1990s. It is called the Balanced Scorecard that strikes a balance between financial and non-financial measures, links performance to rewards, and gives explicit recognition to the diversity of organisational objectives. The Balanced Scorecard

provides a performance measurement framework based on critical success factors in four different dimensions. One dimension is financial; the other dimensions are non-financial:

- *Financial performance*: measures of profitability and market value, among others, as indicators of how well the company satisfies its owners and shareholders.
- *Customer satisfaction*: measures of quality and service, among others, as indicators of how well the company satisfies its customers.
- *Internal business processes*: measures of the critical internal activities that must be performed effectively and efficiently by the company in order to satisfy the expectations of its customers. These measures include quality, manufacturing cycle times and on-time deliveries.
- *Innovation and learning*; measures of the company's ability to develop and utilize human resources in order to achieve superior internal processes that create value for customers and shareholders. These measures include employee education and skill levels, employee satisfaction and employee retention levels.

The Role of the Management Accountant

The management accountant has a vital role to play in developing the information that managers need to run their companies effectively and to make them more competitive and successful. The management accountant is no longer seen as a number cruncher but as a vital partner in the business team providing information for strategic management, planning and decision-making and control. Managers need information to make sound strategic decisions regarding choice of products, production methods, distribution channels, marketing techniques and other long-term issues. Strategic management is the development of a sustainable competitive position in which the company's competitive advantage provides continued success. Managers also need information for planning and decision-making which involves budgeting and profit planning, cash flow management, and other decisions such as pricing. Information is also needed to provide a basis for identifying inefficient operations and to evaluate and reward managerial performance. Management control information has a vital role to play in influencing managerial behaviour, positively or negatively, and therefore needs to be designed very carefully – “what you measure is what you get”.

The Changing Business Environment and Management Accounting

Many changes in the business environment in recent years have had a significant impact on management accounting practices. Major changes include: environmental, social, political and cultural changes; increasing global competition; advances in technology; greater customer; new forms of management organisation.

The Global Business Environment

A major factor driving the extensive changes in the contemporary business environment is the growth of international markets and trade. Many businesses are significantly affected by the rapid growth of economic interdependence and increased competition from other countries. For example, the World Trade Organisation (WTO), the European Union (EU) and the growing number of alliances among large international companies clearly indicate that the opportunities for growth and profitability lie in global markets. The increasing competitiveness of the global business environment means that, to be competitive, businesses increasingly need managerial accounting information.

Manufacturing technologies

To remain competitive, companies around the world are adopting new manufacturing technologies. These include just-in-time (JIT) inventory methods to reduce the cost and waste of maintaining large levels of raw materials, unfinished and finished product. Also, many companies have adopted total quality management (TQM) systems that have produced significant cost and quality improvements. Other manufacturing changes include flexible manufacturing techniques, developed to reduce set-up times of machinery and allow speedier production and delivery of customer orders. A key competitive edge in what is called ‘speed-to-market’ is the ability to deliver the product or the service faster than the competition.

Advances in information technologies

Perhaps the most fundamental of all business changes in recent years has been the increasing use of information technology, e-commerce and data analytics. These technologies have fostered the growing strategic focus in managerial accounting by reducing the time required for processing transactions and by expanding the individual manager’s access to information within the company, the industry and the business environment around the world.

Focus on the customer

Customers are crucial to the success of a business. The number of companies aiming to be ‘customer driven’ is large and increasing. Producing value for the customer changes the focus of managers from low cost production of large quantities to quality, service, on-time delivery and the ability to respond to the customer’s desire for specific features.

Environmental, social, political and cultural changes

Global awareness of environmental issues has risen significantly during the past two decades, and there are increased concerns over major issues such as global warming, depletion of non-renewable resources, and loss of natural habitats. This has led to a general questioning of business practices and numerous calls for change. Traditional accounting, both management and financial, has failed to appropriately accounting for the environmental and social impacts of business organisations. Environmental management accounting (EMA) is an innovative management accounting approach that covers a large range of tools, for example input/output analysis, environmental activity-based costing and life-cycle costing, with the aim of supporting environmentally beneficial decision-making within organisations. EMA is concerned with two types of information, physical information and monetary information. Physical information includes environmental inputs and outputs e.g. waste, raw materials, water, energy, biodiversity. Monetary information includes the financial aspects of environmental inputs and outputs e.g. pollution penalties, costs of waste disposal. Materials, energy and emission accounting has been the main area of application of EMA in practice for the last two decades.

In addition significant changes have also taken place in the social, political and cultural environments that affect business. Although the nature and extent of these changes vary a great deal from country to country, these changes requires companies to be flexible and adaptable to the cultures of other countries.

New forms of management organisation

Because of the focus on customer satisfaction and value, the emphasis has shifted from financial and profit-based measures of performance to customer-related non-financial performance measures, such as quality, delivery time and service. Similarly, the hierarchical command and control type of organisation is being replaced by a more flexible organisation

form that encourages team-work and coordination between business functions. In response to these changes, management accounting practices are also changing to include reports that are useful to cross-functional teams of managers. The reports reflect the multi-functional roles of these teams and include a variety of operating and financial information, for example, product quality, unit cost, customer satisfaction and production bottlenecks.

Summary

This section has discussed the nature and role of management accounting in the efficient and effective running of business enterprises in a highly competitive environment. Managers need information for planning, control, decision making, and evaluating business unit performance. Management accounting can include financial and non-financial information. An underlying theme in management accounting is ‘what you measure is what you get’.

Section 2 Cost information and Behaviour

Introduction

An understanding of cost behaviour is the key to many decisions in an organisation. Managers who understand how costs behave are better able to predict what costs will be under various operating circumstances. Attempts at decision making without a thorough understanding of the costs involved – and how these costs may change with the activity level – can lead to serious difficulties. For example, a decision to cut back a particular product line might result in far less cost saving than managers had assumed if they confuse variable and fixed costs – leading to a decline in profits. To avoid such problems, a manager must be able to accurately predict what costs will be at various levels.

Types of Cost Behaviour Patterns

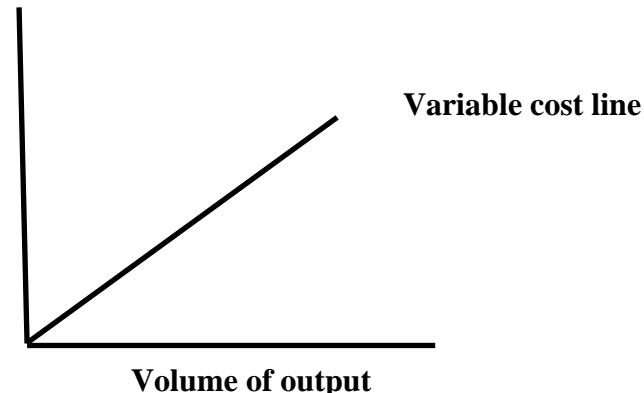
This section describes some common patterns of cost behaviour – variable costs, fixed costs, mixed costs, and step costs. The term *relevant range* is the range of activity within which the assumptions about variable and fixed costs are valid.

Variable costs

Variable costs are costs that change in response to changes in volume or activity. Variable cost behaviour is shown in Figure 2.1.

Figure 2.1 Variable costs

Total cost



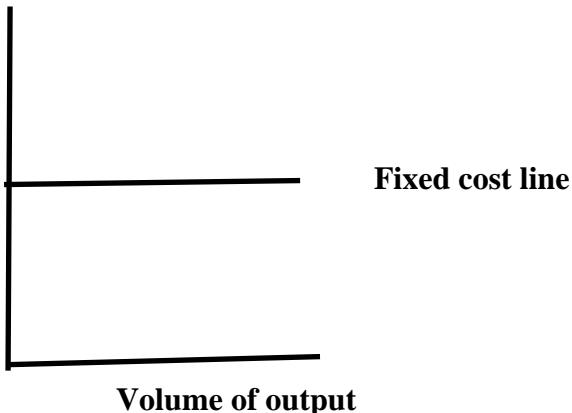
Managers typically assume that variable costs change in proportion to changes in activity. Thus, if activity increases by 10 per cent, variable costs are assumed to increase by 10 per cent. At Ryanair, fuel costs vary with the number of kilometres flown.

Fixed costs

Fixed costs are costs that do not change in response to changes in activity levels. Some typical fixed costs are depreciation, supervisory salaries, and building maintenance. Fixed cost does not change in total as output changes; however, the amount of fixed cost per unit does change with changes in the level of output. When activity increases, the amount of fixed cost per unit decreases because the fixed cost is spread over more units. For example, suppose that a company has €94,000 of fixed costs per month. At a production level of 1,000 units, the fixed cost per unit is €94 ($\text{€94,000}/1,000$), whereas at 2,000 units, the fixed cost per unit is only €47 ($\text{€94,000}/2,000$). Fixed cost behaviour is shown in Figure 2.2

Figure 2.2 Fixed costs

Total cost



In the short run, some fixed costs can be changed while others cannot. Discretionary fixed costs are those costs that management can easily change in the short run. Examples include advertising, research and development, and repair and maintenance costs. Some companies cut back on these expenditures when sales decline, so that profit trends stay roughly constant. That, however, may be short-sighted, as a cut in research and development can have a negative effect on long-run profitability, and a cut in repairs and maintenance can have a negative effect on the life of valuable equipment.

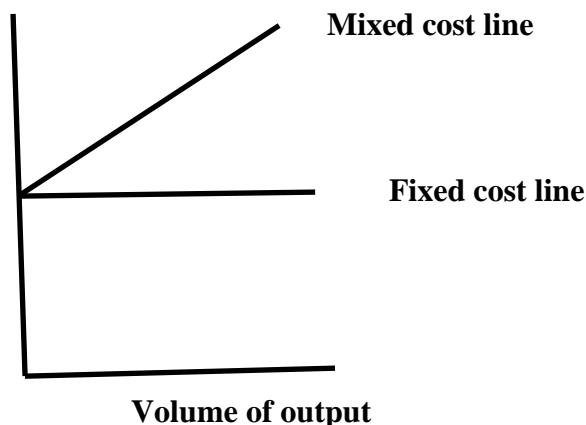
Committed fixed costs, on the other hand, are those costs that cannot easily be changed in a relatively brief period of time. Such costs include rent and insurance related to building and equipment.

Mixed costs

Mixed costs are cost that contain both a variable cost element and a fixed cost element. For example, a sales person may be paid €80,000 per year (fixed amount) plus commissions equal to 1 per cent of sales (variable amount). In this case, the sales person's total compensation is a mixed cost. Total production cost is also a mixed cost since it is composed of material, labour, and both fixed and variable overhead cost items. Mixed cost behaviour is shown in Figure 2.3.

Figure 2.3 Mixed costs

Total cost



As can be seen in Figure 2.3, the total mixed cost at any given volume of output is comprised of a fixed element and a variable element above the fixed cost line. Mixed cost can be represented by an equation in the form $Y = a+b(X)$, where Y is total cost, a is fixed cost, b is the variable cost per unit, and X is the level of output.

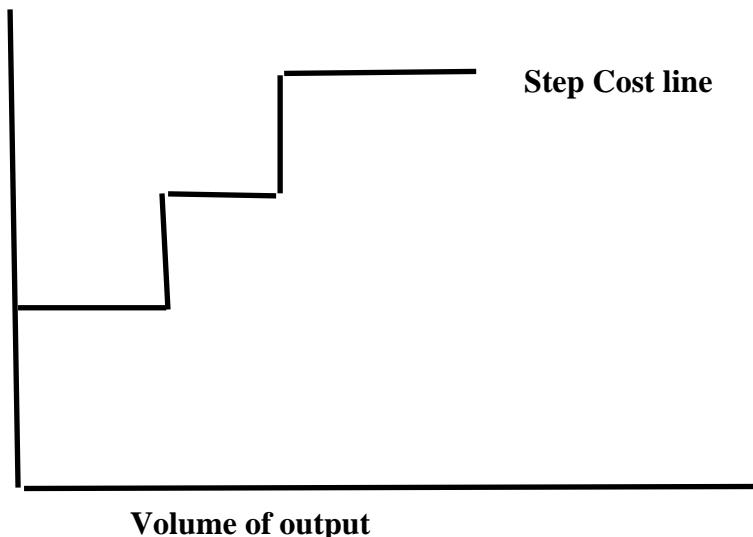
Step costs

Step costs are those costs that are fixed for a certain range of volume but increase to a higher level when the upper bound of the range is exceeded. For example, a certain factory may need, say, four factory supervisors for levels of production up to 50 per cent of capacity.

If the level of production is between 50 and 75 per cent, then six factory supervisors would be required and, if production is between 75 and 100 per cent, eight factory supervisors would be required. Step cost behaviour is shown in Figure 4.4.

Figure 2.4 Step costs

Total cost



The Analysis of Mixed Costs

In practice, mixed costs are very common. For example, the cost of providing x-ray services to patients at a hospital is a mixed cost. There are substantial fixed costs for equipment depreciation and for salaries of radiologists and technicians, but there are also variable costs for x-ray film, power and supplies. At Ryanair, maintenance costs are mixed costs. The company must incur fixed costs for renting maintenance facilities and for keeping skilled mechanics on the payroll, but the costs of replacement parts, lubricating oils, tyres and so forth are variable with respect to how far and how often the company's aircraft are flown.

The fixed portion of a mixed cost represents the basic, minimum cost of having a service ready and available for use. The variable portion represents the cost incurred for actual consumption of the service. The variable element varies in proportion to the amount of service that is consumed.

How does management actually go about estimating the fixed and variable components of a mixed cost? There are several methods available and, in this section, we shall briefly outline the following methods: *account analysis*, *the engineering approach* and *the high-low method*.

Account analysis

In account analysis, each account under consideration is classified as either variable or fixed, based on the analyst's prior knowledge of how the cost in the account behaves. For example, direct materials would be classified as variable and a building lease cost would be classified as fixed, because of the nature of those costs. This method involves the use of professional judgement and does not involve any mathematical calculations.

The engineering approach

The engineering approach to cost analysis involves a detailed analysis of what cost behaviour should be, based on an industrial engineer's evaluation of the production methods to be used, the materials specifications, labour requirements, efficiency of production, power consumption, and so on. For example, Pizza Hut might use the engineering approach to estimate the cost of serving a particular, take-out pizza. The cost of the pizza would be estimated by carefully costing the specific ingredients used to make the pizza, the power consumed to cook the pizza, and the cost of the container the pizza is delivered in.

The high-low method

We can estimate the fixed and variable components of cost at various activity levels using the high-low method. This method consists of selecting the periods with the highest and lowest activity levels and comparing the changes in costs that result from the two levels. This approach is illustrated in Exhibit 4.1.

Exhibit 2.1 The high-low method

The monthly recordings for out and maintenance costs for the past twelve months have been examined and the following information has been extracted for the lowest and highest output levels, which occurred in April and August.

Volume of production (units)	Maintenance costs
Lowest activity (April) 5,000	€22,000
Highest activity (August) 10,000	€32,000

The variable cost per unit is calculated as follows:

$$\frac{\text{Difference in cost}}{\text{Difference in activity}} = \frac{€10,000}{5,000} = €2 \text{ variable cost per unit}$$

We can now calculate the fixed costs by using the €2 variable cost per unit with either the lowest or highest activity above. If we take the lowest activity, where total costs are €22,000, and the variable cost are $(5,000 \times €2) €10,000$, then the fixed cost must be €12,000. If we perform a similar exercise with the highest activity level in August, we will get the same figure for fixed costs.

The key advantage of the high-low method is that it is a quick way to provide a cost equation that gives a rough estimate of fixed and variable costs. However, the high-low method has its limitations: it only represents the best possible line based on two selected points, and these points may be outliers, in that they reflect abnormal circumstances. In addition, the high-low method does not provide any statistical measure of the estimation error.

Summary

This section has focused on managers' need to understand how costs behave for decision-making and control purposes. Four types of cost behaviour were analysed – variable costs, fixed costs, mixed costs and step costs. In terms of estimating mixed costs, we examined three different approaches – account analysis, the engineering approach and the high-low method.

Self-Study Questions

1. What is meant by cost behaviour?
2. Why is it important for management to understand cost behaviour?
3. Distinguish between variable costs, fixed costs and mixed costs.
4. Describe the behaviour of unit variable costs and unit fixed costs as output changes.
5. What is meant by step fixed costs?
6. What are the advantages and disadvantages of the high-low method of cost estimation?

Recommended Reading

Drury: Chapters 1 and 2, Chapter 24 p. 646-653, Summary p 661-662.

Section 3 Budgetary Planning and Control

Introduction

Budgeting is one of the most widely used tools for planning and controlling organisations. Surveys show an almost universal use of budgets by medium or large companies in many parts of the globe. Budgeting systems turn managements' perspectives forward. A forward-looking perspective enables managers to be in a better position to exploit opportunities. It also enables them to anticipate problems and take steps to eliminate or reduce their severity.

The actions that follow managerial decisions normally involve several aspects of the business, such as the marketing, production, purchasing and finance functions, and it is important that management should coordinate these various inter-related aspects of decision making. If they fail to do this, there is a danger that individual managers may each make decisions that they believe are in the best interests of the organisation, when, in fact, taken together they are not; for example, the marketing department may introduce a promotional campaign that is designed to increase sales demand to a level beyond that which the production department can handle. The various activities within a company should be coordinated by the preparation of plans of actions for future periods. These detailed plans are usually referred to as *budgets*.

The entire planning and control process of many companies is built around budgets. This section will illustrate the preparation of several budgets that are in common use. The section also describes the role of budgets in the performance evaluation process and discusses a number of issues associated with budgets.

The Basic Framework of Budgeting

A budget is a detailed plan for acquiring and using financial and other resources over a specified time period. It represents a plan for the future, expressed in formal, quantitative terms, which involves developing objectives and preparing various budgets to achieve these objectives. The use of budgets to control a firm's activities is known as *budgetary control*. Control is exercised by comparing an organisation's actual performance with budgeted performance, establishing and analysing the variances, and taking corrective action if necessary.

The *master budget* is a summary of a company's plans that sets specific targets for sales, production, distribution and financing activities. It is generally finalised through the preparation of a cash budget, a budgeted income statement, and a budgeted balance sheet. In short, it represents a comprehensive expression of management's plans for the future and how these plans are to be accomplished.

Personal Budgets

Nearly everyone budgets to some extent, even though many of the people who use budgets do not recognise what they are doing as budgeting. For example, most people make estimates of their income and plan expenditures for food, clothing, education, housing, and so on. As a result of this planning, people restrict their spending to some predetermined, allowable amount. Individuals also use budgets to forecast their future financial position for purposes such as purchasing a home, financing college education, or setting aside funds for retirement. The budgets of a business serve much the same function as the budgets prepared informally by individuals. Like personal budgets, they assist in planning and controlling expenditure; they also assist in predicting operating results and the financial position in future periods.

Advantages of Budgeting

Companies realise many benefits from a budgeting process:

1. Budgets provide a means of *communicating* management's plans throughout the organisation.
2. Budgets force managers *to think about and plan for the future*. In the absence of the necessity to prepare a budget, there may be a temptation for managers to spend all of their time dealing with daily emergencies. The budgeting process ensures that managers consider how conditions in the next year might change and what steps they should take now to respond to these changed conditions.
3. The budgeting process provides a means for *allocating resources* to those parts of the organisation where they can be used most effectively.
4. The budgeting process can uncover potential *bottlenecks* before they occur. A bottleneck is a constraint that limits output. For example, it may be the output capacity of a particular, specialised machine.

5. Budgets *coordinate* the activities of the entire organisation by integrating the plans of the various parts. Budgeting helps to ensure that everyone in the organisation is pulling in the same direction.
6. Budgets define goals and objectives that can serve as *benchmarks* for evaluating the performance of managers. The budget thus provides a useful means of informing managers of how well they are performing in meeting targets that they have previously helped to set.
7. A budget is also a *motivating* device. With the expected results clearly outlined in the budget, employees know what is expected of them; this in turn motivates people to work to attain the budgeted targets. To enhance the role of the budget as a motivating device, many organisations have employees participate in the budgeting process, thus helping employees identify the budget as their own.
8. A budget assists managers in *controlling* the activities for which they are responsible, by highlighting variances between budgeted and actual.

Responsibility Accounting

The basic idea behind *responsibility accounting* is that a manager should be held responsible for those items – and only those items – that the manager can actually control to a significant extent. Each line item (i.e., revenue or cost) in the budget is made the responsibility of a manager, and that manager is held responsible for subsequent deviations between budgeted and actual results. In effect, responsibility accounting *personalises* accounting information by looking at costs from a *personal control* standpoint. This concept is central to any effective profit planning and control system. Someone must be held responsible for each cost or else no one will be responsible, and the cost will inevitably grow out of control.

Being held responsible for costs does not mean that the manager is penalised if the actual results do not measure up to the budgeted targets. However, the manager should take the initiative to correct any unfavourable variances, should understand the source of significant favourable or unfavourable variances, and should be prepared to explain the reasons for variances to higher management. The point of an effective responsibility system is to ensure that the organisation reacts quickly and appropriately to deviations from its plans, and that the organisation learns from the feedback it gets, by comparing budgeted targets to actual results.

Importance of Strategy in Budgeting

A firm's strategy is the path it chooses for attaining its long-term goals and mission. It is the starting point in preparing its plans and budgets. The process of determining a firm's strategy begins by assessing external factors that affect operations and evaluating internal factors that can be its strengths and weaknesses. External factors typically include competition, technological, economic, political, regulatory, social, and environmental factors. A careful examination of such factors can help the organisation identify opportunities, limitations and threats. An organisation's internal factors include operating characteristics such as financial strength, managerial expertise, functional structure, and organisational culture. Matching the organisation's strengths with its identified opportunities and threats enables it to form its strategy.

The importance of strategy in planning and budgeting cannot be overemphasised. Too often, organisation view the budget for the coming period as a continuation of the budget for the current period, with at best a scant attempt to link the budget to their strategy. A budget should start with a careful review and study of the organisation's strategic plan. The objective is to build a budget to achieve the organisation's strategic goals and objectives. Not relying on its strategic plan, an organisation very likely would not be able to fully utilise its strengths and take full advantage of opportunities. Repeated missed opportunities and underperformances can cause an organisation to stagnate. In the worst cases, an inappropriate strategy, or lack of one, can lead to the eventual demise of organisations.

In the late 1960s and early 70s, US auto manufacturers decided not to develop compact and sub-compact automobiles; thus, they did not plan and budget the necessary resources for developing and manufacturing such vehicles. This strategy later proved to be a costly mistake, and auto manufacturers suffered for almost 20 years because of this strategic decision. They did not begin to recover until the early 1990s.

Common Factors of Successful Budgets

Successful budgets share several common factors:

- Most important among them is acceptance and support of the budget by all managers and employees. Such a budget often becomes a personalise budget of the people who have

the responsibility for carrying it out. They feel it is their budget, not a detached, impersonal, institutional budget.

- A budget is more likely to be successful if employees perceive it as a planning and coordinating tool to help them to perform their jobs effectively, not as a pressure device to squeeze the last drop of their energy out of them. Nor is a budget likely to be an asset when it is viewed as a tool for management to place blame.
- A successful budget is a motivating device that helps people work towards the goal of the organisation and a better operating result; it is never used as an excuse for not doing things strategically important to the organisation with a successful budgeting system.
- A budget should be seen by managers and employees as being realistically attainable. Otherwise, they can easily become frustrated and demotivated, with consequent negative impact on their work performance.

The Budgeting Process

The budgeting process can range from the informal, simple processes small firms use, that take only days or weeks to complete, to elaborate, lengthy procedures large firms or governments employ that span many months from the start to the final approval. The process usually includes the formation of a budget committee; determination of the budget period; specification of budget guidelines; preparation of the initial budget proposal; budget negotiation, review, and approval; and budget revision.

Budget Committee

The budget committee should consist of high-level executives who represent the major segments of the business. The committee sets and approves the overall budget goals for all major business units, directs and coordinates budget preparation, resolves conflicts and differences that may arise during budget preparation, approves the final budget, monitors operations as the year unfolds, and reviews the operating results at the end of the period. The budget committee also approves major revisions of the budget during the period.

Budget period

A budget is usually prepared for a set time, most commonly one year, and is then broken down by quarters and/or months. An increasing number of companies prepare *continuous*

(rolling) budgets. A continuous budget is a budget system that has in effect a budget for a set number of months, quarters or years at all times.

Thus, as a month or quarter ends, the original budget is updated based on the newly available information, and the budget for a new month or quarter is added. Advances in information technology and availability of easy-to-use budgeting and planning software facilitate the continuous updating of budgets and have greatly increased the number of firms that use continuous budgets. These companies no longer view their budgets as cast in stone at the start of a financial year but as living documents they can revise on an on-going basis throughout the year.

In addition to having a constant budget period at all times, continuous budgets yield other benefits. With continuous budgets, managers are more likely to constantly scrutinise budgeted operations for the remainder of the budget period and examine operations beyond the immediate future. Budgeting and planning are no longer once a year events. Firms using continuous budgets are more likely than firms with a traditional budgeting approach to have up-to-date budgets, because the preparation of a budget for a new quarter or month often leads to revision of the existing budget.

Budget guidelines

The budget committee is responsible for providing initial budget guidelines that set the tone for the budget and govern its preparation. The committee issues budget guidelines after careful consideration of the general outlook of the economy and the market, the organisation's long-term goals, short-term objectives, and expected operating result of the current period. All responsibility centres follow the budget guidelines in preparing their budgets.

Initial budget proposal

Each responsibility prepares its initial budget proposal based on the budget guidelines. In addition, responsibility centre managers will need to consider a number of internal factors when preparing their budget proposals, such as changes in availability of equipment or facilities, changes in product design or product mix, and the introduction of new products. Inevitably, external factors also need to be considered, such as the industry's outlook for the

near future, likely actions of competitors, bargaining power of customers, and the existence of substitute products.

Negotiation, review, and approval

To implement a participative approach to budgeting, the budget should be originated at the lowest level of management. The managers at this level should submit their budget to their superiors for approval. The superior should then incorporate this budget with the other budgets for which he/she is responsible and then submit this budget for approval to his/her superior. The budgets go through the successive levels of the organisation until they reach the final level, and the combined budgets become the organisation's budget. At each stage of the budgeting process, the budgets will be negotiated until eventually they will be agreed by both the responsibility centre manager and his/her superior. The budget committee reviews the budget for consistency with the budget guidelines, attainments of the desired short-term objectives, and fulfilment of the strategic plan. The budget committee gives final approval, and the chief executive officer then approves the entire budget and submits it to the board of directors.

Budget revision

No budget is ever cast in stone. As time passes, changes in internal or external factors may make it necessary to revise the budget. Procedures for budget revisions vary among organisations. Once a budget has been approved, some organisations allow for revision only under special circumstances; others, such as firms adopting continuous budgeting systems, build in quarterly or monthly revisions.

Systematic, periodic review of the approved budget or the use of a continuous budget can be an advantage in dynamic circumstances. An updated budget provides better operating guidelines. Regular budget revision, however, might encourage responsibility centre managers to prepare their budgets with insufficient diligence. Organisations with systematic budget revisions need to ensure that revisions are allowed only if circumstances have changed significantly and are beyond the control of the responsibility centre manager or the organisation.

Zero-Based Budgeting

In the traditional approach to budgeting, the manager starts with last year's budget and adds to it (or subtracts from it) according to anticipated needs. This is an incremental approach to budgeting in which the previous year's budget is taken for granted as a starting point. *Zero-based budgeting* (ZBB) is an alternative approach that has been used in governmental and not-for-profit sectors of the economy. Under a zero-based budget, managers are required to justify *all* budgeted expenditures, not just changes in the budget from the previous year. The starting point is zero rather than last year's budget.

A zero-based budget requires considerable documentation. In addition to all of the schedules in the usual master budget, the manager must prepare a series of *decision packages* in which all of the activities of the department are ranked according to their relative importance and the cost of each activity is identified. Higher-level managers can then review the decision packages and cut back in those areas that appear to be less critical, or whose costs do not appear to be justified.

Many people would agree that zero-based budgeting is a good idea. The only issue is the frequency with which a zero-based review is carried out. Under ZBB, the review is performed every year. Critics of ZBB argue that properly executed ZBB is too time consuming and too costly to justify on an annual basis. A ZBB approach that may prove useful is for an organisation to target high-spending activities or high-spending departments on, perhaps, a three or five-year basis and undertake an in-depth review based on ZBB principles.

Activity-Based Budgeting

To manage costs more effectively, organisations that have implemented activity-based costing have also adopted *activity-based budgeting* (ABB). The aim of ABB is to authorise the supply of only those resources that are needed to perform activities required to meet the budgeted production and sales volume. Whereas ABC assigns resource expenses to activities and then uses activity-cost drivers to assign activity costs to cost objects (such as products, services, or customers), ABB is the reverse of this process. Cost objects are the starting point. Their budgeted output determines the necessary activities that are then used to estimate the resources that are required for the budget period. For example, in the case of an insurance

company, the estimate for the issue of new life assurance policies for next year may be 50,000 policies.

The various activities involved in issuing these policies will need to be determined. It is then necessary to estimate the resources that are required for performing the quantities of activity drivers demanded. For example, each policy may take 30 minutes to be processed, and thus 50,000 policies will take 25,000 hours.

Static and Flexible Budgets

In using budgets to evaluate performance, we must take care to ensure that the level of activity used in the budget is equal to the *actual* level of activity. Otherwise, we will not be comparing like with like. We shall consider the following example to see why this is the case. Suppose the manager responsible for manufacturing overhead at a particular company is evaluated at the end of the first quarter by comparing the actual level of overhead cost to the overhead cost budgeted at the start of the year (i.e., on the basis of a *static budget*). This comparison is presented in Exhibit 3.1.

Exhibit 3.1 Static budget comparison

**Performance Report, Manufacturing Overhead
Static Budget Comparison
First quarter, 2007**

	Static budget	Actual	Variance
Units produced	<u>21,400</u>	<u>25,000</u>	<u>3,600</u>
Variable costs:			
Indirect materials (budgeted @ €2 per unit)	€42,800	€49,000	(€6,200)
Indirect labour (budgeted @ €1.50 per unit)	32,100	38,000	(5,900)
Power and light (budgeted @ €1 per unit)	<u>21,400</u>	<u>24,600</u>	<u>(3,200)</u>
Total variable costs	<u>96,300</u>	<u>111,600</u>	<u>(15,300)</u>
Fixed costs:			
Supervisory salaries	90,000	90,200	(200)
Depreciation on plant and equipment	20,000	20,300	(300)
Other	<u>5,000</u>	<u>5,000</u>	<u>-0-</u>
Total fixed cost	<u>115,000</u>	<u>115,500</u>	<u>(500)</u>
Total overhead	<u>€221,300</u>	<u>€227,100</u>	<u>(€15,800)</u>

()denotes unfavourable variance

An initial analysis implies that the manager responsible for overhead costs has not been effective in controlling costs. After all, total variable overhead costs are €15,300 higher than planned, and total fixed overhead costs are €500 higher than planned. However, note that

actual production was 25,000 units, whereas planned production was only 21,400 units. The extra production may be due to an unexpected increase in sales necessitating increased production. With the increase in production, an increase in variable costs is to be expected, whereas fixed costs would be expected to remain almost the same.

Since changes in cost are expected when actual production is different from planned production, the analysis presented is not very useful for evaluating performance. The budget presented in Exhibit 3.1 is referred to as a static budget because it is not adjusted for the actual level of production. A more appropriate analysis of performance would make use of a *flexible budget*, which is a set of budget relationships that can be adjusted to various activity levels. Thus, flexible budgets take into account the fact that, when production increases or decreases, variable costs change. Fixed costs, however, stay the same.

In Exhibit 3.2, a flexible budget is used to evaluate the performance of the manager responsible for manufacturing overhead. Note that the variable costs are adjusted to the actual level of units produced. The fixed costs are at the same level as in the static budget, because they are not expected to change when production increases or decreases. Comparison of actual overhead costs with the overhead costs in a flexible budget is, potentially, more revealing about the manager's ability to control costs.

You will note from Exhibit 3.2 that actual variable costs are €900 less than the flexible budget amount. This contrasts sharply with the €15,300 amount by which actual variable costs were greater than the static budget amount. The variance with respect to fixed costs is still €500 more than the budgeted – the same as in the static budget comparison. It is clear that the preparation of a flexible budget is essential for meaningful evaluation of managerial performance; otherwise, we are not comparing like with like.

Exhibit 3.2

Performance Report, Manufacturing Overhead
Flexible Budget Comparison
First quarter, 2007

	Flexible budget	Actual	Variance
Units produced	<u>25,000</u>	<u>25,000</u>	-0-
Variable costs:			
Indirect materials (budgeted @ €2 per unit)	€50,000	€49,000	€ 1,000
Indirect labour (budgeted @ €1.50 per unit)	37,500	38,000	(500)
Power and light (budgeted @ €1 per unit)	<u>25,000</u>	<u>24,600</u>	400
Total variable costs	<u>112,500</u>	<u>111,600</u>	900
Fixed costs:			
Supervisory salaries	90,000	90,200	(200)
Depreciation on plant and equipment	20,000	20,300	(300)
Other	<u>5,000</u>	<u>5,000</u>	-0-
Total fixed cost	<u>115,000</u>	<u>115,500</u>	(500)
Total overhead	<u>€227,500</u>	<u>€227,100</u>	€ 400

()denotes unfavourable variance

Behavioural Aspects of Budgeting

One of the important roles of a budget is to evaluate managerial performance. When we use a budget for such a purpose, we must remember, *what you measure is what you get!* Ideally, the budget should act as a positive motivator for managers and employees, influencing them in a positive way towards achieving the budget objectives. However, there are several negative aspects that can arise in the budgetary control process:

- If there is overemphasis on achieving the short-term budget, managers may be tempted to take actions that, while improving the short-term profit figures, can actually damage the company's performance in the medium and long term. For example, where a chief executive is under pressure to achieve a certain budget target for profit, and the company's performance during the latter part of the year is indicating that the target will not be met under present circumstances, he/she may instruct that certain budgeted expenditures be cut back, eliminated or deferred until next year. Such expenditure cuts are usually made in the areas of discretionary expenditure, such as staff training, research and development, advertising, and repairs and maintenance. As a result of these cutbacks, short-term profit can be boosted, but consider the negative impact of such action on staff capabilities, future product development, competitiveness, and quality.

- If the budget focus is purely on money amounts, then this is where managers will focus their attention, because this is what is being measured. Thus, it is important to quantify in budgets the key success factors for the company. For example, if a key aspect of a company's success is high-quality, defect-free products, it may be useful to budget the number of defects and the number of customer complaints can be compared with the budgeted quantities to evaluate performance.
- Some of you may already have experienced the syndrome of '*spend it or we will lose it*'. This practice arises where a budgeted amount remains partially unspent towards the end of the year and there is a fear that, if the money is not spent, the budget for next year for that item will be reduced. This encourages spending for the sake of spending, and it may be more effective to allow unspent amounts to be carried forward to next year. These unspent amounts may, in fact, be savings that a particular business unit has made.
- Where achieving budget targets is a significant factor in evaluating managerial performance, managers may be tempted to *build in slack*. This means that, if managers have a major say in the development of their own budgets, they may underestimate expected revenues and overstate expected costs. This has the effect of making the budget targets easier to achieve and reduces the risk of the manager not achieving his/her targets.
- Where bonuses are at stake, sales managers may sell to customers whose credit worthiness is doubtful, cut prices to encourage sales, and overload distributors with goods that they take back later.
- If there is a very rigid and inflexible approach taken to the budget that has been approved for the year, there may be a danger that new innovative ideas and opportunities, not foreseen at the time of the budget's development, may be shelved, postponed or missed altogether. This position arises because they were not included in the original budget.
- Budgeting can sometimes be an intensely political process in which managers bargain for resources. No two managers are the same – each will have different managerial skills, different lobbying capabilities, different personalities, and different powers of persuasion. This can make for a situation in which the manager *who shouts the loudest gets the most* – hardly an effective budgeting process.

What is Wrong with Traditional Budgeting?

The traditional approach to budgeting starts with reference to last year's budget, builds in an allowance for inflation and growth, and perhaps includes budget slack (padding) to anticipate

future cuts at the budget review stage. The underlying assumptions in this approach are that on-going activities are essential, are being carried out efficiently and will continue to be necessary in the future. The consequences of this approach to budgeting are:

- Inefficiencies are carried forward
- There is little emphasis on examining more efficient ways of performing activities
- It may be difficult to obtain funding for new activities, since existing activities take precedence
- Where budget cuts are necessary before the master budget is finalised, they are often on an across-the-board-basis. This means that the various departments in an organisation (could easily apply to government departments) are requested to reduce their budget applications by a certain percentage, so that the overall budget fits with the available resources. There is a danger that individual departmental priorities are blurred by this approach.
- Traditional budgeting can be a time-consuming and bureaucratic exercise, and budgets can soon become out of date if external conditions change significantly from those envisaged during the initial budgeting process.
- As mentioned previously in this chapter, budgets can impose a heavy focus on short-term financial measures, with consequent dysfunctional behaviour (behaviour that damages the medium and long-term performance of the organisation).
- Traditional budgeting is often accused of being developed in isolation from an organisation's strategy. As mentioned earlier, organisations sometimes view the budget for the coming period as a continuation of the budget for the current period, with little or no attempt to link it to their strategy.
- In traditional budgeting, the focus is very much on variances in relation to line items, such as salaries, travel, staff training, and stationery. But what activities necessitate these expenses – are these activities value-added or non-value-added? This line of questioning is not pursued in traditional budgeting.
- Budgets can create a climate of '*by the book*' within organisations, whereby achieving budget targets is all that matters and is all that will be rewarded. This straightjacket approach to budget implementation can have the effect of stifling the entrepreneurial spirit of managers.

Beyond Budgeting

In the late 1990s, companies in Europe and around the globe formed a beyond budgeting round table (BBRT) in response to growing dissatisfaction, and indeed frustration, with traditional budgeting. All member companies joined because they recognised that their existing budgeting process was too long, too expensive, added little value, and was increasingly out of touch with their competitive environment. In fact, research suggests that between 80 and 90 per cent of companies are dissatisfied with their planning and budgeting processes. Despite these concerns, however, few were convinced at the outset that there was a viable alternative.

For most organisations, the annual budgeting process results in a *fixed performance contract* between superiors and subordinates. One problem is that, as managers take whatever actions they feel are warranted to meet their contracted numbers, the negative effects may outweigh the positive effects. Faced with missing the recognition and rewards that come from meeting agreed targets, managers can sometimes resort to a range of ‘shady’ practices. At best it leads to ‘managing their earnings’; at worst to outright fraud (Enron, for example). Another problem with the fixed performance contract is that managers find themselves unable to react quickly and decisively in a rapidly changing environment. They tend to see everything through the narrow lens of the pre-determined plan.

Many companies, aware of the deficiencies of traditional budgetary practices, have attempted to improve their budgeting by using the *Balanced Scorecard* (a performance management framework comprised of a range of performance measures, financial and non-financial) and by harnessing the power of their information databases to enable the budgeting process to be performed with more relevant real-time data.

Cases of beyond budgeting

A famous beyond-budgeting case involves a Scandinavian bank called Svenska Handelsbanken, which claims to have abandoned traditional budgeting as long ago as 1979 and has since achieved dramatic success. In 1977, the chief executive of the bank stated that a culture of thrift and improvement, rather than imposed budgetary controls, had enabled the bank to drive down costs to a level that is the envy of its competitors.

By operating each branch of the bank like an independent business where managers are empowered to make a wide range of decisions, by adopting a unique profit-sharing scheme based on performance relative to competitors, and by developing a fast and open information system so that one branch can compare its performance against another, its cost/income ratio has been significantly reduced and profitability increased. With such a system, frontline managers become entrepreneurs and strategists in an organisation that is radically decentralised to meet the demands of a rapidly changing business environment. They see the traditional budget as a commitment and therefore as a constraint, as it is based on assumptions that are bound to be out of date as soon as the ink is dry.

Another company that adopted the beyond-budgeting approach was Borealis A/S, a company at the leading edge of polymer research and development. It replaced the target setting, planning measurement and control functions of the budgeting process by integrating them within a Balanced Scorecard that (freed from the constraining influence of short-term budgets) directed managerial attention towards a number of strategic themes that underpin medium-term goals (such as reducing fixed costs by 30 per cent over five years). Targets are now set by reference to industry benchmarks, and the annual review process takes only a few weeks compared with five months spent previously on the budget. Rolling forecasts support quarterly performance reviews, and costs are managed through trend analysis. Performance is now reviewed quarterly and balanced scorecard measures are a feature of web pages and bulletin boards that inform everyone about strategic performance.

Reward systems without a budgeting process

Companies that have adopted the beyond-budgeting philosophy evaluate and reward performance on the progress that both teams and the firm as a whole make towards achieving medium-term goals (using a range of key performance indicators – KPIs). Performance evaluation is made in the light of how a unit performed against internal and external benchmarks. One firm has dispensed with local rewards altogether and for the past thirty years has been using one group-wide profit sharing scheme based on a formula related to the competitive performance of the firm. One benefit is that all cases have seen a reduction in ‘gaming’ behaviour (with no fixed contract, there is no point in gaming).

Managing resources without a budgeting process

The traditional budgeting approach allocated resources on the basis of budget contracts negotiated in advance. The benefit was that, at one point in time, all resources were allocated to one unit or another. No further management attention was then needed until the following year's budget review. However, senior executives too often acted like central committees, approving or disapproving investment proposals based on annual plans. In beyond-budgeting companies, resources are made available and accessible to frontline teams as and when required through *fast track* approvals and easier access to operational resources. They also have a high level team that manages the resource portfolio.

Devolving more resource decisions to frontline teams has the effect of making them more accountable for resource decisions. This, in turn, builds greater ownership and leads to less waste.

Measuring and controlling performance without a budgeting process

Beyond-budgeting companies find that with no budgets against which to compare performance, managers are not flying blind. On the contrary, they are more aware of where they are going than ever before, as they have more relevant indicators to guide them. They use measures and controls to focus management attention on anticipating the future rather than explaining what went wrong in the past. Main features include comparisons with external benchmarks, performance league tables, leading indicators, and rolling forecasts. These are also combined with actual financial results, comparisons against prior years, and trend analysis to provide a rich and constantly moving picture of performance. The overall effect of these changes is a performance management process based on a *relative performance contract* rather than fixed targets. Though freed from the fixed performance contract, managers must still perform to high levels of expectation. Otherwise, they will fail to survive. The difference is that the performance emphasis has shifted from internally negotiated short-term contracts to externally benchmarked medium-term KPIs. This is, in essence, how organisations have gone 'beyond' budgeting and broken free from the annual performance trap.

Summary

Every organisation needs to plan and consider how to deal with future challenges and opportunities. In most organisations, this process is formalised by preparing annual budgets

and monitoring performance against the budgets. As well as being used for planning and control, budgets also serve as a framework for performance evaluation, for motivating managers and employees, and for promoting coordination and communication. While budgeting is very much a technical exercise, the behavioural aspects of budgeting cannot be overlooked. The need to flex the budget was also highlighted in the context of meaningful performance evaluation. Traditional budgeting was critically examined and various alternatives were mentioned, such as ZBB and ABB. The beyond budgeting debate was also discussed.

Self-Study Questions

1. What is a budget? What is budgetary control?
2. What are the major benefits of budgeting?
3. What is meant by the term responsibility accounting?
4. Describe the traditional budgeting process.
5. What are the weaknesses in the traditional budgeting process?
6. How does zero-based budgeting differ from traditional budgeting?
7. ‘Behavioural considerations are extremely important in the context of budgeting.’

Discuss

8. What is the nature and purpose of a rolling budget?
9. What is meant by flexing a budget? In what context is it important to flex a budget?
10. Describe some of the reasons why companies might be attracted to the concept of ‘beyond budgeting’.
11. What are the benefits to a company of preparing a cash budget?
12. What might be the impact on managerial behaviour of a budgetary system that rewards and promotes managers based on achieving short-term profit targets?

Recommended Reading

Drury: Chapter 15 and 17.

Section 4 Costing Systems

Introduction

Determining the accurate cost of a product or service plays a critical role in the success of business organisations. For example, how much does it cost an accountancy firm to audit a particular company? How much does it cost a manufacturing company to make a particular product? Managers ask these questions for many purposes, such as product and service cost determination, management planning, cost control and performance evaluation, pricing and other managerial decisions.

Product Costing Systems

Two costing systems that are commonly used in manufacturing and in many service companies are known as *process costing* and *job-order costing*.

Process costing

A process costing system is used in situations where the company produces many units of a single product for long periods at a time. Examples include mixing and bottling beverages, oil refining and cement processing. The basic approach in process costing is to accumulate costs in a particular operation or department for an entire period (month, quarter, year) and then to divide this total by the number of units produced during the period. This costing technique results in a broad, average unit cost figure that applies to homogeneous units flowing in a continuous stream out of the production process.

The following is a numerical example of process costing. The total manufacturing costs for July in processing 20,000 litres of paint is €800,000. Therefore, the total cost per litre is €40.

Job-order costing

A job-order costing system is used in situations where many different products are produced each period, and where the costs can be readily identified with specific products, batches, contracts or customers. In a job-order costing system, the jobs or batches of products or services are the cost objects. Examples include house construction, furniture manufacture, production of garments for the fashion industry, motor repairs and management consultancy. Each job will require different amounts of materials, labour and overhead.

The record keeping and cost assignment problems are more complex when a company sells many different products and services than when it has only a single product or service. Since the products/services are different the costs are likely to be different. Consequently, cost records must be maintained for each distinct product or job. For example, a lawyer in a large criminal law practise would ordinarily keep separate records of the costs of advising and defending each client; the Levi-Strauss factory would keep separate records of the costs of filling orders for particular styles, sizes and colours of jeans. Thus, a job-order costing system requires more effort than a process costing system.

In *job-order costing for manufacturing*, the basic supporting document is the *job cost sheet*. The various elements of cost are included, namely, direct materials, direct labour and manufacturing overhead (sometimes referred to as a *factory overhead*).

The support document for direct materials is the *materials requisition form* that the production department supervisor uses to request materials for production. In an on-line computer environment, the information is entered electronically. A detailed listing of all the materials needed for a given job is often developed in a *bill of materials*.

Direct labour costs are recorded on the job cost sheet by means of a time sheet prepared daily for each employee. A time sheet shows the amount of time an employee worked on each job, the pay rate, and the total cost chargeable to each job. In some instances, the time will be recorded electronically, possibly by use of a swipe card.

Indirect labour costs are treated as part of manufacturing overhead. Indirect labour usually includes items such as salaries or wages for supervisors, inspectors and warehouse clerks. So far, we have traced raw material and direct labour costs to jobs, and this is relatively straightforward. The final and more complex cost component to assign is manufacturing overhead. There are three reasons for the complexity.

1. Manufacturing overhead is an indirect cost. This means that it is either impossible or difficult to trace these costs to a particular product or job.
2. Manufacturing overhead consists of many different items, ranging from the grease used in machines to the annual salary of the production manager.

- Even though output may fluctuate due to seasonal or other factors, manufacturing overhead costs tend to remain relatively constant because of the presence of a large amount of fixed costs.

Given these problems, we need to use an allocation process to assign the overhead costs to the products. An allocation base is a measure such as direct labour hours (DLH) or machine hours (MH) that is used to assign overhead costs to products. The overhead rate, which is calculated using of these allocation bases, is called a pre-determined manufacturing overhead rate, since it is calculated using the expected or budgeted manufacturing overheads divided by the expected level of labour hours or machine hours. In using labour hours or machine hours to absorb manufacturing overhead, we are assuming that manufacturing overhead is driven by the volume of production. We shall see in the next chapter, when we discuss activity-based costing, that such an assumption may not always be valid.

For example, the following budgeted and actual data have been obtained for Laverne Products Ltd:

Estimated annual manufacturing overhead	€2,000,000
Estimated annual machine hours*	16,000 hours
Actual machine hours for job 351	26 hours
Actual units for job 351	10 units

*Machine hours are used, as the manufacturing department is machine intensive

The pre-determined overhead rate is calculated as follows:

$$\frac{\text{Estimated overhead}}{\text{Estimated number of machine hours}} = \frac{\text{€2,000,000}}{16,000 \text{ MH}} = \text{€125 per machine hour}$$

The overhead cost applied (assigned) to job 351 is $26 \text{ MH} \times \text{€125} = \text{€3,250}$. The overhead cost per unit is $\text{€3,250}/10 = \text{€325 per unit}$.

Assuming that the following additional information is provided regarding job 351:

Direct materials per unit €300

Direct labour cost per unit €275

the product cost per unit can now be calculated:

Direct materials €300

Direct labour €275

Manufacturing overhead €325

Unit product cost €900

Reasons for using a pre-determined overhead rate

Instead of using a pre-determined rate, a company could wait until the end of the accounting period to calculate an actual overhead rate based on the actual manufacturing overhead costs and the actual level of activity (labour hours or machine hours) for the period. However, managers need information on the value of completed jobs before the end of the accounting period both to provide price quotations to prospective customers and to facilitate the preparation of periodic financial statements. When a company applies overhead costs to jobs using the pre-determined overhead rate, it is called a *normal cost system*.

Example of product costing and establishing a selling price

The following information relates to a job 180 which is being carried out by Apex Ltd to meet a customer's order. The product passes through Department X and Department Y, and both departments are labour intensive. Therefore, the manufacturing overhead rate is based on labour hours.

	Department X	Department Y
Direct materials used	€4,000	€3,000
Direct labour hours	300 hours	200 hours
Direct labour rate per hour	€8	€10
Manufacturing overhead rate per hour	€4	€8

Non-manufacturing overhead 20% of full production cost

Profit mark-up required 25% of total cost

What is the selling price to the customer for job 180?

Direct materials ($\text{€}4,000 + \text{€}3,000$)	€7,000
Direct labour hours ($300 \times \text{€}8 + 200 \times \text{€}10$)	€4,400
Manufacturing overhead ($300 \times \text{€}4 + 200 \times \text{€}8$)	€2,800
Total production cost	€14,200
Non-manufacturing cost ($20\% \times \text{€}14,200$)	€2,840
Total Cost	€17,040
Profit mark-up ($25\% \times \text{€}17,040$)	€4,260
Selling price	<u>€21,300</u>

Under and over-absorption of overheads

The effect of calculating manufacturing overhead rates based on budgeted overhead expenditure and activity is that it will be most unlikely that the overhead allocated to products manufactured during the period will be the same as the actual overhead incurred. Consider a situation where the estimated annual fixed overheads are €2m and the estimated activity is 1m in direct labour hours. The estimated overhead rate will be €2 per hour. Assume that actual overheads are €2m and are therefore identical with the estimate, but that actual activity is 900,000 direct labour hours instead of the estimated 1m hours. In this situation on €1.8m will be charged to production. This calculation is based on 900,000 direct labour hours at €2 per hour, giving an *under-absorption (under-recovery)* as it is also called) of €200,000.

Consider an alternative situation where the actual overheads are €1,950,000 instead of the estimated €2m, and actual activity is 1m direct labour hours as originally estimated. In this situation 1m direct labour hours at €2 per hour will be charged to production (€2m), giving an *over-absorption (over-recovery)* of €50,000.

These examples illustrate that there will be an under or over-absorption of overheads whenever actual activity or overhead expenditure is different from the budgeted overheads and activity used to estimate the budgeted overhead rate.

The question now arises as to how the under or over-absorption of overheads should be accounted for. We could go back and share the under or over-absorption among all the products worked on during the year. In practice, this would not be worthwhile. The normal procedure is to treat any under or over-absorption as a period cost. In other words, the under or over-absorption should be written off against the profit and loss statement in the current accounting period.

Job costing in service industries

Job costing is used extensively in service industries, such as advertising agencies, repair shops, as well as consulting, architecture, accounting and law firms. Instead of using the term *job*, accounting and consulting firms may use the term *client* or *project*. Law firms may use the term *case* and advertising agencies may use the term *contract* or *project*.

Job costing in service industries uses recording procedures similar to those illustrated earlier in this chapter, except for direct materials involved (there could be none, or an insignificant amount). The primary focus is on direct labour. The overhead costs are usually applied to jobs based on direct labour hours or euros.

Suppose that a Dublin law firm has the following budget of estimated costs for next year:

Salaries of professional staff	€,000,000
Other costs*	€10,000,000
Total budgeted costs for next year	€15,000,000

Other costs* include stationery and supplies, photocopying, computer-related expenses, insurance, office rent, utilities, training costs, accounting fees, and other office expenses.

The law firm charges overhead costs to clients or jobs at a pre-determined percentage of the professional salaries charged to the client.

Using the data above, the law firm's pre-determined (budgeted) overhead rate is:

$$\frac{\text{Budgeted overhead}}{\text{Budgeted direct labour}} = \frac{\text{€}10,000,000}{\text{€}5,000,000} = 200\%$$

As each assignment is budgeted, the law firm will predict the expected number of direct professional hours required. Direct professional hours are those worked by partners, managers, and juniors. The budgeted direct labour cost is the relevant hourly labour rate for each category multiplied by the number of hours required.

Suppose that the law firm has the following costs on a legal case:

Direct professional labour	€500,000
Travel costs	€140,000

What are the total costs of this case?

Direct professional labour	€500,000
Overhead absorbed (200% x €500,000)	€1,000,000
Travel costs	€140,000
Total costs	€1,640,000

Note that costs reimbursed by the client – such as travel costs – do not add to overhead costs and should not be subject to any mark-ups in the setting of fees

Flow of Costs

The flow of costs is the path taken through the ledger accounts, balance sheet and income statement by costs as they move through a production and sales process. During this process flow, the costs are initially recorded in the balance sheet as assets, and when the goods are sold move to the cost of goods sold section of the income statement. The concept is most applicable to a manufacturing firm, where costs are first incurred when raw materials are purchased (DR stores control/raw materials account and CR creditors/bank account). The flow of costs then moves to work-in-process inventory, where any other relevant costs such as labour, machining, and overhead costs are added to the cost of the raw materials (DR WIP account CR raw materials/labour/overhead account etc). Once the production process is complete, the costs move to the finished goods inventory classification, and remain there until sale (Dr finished goods CR WIP). When the goods are sold, the costs move to the cost of goods sold (DR cost of goods sold CR finished goods). The following table summarises the process, the ledger entries and balance sheet/income statement flow.

Production Process	Ledger entries	Financial Statement
Buy raw materials	DR stores control/raw materials account and CR creditors/bank account	Balance Sheet
Making Product	DR WIP account CR raw materials/labour/overhead account etc	Balance Sheet
Product made	Dr finished goods CR WIP	Balance Sheet
Product Sold	DR cost of goods sold CR finished goods	Income Statement

The flow of costs concept is less applicable in a services firm, where most costs are incurred and charged to expense at the same time.

Summary

Product costing is the process of assigning direct materials, direct labour, and manufacturing overhead costs to products or services. Product costing provides useful cost information for both manufacturing and non-manufacturing firms for

- 1) product and service cost determination,
- 2) management planning, cost control and performance evaluation, and
- 3) managerial decisions.

Two types of product costing systems were described – job costing and process costing systems, with the choice of a particular system depending on the nature of this industry and the product or service. The tracing of direct materials and direct labour to products or services is reasonably straightforward. The development of manufacturing overhead rates is necessary to assign manufacturing overhead cost to products. The difference between the actual manufacturing overhead and the amount of the overhead absorbed is either under-absorbed or over-absorbed. Job costing is also used extensively in service industries.

Self-Study Questions

1. Why do business organisations need cost information?
2. Distinguish between process costing and job-order costing.
3. Identify companies that would use each costing method.
4. Describe how direct material, direct labour and manufacturing overhead are assigned to jobs.
5. Explain the role of a pre-determined overhead rate in assigning overhead to jobs.
6. Why do firms use pre-determined overhead rates rather than actual manufacturing overhead costs in assigning overhead to jobs.
7. What factors should be considered in selecting a base to be used in computing the pre-determined overhead rate?
8. Explain the difference between under-absorbed and over-absorbed overhead.
9. Which product costing system is extensively used in the service industry for firms such as consultancy and accounting? Explain why.
10. Diagram the flow of costs process.

Recommended Reading

Drury: Chapter 3, p.44-51, and Chapter 5 104-106.

Section 5 Activity-Based Costing

Introduction

Many companies assign overhead to jobs by means of a single overhead absorption rate using direct labour hours or machine hours, as explained in Section 4. The essential feature of such an approach is that manufacturing overhead costs are assigned to products in proportion to the volume of production. This means, for example, that when volume increases by 20 per cent, overhead increases by 20 per cent; when volume increases by 50 per cent, overhead increases by 50 per cent. Using a volume-based overhead rate to assign overhead to products is referred to as the traditional approach. This approach is adequate in providing cost information as long as manufacturing overheads are not a significant cost in manufacturing products, or where all products require more or less equal or proportional amounts of overhead. However, manufacturing overhead costs may be driven by a variety of factors, and assigning costs just on the basis of labour hours or machine hours may seriously distort product costs. Such distorted cost information can lead to improper pricing or faulty management decisions. Many overhead costs (such as the cost of setting up the equipment for a production run, the cost of inspecting raw materials, and the cost of handling materials) are not proportional to volume. Such overhead costs are referred to as transaction-driven costs.

Designing an Activity-Based Costing System

Activity-based costing (ABC) is a relatively recent development in managerial accounting that has received a lot of attention from both academics and practitioners interested in improving managerial accounting information. The initial objective of ABC when it appeared in the literature towards the mid-1980s was to provide more accurate costing of products and services for a whole range of managerial decisions, including pricing and allocation of advertising resources. Rather than use a single base for assigning overheads, such as direct labour hours or machine hours, activity-based costing uses a number of bases for assigning overheads to products. Each base in an ABC system represents a major activity that causes overhead costs. Examples of activities in various organisations include the following:

<ul style="list-style-type: none"> • Setting up machines 	<ul style="list-style-type: none"> • Billing customers
<ul style="list-style-type: none"> • Performing blood tests at a clinic 	<ul style="list-style-type: none"> • Ordering materials
<ul style="list-style-type: none"> • Meeting with clients at a law firm 	<ul style="list-style-type: none"> • Inspecting materials for defects
<ul style="list-style-type: none"> • Opening an account at a bank 	<ul style="list-style-type: none"> • Maintaining equipment
<ul style="list-style-type: none"> • Processing an insurance claim 	<ul style="list-style-type: none"> • Admitting patients to a hospital

Each major activity has its own cost pool (also known as an activity-cost pool). An activity-cost pool is a ‘cost-bucket’ in which costs related to a particular activity are accumulated. The overhead costs are assigned to products using a measure of activity referred to as a cost driver. Exhibit 3.1 provides examples of different activities and their cost drivers.

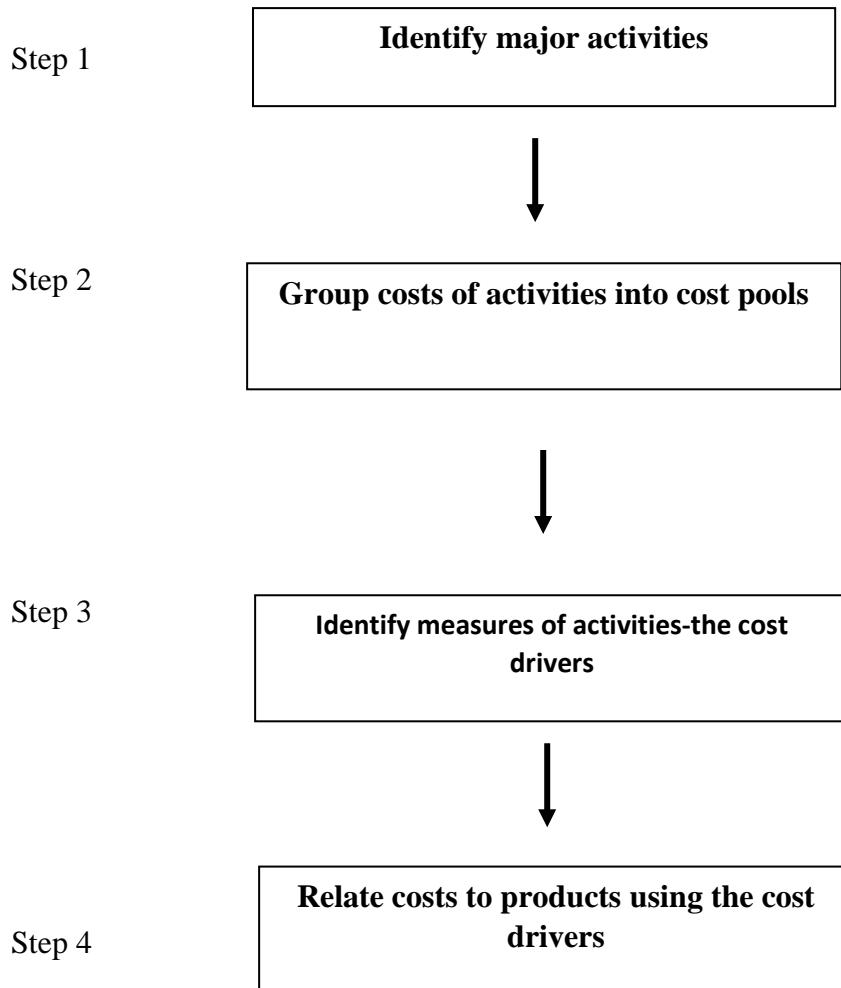
Exhibit 5.1 Activities and their cost drivers

Activities	Cost Drivers
Processing purchase orders for materials	Number of purchase orders processed
Issuing materials to production	Number of material requisitions
Inspecting incoming materials	Number of receipts
Setting up equipment	Number of set-ups
Admitting students to a school	Number of students

Once the cost of each activity has been traced to that activity’s cost pool, and the volume of the cost driver has been determined, a cost driver rate can be developed. For example, if the budgeted cost of inspection is €2.5 million, and the budgeted number of inspections is 100,000, then the cost per inspection is €25.

Taking each activity in isolation, this system works exactly like the job-order costing system described in the last chapter. A pre-determined overhead rate (cost driver rate) is computed for each activity and then applied to products or services based on the amount of activity required by the product or service.

It may be helpful at this stage to summarise the steps involved in the ABC approach.



The following simple example in Exhibit 3.2 will show the difference between the traditional approach and the ABC approach in tracing overheads to products. The example may be overly simple, but it will serve to illustrate the point.

Annual production:	Product X: 10,000 units
	Product Y: 10,000 units
Each unit requires 1 direct labour hour (DLH)	
Machine set-up costs: €55,000 per year	
Number of set-ups: 22 per year	
Product X:	Produced in 20 batches (500 units per batch)
Product Y:	Produced in 2 batches (5,000 units per batch)
<ul style="list-style-type: none"> • How are set-up costs assigned <ul style="list-style-type: none"> ○ Under traditional costing using direct labour hours? ○ Under ABC? 	
Under traditional costing we develop an overhead absorption rate as follows:	
Overhead rate = €55,000/20,000 DLH = €2.75 per DLH	
Assigned as follows: Product X: 10,000 DLH x €2.75 = €27,500	
Product Y: 10,000 DLH x €2.75 = €27,500	
Under ABC we develop a cost driver rate for set-ups: €55,000/22 = €2,500 per set-up	
Product X: 20 set-ups @ €2,500 = €50,000	
Product Y: 2 set-ups @ €2,500 = €5,000	

Exhibit 5.2 Traditional and ABC approach compared

As can been seen from Exhibit 5.2, the amount of overhead assigned to each product is exactly the same under traditional costing, as it is based on the volume of production. However, when we use ABC we find that the amount of overhead assigned to product X is ten times that assigned to product Y, as overhead is driven by the number of transactions (set-ups).

The Benefits of Activity-Based Costing

Activity-based costing improves the accuracy of product costs in two ways. First, activity-based costing usually increases the number of cost pools used to accumulate overhead costs. Rather than accumulating all overhead costs in a single or departmental pool, the company accumulates costs for each major activity. In principle, all the costs in an activity cost pool relate to a single activity. In contrast, departmental cost pools contain the costs of many different activities carried out in the department. Second, activity-based costing changes the bases used to assign overhead costs to products. Rather than assign costs on the basis of direct labour or some other measure of volume, managers assign costs on the basis of the activities that cause overhead costs.

In a traditional costing system, overhead is typically applied to products on the basis of direct labour hours. In activity-based costing, managers see that batch set-ups, material purchase orders, and other activities also cause overhead costs. ABC is less likely than traditional costing systems to undercost complex, low-volume products and overcost simple, high-volume products. This follows because ABC uses more cost drivers to assign costs and the drivers are not necessarily volume related.

Another benefit is that ABC can be used as part of a programme to improve the overall operations in organisations. It can provide valuable clues concerning the activities that could benefit most from improvement initiatives.

Companies that have some of the following characteristics are most likely to benefit from ABC:

1. Products differ substantially in volume and in the activities they require.
2. Overhead costs are high and increasing, and no one seems to understand why.
3. Management does not trust the existing cost system and ignores cost data from the system when making decisions.

Limitations of Activity-Based Costing

A major disadvantage of ABC is its expense; an ABC system is more costly to develop and maintain than a traditional costing system. Implementing ABC is a major project that involves a great deal of effort and time. In some cases, data will need to be collected that has never been collected before. Some of the problems facing the designers of an ABC system are how many activity centres there should be and which cost drivers should be used. In setting up a realistic ABC system, activity centres will often consist of several activity areas being added together, or aggregated. Rather than 200 activity centres, there will only be, say 30. Similarly with cost pools. There is no theoretical answer or formula that will allow us to derive how many cost pools an organisation must have. There is a problem with the aggregation of activities into activity centres, in that the number of activities is potentially enormous across a large organisation. To overcome this problem, many activities will need to be aggregated. Such aggregations may be so arbitrary that they tend to lead to the arbitrary assignment of overheads. If this becomes the case, ABC may lose many of its benefits.

In addition, the new product information associated with ABC may sometimes meet resistance within the organisation – for example, the sales department of a company may not be happy with the ABC costing which suggest eliminating some of the products in the product line. Furthermore, employees may perceive the introduction of ABC as part of a process to justify subsequent job losses. Where there is talk of streamlining activities, and even eliminating non-value-added activities, employees can feel very vulnerable. In such circumstances, employees may be reluctant to cooperate and provide the initial information on which the operation of the ABC system will be based. The behavioural dimension is important, since it will require a fundamental re-direction in thinking for all participants together with employees' willingness to accept new ideas.

The introduction of an ABC system should not be undertaken lightly and should not be seen as a ‘finance’ or ‘accounting’ – driven project. There is a danger that such a perception may lead to the conclusion that this new ABC project is just another ‘accounting’ fad. In addition, there is as yet insufficient evidence that the introduction of an ABC system significantly improves company profitability in all situations. However, some recent research does highlight the fact that ABC-adopting firms outperform their non-adopting competitors.

Perhaps the major limitation is that, in practise, ABC is used to develop the *full* cost of products. This will include a number of fixed costs that are assigned over various products as if they were variable costs. If managers want to calculate the incremental costs of a special order using such information, there is a danger that they will include costs that will not change with the acceptance of the order. In such situations, managers should ensure that only the costs that actually change with the decision are included in the analysis.

Activity-Based Costing in Service Industries

Although initially developed as a tool for manufacturing companies, activity-based costing is also being used in service industries. Successful implementation of an ABC system depends on identifying the key activities that generate costs and tracking how many of those activities are performed for each service the organisation provides. ABC has been implemented in a wide variety of service industries worldwide, including hospitals, railroads, banks and data service companies.

Customer Profitability Analysis and ABC

While most companies worldwide have a good knowledge of the profitability of their various products or services, it may be surprising to realise that many companies have little idea of how profitable their various customers are to them. ABC product costing can be extended to *customer profitability analysis* to identify the best customers. If two customers purchased from your company the exact same amount and mix of products or services, at the exact same prices, during the exact same time period, would both customers be equally profitable? Most likely not. Some customers place standard orders with no fuss or bother, whereas others demand all kinds of support activities and concessions, such as special delivery requirements, quantity discounts and extended credit terms.

Customer profitability analysis focuses on selling, general and administrative costs. It analyses activities, identifies proper cost drivers and determines realised profits from customers.

In calculating customer profitability, we need to identify customer revenues and customer costs. Customer-level costs include the cost of goods sold, order taking, customer visits, deliveries, product handling, and after-sales service.

Customer profitability analysis can help to separate profitable customers from those who generate losses. Such information can assist companies in the following ways:

- Providing better services to highly profitable customers
- Transforming unprofitable customers into profitable once through targeted negotiations on price, quantity, delivery terms and payment arrangements
- Identifying and conceding permanent loss customers to competitors
- Charging higher prices for expensive services and granting discounts, if necessary, to acquire customers requiring lower levels of service.

Customer profitability analysis provides valuable information on the profitability of different customers. In addition, companies must weigh up other relevant factors before determining the action appropriate for each customer. The following are among these relevant factors:

- Growth potential of the customer
- Possible reactions of the customer to changes in sales terms or services

- Importance of having the firm as a customer for future sales references, especially when the customer could play a pivotal role in bringing in additional business.

One of the first reported case studies on customer profitability analysis (undertaken by US academics, Cooper and Kaplan in the late 1980s) involved a Swedish wire manufacturing company called Kanthal. The study found that only 20 per cent of the company's customers were generating profits, 70 per cent were breaking even, and the remaining 10 per cent were loss making. Before the study, Kanthal had little idea of their customers' profitability profile and, as a result, it was not an issue that attracted their attention.

Worldwide Implementation of the ABC Systems

While ABC has been around to almost twenty years, and it offers several advantages in terms of providing more accurate information for managerial decision making and cost management, the level of take-up worldwide has not been remarkable. Recent surveys of manufacturing companies in the UK show that the take-up of ABC is around 20 per cent, while in the United States the corresponding figure is around 40-45 per cent, and in Norway about 40 per cent. In Ireland, the figure is about 10 per cent.

A UK survey suggests that service organisations are more likely to implement ABC systems. A study by Drury and Tayles (2000) reported that over 50 per cent of the financial and service organisations surveyed had implemented ABC.

Summary

This section has looked at the role of activity-based costing in providing a more rigorous approach to the costing of products and services, as well as providing more detailed information for customer profitability analysis. With ABC, activities are firstly identified, costs are then traced to those activities, cost drivers are established, cost driver rates are calculated, and products or services are charged based on the demands they make on the activities. The benefits and limitations of ABC are outlined.

Self-Study Questions

1. What criticisms have been made of the traditional approach to product costing?
2. Why should managers be concerned about product over or undercosting?
3. Why do some companies introduce an ABC system?
4. What is meant by an ABC system?
5. What are cost pools and cost drivers?
6. What are the implications for management of using unreliable cost information?
7. What types of company need an ABC system?
8. What are the major advantages and limitations of ABC systems?
9. Give examples of four activities in an organisation with which you are familiar and identify the likely factors driving the costs of those activities (cost drivers).
10. Identify opportunities afforded by customer profitability analysis.

Recommended Reading

Drury: Chapter 3 p.56-59 (ignore re-allocation of service dept costs info.), Chapter 11.

Section 6 Decision Making – Cost-Volume-Profit Analysis

Introduction

Once fixed and variable costs have been estimated, *cost-volume-profit* (CVP) analysis can be conducted. CVP analysis is one of the most powerful tools that managers have at their command. It helps them understand the inter-relationship between cost, volume, and profit in an organisation by focusing on interactions between the following five elements:

- Prices of products
- Volume or level of activity
- Per unit variable costs
- Total fixed costs
- Mix of products sold

The types of questions that can be answered using CVP analysis include:

1. What would be the effect on profits if we reduce our selling price and sell more units?
2. What sales volume is required to meet the additional fixed costs arising from an advertising campaign?
3. How will costs and revenues be affected if we sell 1,000 more units?
4. How many units do we need to sell to break even?
5. How many units do we need to sell to make a required profit?
6. What price do we need to charge to make a required profit?

It is important to be aware that in using CVP analysis managers simplify the real world conditions that a company will face. Like most models, which are abstractions from reality, CVP analysis is subject to a number of underlying assumptions and limitations that will be discussed later in this section. Nevertheless, it is a powerful tool for decision making in certain situations. The managers of non-profit organisation can also benefit from the study of CVP relationships, because no organisation has unlimited resources; and knowledge of how costs fluctuate as volume changes helps managers to understand how to control costs.

CVP Terminology

It may be useful at this point to clarify the essential terminology we need to use in CVP analysis:

- *Breakeven point* (BEP) is the level of sales where neither a profit nor a loss occurs. At this level of sales where neither a profit nor a loss occurs. At this level, the sales revenue just covers all the costs (variable and fixed). If we show this in equation form, where S = sales, VC = variable cost, and FC = fixed cost,

$$S - VC - FC = 0$$

If we require a specific profit, the zero in the equation becomes the required profit.

- *Unit contribution* is equal to the selling price minus the variable cost.
- *Contribution margin ratio* is equal to contribution divided by selling price. The following example will help to illustrate the above.

A product has a selling price of €50 - €30 = €20

Contribution margin ratio (CMR) = €20/€50 = 0.4 (or 40%)

CVP Methods – Calculating the Break-even Point

In this section we shall exam three methods for conducting CVP analysis – the *equation method*, the *contribution margin method*, and the *contribution margin ratio method*. The graphical method of CVP is not dealt with in these notes. The following information will be used to illustrate the three methods:

A company produces a single product with the following details:

Selling price per unit	€20
Variable cost per unit	€ 5
Annual fixed costs	€300,000

Calculate the BEP in units and euros.

The equation method

Let X = the required number of units which must be sold to break even

Then the equations ($S - VC - FC = 0$) can be stated as follows:

$$20X - 5X - €300,000 = 0$$

$$15X = €300,000$$

$$X = 20,000 \text{ units}$$

If a profit is required, then it will replace the zero in the equation. For example, let us assume that the required profit is €150,000. The equation can now be restated as follows:

$$20X - 5X - €300,000 = €150,000$$

$$15X = €450,000$$

$$X = 30,000 \text{ units}$$

The contribution margin method

With this method, the fixed costs are divided by the unit contribution. The answer will provide us with the breakeven point. The contribution per unit figure has already deducted the variable costs from the selling price. The only costs that remain to be covered are the fixed costs. The question then is how many unit contributions do we need to cover the fixed costs and thereby break even? The calculation is as follows:

$$\text{Fixed costs/Unit contribution} = €300,000/€15 = 20,000 \text{ units}$$

Please note that this answer is the same as was obtained using the equation method.

If a profit is required, it is added to the fixed costs to obtain the required number of units.

Assuming that a profit of €150,000 is required, our calculation can be restated as follows:

$$(\text{Fixed costs} + \text{profit})/\text{Unit contribution} = €450,000/€15 = 30,000 \text{ units}$$

The contribution margin ratio method

The contribution margin ratio provides a measure of the contribution of every sales euro to covering fixed costs in order to obtain the breakeven point. The calculation is as follows:

$$\text{Fixed costs/CMR} = €300,000/0.75 = €400,000 \text{ (which is 20,000 units)}$$

The CMR of 0.75 has been calculated as follows:

$$\text{Contribution/selling price} = €15/€20 = 0.75$$

Again, if a profit is required, it is added to the fixed costs.

‘What If’ Analysis

The equation shown above can also show how profit will be affected by various options under consideration by management. Such analysis is sometimes referred to as ‘*what if*’ analysis, because it examines what will happen if a particular action is taken. Using the information in the numerical example above, we could ask what would happen to the breakeven point if we increased the selling price by €5. The new breakeven point can be calculated as follows:

$$\text{Fixed costs/unit contribution} = €300,000/€20 = 15,000 \text{ units}$$

Thus it can be seen that, if the selling price is increased by €5 per unit, and the costs remain the same, then the breakeven point will decline by 5,000 units ($20,000 - 15,000$). In a similar fashion, we could ask many other ‘what if’ questions that can be quickly answered using CVP analysis.

Margin of Safety

The *margin of safety* (MOS) is the excess of budgeted sales over the breakeven volume of sales. It states the amount by which sales can drop before losses begin to be incurred. The formula for its calculation is:

$$\text{Margin of safety} = \text{Total budgeted sales} - \text{breakeven sales}$$

The margin of safety can also be expressed in percentage form. This percentage is obtained by dividing the margin of safety by total budgeted sales. The sales figures used can be in money or in units.

Illustrations of MOS:

Assume the budgeted sales for 2008 will be 25,000 units.

Assume that the breakeven point for 2008 has been calculated at 20,000 units.

The MOS is calculated as follows:

$$25,000 - 20,000 = 5,000 = \text{BEP}$$

In percentage terms, the MOS is calculated as $5,000/25,000 = 20$ per cent. This margin of safety means that the budgeted sales for next year can fall by up to 20 per cent before a loss will be incurred. The lower it becomes, the riskier the outcome.

Dealing with Taxation

To calculate the required number of units to be sold when an after-tax profit is required, it is necessary to convert the after-tax profit to before-tax profit. If this is not done, our answer will underestimate the number of units required, because we will have ignored the sales units required to pay the tax.

Example: A company produces a single product:

Selling price per unit	€0
Variable cost per unit	€30
Annual fixed costs	€500,000
Tax rate	40%

How many units must it sell to make an after-tax profit of €120,000?

To convert the after-tax profit to before-tax profit, we use the following formula:

$$\frac{\text{After-tax profit}}{1 - \text{tax rate}} = \frac{\text{€120,000}}{1 - 0.4} = \text{€200,000}$$

The number of units required to make a before-tax profit of €200,000 is

$$\frac{\text{€500,000} + \text{€200,000}}{\text{€20}} = 35,000 \text{ units}$$

Multi-Product CVP

The previous examples illustrated CVP analysis for a single product. We must now examine how this analysis can be extended easily to cover multiple products.

If a company sells more than one product, breakeven analysis is somewhat more complex than discussed earlier in the chapter. The reason is that different products will have different selling prices, different costs, and different contribution margins. Consequently, the breakeven point will depend on the *sales mix* of the various products. The term sales mix means the relative proportions in which a company's products are sold. Managers try to achieve the combination, or mix, that will yield the greatest amount of profit. Changes in the sales mix can cause interesting variations in a company's profits. A shift in the sales mix

from high-margin items to low-margin items can cause total profits to decrease, even though total sales may increase.

Conversely, a shift in the sales mix from low-margin items to high-margin items can cause the reverse effect – total profits may increase even though total sales decrease.

Example of multi-product CVP: A company sells three types of product, A, B and C with the following profile:

	A	B	C
Selling price	€10	€40	€30
Variable cost	€5	€20	€20
Sales mix	20%	30%	50%

In addition, we are informed that annual fixed costs amount to €2.2 million.

Calculate the BEP in units for each product, assuming that the sales mix above remains constant at different sales levels.

To calculate the breakeven point, we need to take into account the contribution of each product and the relative sales mix. Firstly, we calculate the weighted contribution as shown below (€22) and divide this figure into the fixed costs. The answer we obtain, namely, 100,000 units, can be broken down by product using the sales mix percentages. If we require a certain profit, we simply add this figure to the fixed costs and proceed as usual.

Solution:

	A	B	C
Unit contribution	€5	€20	€30
Sales mix	<u>20%</u>	<u>30%</u>	<u>50%</u>
Weighted contribution	€1	€6	€15

Total weighted contribution = €22

BEP = €2,200,000/€22 = 100,000 units

BEP by product =	A (20%)	= 20,000 units
	B (30%)	= 30,000 units
	C (50%)	= 50,000 units

Assumptions of CVP Analysis

A number of assumptions typically underlie CVP analysis:

1. Selling price is constant throughout the entire relevant range. The price of a product or service will not change as volume changes. A limitation of this assumption is that, if sales volume is to increase by a significant amount, it may be necessary to reduce the price.
2. Costs are linear throughout the entire relevant range, and they can be accurately divided into variable and fixed elements. The variable element is constant per unit, and the fixed element is constant in total over the entire relevant range. The assumption that variable costs per unit of output remain constant ignores the impact of production efficiency and quantity discounts.
3. In multi-product companies, the sales mix is constant. In reality, this assumption may not hold true, as the sales mix may change from time to time.
4. The analysis applies only to a short-term horizon.

In spite of these assumptions and limitations, many managers find CVP analysis to be a useful tool for exploring various profit targets and for performing ‘what if’ analysis.

Operating Leverage

Operating leverage relates to the level of fixed versus variable costs in a firm’s cost structure. Firms that have relatively high levels of fixed cost are said to have high operating leverage. To some extent, firms can control their level of operating leverage. For example, a firm can invest in an automated production system using robotics, thus increasing its fixed costs while reducing labour, which is a variable cost. The level of operating leverage is important because it affects the change in profits when sales change. Consider two firms (see Exhibit 6.1) with the same level of profit but different mixes of fixed and variable cost. The information is presented in a *contribution income statement* format.

Exhibit 6.1 Different operating leverages

	Firm 1	Firm 2
Sales	€10,000,000	€10,000,000
Variable cost	€ 5,000,000	€ 7,000,000
Contribution margin	€ 5,000,000	€ 3,000,000
Fixed costs	€ 3,000,000	€ 1,000,000
Profit	€ 2,000,000	€ 2,000,000

Suppose there is a 20 per cent increase in sales. Which firm will have the greatest increase in profit? If firm 1 has a 20 per cent increase in sales, its profit will increase by €1,000,000 (that is, 20 per cent multiplied by the contribution margin), which represents a 50 per cent increase in profit. Firm 2, on the other hand, will have a profit increase of only €600,000 or 30 per cent. Now, suppose there is a 20 per cent decrease in sales. Which firm will have the greatest decrease in profit? Again, the answer is Firm 1. This is because it has relatively more fixed costs (higher operating leverage).

Firms that have high operating leverage are generally thought to be more risky, because they tend to have large fluctuations in profit when sales fluctuate. However, suppose you are very confident that your firm's sales are going to increase. In that case, you would want high operating leverage because the large positive fluctuation in sales will lead to a large positive fluctuation in profit. Unfortunately, many, if not most, managers are not highly confident that their firm's sales will only increase.

Summary

CVP analysis is a profit-planning technique that examines the financial impact of changing activity levels. It also provides information on risk by enabling firms to calculate their breakeven point and their margin of safety. It provides the answers to a whole range of 'what if' questions. Three methods of performing CVP analysis were shown, and single product and multi-product situations were explained. While there are several assumptions that may limit the effectiveness of CVP analysis, many managers nevertheless find it a useful decision-making tool.

Self-Study Questions

1. What is CVP analysis?
2. What is the usefulness to management of knowing a product's breakeven point?
3. Explain the difference between contribution margin and contribution margin ratio.
4. Describe three ways of lowering a breakeven point.
5. Identify the major simplifying assumptions that underlie CVP analysis.
6. Define the term 'margin of safety' and indicate the usefulness of the information that it provides.
7. A company produces and sells one product. The selling price per unit is €800 and the variable cost per unit is €400. Fixed costs are €1,000,000 per year.
 - (a) Calculate the breakeven point.
 - (b) Calculate the number of units to be sold to make a profit of €400,000.
8. Using the information in question 7 above, and assuming that the budgeted level of sales for next year is 3,000 units, calculate the margin of safety percentage.
9. Zhou Company produces and sells three products, X, Y, and Z. The following budgeted data relate to next year:

	A	B	C
Selling price per unit	€12	€12	€15
Variable cost per unit	€ 6	€ 8	€10
Sales mix	50%	20%	30%

Fixed costs are budgeted at €30,000. Calculate the breakeven point in units.

10. A consulting firm has produced the following budget for next year:

Fee income	€5,000,000
Variable costs	<u>€1,000,000</u>
Contribution margin	€4,000,000
Fixed costs	<u>€2,000,000</u>
Profit	<u>€2,000,000</u>

Calculate

- (a) The breakeven point in euros for next year;
- (b) The amount of fee income required to make a profit of €400,000.

Recommended Reading

Drury: Chapter 8

Section 7 Decision Making and Scarce Resources

Introduction

In the short term, sales demand may exceed the existing production capacity of a company. The production capacity may be restricted by a shortage of skilled labour, special raw materials, equipment, or space. When sales demand is in excess of production capacity for a company, the resources responsible for limiting the output should be identified. These scarce resources are known as *limiting factors*. Within a short-term time period, it is unlikely that production constraints can be removed and additional resources acquired. Where limiting factors apply, profit is maximised when the greatest possible contribution to profit is obtained each time the scarce or limiting factor is used.

In the example that follows, we will be identifying the mix of products that should be produced in the situation where machine hours are limited in the short term. In the long term, it may be possible to remove this constraint.

Exhibit 7.5 Contribution per limiting factor and decision making

Liffey Autos is a major European car manufacturer. A department within one of its divisions supplies component parts to firms operating within the automobile industry. The following information is provided relating to the anticipated demand and the productive capacity for the next quarter in respect of three components that are manufactured within the department:

	Component X	Component Y	Component Z
Contribution per unit	€12	€10	€6
Machine hours required per unit	6 hours	2 hours	1 hour
Estimated sales demand	2,000 units	2,000 units	2,000 units
Required machine hours for the quarter	12,000 hours	4,000 hours	2,000 hours

Because of the breakdown of one of its special purpose machines, capacity is limited to 12,000 machine hours for the period, and this is insufficient to meet total sales demand. You have been asked to advise on the mix of products that should be produced during the period.

	Component X	Component Y	Component Z
Contribution per unit	€12	€10	€6
Machine hours	6 hours	2 hours	1 hour
Contribution per machine hour	€2	€5	€6
Ranking	3 rd	2 nd	1 st

Using the figures in Exhibit 7.5, the result would be as follows:

You may think, on first looking at the available information, that the company should give top priority to producing component X, since this yields the highest contribution per unit sold, but this assumption would be incorrect. To produce each unit of component X, six scarce machine hours are required, whereas components Y and Z, the company can sell 2,000 units of each component and still have some machine capacity to make component X. If the company concentrates on producing component X, it will only have enough machine hours to meet the maximum sales demand of component X (i.e., 2,000 units x 6 hours) and will have no machine capacity left to make components Y or Z. Thus, the way of determining the optimum production plan is to calculate the contribution per limiting factor for each component, and then rank the components in order of profitability based on this calculation. In determining the optimal production plan, we start with component Z because it is ranked number one, then proceed to component Y, and finally to component X. We can now summarise the allocation of the scarce machine hours as follows:

Production	Machine hours used	Balance of machine hours available
2,000 units of Z	(2,000 x 1 hour) 2,000	10,000
2,000 units of Y	(2,000 x 2 hours) 4,000	6,000
1,000 units of Z	(1,000 x 6 hours) 6,000	zero

The production programme results in the following total contribution:

	€
2,000 units of Z @ €6 per unit contribution	12,000
2,000 units of Y @ €10 per unit contribution	20,000
1,000 units of X @ €12 per unit contribution	<u>12,000</u>
Total contribution	<u>44,000</u>

It is important to remember the necessity of considering other qualitative factors before the production programme is determined. For example, customer goodwill may be lost, causing a fall in future sales, if the company is unable to supply all three products to, say, 150 of its regular customers. To satisfy these customers, the optimal production plan may be altered. This will result in the optimal contribution figure being reduced. The amount of the reduction is another example of opportunity cost.

Difficulties may arise in applying the procedure we have just described when there is more than one scarce resource. A company may be faced simultaneously with a scarcity of raw materials, labour, and specialised equipment. In this type of situation, it may be necessary to resort to linear programming methods in order to determine the optimal production plan.

Section 8 Relevant Information for Decision Making

Introduction

Making decisions is one of the basic functions of a manager. Managers are constantly faced with problems of deciding what products to sell, what production methods to use, whether to make or buy component parts, what prices to charge, what channels of distribution to use, whether to accept special orders at special prices, and so forth. Decision making is often a difficult task that is complicated by the existence of numerous alternatives and massive amounts of data, only some of which may be relevant.

Every decision involves choosing from among at least two alternatives. In making a decision, the costs and benefits of one alternative must be compared with the costs and benefits of other alternatives. Costs that differ between alternatives are called *relevant costs*. Distinguishing between relevant and irrelevant cost and benefit data is critical for two reasons. First, irrelevant data can be ignored and need not be analysed. This can save decision makers time and effort. Second, bad decisions can easily result from erroneously including irrelevant cost and benefit data when analysing alternatives.

An Illustration of Decision Making

To bring this topic to life, we shall look at a realistic example relating to the search for ways to cut costs and improve profitability.

At the start of the year, the chief executive of Icecold Refrigeration Company asked his three plant managers to examine their operations and search for a way to cut costs and improve profitability. Substantial bonuses were promised to managers who achieved cost savings in excess of €1,000,000.

Wendy O'Brien, manager of the Southern plant, thought she had an effective way to save money. Her plant manufactures refrigeration units used by food processors and retail food stores. One of the main components of the refrigeration units is a compressor. Wendy anticipates producing 50,000 compressors in the coming year at a cost per unit of €345. Because she is concerned that production of compressors is not efficient, Wendy asked Corbally Compressor Corporation to bid on supplying the 50,000 units. They have quoted a price of €310 per unit.

Wendy explained to her plant accountant, ‘if we close the compressor operation and buy the compressors from outside, we’ll save about €1,750,000 a year! That kind of cost saving ought to really grab the chief executive’s attention.’ The plant accountant seemed sceptical. ‘Wendy, let’s look at the cost of producing the compressor. More than €1,000,000 of the cost is depreciation on plant and equipment purchased years ago. Another €800,000 represents the salaries of production supervisors. I don’t think all of those costs will go away just because we shut down the compressor operation and turn to an outside supplier. Perhaps you’d better let me analyse the cost information in some detail before you make a recommendation.’

The plant accountant’s point is well taken. Before making a decision, managers must gain a thorough understanding of the cost information that is relevant.

The Meaning of Relevance

The relevant costs and benefits required for decision making are only those that will be affected by the decision. If a cost will be the same regardless of the alternative selected, then the decision has no effect on the cost and it can be ignored. If you are trying to decide whether to go to a movie or to rent a video for the evening, the rent on our apartment is irrelevant. Whichever of the options you choose, the rent on your apartment will be exactly the same and is therefore irrelevant in the decision. On the other hand, the cost of the movie ticket and the cost of renting the video would be relevant in the decision, since they are *avoidable costs*.

An avoidable cost is a cost that can be eliminated in whole or in part by choosing one alternative over another. By choosing the alternative of going to the movie, the cost of renting the video can be avoided. By choosing the alternative of renting the video, the cost of the movie ticket can be avoided. Therefore, the cost of the movie ticket and the cost of renting the video are both avoidable costs. On the other hand, the rent of the apartment is not an avoidable cost of either alternative. You would continue to rent your apartment under either alternative. Avoidable costs are relevant costs. Unavoidable costs are irrelevant costs.

Review of Decision-Making Concepts

A number of cost concepts have been used earlier, and we briefly review them here. Recall that the basic approach to decision making is to compare decision alternatives in terms of costs and revenues that are *incremental*. Costs that can be *avoided* by taking a particular course of action are always incremental costs and, therefore, relevant to the analysis of the decision. Costs that are *sunk* (i.e., already incurred and not reversible) are never incremental costs because they do not differ among the decision alternatives. Therefore, they are not relevant in making a decision.

Students of management accounting can sometimes assume that fixed costs are always sunk costs and thus irrelevant, but this is not always the case. For example, if taking on a special project for a client involves the hiring of specialised equipment (a fixed cost), this is an example of an incremental cost and therefore relevant to the decision.

Finally, *opportunity costs* represent the benefit foregone by selecting a particular alternative over another. By their nature, they are always incremental costs and they must be considered when making a decision. For example, where a company is faced with a special order from a customer that will require it to turn away business from smaller existing customers, then the profits lost from the existing customers are an opportunity cost of taking on a special order.

Importance of Qualitative Factors

In many situations it is difficult to quantify in money terms all the important elements of a decision. Those factors that cannot be expressed in money terms are classified as *qualitative factors*. A decline in employee moral that results from redundancies arising from downsizing is an example for a qualitative factor. Another example is in relation to the choice of a supplier for, say, a particular component. We may find that supplier A is cheaper than supplier B. On closer examination, we find that supplier A is located several hundred kilometres away, whereas supplier B is nearby. Another issue to be considered in this example is the quality of the components supplied, as well as the reliability of the supplier to deliver exactly what was ordered and on time.

It may not be possible to quantify in money terms the qualitative factors that we have mentioned, but the accountant in such circumstances should present the relevant quantifiable financial information and draw attention to those qualitative items that may have an impact on future profitability.

Examples of Decision Making

The following is an example of an *ad hoc* decision, that is, a decision for a specific purpose.

Exhibit 8.1 Example of relevant costs for decision making

Tony's Restaurant can cater for 500 meals per day, although on average it caters for 400. The fixed costs for the restaurant are €1,000 per day, and the average selling price for a meal is €10, with the variable costs amounting to €5 per meal. One day, a group of 30 tourists arrived unexpectedly at the restaurant and offered to pay a total of €250 if every member of the party could have a full meal each.

Assuming you are the duty managers of Tony's Restaurant at the time, would you accept this deal (assuming that there is spare capacity). The answer is that you would accept the deal because, as a result of it, the restaurant would be €100 better off. The workings are as follows:

Increase in revenues	€250
Less increase in costs	€150 (30 x €5)
Increase in contribution	<u>€100</u>

In this decision the assumption is that the fixed costs will remain unaffected and therefore we can conclude that it is only the increase in revenues and variable costs that are relevant and our decision is to accept.

Developing the Tony's Restaurant example a little, imagine that a large business nearby is cutting costs and wishes to close down its own in-house restaurant. A senior manager of a nearby business contacts you, the manager of Tony's Restaurant, and puts the following proposal to you: in return for a guaranteed 200 customers per day, five days a week, my business will pay you €1,400 per day to provide a full meal for every one of the 200 people. What is your response to this proposal? As we should expect, we need to sort out what is relevant and what is not relevant.

In order for this proposal to be accepted, 100 existing customers would have to be turned away every day. This is because the restaurant has the capacity to cope with 500 meals per day and is currently serving an average of 400 per day. Thus, in order to cope with the extra 200 meals for the large business nearby, 100 regular customers would have to be turned away. The analysis is as follows:

Additional revenues per day	€1,400
Less revenues lost (100 people @ €10)	<u>€1,000</u>
Increase in revenues	<u>€ 400</u>

Additional costs (200 people @ €5)	€1,000
Less savings from 100 people (100 @ €5)	<u>€ 500</u>
Increase in costs	<u>€ 500</u>

The outcome of this proposal would be that Tony's Restaurant would be €100 per day worse off as a result of accepting it. Your decision must therefore be to reject the proposal, as it is currently presented. Perhaps a higher price could be negotiated with the nearby business, or the possibility of increasing the capacity of Tony's Restaurant could be considered.

Exhibit 8.2 Make or buy decisions

Lex Company needs 1,000 components for its car manufacture. It can buy these from Apex Ltd for €1,250 each. Lex Company's plant can manufacture the components for the following costs per unit:

Direct materials	€ 500
Direct labour	250
Variable manufacturing overhead	200
Fixed manufacturing overhead	<u>350</u>
Total	<u>€1,300</u>

If Lex buys the components from Apex, 70 percent of the fixed manufacturing overhead applied will not be avoided. Should Lex Company make or buy the components?

The solution can be presented as follows:

Purchase costs of the components (1,000 x €1,250)	€1,250,000
Relevant costs to make:	
Direct materials (1,000 x €500)	€500,000
Direct labour (1,000 x €250)	250,000
Variable manufacturing overhead (1,000 x €200)	200,000
Avoidable fixed overhead (1,000 x 30% x €350)	<u>105,000</u>
Savings if the components are manufactured internally	<u>€ 1,055,000</u> <u>€ 195,000</u>

Therefore, based on the workings in Exhibit 6.2 it makes economic sense to manufacture the components internally.

Exhibit 8.3 Special pricing decision

The **Clover Company** is a manufacturer of clothing that sells its output directly to clothing retailers. One of its departments manufacturers a special type of sports shirt. The department has a production capacity of 50,000 of these sport shirts per month. Because of the recent cancellation of an order by one of its major customers, Clover Company has excess capacity. For the next three months, monthly production and sales volume is expected to be 35,000 sports shirts at a selling price of €40 per shirt. Expected costs and revenues for the next month at an activity level of 35,000 sports shirts are as follows:

	€	€
	Total	Unit
Direct labour	420,000	12
Direct material	280,000	8
Variable manufacturing overhead	70,000	2
Fixed manufacturing overheads	280,000	8
Marketing and distribution costs	<u>105,000</u>	<u>3</u>
Total costs	1,155,000	33
Sales	<u>1,400,000</u>	<u>40</u>
Profit	<u>245,000</u>	<u>7</u>

Clover is expecting an upsurge in demand and considers that the excess capacity is temporary. A company in the leisure industry has offered to buy 3,000 sports shirts per month for the next three months at a price of €20 per shirt. The company would collect the shirts directly from Clover's factory and thus no marketing or distribution costs will be incurred. No subsequent sales to this customer are anticipated. The leisure company would require its company logo on the shirts and Clover has predicted that this will cost €1 per shirt. For the purpose of this example, we are assuming that the direct labour cost relates to the existing labour force, which will not be affected if the business is taken on from the leisure company. Should Clover accept the offer from the leisure company?

The solution can be presented as follows: If the special order is accepted:

Incremental revenue (3,000 shirts x €20)	€60,000
Less incremental costs	
Direct materials (3,000 x €8)	€24,000
Variable manufacturing overheads (3,000 x €2)	6,000
Inserting of the logo (3,000 x €1)	<u>3,000</u>
Increase in profit per month	<u>€3,000</u>
	<u>€27,000</u>

Four important factors must be considered before recommending acceptance of the order. First, it is assumed that the future selling price will not be affected by selling some of the output at a price below the going market price. If this assumption is incorrect, then competitors may engage in similar practices of reducing their selling prices in an attempt to unload spare capacity. This may lead to a fall in the market price, which in turn would lead to a fall in profits from future sales. The loss of future profits may be greater than the short-term gain obtained from accepting special orders at prices below the existing market price. Second, the decision to accept the order prevents the company from accepting orders that may be obtained during the period at the going price. In other words, it is assumed that no better opportunities will present themselves during the period. Third, it is assumed that the resources have no alternative uses that will yield a contribution to profits in excess of €27,000 per month. Finally, it is assumed that the direct labour and the fixed manufacturing overheads are unavoidable for the period under consideration.

Exhibit 8.4 Dropping a product line

Beckham Ltd has three products and uses joint facilities to produce all three products. The relevant data are:

	Product			
	A	B	C	Total
Sales per month (units)	900	1,200	700	----
Selling price (€ per unit)	150	115	175	----
Variable costs (€ per unit)	110	90	150	----
Fixed costs (€ per month)	----	----	----	79,100

As part of a profitability assessment project, fixed costs have been apportioned to each of the products at the rate of 20 per cent of the product's sales. The management accountant has prepared a profit statement for the three products as follows:

	Product			
	A	B	C	Total
	€	€	€	€
Sales	135,000	138,000	122,500	395,500
Less: Variable costs	99,000	108,000	105,000	312,000
Contribution	36,000	30,000	17,500	83,500
Less:				
Apportioned fixed costs	27,000	27,600	24,500	79,100
Net Profit/(loss)	9,000	2,400	(7,000)	4,400

On reviewing the statement above, the managing director asked the management accountant's opinion on getting rid of product C. The accountant replied immediately that it is rarely the case that eliminating an entire loss-making product group will save as much as it is apparently losing because of the fixed cost implications of the decision. The accountant has redrafted the profit statement to try to illustrate what he meant.

	Redrafted profit statement		
	Product		
	A	B	Total
	€	€	€
Sales	135,000	138,000	273,000
Variable cost	<u>99,000</u>	<u>108,000</u>	<u>207,000</u>
Contribution	36,000	30,000	66,000
Fixed costs			<u>79,100</u>
Profit (loss)			(13,100)

We can see that by dropping product C the overall result has gone from a profit of €4,400 to a loss of €13,100 (a decline of €17,500). Why has this happened? By dropping product C, its contribution of €7,500 has been lost. An assumption has been made that the total fixed costs remain at their previous level for this example. If, on the other hand, some fixed costs could have been saved by dropping product C, then this factor would have to be taken into account in making the decision.

Determining the Relevant Costs of Direct Materials

A slight complexity can arise in determining the relevant costs of direct materials in specific decision-making scenario. It is important to be clear about the cash flow implications. Where the raw materials are not in stock and must be purchased, the relevant cost is the current purchase price of the raw materials (say, €60 per kg). Where the raw materials are already in stock (say, purchased at a price of €50 per kg) and will be replaced immediately if used on this particular job, then the relevant cost is the replacement cost (i.e., €60 per kg). That is the cash flow implication of using the raw materials that are already in stock.

Consider now the situation where 5,000 litres of raw materials are in stock and which cost €30 per litre when purchased some time ago. These materials have very limited use and if not used on a particular job which is currently being considered for acceptance they would be sold at €20 per litre. What is the relevant cost of using the 5,000 litres on this particular job?

This is an example of opportunity cost. By using the 5,000 litres on this job, the company sacrifices the sales revenue of €100,000 (€20 per litre x 5,000). Therefore the relevant cost is €100,000.

If the 5,000 litres of raw materials (mentioned above) have no saleable value, then the relevant cost of using them on a particular job will be zero.

If the same 5,000 litres of raw materials have no saleable value and will incur a disposal cost of €10,000, then by using these raw materials on a job for which they are suitable the company will save €10,000.

Determining the Relevant Costs of Direct Labour

Determining the direct labour costs that are relevant to short-term decisions depends on the circumstances. Where a company has temporary spare capacity and the labour force is to be maintained in the short term, the direct labour cost incurred will remain the same for all alternative decisions. Thus, the direct labour cost will be irrelevant for short-term decision-making purposes.

Consider now a situation where casual labour is used and where workers can be hired on a daily basis; a company may then adjust the employment of labour to exactly the amount required to meet the production requirements. The labour cost will increase if the company accepts additional work and thus will be a relevant cost for decision-making purposes. If acceptance of a particular job requires overtime to be worked, then this will also be a relevant cost.

In a situation where full capacity exists and additional labour supplies are unavailable in the short term, and where no further overtime working is possible, the only way that labour resources could then be obtained for a specific order would be to reduce existing production. This would release labour for the order, but the reduced production would result in a lost contribution, and this lost contribution must be taken into account when ascertaining the relevant costs for the specific order. The relevant labour cost per hour, where full capacity exists, is therefore the hourly labour rate plus an opportunity cost consisting of the contribution per hour that is lost by accepting the order.

Summary

This section has focused on the issue of determining relevant information for decision making. It is important in every decision to identify the incremental revenues and incremental costs arising from a decision. Sunk costs are never relevant and should not be considered in decision making. Several examples were presented dealing with different types of decisions, such as make or buy, drop a product, special pricing, and determining the optimal production plan in a situation of scarce resources.

Self-Study Questions

1. What is the difference between a relevant cost and a sunk cost?
2. What are avoidable costs?
3. Define opportunity cost.
4. Why are opportunity costs relevant when making decisions?
5. Distinguish between quantitative and qualitative factors in decision making.
6. What are the qualitative advantages of making rather than buying a component?
7. What is the proper approach to analysing whether or not a product line should be dropped?
8. Outline the approach to determining the optimal production plan in a situation where there are several products and a limiting resource such as skilled labour.

Recommended Reading

Drury: Chapter 9.

Section 9 Risk and Uncertainty

The basic concept of risk is that the final outcome of a decision, such as an investment, may differ from that which was expected when the decision was taken. The wider the range of possible outcomes, the more risky (or uncertain) the situation. The difference between risk and uncertainty is the extent to which the number, value and likelihood of the outcomes can be confidently estimated. Risk is when the probabilities of the possible outcomes are known (such as when tossing a coin or throwing a dice). Uncertainty is where the randomness of outcomes cannot be expressed in terms of specific probabilities.

Probability

The term ‘probability’ refers to the likelihood or chance that a particular event will occur, with potential values ranging from 0 (the event will not occur) to 1 (the event will definitely occur). For example, the probability of a tail occurring when tossing a coin is 0.5, and the probability when rolling a dice that it will show a four is 1/6 (0.166). The total of all the probabilities from all the possible outcomes must equal 1, ie some outcome must occur.

A probability distribution lists “all possible” outcomes for an event and the probability that each will occur. For example, a company has forecasted potential future sales from the introduction of a new product in its first year as follows (does this exhibit really list “all possible” outcomes?):

Exhibit 9.1: Probability of new product sales

Sales	€50,000	€70,000	€100,000	€125,000	€150,000
Probability	0.1	0.2	0.	0.2	0.1

Probability	0.1	0.2	0.	0.2	0.1
-------------	-----	-----	----	-----	-----

In this case, the most likely outcome is that the new product generates sales of €100,000, as that value has the highest probability. Forecasted outcomes (e.g. future sales) and probabilities can be used to calculate an expected value for an event.

Expected value

The expected value of a decision can be calculated simply by multiplying the value associated with each potential outcome by its probability. The expected value of the introduction of the new product from exhibit 9.1 is calculated as follows:

$$\begin{aligned}
\text{Expected value} &= (\text{€}0,000)(0.1) + (\text{€}7,000)(0.2) + (\text{€}100,000)(0.4) + (\text{€}125,000)(0.2) + \\
&\quad (\text{€}150,000)(0.1) \\
&= \text{€}0,000 + \text{€}14,000 + \text{€}40,000 + \text{€}25,000 + \text{€}15,000 \\
&= \text{€}9,000
\end{aligned}$$

The expected value (€9,000) is very close to the most likely outcome (€100,000), but this is not usually the case in real life. In addition, the probabilities are based upon the event occurring repeatedly, whereas, in reality, most events only occur once.

DECISION-MAKING CRITERIA

Decision making from the same information may vary from manager to manager as a result of their individual attitude to risk. Individual attitudes to risk vary along a continuum between risk averse (dislike risk) and risk seeking (content with risk). The decision-making criteria used to make decisions are often determined by the individual's attitude to risk. Three possible models of decision making criteria are:

1. Maximin
2. Maximax
3. Minimax regret

To illustrate each of these models we'll use the example of a seaside lemonade stall. The stall owner when deciding how much lemonade to order (a small, medium, or large order), takes into consideration the weather forecast (cold, warm, or hot). There are nine possible combinations of order size and weather, and the payoffs for each are shown in Exhibit 9.2.

Exhibit 9.2: Decision-making combinations

Order/weather	Cold	Warm	Hot
Small	€500	€400	€300
Medium	€400	€1000	€600
Large	€200	€600	€1,500

The highest payoffs for each order size occur when the order size is most appropriate for the weather, ie small order/cold weather, medium order/warm weather, large order/hot weather. Otherwise, profits are lost from either unsold lemonade or lost potential sales. We shall consider the decisions the stall owner has to make using each of the decision criteria previously noted (in the absence of probabilities regarding the weather outcomes).

Maximin

This criteria is based upon a risk-averse (cautious) approach. The order decision is based upon maximising the minimum payoff. The lemonade seller will therefore decide upon a medium order, as the lowest payoff is €100, whereas the lowest payoffs for the small and large orders are €300 and €200 respectively.

Maximax

This criteria is based upon a risk-seeking (optimistic) approach. The order decision is based upon maximising the maximum payoff. The lemonade seller will therefore decide upon a large order, as the highest payoff is €1,500, whereas the highest payoffs for the small and medium orders are €500 and €1,000 respectively.

Minimax regret

This approach attempts to minimise the regret from making the wrong decision and is based upon first identifying the optimal decision for each of the weather outcomes. If the weather is cold, then the small order yields the highest payoff, and the regret from the medium and large orders is €100 and €300 respectively. The same calculations are then performed for warm and hot weather and a table of regrets is prepared.:.

Table 9.4: Table of regrets

Order/weather	Cold	Warm	Hot
Small	€0	€600	€1,200
Medium	€100	€0	€900
Large	€200	€400	€0

The decision is then made on the basis of the lowest regret, which in this case is the large order with the maximum regret of €400, as opposed to €1,200 and €900 for the small and medium orders.

Self-Study Questions

1. Define risk
2. Define uncertainty
3. What is the difference between risk and uncertainty?
4. Define probability.
5. What is expected value and how is it calculated?
6. Explain how a manager's attitude to risk may affect their decision making.
7. Explain the maximax, maximin and minimax regret approaches to decision making.

Recommended Reading

Drury: Chapter 12

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Cost Information and Behaviour

QUESTION 1. (MCQs)

Identify the choice that best completes the statement or answers the question.

1. Which of the following costs is a variable cost?
 - a. supervisors' salaries
 - b. research and development
 - c. materials used in production
 - d. rent

2. Direct materials are an example of a
 - a. fixed cost.
 - b. variable cost.
 - c. step cost.
 - d. mixed cost.

3. Which of the following statements is TRUE about fixed and variable costs?
 - a. Both costs are constant when considered on a per-unit basis.
 - b. Both costs are constant when considered on a total basis.
 - c. Fixed costs are constant in total and variable costs are constant per unit.
 - d. Variable costs are constant in total and fixed costs are constant per unit.

4. The total direct material cost is €215,000 when 20,000 units are produced. What is the total direct material cost for 25,000 units produced?
 - a. €268,750
 - b. €208,000
 - c. €285,000
 - d. €120,500

5. Blue Ltd. has the following total costs for 2,000 units:

	<u>Total Cost</u>
Direct materials	€3,000
Direct labour	15,000
Depreciation on building	45,000

What is the total amount of direct costs for 200 units?

- a. €0
- b. €31.5
- c. €1,800
- d. €6,300

6. Boulder Ltd has leased a piece of equipment. The lease that specifies a payment of €15,000 per month plus €6 per machine hour used is an example of a
- fixed cost.
 - variable cost.
 - step cost.
 - mixed cost.
7. Variable costs,
- in total, remain constant within a relevant range.
 - on a per unit basis, are constant as activity increases or decreases.
 - on a per unit basis, decreases as activity decreases.
 - in total, decrease when activity increases.
8. Mixed costs
- are step costs.
 - in total, remain constant within a relevant range.
 - have a fixed and variable component.
 - on a per unit basis, are constant as activity increases or decreases.

QUESTION 2.

Classify the following costs incurred by a step railing manufacturing company as direct materials (DM), direct labour (DL), factory overhead (FO), or period costs (PC):

- | | |
|-----|------------------------------------|
| 1. | Wages paid to production workers |
| 2. | Utilities in the office |
| 3. | Depreciation on machinery in plant |
| 4. | Steel |
| 5. | Accountant's salary |
| 6. | Rent on factory building |
| 7. | Rent on office equipment |
| 8. | Maintenance workers' wages |
| 9. | Utilities in the plant |
| 10. | Maintenance on office equipment |

QUESTION 3.

Lakeview Medical Clinic offers a number of specialised medical services, one of which is psychiatric care. Because of the reputation the clinic has developed, demand for these services is strong. As a result, Lakeview recently opened a 100-bed psychiatric hospital near the clinic. The new hospital building is leased on a long-term basis. All equipment within the hospital is owned by the clinic.

Since the clinic had no experience with in-patient psychiatric services, it decided to operate the hospital for two months before determining how much to charge per patient day on an ongoing basis. As a temporary measure, the clinic adopted a patient day charge of €100.

The hospital opened on January 1. During January, the hospital had 2,100 patient days of activity. During February, the activity was 2,250 patient days. Costs for these two levels of activity are as follows:

	2,100 Patient Days	2,250 Patient Days
	€	€
Salaries (nurses)	37,200	37,200
Aides/orderlies	2,000	2,000
Laboratory	30,250	32,125
Pharmacy	20,900	21,800
Lease	10,000	10,000
Laundry	15,750	16,875
Administration	13,000	13,000
Depreciation	30,000	30,000

Required:

- a) Classify each cost as fixed, variable or mixed.
- b) The hospital's administrator has estimated that the hospital will average 2,000 patient days per month. If the hospital is to be operated as a non-profit organisation, how much will it need to charge per patient per day? How much of this charge is variable? How much is fixed?
- c) Suppose the hospital averages 2,500 patient days per month. How much would need to be charged per patient day for the hospital to cover its costs? Explain why the charge per patient day decreased as the activity increased.

Budgeting.

QUESTION 4.

HS Limited is a service company, providing IT advice to clients. It was formed as a limited liability company on 1 January, 20x1. The following transactions are anticipated to occur during the first year of operations:

1. Share capital amounting to €90,000 (in total) will be contributed to the company by the investors (shareholders).
2. The company will obtain a short-term loan from a local bank in the amount of €60,000.
3. The company will purchase equipment (fixed assets) in the amount of €125,000 of which €100,000 will be paid immediately and the balance at some time in the future.
4. The company will pay rent (in cash) amounting to €30,000.
5. The company will provide an IT service for its clients for an agreed amount of €250,000 which will be collected in future months.
6. The company will collect €180,000 in respect of accounts receivable for services rendered in 5 above.
7. The company will pay wages in cash, €101,000 to its employees.
8. The company will pay interest amounting to €4,000.
9. The company will acquire and use stationery in the amount of €8,500. The company will pay €8,000 to its suppliers of office stationery.
11. The company will provide IT services to clients in the amount of €100,000 which will be received immediately in cash.
12. The company will pay €15,000 against its bank loan.
13. Depreciation is to be provided on fixed assets in the amount of €5,000 for the year.
14. Provide for taxation payable on profit for the above year, in the amount of €10,000.

You are required to prepare:

1. A budgeted income statement for the year.
2. A budgeted cash flow statement for the year.
3. A budgeted closing balance sheet.
4. Explain **one** advantage of preparing budgets in modern organizations

QUESTION 5.

Each unit of **Product Omega** requires 3 kgs of raw material. Next month's production budget for product Omega is as follows:

Opening stocks:

Raw materials	15,000 kgs.
Finished units of Omega	3,000 units
Budgeted sales of Omega	60,000 units

Planned closing stocks

Raw materials	7,000 kgs.
Finished units of Omega	4,000 units

Required:

Calculate the number of kilograms of raw materials that should be purchased next month.

QUESTION 6.

Arkan Ltd. plans to set up business at the start of 20x9 and to sell a single product, Alpha. Its share capital, contributed in cash, amounts to €200,000. On the basis of sales forecasts, it is anticipated that 40,000 units of Alpha will be sold (all on credit) in 20x9 at a selling price of €20.

At the end of the year, management require 2,000 units of Alpha to be held in stock. €7,000 of raw material is also to be held.

The production inputs and costs are as follows:

	Alpha
Raw materials	2 kgs.
Cost of raw material	€1/kg.
Direct labour	3 hours
Rate per hour	€1.50
Other production overheads (variable)	50c/unit

The following costs are anticipated during the year:

	€
Light and heat	8,000
Administration	22,000
Rent and rates	25,000
Selling expenses	70,000

Depreciation is calculated at the rate of 10% of book value of assets in existence at the end of year.

During the year, €100,000 of new fixed assets will be purchased.

Strict credit limits will be imposed on customers. It is agreed that the average period of credit allowed to customers will be 60 days (based on a 360 day year) and this figure is to be used in budget calculations. Purchases will be paid for in cash.

Required:

Prepare a budgeted Profit and Loss A/c for 20x9 and a budgeted Balance Sheet as at 31 December 20x9 (monthly figures are not required).

QUESTION 7.

Milton Company manufactures a single product. It has developed the following estimated sales figures for the six months May to October 20X8:

Month	Sales (Units)
May	10,000
June	8,000
July	10,000
August	12,000
September	14,000
October	14,000

The following additional information is available:

1. Selling price per unit is €30. Seventy five percent of sales are paid for in the month of sale with the remainder paid for in the following month.
2. The company maintains a stock of finished goods equal to half the next month's sales.
3. Each unit produced requires 4 kgs of raw material at €2 per kg and 2 hours of labour at €6 per hour.
4. The company maintains a stock of raw materials equal to the next month's production requirements.
5. Payment is made to suppliers one month after delivery.
6. Variable manufacturing overheads are €2 per unit. Fixed manufacturing overheads are €2,800 per month, which includes depreciation of €800.
7. Fixed selling and administration expenses are estimated at €4,000 per month. Sales commissions of 2% of sales are paid in the following month.
8. The company will pay rates of €5,000 in August 20X8 and intends buying new equipment in June 20X8 for €45,000 which it will pay for in August 20X8.
9. The opening figures for stocks on 1 May 20X8 are:

Finished goods	5,000 units
Raw materials	36,000 kgs
10. The estimated cash balance on 1 June 20X8 is €8,000 overdrawn.
11. Except where noted to the contrary all expenses will be paid for in the month incurred.

REQUIRED:

Prepare the following monthly budgets for the **three-month period June to August 20X8:**

- (a) Sales budget
- (b) Production budget
- (c) Materials usage budget
- (d) Materials purchases budget
- (e) Labour utilisation budget
- (f) Cash budget

QUESTION 8.

The following forecast information is available for **Pearce Limited**:

- (i) Sales are budgeted as follows for the next five months:

	<u>Units</u>
June	15,000
July	18,000
August	20,000
September	17,000
October	12,000

The budgeted selling price per unit is €30.

- (ii) The firm makes all sales on credit, collecting 20% in the month of sale and 80% in the month after sale. The opening balance in debtors on 1 June is expected to be €384,000.
- (iii) The stock of finished goods at 1 June is expected to be 6,000 units.
- (iv) The closing stock of finished goods each month is to be 40% of the next month's sales.
- (v) Each unit produced uses 4 kg of material X.
- (vi) The opening stock of material X at 1 June is expected to be 32,400 kg
- (vii) The closing stock of material X is to be 50% of the next month's usage.
- (viii) Material X costs €3 per kg.
- (ix) Material purchases are paid for in the month of purchase.
- (x) The following expenses are estimated:
- | | May | June | July | August |
|-------------|---------|---------|---------|---------|
| Wages € | 130,000 | 120,000 | 130,000 | 140,000 |
| Overheads € | 88,000 | 85,500 | 92,500 | 90,000 |
- (xi) The lag in the payment of wages is 1/4 month (i.e. one week's wages owing at the end of each month). The wages in May were €130,000.
- (xii) Overheads include €25,500 per month for depreciation. Overheads are paid for in the month **after** they are incurred.
- (xiii) A tax bill of €45,000 is to be paid in July.
- (xiv) A machine will be purchased in June and paid for in July costing €60,000.
- (xv) The opening cash balance in June is expected to be an **overdraft** of €32,000.

REQUIRED:

Prepare the following budgets for June, July and August:

- (i) the sales budget,
- (ii) the production budget,
- (iii) the materials usage budget,
- (iv) the materials purchases budget and
- (v) the cash budget

QUESTION 9.

Fern Limited manufactures two products. The budgeted sales for September are:

Product A	10,000 units at a selling price of €100 per unit
Product B	5,000 units at a selling price of €80 per unit

Other details are as follows:

- 1) Two raw materials are used in the manufacture of the company's products:

Raw Material	Quantity in Product A	Quantity in Product B
Plastic	4 kg	3 kg
Cloth	5 metres	8 metres

- 2) Plastic costs €5 per kg and Cloth cost €2 per metre.

- 3) Stocks of raw materials at 1 September are expected to be as follows:

Plastic	16,000 kg
Cloth	9,000 metres

- 3) Stocks of finished goods at 1 September are expected to be as follows:

Product A	500 units
Product B	400 units

- 4) Labour costs €12 per hour. The labour time to produce each unit is as follows:

Product A	3 hours
Product B	2 hours

- 5) The company plans an increase of 25% in the quantity of each raw material in stock at the end of September

- 6) The company plans a reduction of 50% in the quantity of finished goods in stock at the end of September for both Product A and Product B

- 7) Variable overhead is applied at the rate of €2 per labour hour

REQUIRED:

Prepare the following budgets for Ferns Limited for September.

- a) The Sales Budget
- b) The Production Budget
- c) The Materials Usage Budget
- d) The Materials Purchases Budget
- e) The Labour Utilisation Budget.
- f) The Variable Overhead Budget
- g) The contribution per unit for each product. (ignore)

QUESTION 10.

The Ortega Company manufactures and sells two products, Arrows and Spears. In October 2008 the Company's budget department gathered the following data in order to project sales and budget requirements for 20x9:-

20x9 Projected Sales	Product	Units	Price
	Arrows	30,000	€ 70
	Spears	20,000	€100
Stocks (Units)	Product	Expected January 1, 20x9	Desired Dec.31,20x9
	Arrows	10,000	15,000
	Spears	5,000	6,000
Raw materials		Amount used per Unit	
	Raw Materials	Unit	Arrows Spears
	A	Kilos	4 5
	B	Kilos	2 3
	C	Blocks	1

Projected data for 2009 with respect to raw materials are as follows:-

Raw Material	Anticipated purchase price	Expected stocks 1 January 20x9	Desired stocks 31 December 20x9
A	€7.00	15,000 Kilos	20,000 Kilos
B	€5.00	14,000 Kilos	17,000 Kilos
C	€2.50	2,000 Blocks	3,000 Blocks
Direct labour Projected requirements	Product	Hours per unit	Rate per hour
	Arrows	2	€3
	Spears	3	€4

Variable Overhead Applied at the rate of €2 per direct labour hour.

Required:

Based on the above, prepare the following budgets for 20x9:

- (i) Sales budget (in €)
- (ii) Production budget (in units)
- (iii) Raw materials purchase budget (in quantities)
- (iv) Raw materials purchase budget (in €)
- (v) Direct labour budget (in €)
- (vi) Budgeted finished goods inventory at Dec. 31, 20x9 (in €)

QUESTION 11. (Final Exam 2014/15)

Raw Limited produces a range of juices, smoothies and fruit based vitamin drinks. The company is currently preparing its budget for its VITC HIT product for the first three months of next year, January to March. VITC HIT is manufactured from carbonated spring water (90%) and a blend of fresh pasteurised orange juice and fruit extracts (10%) sold in 500ml bottles. The selling price is €1.90 per bottle

Projected sales for the next four months are shown below.

	January	February	March	April
Sales units (500ml bottles)	55,000	53,000	57,500	48,000

At 1 January the company expects to have 2,000 bottles of VITC HIT in inventory. However, the sales manager requires that at the end of each of the next six months there will be 5,000 bottles in inventory.

The costs incurred to produce one 500ml bottle of VITC HIT are as follows:

	€
Direct Materials:	
- Spring water (450ml @ €0.20 per litre)	0.09
- Juice blend (50ml @ €1 per litre)	0.05
- 500ml plastic bottle	0.06
Direct Labour (0.05hr @ €8 per hour)	0.40
Variable production overhead	<u>0.11</u>
	0.71

At 1 January the company will have 2,000 litres of spring water, 500 litres of juice blend and 5,000 plastic bottles in inventory. To reduce the risk of disruption to manufacturing, Raw Limited has a policy of maintaining the same opening and closing monthly inventory of direct materials. The cost of material purchases has not changed in the past two years and is not expected to change for the next year.

REQUIREMENT:

- A. Based on the above prepare the following budgets for the first three months of next year (January, February and March):
 - i. Sales Budget (in €). (3 marks)
 - ii. Production budget (in units). (3 marks)
 - iii. Materials purchase budget (in units and €) for each material. (12 marks)
 - iv. Labour cost budget (in hours and €). (3 marks)
- B. Calculate the total budgeted gross profit from sales of VITC HIT for the three month period 1 January to 30 March. (5 marks)
- C. Explain the term ‘flexible budget’. (3 marks)

D. Briefly discuss the advantages of preparing a flexible budget.

(6 marks)

(Total: 35 marks)

QUESTION 12.

The Target Sales Co. which is a wholesale trading company, had the following Sales and Purchases for the first 3 months of the year:

€000	Jan	Feb	Mar
Sales	100	200	250
Purchases	150	220	280

Sales and Purchases projections for the next 6 months are as follows:

€000	Apr	May	Jun	Jul	Aug	Sep
Sales	300	350	500	200	300	400
Purchases	400	450	300	400	200	300

Expenses are €40,000 per month except in July when holiday pay of €10,000 increases the total to €50,000. The expenses comprise the following:

Wages	20
Depreciation	10
General Expenses	<u>10</u>
TOTAL	40

The cash proceeds from the sale of an asset for €120,000 are expected to be received in June.

10% of the sales are for cash and the remainder on 2 month's credit.

1 month's credit is expected to be received in respect of purchases.

At the end of March the Company had an overdrawn balance of €25,000 at the bank.

Required:

Prepare a Cash Forecast for each of the 6 months ended September.

QUESTION 13.

Lansdowne Company manufactures a single product. It has developed the following production and sales budgets for the eight months May to December, 20x9.

Month	Production	Sales (Units)
May	8,000	10,000
June	10,000	8,000
July	12,000	10,000
August	14,000	12,000
September	14,000	14,000
October	12,000	14,000
November	10,000	12,000
December	10,000	10,000

The following information is available:

- i) Selling price per unit is €40. Sixty percent of sales are paid for in the month after sale with the remainder paid for in the following month.
- ii) Each unit produced requires 2 kgs. of material at €4 per kg. and 1 hour of labour at €7 per hour.
- iii) Payment is made to suppliers one month after delivery.
- iv) Variable manufacturing overheads are €3 per unit. Fixed manufacturing overheads are €2,000 per month which includes depreciation of €400.
- v) Fixed selling and administration expenses are estimated at €2,000 per month.
Sales commissions of 3% of sales are paid in the following month.
- vi) The company maintains an inventory of raw materials equal to the next month's production requirements.
- vii) The company will pay a dividend of €7,000 in August 20x9 and intends buying new equipment in June 20x9 for €30,000 which it will pay for in August 20x9.
- viii) The estimated cash balance on 1 July 20x9 is €200,000 overdrawn.
- ix) Except where noted to the contrary all expenses will be paid for in the month incurred.

Required:

- (a) Prepare a Cash Budget for each of the three months to 30 September 20x9.
- (b) Discuss briefly the usefulness of cash budgets.

QUESTION 14.

The projected monthly profit and loss account of **Mars Ltd.** was as follows:-

	April	May	June	July
Sales	200,000	300,000	240,000	210,000
Cost of Goods Sold	<u>150,000</u>	<u>225,000</u>	<u>186,000</u>	<u>150,000</u>
Gross Profit	50,000	75,000	54,000	60,000
Expenses	<u>40,000</u>	<u>45,000</u>	<u>35,000</u>	<u>40,000</u>
Net profit	<u>10,000</u>	<u>30,000</u>	<u>19,000</u>	<u>20,000</u>

The following additional information is available:-

1. 20% of sales are for cash, 80% on credit. One quarter of credit sales are paid for in the month of sale, three quarters in the following month.
2. Debtors at the end of March amounted to €60,000.
3. All purchases are on credit and are paid for in the month after purchase.
4. Creditors at the end of March amounted to €150,000.
5. Stocks at the end of March amounted to €5,000.
6. Physical stocks are to be maintained at 33½% of the following month's sales.
7. There is a lag of one fifth of a month in payment of expenses which include €5,000 per month for depreciation. Accrued expenses at the end of March were €3,000.
8. New fixed assets costing €25,000 will be purchased in April and paid for in May.
9. The cash balance at the end of March is expected to be €5,000.

Required:

- (a) Draw up a Cash Budget for each of the three months, April, May and June.
- (b) What are the main benefits to an organisation of budgeting?

QUESTION 15.

A.Seer projected the following Profit and Loss Account on a monthly basis for his business:-

	October	November	December	January
Sales	80,000	120,000	60,000	80,000
Cost of Goods Sold	<u>60,000</u>	<u>90,000</u>	<u>45,000</u>	<u>60,000</u>
Gross Profit	20,000	30,000	15,000	20,000
Expenses	<u>16,000</u>	<u>18,000</u>	<u>15,000</u>	<u>16,000</u>
Net profit	<u>4,000</u>	<u>12,000</u>	<u>Nil</u>	<u>4,000</u>

The following additional information is available:-

- (i) All sales are on credit, half are paid for in the month of sale and half in the following month.
- (ii) Debtors at the end of September amounted to €30,000.
- (iii) All purchases are on credit and are paid in the month after purchase.
- (iv) Creditors at the end of September amounted to €20,000.
- (v) Stocks at the end of September amounted to €4,000.
- (vi) It is desired to maintain closing stocks equal to 50% of the next month's sales.
- (vii) Expenses which include €2,000 per month for depreciation are paid as they arise.
- (viii) New fixed assets costing €10,000 will be purchased in October and paid for in December.
- (ix) The cash balance at the end of September is expected to be €2,000.

Required:

- (a) Draw up a Cash Budget for each of the three months October, November and December.
- (b) How might uncertainty be incorporated into the budgeting process?

QUESTION 16.

Kilmainham Ltd. has developed the following month by month sales forecast for its only product for the seven months June to December, 20x9.

Month	Unit Sales
June	4,000
July	6,000
August	8,000
September	5,000
October	4,000
November	6,000
December	8,000

The budgeted variable manufacturing cost per unit is as follows:-

Material 16 kgs. at €0.50 per kg.	€ 8
Labour 6 hours at €2 per hour	€12
Variable overhead	€ 6

Fixed manufacturing overhead amounts to €19,000 per month which includes depreciation of €9,000 and rent. The selling price per unit is €30. Selling expenses, all of which are fixed, are estimated to amount to €8,000 per month. The following additional information is available:-

- 1) Payment is made to suppliers one month after delivery.
- 2) The lag in payment of wages is $\frac{1}{6}$ month.
- 3) Sales are paid for in the month after sale.
- 4) Overheads are paid for as incurred except for rent.
- 5) Rent amounts to €12,000 per year and is paid quarterly and the last day of January, April, July and October.
- 6) The company maintains inventories as follows:
 - (a) Raw Materials: next $1\frac{1}{2}$ months' requirements.
 - (b) Finished Goods: $\frac{1}{2}$ next month's sales.
- 7) The company intends buying a new machine in July for €24,000 which it will pay for in September.
- 8) The estimated cash balance on 1st July, 20x9 is €1,000.

Required:

Prepare a cash budget for each of the three months to 30th September, 20x9 together with whatever supplementary budgets you consider necessary.

QUESTION 17. (Final Exam Semester 2 15_16)

Autoengineering Ltd. produces a component, XY for the automotive industry. Sales volumes for the first four months of the forthcoming year have been forecast to be as follows:

	January	February	March	April
XY	1,000	1,200	1,100	1,300

The budgeted selling price for XY is €300 per unit. All purchases of materials made by the company are paid for in the month after purchase. All sales are on one month's credit. The following opening balances are expected to be included in Autoengineer Ltd's ledger at the start of January:

Bank	€ 12,000 (DR)
Creditors/Trade Payables	€18,000 (CR)
Debtors/Trade Receivables	€194,000 (DR)

The company's inventory policy requires that sufficient stock of XY be held at the end of every month to cover 40% of the following month's sales. It is expected that at the start of January, 400 units of XY will be in stock.

The direct materials and labour inputs required for the production of one unit of each of the products are budgeted to be as follows:

	XY
Material 1	2 kg
Material 2	4 kg
Direct Labour	2 hrs

Material 1 is budgeted to cost €12 per kg. It is expected that 360 kg of Material 1 will be in stock at the start of January. Management require that the quantities of Material 1 in stock at the **end** of each of the first three months of the year should be:

	January	February	March
Quantity (in kg)	375 kg	400 kg	475 kg

Material 2 is expected to cost €14 per kg. It is expected that 760 kg of Material 2 will be in stock at the beginning of January. Management require that the quantities of Material 2 in stock at the **end** of each of the first three months of the year should be:

	January	February	March
Quantity (in kg)	825 kg	920 kg	960 kg

The following additional information is also available:

- The direct labour rate is €9.50 per hour. Labour costs are paid for in the month they are incurred.

- Every month fixed overheads of €46,000 are incurred, including €9,000 per month for depreciation and are paid for in the month in which they are incurred.
- Variable selling and distribution expenses of €12 per unit sold are also paid for in the month in which they are incurred.
- The company will make a dividend payment in February of €50,000
- The company intends to purchase a new machine in March for €100,000 which it will pay for in April.

REQUIRED:

- (a) Prepare a production budget (in units) for XY for the first three months of the forthcoming year. **(4 marks)**
- (b) Prepare the raw material purchase budgets (in kg and in €) for Material 1 and Material 2 for the first three months of the forthcoming year. **(6 marks)**
- (c) Prepare a cash budget for Autoengineer Ltd. for the first three months of the year which shows receipts and payments for each month and in total for the period. **(20 marks)**
- (d) Briefly discuss how uncertainty might be incorporated into the budgeting process. **(5 marks)**

(Total: 35 marks)

QUESTION 18. (MCQs)

The following information relates to both Item 1 and Item 2 below:

The expected sales for a company for July, August and September are 8,000, 10,000 and 12,000 units respectively. Each unit sells for €30. 25% of the sales in each month are for cash and the remainder are on credit. These are paid for in the month following sale.

The company maintains closing stock of finished goods at 25% of expected sales for the following month. (Note: The opening stocks for July met this requirement).

Each unit of production takes 2 direct labour hours at €6 per hour. Labour is paid for immediately.

Item 1.

The cash inflows from sales for August and September are:

	August	September
(a)	€40,000	€300,000
(b)	€85,000	€345,000
(c)	€255,000	€315,000
(d)	None of the above	

Item 2

The total wages to be paid in July and August are:

	July	August
(a)	€85,000	€50,000
(b)	€75,000	€65,000
(c)	€80,000	€70,000
(d)	None of the above	

Item 3.

Budget working papers for **Diners Ltd.**, a contract caterer, show the following for the first quarter of next year:

	January	February	March	April
Estimated sales revenue	€90,000	€120,000	€80,000	€100,000

10% of sales will be for cash, and attract a 10% discount, the remainder being on credit.

60% of sales revenue will be received in the month after sale, 20% two months after sale, 8% three months after sale and the balance is reckoned to be bad debts.

What will be Diner Ltd.'s cash receipts from sales in April next year?

- (a) €88,200
- (b) €90,000
- (c) €95,600
- (d) None of the above

Standard Costing and Variance Analysis

QUESTION 19.

BELTRA FINE FOODS LIMITED operates a salmon canning plant in Cork. The standard cost of its only product, goormay, is as follows:

	€
Materials ½ kg. at €4 per kg.	2.00
Direct labour 2 hours at €3 per hour	6.00
Variable overhead 2 hours at €1	2.00
Fixed overhead 2 hours at €2	<u>4.00</u>
	<u>14.00</u>

Budgeted Fixed overhead is €1,000,000 per year based on expected production and sales of 250,000 units of product. The company never carries any stock.

The budgeted profit for 2009 was €1,500,000 calculated as follows:-

	€
Sales 250,000 units at €20 each	5,000,000
Costs 250,000 units at €14 each	<u>3,500,000</u>
Budgeted profit	<u>1,500,000</u>

The actual results for 2009 were as follows:-

Production and sales (units)	240,000
Sales	€
Costs:-	
Materials (125,000 kgs.)	487,500
Direct labour (500,000 hours)	1,490,000
Variable Overhead	495,000
Fixed Overhead	<u>1,027,500</u>
Net Profit	<u>3,500,000</u> <u>1,540,000</u>

Required:

- Prepare a statement for the Managing Director explaining the difference (that is, showing all the variances) between budgeted profit and the actual profit.
- Give two possible reasons for the materials usage variance.

QUESTION 20.

Speedy Ltd. makes running shoes. The Budgeted Profit and Loss Account for the company for the year ended 30 June 2009 is as follows:

	€
Sales (€30 per unit)	900,000
Less Production Costs	
Variable (€15 per unit)	450,000
Fixed (€5 per unit)	<u>150,000</u>
Budgeted Profit	<u>300,000</u>

The standard Cost Card for a pair of shoes is:

Material (5 kg @ €1 per kg)	5
Direct Labour (4 hours @ €2 per hour)	8
Variable overhead (4 hours @ 50c per hour)	<u>2</u>
	<u>15</u>

Actual results for the year to 30 June 2009

Sales (31,000 units)	961,000
Production Costs	
Materials (157,000 kg. purchased and consumed)	149,150
Direct Labour (120,000 hours)	252,000
Variable overhead (120,000 hours)	66,000
Fixed Overhead	<u>155,000</u>
Actual Net Profit	<u>622,150</u>
	<u>338,850</u>

Required:

- (a) Reconcile budgeted and actual net profit figures by showing all revenue* and cost variances in as much detail as possible.
- (b) Give two reasons for the labour efficiency variance.

* Contribution per unit = selling price - variable cost (used to calculate sales volume variance)

QUESTION 21.

A division head of **QUALITY MOULDED PRODUCTS LTD.** reviewed the accounts for the first year's results of the division. She had been entrusted with the production and sale of a highly successful product with no selling and distribution costs and no requirement to carry stocks. The budget based on 25,000 units (produced and sold) was as follows:

	€
Sales @ €20 per unit	500,000
Production costs @ €14 per unit	<u>350,000</u>
Budgeted Profit	<u>150,000</u>

The standard cost sheet for the product was as follows:

	€
Materials 1 kg. @ €2 per kg.	2.00
Direct labour 2 hrs. @ €3 per hr.	6.00
Variable overhead 2 hrs. @ €1 per hr.	2.00
Fixed overhead 2 hrs. @ €2 per hr.	<u>4.00</u>
	<u>14.00</u>

Actual results for the period based on 24,000 units were:

	€
Sales	514,000
Costs:	
Materials 25,000 kgs. (purchased & consumed)	48,750
Direct labour (50,000 hrs.)	149,000
Variable overhead	49,500
Fixed Overhead	<u>106,750</u>
Actual Profit	<u>354,000</u>
	<u>160,000</u>

Required:

- (a) Prepare a statement for the Divisional Head identifying the variances relating to both costs and revenues which will reconcile the actual with budgeted profit.
- (b) Outline three major uses of Standard Costing.

QUESTION 22.

BARK LTD. produces a single product. The company maintains no stocks of raw materials or finished goods. Its budgeted profit and loss account for 2009 was as follows:-

Budgeted profit and loss account

	€
Sales	300,000 units @ €5 p.unit
Standard cost of sales	<u>300,000 units @ €4 p.unit</u>
	<u>300,000</u>

Standard cost per unit

	€
Material	2.0 kg. @ €0.50
Direct labour	0.1 hours @ €12
Variable overhead	0.1 hours @ €8
Fixed overhead	<u>0.1 hours @ €10</u>
	<u>4.00</u>

The actual results for 2009 were as follows:-

	€
Sales	320,000 units @ €4.50
Costs:	
Materials	(650,000 kg.)
Direct labour	(17,500 hours)
Variable overhead	257,000
Fixed overhead	<u>320,000</u>
Profit	<u>1,288,700</u>
	<u>151,300</u>

Required:

- (a) Reconcile the budgeted profit with the actual profit in as much detail as possible, showing all the variances and their computation.
- (b) Outline two possible reasons for the materials price variance.

QUESTION 23.

Bolts Ltd. produces a single product. The company maintains no stocks of raw materials or finished goods. Its profit and loss account for 2008 as follows:-

Profit and loss account 2008

		€
Sales	23,000 units @ €22	506,000
Costs:		
Materials	(47,150 kg.)	140,507
Direct labour	(21,850 hours)	111,435
Variable overhead		42,826
Fixed overhead		<u>105,000</u>
Profit		<u>399,768</u>
		<u>106,232</u>

The following variances arose in 2008

	€
Sales price variance	46,000 Favourable
Sales quantity variance	14,000 Unfavourable
Materials price variance	943 Favourable
Materials usage variance	3,450 Unfavourable
Labour rate variance	2,185 Unfavourable
Labour efficiency variance	5,750 Favourable
Variable overhead spending variance	874 Favourable
Variable overhead efficiency variance	2,300 Favourable
Fixed overhead variance	5,000 Unfavourable

Required:

- (a) Calculate the standard cost and the budgeted selling price per unit in as much detail as possible.
- (b) Prepare the budgeted profit and loss account for 2008
- (c) Briefly outline the possible reasons for the difference between the budgeted and actual profits.

Costing Systems

QUESTION 24.

Mannix plc uses a predetermined overhead rate in applying factory overhead to production orders on a labour hour basis for Department X and on a machine-hour basis for Department Y. At the beginning of the year, the company made the following predictions:

	Dept.X	Dept.Y
Direct labour cost	€160,000	€ 35,000
Factory overhead	€20,000	€150,000
Direct labour hours	16,000	5,000
Machine hours	1,000	30,000

During the month of November, the cost sheet for production order No.679 shows the following:

	Dept. X	Dept. Y
Materials requisitioned	€8	€2
Direct labour hours	6	3
Machine hours	3	14

Required:

- Calculate the total production cost of order No. 679 using a blanket overhead rate based on direct labour hours.
- Calculate the total production cost of order No. 679 using departmental rates.
- Comment briefly on the differences between your answers to (a) and (b) above.

QUESTION 25.

The following job is being carried out by **Lima Products** for one of its largest customers:

	Dept.R	Dept.T
Materials issued	€8,000	€7,000
Direct labour hours	600 hours	400 hours
Direct labour rate per hour	€8	€12

Departmental overheads are absorbed on a direct labour cost basis of 80% per €. For quotation/sales price purposes, general administration and selling costs are charged at 25% of full production cost and the profit margin is 20% of the selling price.

Required:

- (a) Calculate the selling price for the job.
- (b) Critically evaluate the cost-plus approach to pricing used in (a) above.

QUESTION 26.

Wexford Company applies manufacturing overhead costs using a budgeted rate per machine-hour. The following data are available for 20x8:

Budgeted manufacturing overhead costs	€5,700,000
Budgeted machine hours	380,000
Actual manufacturing overhead costs	€5,820,000
Actual machine hours	390,000

Required:

- (a) Calculate the predetermined manufacturing overhead rate for 20x8.
- (b) Compute the manufacturing overhead applied during 20x8.
- (c) Calculate the amount of underabsorbed or overabsorbed manufacturing overhead.
- (d) Why do firms use predetermined overhead rates as opposed to actual overhead rates?

QUESTION 27.

The Felix Company uses a job-costing system at its Carlow plant. The plant has a Machining Department and an Assembly Department. Its job-costing system has two direct-cost categories (direct materials and direct manufacturing labour) and two manufacturing overhead cost pools (the Machining Department overhead, applied to jobs based on actual machine-hours, and the Assembly Department overhead, applied to jobs based on actual direct manufacturing labour cost). The 2008 budget for the plant is:

	Machining Department	Assembly Department
Manufacturing overhead	€1,800,000	€3,600,000
Direct manufacturing labour cost	€1,400,000	€2,000,000
Direct manufacturing labour-hours	100,000	200,000
Machine-hours	50,000	200,000

Required:

- (a) During February, the job-cost record for Job 494 contained the following:

	Machining Department	Assembly Department
Direct materials used	€45,000	€70,000
Direct manufacturing labour costs	€14,000	€15,000
Direct manufacturing labour-hours	1,000	1,500
Machine-hours	2,000	1,000

Calculate the total manufacturing overhead costs allocated to Job 494.

- (b) At the end of 2008, the actual manufacturing overhead costs were €2,200,000 in Machining and €3,800,000 in Assembly. Assume that 55,000 actual machine-hours were used in Machining and that actual direct manufacturing labour costs in Assembly were €2,300,000.

Calculate the over or underapplied manufacturing overhead for each department.

- (c) "Job costing is appropriate for certain kinds of firms." Discuss briefly.

QUESTION 28.

Sandcliffe & Co., a law firm, had the following costs last year:-

	€
Direct professional labour	10,000,000
Overhead	<u>19,000,000</u>
	<u>29,000,000</u>

The following costs were included in overhead:-

	€
Fringe benefits to direct labour	1,500,000
Secretarial costs	2,700,000
Telephone call time with clients	600,000
Computer time	1,800,000
Photocopying	<u>400,000</u>
	<u>7,000,000</u>

The firm's computing capabilities now make it feasible to document and trace these costs to individual cases. The managing partner is wondering whether more costs than just direct professional labour should be applied directly to jobs. In this way, the billings to clients will appear more equitable and transparent..

Late last year, arrangements were made to trace specified costs to seven client engagements. Two of the case records showed the following:-

	Client Cases	
	304	308
	€	€
Direct professional labour	20,000	20,000
Fringe benefits to direct labour	3,000	3,000
Secretarial costs	2,000	6,000
Telephone call time with clients	1,000	2,000
Computer time	2,000	4,000
Photocopying	<u>1,000</u>	<u>2,000</u>
	<u>29,000</u>	<u>37,000</u>

Required:

- (a) Calculate the overhead absorption rate based on last year's direct labour costs.
- (b) Calculate the overhead absorption rate as a percentage of direct labour, assuming that last year's costs were reclassified so that the €7 million would be regarded as direct costs instead of overhead.

- (c) Calculate the total costs of cases 304 and 308, using the rates computed in requirements a) and b).
- (d) Calculate the billings in requirement c) for cases 304 and 308, assuming that the billing of clients was based on a 20% mark-up of total case costs.
- (e) Explain which method of overhead absorption you favour.

QUESTION 29. (FINAL EXAM Semester 2 15_16)

Pop-Up is a medium sized company which produces marquees, tents and awnings and has been in operation for two years. Customer orders are priced by adding 25% onto the total product cost of the required marquee, awning or tent. The direct materials and direct labour costs of each order are simple to compute but the overhead is more difficult to calculate and, to facilitate the process, the company has adopted a traditional approach to the allocation of overheads. The company has three production departments, Cutting, Stitching and Finishing.

The following budgeted cost information for 2016 is available:

	Cutting €	Stitching €	Finishing €	Total €
Direct Wages	65,000	45,000	88,000	198,000
Indirect wages	31,000	23,000	18,000	72,000

Overheads	Total €
Heating and Air-conditioning	75,000
Factory Insurance	25,000
Factory Rent	49,000
Machine Depreciation	62,500
Power	96,000
Stores costs	44,120
Maintenance	22,070

The following budgeted operational information is also available for 2016:

	Cutting	Stitching	Finishing	Total
Machine hours	15,000	20,000	1,000	36,000
Direct labour hours	5,000	4,000	11,000	20,000
Value of stores issues (€)	127,400	54,880	13,720	196,000
Floor area (square metres)	150	125	120	395
Value of machinery (€)	180,000	200,000	60,000	440,000
Kilowatt hours (% usage)	45	45	10	100

REQUIREMENT:

- (a) Calculate a pre-determined overhead absorption rate for each of the production departments on the basis of machine hours for the Cutting and Stitching departments and direct labour hours for Finishing. The bases of apportionment adopted for each category of overhead should be clearly shown.

(16 marks)

- (b)** For customer order GB147 shown below, calculate the total price that would be quoted by Pop-Up Limited for the required awning:

Direct materials	€60
Direct labour hours:	
Cutting	1 hour
Stitching	1 hour
Finishing	1.5 hours
Machine hours:	
Cutting	2 hours
Stitching	3 hours
Finishing	.5 hour

(8 marks)

- (c)** The managing director of Pop- Up ltd has heard that some of his competitors are using Activity Based Costing to allocate overheads and he has asked you to prepare a report to provide more information about it. Draft a report for the managing director which:

- (i)** **Briefly** describe how activity based costing operates. **(6 marks)**
- (ii)** Outlines the suitability of an activity based costing system for Pop-up. **(5 marks)**

(Total: 35 marks)

QUESTION 30.

A friend of yours who manages a small business has sought your advice about how to produce quotations in response to the inquiries which her business receives. Her business is **bedroom furniture** manufacture. She believes that she has lost orders recently through the use of a job costing system which was introduced, on the advice of her auditors, seven years ago. You are invited to review this system.

Upon investigation, you find that a plant-wide percentage of 125% is added to prime costs (material plus labour) in order to arrive at a selling price. The percentage added is intended to cover all overheads for the three production departments (Departments P, Q and R), all the selling, distribution and administration costs and the profit.

You also discover that the selling, distribution and administration costs equate to roughly 20% of total production costs and that to achieve the desired return on capital employed, a margin of 20% of sales value is necessary.

You recommend an analysis of overhead cost items be undertaken with the objective of determining a direct labour hour rate of overhead absorption for each of the three departments work passes through.

From the books, records and some measuring, you ascertain the following information which will enable you to compile an overhead analysis spreadsheet and to determine overhead absorption rates per direct labour hour for departmental overhead purposes.

<u>Cost/Expense</u>	<u>Annual Amount</u>	<u>Basis for apportionment where allocation not given</u>
	(€)	
Repairs and maintenance	62,000	Technical assessment P €42,000, Q €10,000, R €10,000
Depreciation	40,000	Cost of plant and equipment
Consumable supplies	9,000	Direct labour hours
Wage related costs	87,000	12.5% of direct wages cost
Indirect labour	90,000	Direct labour hours
Canteen	30,000	Number of direct workers
Business rates and insurance	26,000	Floor area

Other estimates/information

	Dept P	Dept Q	Dept R
Estimated direct labour hours	50,000	30,000	20,000
Direct wage cost	€86,000	€10,000	€100,000
Wage rate per hour	€7.72	€7.00	€5.00
Number of direct workers	25	15	10
Floor area in square metres	5,000	4,000	1,000
Plant and equipment at cost	€70,000	€40,000	€90,000

Required:

- a) Calculate the overhead absorption rates for each department, based on direct labour hours.
- b) Prepare a sample quotation for job 976 utilising information given in the question, your answer to a) above and the following additional information:

Estimated direct material cost	€800
Estimated direct labour hours	30 in Department P
	10 in Department Q
	5 in Department R

- c) Calculate what would have been quoted for job 976 under the “auditors system” and comment on whether your friend’s suspicions about lost business could be correct.
- d) Outline briefly the major deficiencies of traditional product costing systems.

QUESTION 31.

The production department **Laburnum Ltd.** has four separate processes each with a separate dedicated group of machines. The budget for the year ended 31st December, 2008 shows the following information:

Indirect Materials

Production Group:

	€	€
A	500	
B	2,000	
C	1,000	
D	<u>5,500</u>	9,000

Maintenance

Production Group:

A	1,000	
B	5,000	
C	3,000	
D	<u>10,000</u>	19,000
Rent & rates		20,000
Building insurance		12,000
Insurance of machinery		15,000
Electricity		30,000
Supervision costs		<u>40,000</u>
		<u>145,000</u>

The following operational information is also available:

Production Group	<i>Area Occupied</i> <i>Sq. Metres</i>	<i>Machine Working</i> <i>Hours</i>	<i>Book Value of</i> <i>Machinery</i>
	€	€	€
A	500	1,200	5,000
B	1,500	2,500	20,000
C	800	1,800	15,000
D	<u>2,200</u>	<u>2,500</u>	<u>40,000</u>
	<u>5,000</u>	<u>8,000</u>	<u>80,000</u>

Product X has a raw materials cost of €40, is sold at a 40% mark-up on cost and requires production processing as follows:

Production Group	
A	3 hours
B	7 hours
C	2 hours
D	4 hours

Required

- (a) Calculate a machine hour overhead absorption rate for each Production Group.
- (b) Calculate the overhead that will be absorbed by one unit of product X.

- (c) Calculate the selling price of product X.
- (d) Discuss briefly the advantages and disadvantages of cost-plus pricing.

QUESTION 32.

Commerce Contractors Ltd. operate a job cost system. The following information is available in respect of August.

1. Balances at 1 August

	€
Creditors control	10,000
Stores control	20,000
Work-in-progress control	Nil
Finished goods control	40,000

2. During August the following jobs were commenced and the costs indicated incurred:-

<u>Job No.</u>	<u>No.of Units</u>	<u>Materials €</u>	<u>Labour Hours</u>	<u>Labour Cost €</u>
81	100	10,000	800	4,000
82	200	15,000	1,800	8,500
83	100	12,000	1,200	6,000
84	400	16,000	800	4,200

3. Job numbers 81, 82 and 83 were completed.
4. Overhead is charged to jobs at €4 per direct labour hour.
5. Payments to suppliers of raw materials amounted to €50,000 while creditors at the end of the month amounted to €20,000.
6. Actual overheads amounted to €19,000.
7. During the month, half of the opening stock of finished goods, all of Job 81, half of Job 82 and one quarter of Job 83 were sold.

Required.

Write up the appropriate accounts in the company's ledger. It is company policy to write off any under or over applied overhead to Cost of Goods Sold in the month in which it arises.

QUESTION 33.

Apex Company operates a job costing system and had the following balances in its ledger:-

	<u>1 November</u>	<u>30 November</u>
Stores control	12,000	14,000
Work in progress control	10,000	7,000
Finished goods control	17,000	21,000
Creditors control	10,000	12,000

The following transactions took place in November:-

Direct labour cost incurred	€20,000
Sundry factory overhead incurred	€13,000
Payments to suppliers in November	€14,000

Overhead is applied on the basis of 60% of direct labour cost.

Calculate

1. The cost of goods produced in November.
2. The cost of materials issued to production in November.
3. The cost of raw materials purchased in November.
4. The normal cost of goods sold in November.
5. The overapplied or underapplied overhead in November.
6. The gross profit if sales were €60,000 and overapplied or underapplied overhead is written off.

QUESTION 34.

Randolph Company which operates a job costing system had the following balances in its ledger:-

	<u>1 April</u>	<u>30 April</u>
Stores control	18,000	21,000
Work in progress control	15,000	10,000
Finished goods control	27,000	32,000
Creditors control	16,000	18,000

The following transactions took place in April:-

Direct labour cost incurred	€50,000
Sundry factory overhead incurred	€38,000
Cost of goods produced in April	€150,000

Overhead is applied on the basis of 80% of direct labour cost.

Calculate

1. The payments to suppliers in April.
2. The cost of materials issued to production in April.
3. The cost of raw materials purchased in April.
4. The normal cost of goods sold in April.
5. The overapplied or underapplied overhead in April.
6. The gross profit if sales were €200,000 and overapplied or underapplied overhead is written off.

QUESTION 35. (MCQs).

The following information relates to Items 1, 2, 3, 4, 5, 6 and 7.

A company which operates a job costing system had the following balances in its ledger:-

	<u>1 March</u>	<u>31 March</u>
Stores control	15,000	16,000
Work in progress control	8,000	9,000
Finished goods control	14,000	13,000
Creditors control	10,000	11,000

The following transactions took place in March:-

Payments to creditors	€ 9,000
Sundry factory overhead incurred	€ 6,000
Cost of goods produced in March	€23,000

Overhead is applied on the basis of 50% of direct labour cost.

Item 1.

The cost of raw materials purchased in March was:

- (a) € 8,000
- (b) €10,000
- (c) € 9,000
- (d) None of the above

Item 2.

The cost of materials issued to production in March was:

- (a) € 9,000
- (b) € 7,000
- (c) € 8,000
- (d) None of the above

Item 3.

The direct labour cost in March was:

- (a) € 6,000
- (b) € 8,000
- (c) €10,000
- (d) None of the above.

Item 4.

The applied overhead in March was:

- (a) € 5,000
- (b) € 4,000
- (c) € 3,000
- (d) None of the above.

Item 5.

In March overhead was:

- (a) Overapplied by €2,000
- (b) Underapplied by €1,000
- (c) Underapplied by €2,000
- (d) None of the above

Item 6.

If sales in March amounted to €40,000 and overapplied or underapplied overhead is written off to cost of sales, the gross profit in March was:

- (a) €13,000
- (b) €14,000
- (c) €15,000
- (d) None of the above.

Activity Based Costing.

QUESTION 36.

The **Rodeo ABC Co.** Ltd. produces three products. The data below is available with respect to year ended 31 December.

	<u>Product A</u>	<u>Product B</u>	<u>Product C</u>	<u>Totals</u>
Production and sales (units)	<u>50 000</u>	<u>30,000</u>	<u>5,000</u>	
Selling price per unit	€25	€30	€35	
Direct materials per unit	€3	€2	€1	
Direct labour per unit	€6	€8	€4	
Direct labour hours per unit	1.5 (hours)	2 (hours)	1 (hour)	140,000 (hours)
Machine hours per unit	4 (hours)	2 (hours)	6 (hours)	290,000 (hours)
No. of production runs	5	10	15	30
No. of sales orders	10	20	20	50
Factory overhead Costs (fixed):			€	
Set up Costs			120,000	
Machine Overheads			580,000	
Packaging			<u>140,000</u>	
			<u>840,000</u>	

Required:

- a. Calculate the cost of each product under the traditional approach to product costing i.e. that all production overheads are absorbed on the basis of direct labour hours.
- b. Calculate the cost of each product under Activity Based Cost (ABC), assuming set up costs (€120,000) are driven by the number of production runs, that machine overheads (€580,000) are to be absorbed on the basis of machine hours and packaging are driven by the number of sales orders.
- c. Write a brief critique of Activity-Based Costing.

QUESTION 37.

The following data relate to costs, output volume and cost drivers of **Laverne Supplies Ltd.** for July:-

		<u>Product A</u>	<u>Product B</u>	<u>Product C</u>	<u>Total</u>
1.	Production and sales	3,000 units	2,000 units	1,500 units	
2.	Direct production costs	€per unit	€per unit	€per unit	
	Direct materials	12	11	8	€70,000
	Direct labour	3	6	2	€24,000
		15	17	10	€4,000
3.	Labour hours per unit	.5	1	.33	
4.	Machine hours per unit	2	1	2	
5.	No. of production runs	8	2	10	20
6.	No. deliveries to customers	3	2	10	15
7.	No. of production orders	30	5	15	50
8.	No. of deliveries into store.	17	3	20	40
9.	Production overhead costs				€
	Machining				71,500
	Set-up costs				10,500
	Materials handling (receiving)				35,000
	Packing costs (despatch)				22,500
	Engineering				25,500
					165,000

Indirect production overheads that are not driven by production volume are:-

<i>Item</i>	<i>Cost driver</i>
Set-up costs	Production runs
Materials handling	Deliveries of materials
Packing	Deliveries to customers
Engineering	Production orders

Required:

- Calculate the full production cost per unit of product C if overheads were absorbed on the basis of direct labour hours.
- Calculate the full production cost per unit of product C using activity-based costing and the cost drivers described above, with overheads that are driven by production volume allocated on a machine hour basis.
- Comment briefly on the difference to your answers in (a) and (b) above.

QUESTION 38.

Wong Ltd. manufactures two products, Beta and Gamma.

Beta is the company's standard product; it is produced in large batches and in high volumes. Gamma is manufactured on a special order basis only and in relatively low volumes.

The following data relates to the production of both products for the year ended 31 December 200X

	Beta	Gamma
Production (planned and actual units)	50,000 units	5,000 units
Direct material cost per unit	€2.00	€2.80
Direct labour cost per unit	€1.50	€4.00
Number of direct labour hours per unit	0.375 hours	1 hour

The factory overhead to be charged to production is as follows:

	€
Indirect labour	30,000
Machine re-tooling	15,000
Materials handling	27,000
Electricity	<u>23,000</u>
Total	<u>95,000</u>

In the past the company has charged overheads to production on the basis of direct labour hours.

After an in-depth study by a team of management consultants, the company has decided to introduce an Activity Based Costing System (ABC).

In order to facilitate this proposal, the cost drivers associated with the various overheads have been identified. These cost drivers, and related data for the year, are as follows:

Cost Item	Cost Driver	Number of occurrences during the year		
		Beta	Gamma	Total
Indirect labour	Production runs	50	100	150
Machine re-tooling	Production runs	50	100	150
Materials handling	Deliveries	12	48	60
Electricity	Machine hours	7,000	4,500	11,500

Required

- Calculate the unit product cost of Beta and Gamma using the traditional method of direct labour hours to absorb overhead.
- Calculate the unit product cost of Beta and Gamma using ABC.

- c. Draft a brief memorandum to the Managing Director of Wong Ltd. explaining the difference in the results of the two methods of valuation in (a) and (b) above.
- d. Describe briefly two other applications of activity-based accounting other than product costing.

QUESTION 39.

St. John's Hospital operates an intensive care unit. Currently, patients are charged the same rate per patient for daily care services. Daily care services are broadly defined as occupancy, catering and nursing care. A recent study, however, revealed several interesting outcomes. First, the demands patients place on daily care services vary with the severity of the case being treated. Second, the occupancy activity is a combination of two activities: accommodation and the use of monitoring equipment. Since some patients require more monitoring than others, these activities should be separated. Third, the daily rate should reflect the difference in demands resulting from differences in patient type. To compute a daily rate that reflected the difference in demands, patients were placed in three categories according to illness severity, and the following annual data were collected:

Activity	Cost of Activity	Cost Driver	Quantity
Accommodation	€ 900,000	Patient days	6,000
Monitoring	1,200,000	Number of monitoring devices used	10,000
Catering	100,000	Patient days	6,000
Nursing care	<u>945,000</u>	Nursing hours	63,000
	<u>€145,000</u>		

The demands associated with patient severity are also provided:

Severity	Patient Days	Monitoring Devices	Nursing Hours
High	2,000	5,000	40,000
Medium	3,000	4,000	18,000
Low	1,000	1,000	5,000

Required:

- a) Suppose that the costs of daily care are assigned using only patient days as the cost driver (which is also the measure of output). Compute the daily rate using this traditional unit-based approach of cost assignment.
- b) Compute pool rates using the given cost drivers.
- c) Compute the charge per patient day for each patient type using the pool rates from requirement **b**) above and the demands on each activity.
- d) Comment on the value of activity-based costing in service industries.

QUESTION 40.

The budgeted information for **SELKS PRODUCTS plc** for Period 8 in 2008 is as follows:

	Products		
	X	Y	Z
Sales and production units	5,000 units	4,000 units	3,000 units
Unit sales price	€6	€106	€84
Price cost per unit (direct materials & direct labour)	€3	€5	€6
Machine Dept. (machine hours per unit)	2 hours	5 hours	4 hours
Assembly Dept. (assembly labour hours per unit)	7 hours	3 hours	2 hours

The overheads allocated and apportioned to the Machinery and Assembly departments were recovered on the basis of a machinery overhead recovery rate of €3.50 per machine hour and €1.00 per assembly labour hour.

The Managing Director has requested that you investigate the computation of product profits for Period 8 on the basis of Activity Based Costing and then compare these profits with the profits calculated using the traditional absorption basis currently used by SELKS PRODUCTS plc.

You have agreed with the Managing Director that five cost pools be created as follows:

- Machining Dept.
- Assembly Dept.
- Set-up costs
- Customer order processing
- Purchases order processing.

The following is an analysis of the overheads with their appropriate cost drivers:

Cost pool	€	Cost Driver	
Machining Dept.	84,000	Machine hours	42,000
Assembly Dept.	26,500	Assembly labour hours	53,000
Set-up costs	34,500	Number of set-ups	50
Customer order processing	32,600	Number of customer orders	326
Purchases order processing	22,400	Number of purchases orders	112
	<u>200,000</u>		

The product cost driver analysis is as follows:

	Products			
	X	Y	Z	Total
Number of set-ups	10	20	20	50
Number of customer orders	80	86	160	326
Number of purchases orders	30	40	42	112

Required:

- (a) Calculate the profit per unit for each product if overheads are absorbed on the traditional basis.
- (b) Calculate the profit per unit for each product if overheads are absorbed using activity based costing.
- (c) With regard to Product Z, discuss why there is a difference between the profit/loss shown on a traditional basis with that shown using activity-based costing.

QUESTION 41. (Final Exam 2014/15)

Moose Ltd is a playground equipment supplier. It manufactures two products: playhouses and jungle gyms and sells these products at a price which provides a 20% mark-up on cost. Although Moose operates in a highly competitive environment with intense price competition, sales of the playhouses regularly surpass budget expectations. The sales volumes achieved for the jungle gyms are less satisfactory and in recent years the actual sales volume achieved for this product has consistently been below the budgeted level. The company currently calculates absorption costs using a traditional volume based approach in which overheads are absorbed on the basis of direct labour hours. Moose Ltd produces 6,000 playhouses and 4,000 Jungle gyms every year. The following cost information is currently available in respect of the most recent annual reporting period:

	Playhouses	Jungle gyms
Direct material cost per unit	€125	€145
Direct labour cost per unit (@ €10 per hour)	€ 60	€ 80

Budgeted fixed production overheads amount to €1,360,000 for the year.

A recent examination of production overheads led to the identification of the following activities, activity costs and cost drivers.

Activity	Cost Driver	Cost	Cost	Driver	Volumes	Per
			Playhouses	Jungle gyms	Annum	
Purchasing	No. of requisitions	€240,000	600		200	
Setting-up	No. of set-ups	€360,000	310		140	
Machining	No. of machine hrs	€480,000	4,200		3,800	
Quality control	No. of inspections	€280,000	200		150	

REQUIREMENT:

- A. Calculate the cost per unit for playhouses and jungle gyms using the traditional method of direct labour hours to absorb overhead currently used within Moose Ltd. **(6 marks)**
- B. Calculate the cost per unit for playhouses and for jungle gyms if, on the basis of the information provided above, an Activity Based Costing (ABC) approach was adopted. **(18 marks)**
- C. Discuss why the costs are higher or lower for each product using the traditional system in part (A) compared to the ABC system in part (B). **(4 marks)**
- D. Discuss the appropriateness of introducing ABC to Moose Ltd given the company's particular circumstances. **(7 marks)**

(Total: 35 marks)

Cost Volume Profit Analysis

QUESTION 42.

Fable Company sells one product for which data is given as follows:

Selling price per unit	€50
Variable cost per unit	€20

Fixed production costs are budgeted at €50,000 per annum and fixed selling costs at €40,000 per annum.

Required:

- (a) Calculate the company's break-even point in units.
- (b) Calculate the margin of safety percentage if the budgeted sales for next year are 6,000 units.
- (c) Calculate the number of units to be sold if the company wishes to make a profit before-tax of €30,000.

QUESTION 43.

Abbey Knitwear is choosing among three countries as the sole site for manufacturing its new sweater – Singapore, Thailand and the United States. All sweaters are to be sold to retail outlets in the United States at €32 per unit. These retail outlets add their own markup when selling to final customers. The three countries differ in their fixed costs and variable costs per sweater.

	Annual Fixed Costs	Variable Manufacturing Costs per Sweater	Variable Marketing and Distribution Costs per Sweater
Singapore	€6.5 million	€8.00	€1.00
Thailand	4.5 million	5.50	11.50
United States	12.0 million	13.00	9.00

Required:

- (a) Compute the break-even point of Abbey Knitwear in units for each of the three countries considered for manufacturing the sweaters.
- (b) If Abbey Knitwear sells 800,000 sweaters, what is the budgeted operating income for each of the three countries considered for manufacturing the sweaters?
- (c) Comment on your results to (a) and (b) above.

QUESTION 44.

The Avon Company manufactures and sells a single product. Price and cost data regarding Avon's product and operations are as follows:

Selling price per unit	€25.00
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Variable costs per unit:

Raw materials	€11.00
Direct labour	5.00
Manufacturing overhead	2.50
Selling expenses	1.30
Total variable costs per unit	<u>€19.80</u>

Annual fixed costs:

Manufacturing overhead	€192,000
Selling and administrative	<u>€276,000</u>
Total fixed costs	<u>€468,000</u>

Forecasted annual sales volume (120,000 units)	€3,000,000
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Income tax rate	40%
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Choose the best answer:

1. Avon's breakeven point in units is
 - a. 76,667;
 - b. 90,000;
 - c. 130,000;
 - d. 72,000;
 - e. none of the above.

2. How many units would Avon Company have to sell in order to earn €156,000 after taxes?
 - a. 120,000;
 - b. 165,000;
 - c. 140,000;
 - d. 148,889;
 - e. none of the above.

3. Avon Company estimates that its direct labour costs will increase by 8 per cent next year. How many units will Avon have to sell next year to reach breakeven?
 - a. 97,500;
 - b. 101,740;
 - c. 83,572;
 - d. 86,250;
 - e. none of the above.

4. If Avon Company's direct labour costs do increase 8 per cent, what selling price per unit of product must it charge to maintain the same contribution-margin ratio?
- a. €25.51;
 - b. €27.00;
 - c. €25.40;
 - d. €26.64;
 - e. (e) none of the above.

QUESTION 45.**MARLING COMPANY**

The Marling Company produces consumer pharmaceuticals.

One of its products, 'Rotgut', has the following cost data profile:

Selling price	(per bottle)	€6.00
Material cost	(per bottle)	€2.50
Other variable costs	(per bottle)	€0.50
Fixed overheads		€90,000
Maximum production capacity		80,000

Required:

- a) Calculate the break-even point in units (bottles)
- b) Calculate the break-even point in sales value.
- c) Calculate the number of bottles to be sold to give a profit of €30,000 before tax.
- d) Calculate the maximum potential profit.
- e) Calculate the CMR (contribution margin ratio).

QUESTION 46.

After reviewing its cost structure (variable costs of €7.50 per unit and monthly fixed costs of €60,000) and its potential market, the **Forecast Company** established what it considered to be a reasonable selling price. The company expected to sell 50,000 units per month, and planned its monthly results as follows:

	€
Sales	500,000
Variable costs	<u>375,000</u>
Contribution margin	125,000
Fixed costs	<u>60,000</u>
Profit before tax	65,000
Income tax (at 40%)	<u>26,000</u>
Net profit	<u><u>39,000</u></u>

Required:

- (a) What selling price did the company establish?
- (b) What is the company's contribution margin per unit?
- (c) What is the company's break-even point in units?
- (d) If the company determined that a particular advertising campaign had a high probability of increasing sales by 4,000 units, how much could the company pay for such a campaign without reducing its planned profits?
- (e) If the company wanted to make a before-tax profit of €50,000, how many units would it have to sell?
- (f) If the company wanted to make a before-tax return-on-sales of 10%, what level of sales, in € would be needed?
- (g) If the company wanted to make an after-tax profit of €90,000, how many units would it have to sell?

QUESTION 47.

Wizard Ltd. produces two products A and B. Sales and cost information for the two products lines are as follows:

	A €	B €	Total €
Revenues:			
1000 @ €800	800,000		
2000 @ €500	<u> </u>	<u>1,000,000</u>	<u>1,800,000</u>
Cost of goods manufactured and sold:			
Other variable expenses	100,000	200,000	300,000
Fixed expenses	<u>150,000</u>	<u>200,000</u>	<u>350,000</u>
Total expenses	<u>750,000</u>	<u>800,000</u>	<u>1,550,000</u>
Income before taxes	<u>50,000</u>	<u>200,000</u>	<u>250,000</u>
Tax @ 50%			<u>125,000</u>
Net income after tax			<u>125,000</u>

Required:

- (a) Calculate the contribution-margin ratio for each product line and for the company as a whole.
- (b) Calculate the volume in €at which the company as a whole will break-even.
- (c) Assume that Wizard Ltd. would like to make an after-tax profit of €300,000 next year. It does not expect any changes in selling prices, unit variable costs, total fixed costs or the sales mix. What volume of sales in €will it have to generate next year to meet this objective?
- (d) The company is currently expanding its marketing efforts and, as a result, sales volumes for the coming year are expected to be 3,000 units for each product. The price of product A will remain at €800 while the price of product B will be increased to €70. Variable unit costs will be unchanged. Total fixed costs will increase by €80,000 for advertising, divided equally between the two product lines.
 - (i) Calculate the expected after-tax net income for the coming year.
 - (ii) Compute the volume in €at which the company will break-even with the sales mix anticipated for next year.

QUESTION 48.

HALL COMPANY.

Profit & loss account for the year ended December 31, 2008

Sales(90,000 units @		360,000
€4.00)		
Cost of goods sold		
Direct materials	90,000	
Direct labour	90,000	
Factory overhead		
Variable	18,000	
Fixed	<u>80,000</u>	<u>98,000</u>
Gross margin		278,000
		82,000
Selling expenses:		
Variable		
Sales commissions	18,000	
Shipping	<u>3,600</u>	
	21,600	
Fixed		
Advertising, salaries	<u>40,000</u>	61,600
etc.		
Administrative expenses:		
Variable	4,500	
Fixed	<u>20,400</u>	<u>24,900</u>
Net Loss		86,500
		<u>4,500</u>

Note Commissions are based on sales value: all other variable expenses vary in terms of units sold.

Top management is considering a number of possible ways to make operations profitable in 2009.

Required:

- (i) Recast the income statement into a contribution format.
- (ii) Calculate the company's breakeven volume.
- (iii) Calculate the profit or loss the company would make if the selling price were cut by 15% and the sale volume consequently increased to 150,000 units.
- (iv) Calculate the profit or loss the company would make if the selling price were increased by 25 percent, advertising expenditure were increased by €150,000, sales commissions were increased to 10 percent of sales and the number of units sold increased by 50 percent.

- (v) By how much may fixed selling expenses be increased to bring production and sales up to 130,000 units and enable the company to earn a net profit of 5% of sales without changing the selling price of the product?
- (vi) If the company reduced its fixed costs by 10% how many units would have to be sold at €4 each to make a profit of €20,000?
- (vii) A mail-order firm is willing to buy 60,000 units of product ‘if the price is right’. Assume that the present market of 90,000 units at €4 each will not be disturbed. The company will not pay any sales commission as the mail-order firm will pick up the units directly at the factory. However, the company must refund €4,000 of the total sales price as a promotional and advertising allowance for the mail-order firm. In addition, special packaging will increase manufacturing costs on these 60,000 units by 10c per unit. At what unit price must the mail order chain business be quoted for the company to break even in 2009?
- (viii) The Chairman’s mother-in-law thinks that a fancy new package will aid consumer sales and ultimately Hall’s sales. Present packaging costs per unit are all variable and consist of 5c direct materials and 4c direct labour; new packaging costs will be 30c and 13c respectively. Assuming no other changes in cost behaviour, how many units must be sold to earn a net profit of €20,000?

QUESTION 49.

Doonass Toy Company produces and sells three products: X, Y and Z. The following budgeted data relates to next year:

	X	Y	Z
Selling price	€10	€12	€15
Variable cost per unit	€ 6	€ 7	€ 9

Fixed costs are budgeted at €10,000.

The company expects to have the following sales mix:

X:30%

Y:30%

Z:40%

What is the company's breakeven volume (in units)?

	X	Y	Z
(a)	26,500	26,500	35,330
(b)	19,500	19,500	25,350
(c)	30,000	30,000	40,000
(d)	28,600	28,600	38,133

QUESTION 50.

Work and Games plc assembles computers. It produces both desktop and laptop machines. The market for desktop machines is highly competitive and profit margins are slim. To keep costs to a minimum, only one model of each computer is assembled.

The accounting year has just ended and Work and Games plc wish to use CVP models to analyse their operations. The following data shows the relative profitability of each type of computer for the year just ended.

	Desktop	Laptop
	€	€
Selling Price	1000	2000
Variable Cost	<u>750</u>	<u>1400</u>
Contribution Margin	<u>250</u>	<u>600</u>

Fixed costs of the business were €2,750,000 for the year just ended. The sales mix ratio was 5:3 (desktops:laptops).

Required:

- (a) Calculate the number of computers of each type that Work and Games plc needed to sell last year to break even.
- (b) Calculate the sales revenues Work and Games plc would have required last year to make a profit of €650,000.

QUESTION 51.

The Down-Town Company has hired you as their new management accountant. Your first assignment is to assist management in developing profit plans for next year. The following data have already been collected:-

Product	A €	B €	C €
Selling price per unit	4,000	9,000	14,000
Variable costs per unit:			
Materials	1,200	3,800	3,000
Labour	600	1,600	7,000
Overheads	1,000	-	500

Fixed overheads are expected to total €90,000 for next year and sales are usually distributed in the following percentages in terms of units sold: A 40%, B 40%, C 20%.

Required:

- (a) Calculate how many units of each product must be sold next year by the company:-
 - i) to break even
 - ii) to make a net profit after tax of €1,834,000 assuming that the corporate tax rate is 30% on pre-tax profits.
- (b) Calculate by how much will the company increase its net profit before tax for each increase in sales value of €200,000 above its break-even sales value assuming the existing mix of sales units sold is maintained?
- (c) The managing director has just come from a meeting with the market director and says that the sales mix for next year is likely to change to 30%, 30% and 40% for products A, B and C respectively. Will this increase or reduce the combined total number of units of products A, B and C which must be sold to break even? Briefly explain your answer.

QUESTION 52.

Lorimer plc manufactures rear-view mirrors for cars. It sells two models, the “Standard” and the “Sporty”. The financial results for 2008 are as follows:

	Standard	Sporty	Total
	€	€	€
Sales	450,000	375,000	825,000
Less Variable Costs	<u>225,000</u>	<u>200,000</u>	<u>425,000</u>
Contribution Margin	225,000	175,000	400,000
Less Fixed Costs			<u>300,000</u>
Net Profit			100,000

The selling price of each mirror remained constant during the year 2008. Standard mirrors sold for €9 each and sporty mirrors sold for €15 each.

The General Manager is unhappy with the results as profits were well down on the year 2007. The prospects for 2009 appear even worse as variable costs will increase by 10% and fixed costs by 20% on the first of January, 2009.

The sales manager has suggested that by spending an additional €30,000 in 2009 on advertising standard mirrors in trade magazines, the sales mix between standard and sporty mirrors could be changed to 75%:25%.

Required:

- (a) Calculate the break-even point in unit and sales value for the year 2008
- (b) What total sales would have been required to generate a profit equal to 20% of total sales in the year 2008.(Assume sales mix stays constant at all sales volumes)
- (c) What is the break-even point in units for 2009 if
 - 1. the sales manager’s suggestion is not implemented and sales mix remains unchanged?
 - 2. the sales manager’s suggestion is implemented?
- (d) Explain briefly ‘the margin of safety percentage’ indicating the significance of the measure.

QUESTION 53.

Shy Limited and Bold Limited produce the same product, the selling price of which is fixed by government order. The Profit and Loss Accounts of each company for the years 2008 and 2009 are set out below:-

SHY LIMITED

	2008	2009
	€	€
Sales	1,000,000	1,200,000
Expenses	<u>900,000</u>	<u>1,040,000</u>
Profit	<u>€100,000</u>	<u>€ 160,000</u>

BOLD LIMITED

	2008	2009
	€	€
Sales	1,000,000	1,200,000
Expenses	<u>900,000</u>	<u>960,000</u>
Profit	<u>€100,000</u>	<u>€ 240,000</u>

Required:

- (i) Calculate the breakeven sales in euros for each company.
- (ii) Calculate the €sales Shy Limited would require to make a profit of €240,000.
- (iii) Calculate the margin of safety of Bold Limited in 2009.
- (iv) Calculate the profit each company would make if each had sales of €700,000.

Decision Making and Scarce Resources

QUESTION 54.

Barna plc make three products: X, Y and Z. Raw materials will be in short supply next year and the company wants to determine the optimal production plan. The following information is provided:

	X	Y	Z
Selling Price (€) (Per Unit)	12	16	10
Variable Cost (€) (Per Unit)	8	11	5
Materials (Per Unit)	5 Kg.	3 Kg.	1 Kg.
Maximum sales demand (units)	3,000	2,500	2,000
Maximum Raw Materials Available			18,500 Kg.
Total Fixed Costs			€160,000

Which of the following production plans will maximise profits?

	X	Y	Z
A	1,200	2,000	2,800
B	1,650	2,300	1,850
C	1,800	2,500	2,000
D	None of the above		

QUESTION 55.

The management of **Bayview Ltd.** is frequently faced with the problem of whether it should manufacture components which are required for production or whether it should buy them from outside suppliers.

In what order of priority should the following components be bought from outside suppliers when

- (a) machine capacity is available but labour is scarce,
- (b) labour is available but machine capacity is scarce, and in both cases, the limiting factor makes it impossible to manufacture all components required.

Component	A	B	C
Machine Hours required per unit	12	10	16
Labour Hours required per unit	2	12	8
Direct Material Cost per unit	€24	€ 45	€ 42
Labour Hour Rate	€ 2	€ 3	€ 1.50
Variable Overhead Rate per Labour Hour	€ 0.50	€ 3	€ 2
Fixed Overhead Cost per unit	€10	€ 15	€ 9
Suppliers quoted price per unit	€35	€47	€10

QUESTION 56.

ASSEMBLERS LTD. use two components in the course of manufacturing their only product. These components can either be bought or produced by the company itself. However, because of a shortage of machine capacity, the company can only make one of the components, so that the one not manufactured will have to be bought.

Given the following information, which component should the company produce itself?

Component	X	Y
Variable cost per unit	€50	€24
Machine hours required per unit	10	8
Outside buying price per unit	€64	€36

QUESTION 57.

Datcom Company is experiencing labour shortages. Data relating to its four products is as follows:

	R €	S €	T €	W €
Selling price	40	40	60	90
Variable cost	20	14	40	50
Contribution	20	26	20	40
Apportioned fixed cost	8	14	12	25
Net profit	12	12	8	15
Labour hours required:	1 hour	4 hours	2 hours	8 hours

Demand for each product is unlimited and the company's objective is to maximise profits.

Which product should the company produce and sell if it wishes to maximise profits?

- (a) Product R
- (b) Product S
- (c) Product T
- (d) Product W

Relevant Information for Decision - Making.

QUESTION 58.

Gandon plc has been approached by a customer with a special order for 100,000 units of product X at a price of €250 per unit. The following information is available:

RAW MATERIAL

Each unit of product X would require three different types of raw materials, designated A, B and C. Quantities required, current stock levels and cost of raw materials are as follows:

Raw material	Units required per unit of Prod.X	Current level (unit)	Original cost (unit)	Current replacement cost (unit)	Current realisable value (unit)
A	1	200,000	€21	€25	€18
B	2	60,000	€33	€28	€11
C	2	Nil	-	€55	-

Material A is used continuously by the company and stocks are always replenished. The current stock of material B is surplus to the company's requirements and, unless used on the special order, would be sold. Material C is not in stock and would have to be purchased.

LABOUR

Each unit of product X would require one hour of labour. The current wage rate is €30 per hour. If this special order is not accepted, the company expects to have 120,000 surplus labour hours available in the coming year. The directors have decided not to dismiss any workers in the foreseeable future.

OVERHEADS

Variable overhead is absorbed at a rate of €20 per direct labour hour and fixed overhead is absorbed at a rate of €10 per direct labour hour.

SPECIAL EQUIPMENT.

The company possesses equipment which could be adapted for use on the special contract at a cost of €10,000. The equipment cost €50,000 several years ago and has a written down value of nil. If this equipment is not used on the special contract it would be sold for €2,000. Assume that after the contract is fulfilled, the equipment will have no value.

Required:

State whether or not the special order should be accepted, supporting your conclusion with appropriate figures. Any assumptions made should be clearly stated.

QUESTION 59.

Lara Products has been approached by a customer with a special order for 50,000 units of product M. The customer has offered to pay €70 per unit.

The data relating to the production of one unit of product are as follows:

(i) Material requirements:

- 2 kgs. of material A – see note 1 below
- 3 kgs. of material B – see note 2 below
- 1 kg. of material C – see note 3 below

Note 1 – Material A.

There 100,000 kgs. of this material in stock. It was purchased some years ago at €8 per kg. If it is not used on this special order, it will have to be disposed of. Costs of disposal will be €3,000 plus €0.25 per kg. disposed of.

Note 2 – Material B.

There are 50,000 kgs. of material B in stock. This material originally cost €2 per kg. It has a current realisable value of €3 per kg. and a current purchase price of €4 per kg. If not used on this job, material B will be sold.

Note 3 – Material C.

Material C is used continuously by the company and stocks are always replaced. The company has adequate stocks of material C for this special order which it purchased at €12 per kg. Current replacement cost is €15 per kg.

(ii) Labour:

Each unit of product M will require 1 hour of skilled labour and 2 hours of unskilled labour. Current labour rates are €15 per hour for skilled labour and €5 per hour for unskilled labour. Lara Products expects to have 60,000 surplus hours of skilled labour available in the coming year. Unskilled labour can be regarded as a variable cost.

(iii) Overheads:

Lara Products absorbs overhead by a direct labour rate of €5 per hour, of which €3 is for variable overhead and €2 for fixed overhead. If the special order is accepted, it is estimated that fixed costs will increase for the period of the job by €65,000.

(iv) Special equipment:

Lara Products possesses equipment which could be adapted for use on this special order at a cost of €25,000.

Required:

State whether or not the special order should be accepted, supporting your conclusion with appropriate figures for presentation to management. Any assumptions you make should be clearly stated.

QUESTION 60.

Ankus Ltd. has been asked to undertake a special contract for the production of a new product, the *Starling*. The proposed contract is for the supply of 10 *Starlings* at a selling price of €60,000 each.

The production of each *Starling* will incur the following direct costs:

Direct Materials:

Sub-assembly	X60	400 units
Sub-assembly	Y70	1,000 units
Adhesive	A80	75 units
Fabric	F90	120 units

Direct Labour:

Production Cell A	1,000 hours
Production Cell B	500 hours
Production Cell C	300 hours

The following information is available in respect of the direct materials on a per unit basis:

		Original Cost €	Net Realisable Value €	Replacement Cost €
Sub-assembly	X60	22.00	20.00	40.00
Sub-assembly	Y70	38.00	10.00	n/a
Adhesive	A80	1.10	0.50	1.20
Fabric	F90	9.00	11.00	n/a

The following further information is available in respect of the direct materials:

- (1) All materials required for this contract are in stock.
- (2) Both Sub-assembly X60 and Adhesive A80 are widely used in the production of other products within the company and the quantity used for this contract would need to be immediately replaced.
- (3) Sub-assembly Y70 is now obsolete and this contract is its only alternative production use.
- (4) Due to a civil war in the country where it is sourced, Fabric F90 is no longer available on the world market. It is currently used by the company in the production of one of its most popular products, the *Viella*. Each *Viella* requires 300 units of F90, and has a selling price per unit of €55,000 and variable costs (excluding the cost of Fabric F90) of €40,000 per unit. The quantity of F90 required for use in the *Starling* contract would result in lost production of the *Viella*.

The following information is available in respect of production costs:

Direct Labour

Production Cell A	€5 per hour
Production Cell B	€7 per hour
Production Cell C	€8 per hour

Production Overheads

Variable overheads	€5 per direct labour hour
Fixed overheads	€4 per direct labour hour

The following information is available in respect of direct labour:

- (i) Direct labour in Production Cell A is employed on a casual basis.
- (ii) Direct labour in Production Cell B is part of the company's permanent workforce.
There is currently significant surplus capacity within this labour force.
- (iii) Direct labour in Production Cell C is working at full capacity. Any additional labour hours required under this contract would result in overtime, which is paid at 1.5 times the standard rate.

Additional contract administration costs of €60,000 would also be incurred if the contract were undertaken.

Required:

- (a) Outline, showing detailed computations, whether you believe the company should undertake the proposed contract.
- (b) Outline three qualitative factors which the company should take into account in making this decision.
- (c) Distinguish clearly between a sunk cost and an opportunity cost.

QUESTION 61.

Irish Bags Ltd. produces a single type of travel case which it sells exclusively on the British market.

Its projected profit and loss account for 2009 is as follows:-

Sales 400,000 unit at €4 each		1,600,000
Materials 200,000 square metres at €1 each	200,000	
Direct labour 100,000 hours at €4 per hour	400,000	
Variable factory overhead (25% of direct labour)	100,000	
Fixed factory overhead	300,000	
Variable selling expenses	80,000	
Fixed selling expenses	<u>220,000</u>	<u>1,300,000</u>
Net profit		<u>300,000</u>

The practical attainable capacity of the plant is 120,000 direct labour hours per year (480,000 units), but the demand for the product is 400,000 units.

The managing director of the company is considering launching a de luxe version of the product on the US market. Sales in this market will not affect existing sales in any way. The following data has been collected in respect of the de luxe version of the product:-

- (i) Annual sales would be 200,000 units at a price of €10 per unit.
- (ii) The product would require 5% more material than the existing product.
- (iii) The time required to manufacture the new product would be twice that required to produce the existing product.
- (iv) Variable factory overhead would be 25% higher for the new product.
- (v) Fixed factory overhead would increase by €100,000 per year.
- (vi) Variable selling expenses would be 20% of the selling price.
- (vii) Advertising and distribution costs in the American market would be €100,000 per year.

Required:

- (a) Prepare a report which will assist the managing director in assessing the desirability of launching the new de luxe version of the product in the US market. All your workings should be clearly shown.
- (b) Discuss how uncertainty regarding demand in the US market could be incorporated into the managing director's analysis. (Calculations are not required).

QUESTION 62.

Air Exotique owns a single jet aircraft and operates between Knock and Hong Kong. Flights leave Knock on Mondays and Thursdays and leave Hong Kong on Wednesdays and Saturdays. Air Exotique cannot operate any more flights on the route and offers only economy class tickets. The following information has been assembled:

Seating capacity per plane	360 passengers
Average number of passengers per flight	200 passengers
Flights per week	4 flights
Flights per year	208 flights
Average one-way fare	€500
Variable fuel costs per flight	€14,000 per flight
Food and drink cost (no charge to passenger)	€20 per passenger
Commission paid to travel agents (all sales are made through travel agents)	8% of fare
Fixed annual lease costs charged to each flight	€53,000 per flight
Fixed ground services cost per flight	€7,000 per flight
Flight crew salaries per flight	€4,000 per flight

The board of directors of the company is to consider two proposals at its next meeting:

1. The marketing manager of the company estimates that reducing the one way ticket price by 5% will increase the number of passengers per flight by 10%.
2. A tour operator, Eastern Experiences, has offered to charter the company's aircraft twice a month (that is a total of 24 one-way flights) for the next year to fly its own customers out and back to Hong Kong. This would reduce the number of Air Exotique's own flights per year to 184. The terms of the charter are:
 - (a) For each one-way flight, Eastern Experiences will pay Air Exotique €75,000 to cover the use of the plane, the use of its flight crew and of its ground services.
 - (b) Eastern Experiences will pay for fuel costs.
 - (c) Eastern Experiences will pay for food costs.

Required:

- (a) Calculate the operating income that Air Exotique earns on each one-way flight between Knock and Hong Kong.
- (b) Should Air Exotique accept the marketing manager's recommendation to reduce ticket prices by 5%? Show your calculations.
- (c) On purely financial considerations, should Air Exotique accept Eastern Experience's offer? Show your calculations.
- (d) What other factors should Air Exotique take into account in deciding whether or not to accept Eastern Experience's offer?

QUESTION 63.

Lantern Ltd. produces and sells lamps. Their projected profit for 2009, based on the following data, was €1,500,000:-

Units produced and sold 100,000

Cost per unit	€
Materials	9
Labour cost (at €5 per hour)	10
Factory overhead	9
Administration expenses	<u>7</u>
Selling price per unit	<u>35</u>
Profit per unit	<u>15</u>

The capacity of the plant is 300,000 labour hours per year. One third of factory overheads are variable; all administration expenses are fixed.

The company has been invited to tender for a contract to supply 50,000 customised lamps to an international hotel chain. The following information relates to this contract:-

The company will be required to design special sockets for the lamps at a cost of €10,000.

- (2) Each customised lamp requires 3 hours of direct labour.

Each customised lamp requires one unit of material A and one unit of material B. The company has a stock of 30,000 units of material A. This originally cost €2 per unit, but now costs €3 per unit. Its disposal value is €1.50 per unit. The company has no other use for this material.

- (3) The company has a stock of 35,000 units of material B. This originally cost €4 per unit but now costs €4 per unit. Its disposal value is €2 per unit. The company uses material B in the production of its regular product.

Required:

- Calculate the price per customised lamp that the company needs to charge in order to earn a total profit (i.e. on all its operations) of €1,750,000 in 2009.
- Indicate what factors other than the financial information given above should be taken into account in deciding whether or not to accept the offer to tender for the contract.

QUESTION 64.

Finn Ltd. processes, cans and sells herrings. The company operates a special department to produce the ketchup which is added to the herrings in the production process. The cost of operating this department for the production of its annual requirement of 20,000 litres of ketchup is as follows:-

Materials:

	€	€
Rarefield herbs 6,000 kg. @ €1.50	9,000	
Pickled Salt 3,000 kg. @ €2.00	6,000	
Tomato sauce x 20,000 litres @ €4	<u>80,000</u>	95,000
Direct labour 4 operatives @ €6,000		24,000
Supervisors' Wages		9,000
Manager's Salary		12,000
Depreciation of Equipment		8,000
General factory overhead (50% of direct labour)		<u>12,000</u>
		160,000

An offer has been received from T. O'Matoe Ltd. to supply the ketchup at a price of €6.50 per litre for the next year.

The following additional information is available:-

- (a). The company presently has stocks of raw materials as follows:-

i. Rarefield Herbs	1,000 kg.
ii. Pickled Salt	0
iii. Tomato sauce	4,000 litres

(b). The stock of rarefield herbs originally cost €1.50 per kg. The cost of this material has recently been increased to €2 per kg. which is also its re-sale value.

(c). The cost of pickled salt has recently fallen to €1.80 per kg.

(d). The price of the tomato sauce has remained and is expected to remain at €4 per litre. However, unused stocks of the material could be sold at a price of €3 per litre.

(e). If the department is closed, half the direct labour force and all the supervisors would be employed elsewhere in the company in lieu of hiring new employees. The other half of the direct labour force would be retired on pension equal to half their present wages. The department manager would be employed in another department instead of a new manager who would have to be hired at an annual salary of €15,000.

(f). The plant and machinery in the department was bought two years ago for €40,000 and is expected to last another three years when it will be disposed of for nothing. Its current scrap value is also zero.

Required

1. Prepare cost statements to advise the management of Finn Ltd. as to whether they should accept T. O'Matoe Ltd.'s offer and close the department or continue to operate the department.
2. What other factors should be considered before a final decision is made?

QUESTION 65.

You are the management accountant of a **publishing and printing company** which has been asked to quote for the production of a programme for the local village fair. The work is to be carried out in addition to the normal work of the company. Because of existing commitments, some weekend working would be required to complete the printing of the programme. A trainee accountant has produced the following cost estimate based upon the resources required as specified by the production manager:

	€
Direct materials	5,000
-paper (book value)	5,000
-inks (purchase price)	2,400
Direct labour	1,000
-skilled	250 hours @ €4.00
-unskilled	100 hours @ €3.50
Variable overhead	350 hours @ €4.00
Printing press depreciation	1,400
Fixed production costs	2,100
Estimating department costs	<u>400</u>
	<u>13,150</u>

You are aware that considerable publicity could be obtained for the company if you are to win this order and the price quoted must be very competitive.

The following notes are relevant to the cost estimate above:

1. The paper to be used is currently in stock at a value of €5,000. It is of an unusual colour which has not been used for some time. The replacement price of the paper is €8,000, whilst the scrap value of that in stock is €2,500. The production manager does not foresee any alternative use for the paper if it is not used for the village fair programmes.
2. The inks required are not held in stock. They would have to be purchased in bulk at a cost of €3,000. 80% of the ink purchased would be used in printing the programmes. No other use is foreseen for the remainder.
3. Skilled direct labour is in short supply, and to accommodate the printing of the programmes, 50% of the time required would be worked at weekends for which a premium of 25% above the normal hourly rate is paid. The normal hourly rate is €4.00 per hour. The work, which would be performed during the week on producing the programmes, would displace existing jobs which earn a contribution of €10 per hour. This contribution has been calculated after deducting the hourly wage rate of €4 per hour.
4. Unskilled labour is presently under-utilised and at present 200 hours per week are recorded as idle time.
5. Variable overhead represents the cost of operating the printing press and binding machines.

6. When not being used by the company, the printing press is hired to outside companies for €6.00 per hour. This earns a contribution of €3.00 per hour. There is unlimited demand for this facility.
7. Fixed production costs are those incurred by and absorbed into production using an hourly rate based on budgeted activity.
8. The cost of the estimating department represents time spent in discussions with the village fair committee concerning the printing of its programme.

Required:

- a) Prepare a revised cost estimate using the relevant cost approach, showing clearly the minimum price that the company should accept for the order.
- b) Give reasons for each resource valuation in your cost estimate.

QUESTION 66.

Brandon Ltd. has been invited to submit a bid for producing 100,000 units of a special product, the production of which will require the following:-

100,000 kg. of material J
500,000 litres of material K
250,000 litres of material L
100,000 metres of material M
500,000 direct labour hours

- a. The company has a stock of 50,000 kg. of material J which cost €10 per kg but would cost €12 per kg. now. Its disposal value is €8 per kg. This material is used in the production of the company's existing product range.
- b. The company has a stock of 200,000 litres of material K which cost €20 per litre but would cost €25 per litre now. If not used on this contract, it will have to be disposed of at a cost of €10,000 plus €2 per litre.
- c. The company has a stock of 200,000 litres of material L which originally cost €25 per litre but would cost €30 per litre now. If not used on this contract, it could either be used in producing another product in place of Material N (which would otherwise have to be bought at €15 per litre), or used on a contract in place of material P (which would cost €20 per litre).
- d. The company has a stock of 50,000 metres of material M which originally cost €5 per metre but would cost €8 per metre now. If not used, it will be sold for €10,000.
- e. The company's work force is paid on a fixed salary basis at a rate of €500 per person per week. Because of the recent cancellation of a major contract, the company has 300,000 direct labour hours available. Additional direct labour time can only be made available by ceasing production of product X, details of which are set out below and incurring a penalty cost of €50,000.

Product X	€	€
Selling price per unit		80
Material cost	15	
Labour cost (2 hours)	25	
Variable overhead	10	
Fixed overhead	<u>5</u>	<u>55</u>
Profit per unit		25

- f. The company's overheads are $\frac{2}{3}$ variable and $\frac{1}{3}$ fixed. Overhead is charged to production at a rate of €7.50 per direct labour hour.

Required:

Prepare a cost statement to advise the managing director of the company as to the minimum price per unit they should quote for the contract.

QUESTION 67.

Roadhog Tyre Company has been offered a contract to supply 500,000 car tyres to a large car manufacturer at a price of €75.00 per tyre. The full cost of producing the tyre is €80. The normal sales price for the tyre is €100. Variable costs per tyre amount to €70. However, in order to meet the needs of the car manufacturer, the company will have to cut its sales to regular customers by 100,000 tyres annually. The car maker has clearly indicated that it will enter into the agreement only if Roadhog Tyre Company will agree to supply all 500,000 of the tyres requested.

Required:

Should Roadhog Tyre Company accept the offer? Support your answer with appropriate calculations.

QUESTION 68.

Pyrex Corporation requires an annual volume of 500 subassemblies. Predicted annual costs of internal manufacture are:-

Direct materials	€ 3,000
Direct labour (variable)	€ 5,000
Variable overhead	€ 3,000
Fixed overhead	<u>€28,000</u>
	<u>€39,000</u>

Fixed overhead consists of factory insurance (€18,000) and depreciation of equipment (€10,000).

If the subassembly requirements were purchased externally, the available facilities and staff could be used to manufacture 2,000 units of component S at a variable outlay cost of €20 per unit and with a market value of €25 per unit.

What is the maximum price per unit that Pyrex Corporation should be willing to pay for bought-in subassemblies?

- A €98
- B €78
- C €42
- D None of the above

QUESTION 69.

Simpson Ltd. have been asked to quote for an order to build a custom made portable X-ray machine.

They are currently working well below full capacity and sales orders are scarce. The production department has supplied you with the following information to enable you to decide what selling price to quote.

Labour (1,000 hours)	€10,000
Variable Overhead (1,000 hours @ €5)	5,000
Share of Fixed Overhead	<u>15,000</u>
	<u>30,000</u>

The machine will require parts which are used regularly by the company. They would cost €20,000 to buy now, but the company has sufficient stocks on hand which only cost €12,000 when the company purchased them. Assume labour is a fixed cost.

What is the minimum selling price you could quote so as to avoid making a loss on the contract?

- A €50,000
- B €25,000
- C €40,000
- D None of the above

Decision Making and Uncertainty

QUESTION 70.

Eazy Company is faced with choosing from the following four mutually exclusive alternatives. Each project has the same duration and the cash flows are expected to occur at the same point in time. Their net cash inflows will be determined by the prevailing market conditions. The forecast net cash inflows and their associated probabilities are shown below:

Market conditions	Poor	Good	Excellent
Probability	0.20	0.50	0.30
Project A	€600,000	€620,000	€660,000
Project B	500,000	660,000	684,000
Project C	440,000	480,000	570,000
Project D	432,000	480,000	504,000

Based on the expected value of net cash flows, which project should be undertaken?

QUESTION 71.

The Decker Company must choose between two mutually exclusive alternatives. With alternative 1 an inferior product will be marketed that is best suited to low levels of demand whereas alternative 2 is a superior product that is best suited to high levels of demand. There are only two possible levels of demand – high and low and the probabilities of each event occurring is 0.5. The predicted profits for each alternative are:

	Low demand (€)	High demand (€)
Alternative 1	350,000	560,000
Alternative 2	35,000	700,000

1. Which alternative should the company choose using the maximax criterion?
2. Using the data above relating to the Decker Company, which alternative should be selected using the maximin criterion?
3. Which alternative should be selected using the regret criterion?
4. Assume that the probabilities of 0.5 for high and 0.5 for low demand are changed to 0.6 and 0.4 respectively. How would the change in probabilities change the values used to apply the maximax, maximin and regret criteria?

Past Papers



University College Dublin
An Coláiste Ollscoile, Baile Átha Cliath

SEMESTER I EXAMINATIONS

ACADEMIC YEAR 2015/16

ACC20020

Management Accounting

Professor Noel Hyndman

Professor Ciarán Ó hÓgartaigh

Professor Eamonn Walsh

Ms. Rebecca Maughan*

Time Allowed: 2 Hours

Instructions for Candidates

Answer Question One (Compulsory) and Two other Questions

Instructions for Question One:

- For Items 1 to 5 you are required to circle the correct answer in GRID A.
- For Items 6 to 15 you are required to clearly write your answer in GRID B.
- Any workings should be included in your workbook not in the grids.

Instructions for Invigilators

Use of non-programmable calculators is permitted

This examination paper should be collected at the end of the examination.

Student Number

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Seat Number

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Student Number

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GRID A

ITEM NO.

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E

Student Number

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GRID B

ITEM NO.

6	
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Question 1

(Multiple Choice and Short Answer) - Compulsory (30%)

Item 1

Management accounting and financial accounting differ in that management accounting information is prepared:

- (a)** Following prescribed rules.
- (b)** Using whatever methods the company finds beneficial.
- (c)** For shareholders.
- (d)** For creditors
- (e)** To summarize the whole company with little detail.

Item 2

Direct costs:

- (a)** Are incurred for the benefit of the business as a whole.
- (b)** Would continue even if a particular product was discontinued.
- (c)** Can be assigned to product only by a process of allocation.
- (d)** Are those costs that can be easily and accurately traced to a cost object.
- (e)** None of the above.

Item 3

Budgeted production depends on:

- (a)** The direct materials usage budget and direct material purchases budget
- (b)** The direct manufacturing labour budget
- (c)** Budgeted sales and expected changes in inventory levels
- (d)** The manufacturing overhead costs budget.
- (e)** All of the above.

Item 4

Which one of the following statements about ethical behaviour is true?

- (a)** Ethical behaviour is not guided by well-defined rules and is often subjective.
- (b)** Ethical behaviour is best described as doing actions that are permitted by law.
- (c)** Ethical behaviour always involves choosing between actions that are clearly right or wrong.
- (d)** Ethical behaviour is best guided by a policy of placing corporate performance above individual ends.
- (e)** None of the above.

/over...

Question 1 (continued)

Item 5

Efficiency variances focus on the difference between

- (a) actual quantity used and standard quantity allowed for estimated activity.
- (b) actual quantity used and standard quantity allowed for units actually produced.
- (c) quantity allowed for estimated production and standard quantity allowed for units actually produced.
- (d) actual price and standard price for standard quantity allowed for units actually produced.
- (e) None of the above.

Item 6

Top Logistics has the following information about its truck fleet miles and operating costs:

<u>Year</u>	<u>Miles</u>	<u>Operating Costs €</u>
2012	400,000	256,000
2013	480,000	280,000
2014	560,000	320,000

What is the best estimate of total costs using the high-low method if the expected fleet mileage for 2015 is 500,000 miles?

The following information relates to Items 7 and 8

Next Stop Ltd prepares budgets annually. Stocks of finished goods are budgeted at half a month's sales, based on budgeted sales for the following month. For 2005, the following selected data are available:

	July	Aug.	Sept.	Oct.
Budgeted unit sales	3,000	4,000	3,000	2,000

Item 7

Calculate the number of units of finished goods to be produced in July?

Item 8

Calculate the number of units of finished goods to be produced in August?

/over...

Question 1 (continued)

The following information applies to Items 9 and 10:

Rose Ltd. has developed the following standards for one of its products:

Standard cost of materials	€0.50 per pound
Materials purchased and used	20,000 pounds
Total paid to suppliers	€12,000
Standard quantity allowed	18,000 pounds

Item 9

What is Rose's material price variance?

Item 10

What is Rose's materials usage variance?

The following information relates to Items 11 to 13

Parkin plc makes three products, Widgets, Gizmos and Gadgets. Raw materials will be in short supply next year and the company wants to determine the optimal production plan. The following information is provided:

	<u>Widgets</u>	<u>Gizmos</u>	<u>Gadgets</u>
Selling price (€ (per unit)	11	16	10
Variable cost (€ (per unit)	7	11	5
Materials (per unit)	4Kg	3Kg	1Kg
Maximum sales demand (units)	3,000	2,500	2,000
Maximum raw materials available	18,500 Kg		
Total fixed costs		€160,000	

Item 11

What is the optimal production quantity in units for Widgets?

Item 12

What is the optimal production quantity in units for Gizmos?

Item 13

What is the optimal production quantity in units for Gadgets?

Question 1 (continued)

The following information relates to Items 14 and 15:

Spring Co. uses a job-order costing system to account for product costs. The following information pertains to 2015:

Materials sent to production	€140,000
Indirect labour	40,000
Direct labour (10,000 hours)	160,000
Depreciation of factory building	60,000
Other factory overhead	100,000
Increase in work-in-progress inventory	30,000

Factory overhead is applied at a rate of €18 per direct labour hour.

Item 14

What is the cost of goods produced in 2015?

Item 15

What is the amount of under or overapplied factory overhead for Spring Co. in 2015?

(15 x 2 marks = 30 marks in total)

ANSWER TWO OF THE FOLLOWING QUESTIONS

Question 2 (35%)

Polygon plc assembles home cinema equipment. It sells two models, the “Standard” and the “Deluxe”. The financial results for 2015 are as follows:

	Standard	Deluxe	Total
	€	€	€
Sales	450,000	375,000	825,000
Less Variable Costs	<u>225,000</u>	<u>200,000</u>	<u>425,000</u>
Contribution Margin	225,000	175,000	400,000
Less Fixed Costs			<u>300,000</u>
Net Profit			100,000

The selling price of each product remained constant during the year 2015. Standard products sold for €900 each and Deluxe products sold for €1,500 each. The General Manager is unhappy with the results as profits were well down on the year 2014. The prospects for 2016 appear even worse as variable costs have increased by 10% and fixed costs will increase by 20% in early 2016.

The sales manager has suggested that by spending an additional €30,000 in 2016 on advertising the Standard model, the sales mix between Standard and Deluxe products could be changed to 75% : 25%.

Requirements:

- (a) Calculate the break-even point in unit and sales value for the year 2015. (10 marks)
- (b) What total sales would have been required to generate a profit equal to 20% of total sales in the year 2015? (Assume sales mix stays constant at all sales volumes) (10 marks)
- (c) What is the break-even point in units for 2016 if
- i. the sales manager’s suggestion is not implemented and sales mix remains unchanged?
 - ii. the sales manager’s suggestion is implemented?
- (10 marks)
- (d) Explain briefly ‘the margin of safety percentage’ and its significance as a measure. (5 marks)

(Total: 35 marks)

Question 3 (35%)

TOD Company manufactures a single product. It has developed the following production and sales budgets for the eight months May to December, 2016.

Month	Production (Units)	Sales (Units)
May	8,000	10,000
June	10,000	8,000
July	12,000	10,000
August	14,000	12,000
September	14,000	14,000
October	12,000	14,000
November	10,000	12,000
December	10,000	10,000

The following information is available:

- (i) Selling price per unit is €40. Sixty percent of sales are paid for in the month after sale with the remainder paid for in the following month.
- (ii) Each unit produced requires 2 kgs. of material at €4 per kg. and 1 hour of labour at €7 per hour.
- (iii) Payment is made to suppliers one month after delivery.
- (iv) Variable manufacturing overheads are €3 per unit. Fixed manufacturing overheads are €2,000 per month which includes depreciation of €400 per month.
- (v) Fixed selling and administration expenses are estimated at €2,000 per month. Sales commissions of 3% of sales are paid in the following month.
- (vi) The company maintains an inventory of raw materials equal to the next month's production requirements.
- (vii) The company will pay a dividend of €17,000 in August 2016 and intends buying new equipment in June 2016 for €45,000 which it will pay for in August 2016.
- (viii) The estimated cash balance on 1 July 2016 is €75,000 overdrawn.

(ix) Except where noted to the contrary all expenses will be paid for in the month incurred.

Required:

- (A) Prepare a Cash Budget for each of the three months to 30 September 2016 **(30 marks)**
- (B) Discuss briefly the usefulness of cash budgets. **(5 marks)**
(Total: 35 marks)

Question 4 (35%)

King Manufacturing has four categories of overhead. The four categories and the expected overhead costs for each category for next year are as follows:

Maintenance	€1,400,000
Materials handling	600,000
Setups	500,000
Inspection	1,000,000

Currently, overhead is applied using a predetermined overhead rate based on budgeted direct labour hours. For next year, 500,000 direct labour hours are budgeted.

The company is considering launching a new product. Estimates for the new product are as follows:

Direct materials	€5,000
Direct labour (750 hours)	€7,500
Number of materials moves	8
Number of inspections	5
Number of setups	3
Number of machine hours	300

In the past, full manufacturing cost has been calculated by allocating overhead using a traditional volume-based cost driver system--direct labour hours. The plant manager is considering the use of cost pools and cost drivers. Expected annual activity levels for the four activity-based cost drivers that would be used are as follows:

Machine hours	160,000
Material moves	40,000
Setups	20,000
Quality inspections	8,000

Requirements:

(A) Using the traditional volume-based cost driver (direct labour hours) determine:

(i) the amount of overhead that would be allocated to the new product **(4 marks)**

(ii) the total cost of the new product **(3 marks)**

(iii) the sales price of the new product based upon full manufacturing cost plus 30 per cent.

(3 marks)

(B) Using activity based costing determine:

(i) the amount of overhead that would be applied to the new product **(10 marks)**

(ii) the total cost of the new product **(3 marks)**

(iii) the sales price of the new product based upon full manufacturing cost plus 30 per cent.

(3 marks)

(C) Discuss the benefits and limitations of using an activity based costing system. **(9 marks)**

(Total: 35 marks)

SEMESTER II EXAMINATIONS

ACADEMIC YEAR 2015/16

ACC 20020

Management Accounting

Dr. Paolo Perego

Professor Ciarán Ó hÓgartaigh

Professor Eamonn Walsh

Ms. Rebecca Maughan*

Time Allowed: 2 Hours

Instructions for Candidates

Answer Question One (Compulsory) and Two other Questions

Instructions for Question One:

- For Items 1 to 5 you are required to circle the correct answer in GRID A.
- For Items 6 to 15 you are required to clearly write your answer in GRID B.
- Any workings should be included in your workbook and not in the grids.

Instructions for Invigilators

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This examination paper must be collected at the end of the examination.

Student Number

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GRID A

ITEM NO.

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E

Student Number

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GRID B

ITEM NO.

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Question One (Multiple Choice and Short Answer) - Compulsory (30%)

- For Items 1 to 5 you are required to circle the correct answer in GRID A.
- For Items 6 to 15 you are required to clearly write your answer in GRID B.
- Any workings should be included in your workbook and not in the grids.
- All items in question one carry equal marks – 15 x 2 marks = 30 marks in total

Item 1

The primary goal of management accounting is to:

- a) Provide information to current and potential investors in the company
- b) Provide information to creditors as well as current and prospective investors
- c) Provide information to creditors, taxing authorities, and current and prospective investors
- d) Provide information for internal management to assist them in planning, control and decision making
- e) None of the above.

Item 2

The standards of ethical conduct for management accountants include:

- (a) Competence and performance.
- (b) Integrity and respect for others.
- (c) Confidentiality, confidence, integrity, and observance.
- (d) Competence, confidentiality, integrity, and objectivity.
- (e) None of the above.

Item 3

Which of the following costs would most likely be classified as variable?

- (a) Direct materials
- (b) Supervisory salaries
- (c) Equipment maintenance
- (d) Building occupancy costs
- (e) None of the above.

Item 4

When the use of materials is recorded, the debit entry is to:

- (a) Materials inventory
- (b) Accounts payable (creditors)
- (c) Work-in-progress account
- (d) Factory overhead control account
- (e) None of the above.

/over...

Question One (continued)

Item 5

Overhead costs are allocated to cost objects in an activity-based cost system in the following manner:

- (a) Overhead costs are traced to departments, then costs are traced to products
- (b) Overhead costs are traced to activities, then costs are traced to products
- (c) Overhead costs are traced to activities, then costs are traced to departments before allocating to products
- (d) Fixed overhead costs are traced directly to products
- (e) None of the above.

Item 6

Hi-Low Ltd has analysed its distribution costs and activity over the past 3 months and these are as follows:

	Monthly Distribution costs	Units sold
January	€161,000	50,000
February	€251,000	90,000
March	€228,500	80,000

What is the variable distribution cost per unit (to two decimal places)?

The following information relates to Items 7 to 9

Novelties Ltd is considering undertaking a short term contract to produce and supply branded pens for a conference. In producing the pens three materials are required and the company has these materials in inventory as shown in the table below:

Material	Units in inventory per kg	Cost price per kg	Scrap value per kg	Current purchase price per kg
A	1,000 kgs	€4.00	€	€4.25
B	250 kgs	€2.75	€1.20	€3.20
C	3,500kgs	€1.50	nil	€2.95

Item 7

Assume material A is in regular use by Novelties Ltd and the company requires 1,750 kgs of this material to make the pens. What is the **total** relevant cost of this material to be included in the short term contract price?

/over...

Question One (continued)

Item 8

Assume material B is no longer used by Novelties Ltd and the company requires 500 kgs of this material to make the pens. What is the **total** relevant cost of this material to be included in the short term contract price?

Item 9

Assume material C is no longer used by Novelties Ltd and the company requires 2,500 kgs of this material to make the pens. What is the **total** relevant cost of this material to be included in the short term contract price?

The following information relates to Items 10 to 14

Kilmco Company has developed the following standards for one of its products:

<i>Direct materials</i>	<i>12 pounds at €14 per pound</i>
<i>Direct labour</i>	<i>3 hours at €18 per hour</i>
<i>Variable overhead</i>	<i>3 hours at €8 per hour</i>

The following activities occurred during the month of October:

<i>Materials purchased and used</i>	<i>9,000 pounds at €13.60 per pound</i>
<i>Units produced</i>	<i>800 units</i>
<i>Direct labour</i>	<i>2,500 hours at €19.00 per hour</i>
<i>Actual variable overhead</i>	<i>€22,000</i>

Item 10

What is Kilmco's variable standard cost per unit?

Item 11

What is Kilmco's materials price variance?

Item 12

What is Kilmco's materials usage variance?

Item 13

What is Kilmco's labour rate variance?

Item 14

What is Kilmco's labour efficiency variance? /over...

Question One (continued)

Item 15

The plant manager of Antrim Products plc has recently set up two activity areas, each with its own supervisor. The following information is provided:

Activity Area	Cost Driver	Cost Driver Rate
Material handling	Number of parts	€ 6
Assembly	Number of machine hours	€60

Job no. 425, which has recently been processed at Antrim Products plc, had the following characteristics:

Direct labour cost	€6,000
Direct material cost	€6,000
Number of parts	500
Number of machine hours	500

Assume that Antrim Products plc adopts an activity-based accounting system. What is the selling price of job no. 425 if a mark-up of 20% is required?

(Total: 30 marks)

Question Two

Pop-Up is a medium sized company which produces marquees, tents and awnings and has been in operation for two years. Customer orders are priced by adding 25% onto the total product cost of the required marquee, awning or tent. The direct materials and direct labour costs of each order are simple to compute but the overhead is more difficult to calculate and, to facilitate the process, the company has adopted a traditional approach to the allocation of overheads. The company has three production departments, Cutting, Stitching and Finishing.

The following budgeted cost information for 2016 is available:

	Cutting €	Stitching €	Finishing €	Total €
Direct Wages	65,000	45,000	88,000	198,000
Indirect wages	31,000	23,000	18,000	72,000

Overheads	Total €
Heating and Air-conditioning	75,000
Factory Insurance	25,000
Factory Rent	49,000
Machine Depreciation	62,500
Power	96,000
Stores costs	44,120
Maintenance	22,070

The following budgeted operational information is also available for 2016:

	Cutting	Stitching	Finishing	Total
Machine hours	15,000	20,000	1,000	36,000
Direct labour hours	5,000	4,000	11,000	20,000
Value of stores issues (€)	127,400	54,880	13,720	196,000
Floor area (square metres)	150	125	120	395
Value of machinery (€)	180,000	200,000	60,000	440,000
Kilowatt hours (% usage)	45	45	10	100

REQUIREMENT:

- (a) Calculate a pre-determined overhead absorption rate for each of the production departments on the basis of machine hours for the Cutting and Stitching departments and direct labour hours for Finishing. The bases of apportionment adopted for each category of overhead should be clearly shown.

(16 marks)

/over...

Question Two (continued)

- (b) For customer order GB147 shown below, calculate the total price that would be quoted by Pop-Up Limited for the required awning:

Direct materials £60

Direct labour hours:

Cutting 1 hour

Stitching 1 hour

Finishing 1.5 hours

Machine hours:

Cutting 2 hours

Stitching 3 hours

Finishing .5 hour

(8 marks)

- (c) The managing director of Pop- Up ltd has heard that some of his competitors are using Activity Based Costing to allocate overheads and he has asked you to prepare a report to provide more information about it. Draft a report for the managing director which:

(i) **Briefly** describe how activity based costing operates.

(6 marks)

(ii) Outlines the suitability of an activity based costing system for Pop-up.

(5 marks)

(Total: 35 marks)

Question Three

Autoengineering Ltd. produces a component, XY for the automotive industry. Sales volumes for the first four months of the forthcoming year have been forecast to be as follows:

	January	February	March	April
XY	1,000	1,200	1,100	1,300

The budgeted selling price for XY is €300 per unit. All purchases of materials made by the company are paid for in the month after purchase. All sales are on one month's credit. The following opening balances are expected to be included in Autoengineer Ltd's ledger at the start of January:

Bank	€ 12,000 (DR)
Creditors/Trade Payables	€18,000 (CR)
Debtors/Trade Receivables	€94,000 (DR)

The company's inventory policy requires that sufficient stock of XY be held at the end of every month to cover 40% of the following month's sales. It is expected that at the start of January, 400 units of XY will be in stock.

The direct materials and labour inputs required for the production of one unit of each of the products are budgeted to be as follows:

	XY
Material 1 (kg)	2
Material 2 (kg)	4
Direct Labour (hrs)	2

Material 1 is budgeted to cost €12 per kg. It is expected that 360 kg of Material 1 will be in stock at the start of January. Management require that the quantities of Material 1 in stock at the **end** of each of the first three months of the year should be:

	January	February	March
Quantity (in kg)	375 kg	400 kg	475 kg

Material 2 is expected to cost €14 per kg. It is expected that 760 kg of Material 2 will be in stock at the beginning of January. Management require that the quantities of Material 2 in stock at the **end** of each of the first three months of the year should be:

	January	February	March
Quantity (in kg)	825 kg	920 kg	960 kg

The following additional information is also available:

- The direct labour rate is €0.50 per hour. Labour costs are paid for in the month they are incurred.
- Every month fixed overheads of €46,000 are incurred, including €9,000 per month for depreciation and are paid for in the month in which they are incurred.
- Variable selling and distribution expenses of €12 per unit sold are also paid for in the month in which they are incurred.
- The company will make a dividend payment in February of €50,000
- The company intends to purchase a new machine in March for €100,000 which it will pay for in April.

/over...

Question Three (continued)

REQUIRED:

- (a) Prepare a production budget (in units) for XY for the first three months of the forthcoming year. **(4 marks)**
- (b) Prepare the raw material purchase budgets (in kg and in €) for Material 1 and Material 2 for the first three months of the forthcoming year. **(6 marks)**
- (c) Prepare a cash budget for Autoengineer Ltd. for the first three months of the year which shows receipts and payments for each month and in total for the period. **(20 marks)**
- (d) Briefly discuss how uncertainty might be incorporated into the budgeting process. **(5 marks)**

(Total: 35 marks)

Question Four

Top Fitness commenced trading two years ago and provides a range of fitness activities for customers. The company operates a large purpose built premises located on the outskirts of Dublin. Its facilities include a swimming pool, an outdoor soccer pitch and a large gym. It has recently extended its facilities to add an aerobics studio. Kim Kearns the manager of the facility is considering what type of class to run in the aerobics studio. Two instructors have been recommended to her for either a dance class or a yoga class. Both instructors have limited availability so the classes are mutually exclusive, that is Kim must decide to run the dance class or the yoga class. Kim believes that she can charge a higher price per person for the yoga class. However, each person needs more floor space in the yoga class than the dance class so there is a lower maximum capacity for the yoga class. She has asked you to provide a Cost Volume Profit analysis to help her make her decision.

Details relating to both classes are as follows:

	Dance	Yoga
Price charged per participant per class	€14	€16
Annual insurance	€24,000	€24,000
Licencing fees	€6.40 per class	€6.40 per class
Overheads (electricity, admin, etc.)	€5,072	€5,072
Instructor fees	€100 per class	€6,600 per year
Expected number of participants per class	25	20

REQUIRED:

(a) Assuming that only one type of class will be run, for both classes:

- (i)** Calculate the breakeven point in sales revenue and in number of classes. **(8 marks)**
- (ii)** If Kim expects to run 160 classes per annum what is the margin of safety for each type of class. Explain the significance of this figure. **(4 marks)**
- (iii)** If Top Fitness requires a profit of €20,000 before tax from the aerobics studio how many classes must be held? **(4 marks)**

(b) Assume that the price charged per class is €14 for both the dance class and the yoga class. How many classes must be held for the profit earned from dance class to equal the profit from the yoga class? **(6 marks)**

(c) Kim is considering paying the dance instructor a fixed fee of €5,200 for the year instead of a fee per class.

- (i)** Calculate the effect that this change will have on the breakeven point in sales revenue. **(3 marks)**
- (ii)** Outline one advantage and one disadvantages of paying the dance instructor a fixed fee. **(4 marks)**

(d) Discuss THREE assumptions underlying the Cost Volume Profit analysis you have carried out for Top Fitness. **(6 marks)**

(Total: 35 marks)



SEMESTER II EXAMINATIONS

ACADEMIC YEAR 2016/17

Dr. Paolo Perego

Professor Ciarán Ó hÓgartaigh

Professor Eamonn Walsh

Ms. Rebecca Maughan*

Time Allowed: 2 Hours

Instructions for Candidates

Answer Question One (Compulsory) and Two Other Questions

Instructions for Question One:

- For Items 1 to 5 you are required to circle the correct answer in GRID A.
- For Items 6 to 15 you are required to clearly write your answer in GRID B.
- Any workings should be included in your workbook and not in the grids.

Instructions for Invigilators

Use of non-programmable calculators is permitted

This examination paper must be collected at the end of the examination.

Student Number

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Student Number

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GRID A

ITEM NO.

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E

Student Number

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GRID B

ITEM NO.

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Question One (Multiple Choice and Short Answer) - Compulsory (30%)

- For Items 1 to 5 you are required to circle the correct answer in GRID A.
- For Items 6 to 15 you are required to clearly write your answer in GRID B.
- Any workings should be included in your workbook and not in the grids.
- All items in question one carry equal marks – 15×2 marks = 30 marks in total

Item 1

Overhead costs are allocated to cost objects in an activity-based cost system in the following manner:

- (A) Overhead costs are traced to departments, then costs are traced to products
- (B) Overhead costs are traced to activities, then costs are traced to products
- (C) Overhead costs are traced to activities, then costs are traced to departments before allocating to products
- (D) Fixed overhead costs are traced directly to products.
- (E) None of the above.

Item 2

Which of the following statements is FALSE:

- (A) Relevant costs change according to the decision.
- (B) Fixed costs can never be relevant costs.
- (C) Relevant costs are always future costs.
- (D) Relevant costs are incremental costs.
- (E) Unavoidable costs are irrelevant.

Item 3

The margin of safety is used by managers as an indication of:

- (A) The cyclical nature of a sales plan
- (B) The longevity of a sales plan
- (C) The magnitude of a sales plan.
- (D) The risk inherent in a sales plan
- (E) All of the above

/over...

Question One (continued)

Item 4

The breakeven point would tend to be decreased by:

- (A) An increase in the variable expenses to sales ratio
- (B) An increase in fixed costs
- (C) A decrease in the contribution margin ratio
- (D) A decrease in selling price
- (E) None of the above.

Item 5

The Harmonica Company sells its only product for €3 per unit. The variable cost per unit is €1.50 and the annual fixed costs are €150,000. How many units of its product must Harmonica sell if it is to make a profit of €45,000 before tax?

- (A) 110,000 units
- (B) 120,000 units
- (C) 130,000 units
- (D) 140,000 units
- (E) 150,000 units

Item 6

In April 2017, Duran Company purchased 6,000kgs of raw materials at a cost of €2.60 per pound. If there was a favourable materials price variance of €900 for the month, what is the standard cost per kg?

Item 7

Curing Company produced 40,000 units of product in April 2017. The standard quantity of material allowed per unit was four kgs at a standard cost of €6.00 per kg. If there was a favourable materials usage variance of €30,000 for the month, what was the actual quantity of materials used?

/over...

Question One (continued)

The following information relates to Items 8 to 15

For the current year Apparel Ltd company has a total of 15,000 machine hours and 20,000 direct labour hours available for production. Production and sales details relating to its three garment lines are shown below:

	Blouse	Skirt	Dress
Direct materials: linen @ €6 per metre	1.5 metres	1.25 metres	2.5 metres
Direct labour: @ €12 per hour	0.25 hour	0.25 hour	0.5 hour
Machine hours required	0.3 hour	0.2 hour	0.25 hour
Sales demand for the year (units)	30,000	18,000	15,000
Selling price per unit	€54	€80	€105

Variable overhead is charged at 150% of direct labour cost. Budgeted fixed production overhead is estimated to be €95,200 per month.

Item 8

Calculate the under or over capacity of direct labour hours available for the coming year?

Item 9

Calculate the under or over capacity of machine hours available for the coming year?

Item 10

What is the contribution per unit for blouses?

Item 11

What is the contribution per unit for skirts?

Item 12

What is the contribution per unit for dresses?

Item 13

What quantity of blouses should Apparel produce for the year if it wishes to maximise its expected profit taking into account any limiting factors?

Item 14

What quantity of skirts should Apparel produce for the year if it wishes to maximise its expected profit taking into account any limiting factors?

Item 15

What quantity of dresses should Apparel produce for the year if it wishes to maximise its expected profit taking into account any limiting factors?

Question Two

Engineering Solutions provides a range of engineering and project management services to Irish and European clients, ranging from design only to full supervision and certification of construction. As it is a service company it incurs only labour and overhead costs. Engineering Solutions have two categories of labour cost, technical and administrative support. To allocate labour costs to jobs, separate technical labour and administrative support labour rates are calculated and applied to jobs based on hours worked. Currently the company uses traditional overhead absorption, allocating overheads to jobs based on total labour hours worked (both technical and administrative support).

In an attempt to improve accuracy in tendering for new jobs and to better assess profitability of existing contracts, Engineering Solutions is considering adopting an activity based costing (ABC) approach to overhead allocation. Last year, to facilitate the adoption of ABC, the firm employed accountants to research and compile the detailed information required. Four main cost types or pools were identified: design costs, planning costs, supervision costs and sundry completion costs. The following budgeted information is available for the year ahead:

Cost pool	Cost driver	€
Design costs	Number of drafts of projects	183,330
Planning costs	Number of planning meetings	321,700
Supervision costs	Number of site visits	420,840
Sundry completion costs	Admin support labour hours	252,020

Labour Costs

Technical labour cost	2,450,000
Admin support labour cost	1,620,150

Labour Hours

Technical labour hours	19,600
Admin support labour hours	92,580

Cost Driver Information

Number of drafts of projects	3,780
Total site visits	5,600
Number of planning meetings	2,500

/over...

Question Two (continued)

Details relating to two jobs undertaken by Engineering Solutions are as follows:

	Drogheda	Dublin
Contract price agreed	100,000	100,000
Technical labour hours	500	450
Admin support labour hours	670	490
Number of drafts of project	50	70
Site visits	150	300
Planning meetings	60	100

Required:

- (A) Calculate the total cost of each of the two jobs noted above using:
- (i) The costing approach currently used by Engineering Solutions. **(8 marks)**
- (ii) Activity based costing. **(13 marks)**
- (B) Prepare a memorandum for Ada Kelly, CEO of Engineering Solutions that includes the following:
- (i) An explanation of the factors that led to the emergence of ABC. **(4 marks)**
- (ii) A comparison and comment on your answers in A. (i) and (ii) above. **(4 marks)**
- (iii) A recommendation, with appropriate justification, whether or not Engineering Solutions should adopt an ABC system. **(6 marks)**
- (Total: 35 marks)**

Question Three

Hugh McDermot is a keen amateur cook and has decided to start his own food business. He has developed a delicious gluten free muffin recipe and plans to launch with two varieties: vanilla and chocolate. Hugh hopes to commence production in September 2017 and has conducted some market research to assess the interest in, and demand for, his products. Hugh will invest €5,000 of his savings to get the business started. Hugh has prepared the following information relating to his business:

1. Estimated sales demand

Muffins	September	October	November	December	January	February
Vanilla	1,200	1,400	1,650	1,700	2,100	1,950
Chocolate	1,500	1,650	1,700	2,200	2,100	2,400

Hugh has obtained orders from a hotel that specialises in arranging conferences and events. He also has orders from local restaurants and coffee shops. He estimates that 30% of his customers will pay cash immediately and has agreed to give one month's credit to the remaining customers.

2. The vanilla muffins will have a selling price of €1.50 each while the chocolate muffins will sell for €2.00 each for the first three months but he intends to increase these prices by 10% after that time.
3. The muffins are made using the same basic ingredients but with a different topping. Hugh has calculated that for each variety of muffin, the basic ingredient cost is 20% of the selling price while the cost of the topping is 8% of the selling price. In line with the selling price increase of 10% noted at 2 above, Hugh also expects an increase in the cost of ingredients of 10% after the first three months of operations. Hugh does not expect to hold any inventories as ingredients are delivered on a same day basis.
4. In terms of paying for ingredients and toppings, Hugh has negotiated that he will get one month's credit from the ingredient suppliers but must pay cash immediately for topping purchases.
5. Some months ago, Hugh successfully applied for a grant from the local enterprise Board. He will receive €6,900 in total, to be paid in two equal instalments, October 2017 and February 2018.
6. To start production, Hugh will need to purchase some kitchen equipment in September costing €4,500. The equipment is expected to last for four years and have no scrap value at the end of that time. The equipment will be depreciated on a straight line basis.
7. Hugh has located suitable premises, which have been approved by the food safety authority, and which will cost €1,000 per month to rent. The landlord requires one month's rent as a deposit, and this must be paid with the first month's rent.
8. Other operating costs including power, packaging, insurance, administration expenses and depreciation of kitchen equipment are expected to be **€5,625 per annum**. Additionally, Hugh will employ two staff in the business and will pay wages of €1,320 each per month. The relevant costs are paid in the month in which they are incurred. **/over...**

Question Three (continued)

Required:

- (A) Prepare a cash budget for Hugh McDermot's business, on a monthly basis, for the six month period commencing 1 September 2017, clearly showing the closing cash balance at the end of each month.

(20 marks)

- (B) Hugh has been told by a friend who is an experienced entrepreneur that understanding cost behaviour within a growing manufacturing business is very important, in particular, the differentiation between fixed and variable costs. However, Hugh does not understand what this means for his business. He has asked for your advice. Prepare a report for Hugh in which you discuss the importance of cost behaviour analysis in a manufacturing business. Your report should specifically address the following issues:

- (i) An explanation of the terms total, fixed and variable costs stating why it is important to analyse total cost into its fixed and variable components in a manufacturing business. Provide a practical example and a graphical illustration for each cost type indicating likely behaviour patterns.

(7 marks)

- (ii) Identify and briefly explain three techniques used to differentiate costs into their fixed and variable components and give one advantage and one disadvantage in each case. (Numerical examples are not required.)

(6 marks)

- (iii) Indicate which technique you consider to be the best, clearly stating a reason for your choice.

(2 marks)

(Total: 35marks)

Question Four

Owl Ltd. require 2,000 units of Component A for use in a project for one of its most highly valued customers. Owl Ltd. has never previously produced Component A. However, management of Owl Ltd. are currently deciding whether to purchase the requirement of Component A from another company at a price of €205,000 or to produce it themselves. A member of Owl Ltd's production department has estimated that following resources would be required by Owl Ltd. To produce 2,000 units of Component A would be as follows:

Table One : Estimate of Resources required to produce Component A

Material Alpha:	9,000kg @ €8 per kg
Material Beta:	7,000kg @ €11 per kg
Material Gamma:	5,000kg @ €5 per kg
Skilled Direct Labour:	70hrs @ €40 per hr
Unskilled Direct Labour	120hrs @ €10 per hr
Supervisor's Salary	€45,000 per annum
Depreciation of Equipment	200hrs @ €60 per hr
Miscellaneous Expenses	€5,675
Variable production overheads	€50 per skilled labour hour
Fixed production overhead	€32,500
Production planning costs	€450

The following additional information is available:

- Owl Ltd. already has sufficient stock on hand of Materials Alpha, Beta and Gamma for the production of Component A. The following price data is available in respect of each of these raw materials:

	Material Alpha	Material Beta	Material Gamma
Original purchase price	€8 per kg	€11 per kg	€5 per kg
Current purchase price	€10 per kg	€12 per kg	€6 per kg
Current re-sale price	€6 per kg	€9 per kg	nil

Owl Ltd. always maintains a stock of Material Alpha as it is used in virtually all of its production processes. The stock on hand of Material Beta was purchased several years ago for another project which was cancelled at short notice. Management do not have any use for Material Beta other than in the production of Component A. If the stock of Material Gamma is not used in the production of Component A it will have to be disposed of at cost of €0.50 per kg.

- Skilled direct labourers are paid a fixed weekly wage and are currently under-utilised. It is expected that the hours of skilled labour required for Component A may be met out of what is currently classified as idle time. The unskilled direct labour relates to hours worked by casual employees who are employed as required and paid an hourly rate.

/over...

Question Four (continued)

3. A supervisor with the necessary experience to oversee the production of Component A would need to be hired on a short-term one-month contract.
4. If the equipment is not required for the production of Component A, it may be hired out at a rate of €100 per hour and in doing so would yield a contribution of €85 per hour.
5. The miscellaneous expenses are costs which will be specifically incurred in the production of Component A.
6. Fixed production overheads have been applied using a rate of €20 per direct labour hour. If the company decides to produce Component A it is estimated that incremental fixed overheads incurred directly in respect of producing Component A will amount to €12,700.
7. The production planning costs of €450 have already been incurred by the production department.
8. It is company policy to add 20% on to the production cost of any component as an allowance against administrative costs.

Required:

- (A) Provide a brief explanation, with an example, of each of the following terms:
- (i) Sunk cost;
- (ii) Opportunity cost. (5 marks)
- (B) Determine using relevant costing principles whether Owl Ltd. should produce Component A internally or purchase it from another company. Your answer must include relevant workings and an explanation of your treatment of each of the resources identified in Table A and the additional information. (22 marks)
- (C) Discuss the role of qualitative factors in short-term decision making and suggest TWO qualitative considerations which Owl Ltd. should take into account when arriving at a decision to produce Component A. (8 marks)
- (Total: 35marks)**



SEMESTER II EXAMINATIONS

ACADEMIC YEAR 2017/18

ACC 20020

Management Accounting

Dr. Martin Quinn

Professor Ciarán Ó hÓgartaigh

Professor Eamonn Walsh

Dr. Rebecca Maughan*

Time Allowed: 2 Hours

Instructions for Candidates

Answer Question One (Compulsory) and Two Other Questions

Instructions for Question One:

- For Items 1 to 5 you are required to circle the correct answer in GRID A.
- For Items 6 to 15 you are required to clearly write your answer in GRID B.
- Any workings should be included in your workbook and not in the grids.

Instructions for Invigilators

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This examination paper must be collected at the end of the examination.

Student Number

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Seat Number

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Student Number

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GRID A

ITEM NO.

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E

Student Number

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GRID B

ITEM NO.

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Question One (Multiple Choice and Short Answer) - Compulsory (30%)

- **For Items 1 to 5 you are required to circle the correct answer in GRID A.**
- **For Items 6 to 15 you are required to clearly write your answer in GRID B.**
- **Any workings should be included in your workbook and not in the grids.**
- **All items in question one carry equal marks – 15 x 2 marks = 30 marks in total**

Item 1

Management accounting has which of the following features:

- a) Stewardship orientation focus
- b) Future orientated focus
- c) Focus on detailed annual reports
- d) Focus on decision-making needs of shareholders.
- e) None of the above

Item 2

A disadvantage of the high-low method of cost analysis is that:

- a) It results in totally inaccurate cost formulas
- b) It is very time consuming to apply
- c) It requires many data points
- d) It uses two extreme data points, which may not be representative of normal conditions
- e) All of the above.

Item 3

Cost behaviour refers to:

- a) How costs react to a change in the level of activity
- b) Whether a cost is incurred in a manufacturing, merchandising or service company
- c) Classifying costs as either product or period costs
- d) Whether a particular expense has been ethically incurred
- e) None of the above

Item 4

Overhead absorbed represents which of the following?

- a) Actual activity multiplied by predetermined overhead rate
- b) Estimated activity multiplied by predetermined overhead rate
- c) Actual activity multiplied by actual overhead rate
- d) Estimated activity multiplied by actual overhead rate.
- e) None of the above

Item 5

A budget based on additions and subtractions from last year's budget is:

- a) A zero-base budget.
- b) A continuous budget.
- c) An incremental budget.
- d) A flexed budget.
- e) None of the above

The following information relates to Items 6 to 12

Trizen Ltd manufactures wooden tables. The following details relating to the most recent financial period are available:

Standards for the production of one table:

Direct materials: 1.75 square metres @ €22 per square metre

Direct labour: 0.75 hours @ €20 per hour

Variable production overhead: €4.60 per direct labour hour

Budgeted production costs for 10,000 tables

	€
Wood	385,000
Direct labour	150,000
Variable production overhead	34,500
Fixed production overhead	51,000
Total production cost	<u><u>569,500</u></u>

Actual production costs for 9,500 tables produced

	€
Direct materials - Wood (17,100 square metres)	375,345
Direct labour (6,650 hours)	139,650
Variable production overhead	29,925
Fixed production overhead	50,100
Total production cost	<u><u>595,020</u></u>

Item 6

Calculate the Materials Price Variance

Item 7

Calculate the Materials Usage Variance

Item 8

Calculate the Labour Rate Variance

Item 9

Calculate the Labour Efficiency Variance

Item 10

Calculate the Variable Overhead Spending Variance

Item 11

Calculate the Variable Overhead Efficiency Variance

Item 12

Calculate the Fixed Overhead Expenditure Variance

Item 13

Croft Company is considering dropping one of its product lines that typically has the following revenue and costs:

€

Sales	200,000
Variable costs	<u>160,000</u>
Contribution margin	40,000
Fixed costs	<u>50,000</u>
Net loss	(<u>10,000</u>)

By dropping this product line, €8,000 of the fixed costs would be avoided. In addition, the freed-up capacity would generate €8,000 of additional contribution margin from the expansion of other product lines. If the product line is dropped, what will be the effect on overall net profit?

The following information relates to Items 14 and 15

Laburnum plc is in the process of preparing a quotation for a special job. This job will require the following materials:

Material X 30,000 litres

Material Y 20,000 kgs

The following additional information is available in relation to the materials:

Material X: There are currently 30,000 litres in stock, which originally cost €4.60 per litre. This material has no other use and, if not used on this special job, it will be disposed of. Costs of disposal will be €3,000 plus €0.60 per litre disposed of.

Material Y: There are currently 20,000 kgs in stock. If the material is not used on this job, it will be sold for €2 per kg. Selling cost would be €0.40 per kg. The original cost price was €4.75 per kg.

Item 14

What is the relevant cost of Material X for this special job?

Item 15

What is the relevant cost of Material Y for this special job?

(Total: 30 marks)

Question Two

Kirwan, Allen and Pritchard is a reputable law partnership offering a variety of legal services to clients. Paul Kirwan the managing partner wants to improve the fairness and efficiency of its billing system and is considering the introduction of activity based costing (ABC) to replace the existing traditional overhead costing method used by the firm.

The current costing method allocates overhead costs to clients based on total labour hours (for partners, junior clerks and secretarial support). Clients are billed based on cost plus a mark-up of 60%. In order to introduce ABC the managing partner assigned a team of one partner and two junior clerks, to ascertain the cost and activity relationships, and corresponding cost data, and this is shown below.

Cost activity relationships:

Cost pool	Cost driver
Legal search	Number of searches conducted
Documentation	Number of pages printed/copied
Office administration	Secretarial support time spent on case

Cost data:

Partner salary cost	€772,800
Junior clerk wages cost	€368,640
Secretarial support wages cost	€104,512
Legal search costs	€36,360
Printing and stationery costs	€96,600
Office administration costs	€73,232

Activity Data:

Partner labour hours	12,880
Junior clerk labour hours	15,360
Secretarial support labour hours	7,360
Total number of searches conducted	2,424
Total number of document pages printed/copied	3,220,000

Data related to two cases:

	Case 4135X	Case 3172C
Number of searches	10	2
Partner time spent on case	4 hours	2 hour
Junior clerk time spent on case	10 hours	6 hours
Document pages printed/copied	430	172
Secretarial support time spent on case	2 hour	2 hour

REQUIRED:

A. Calculate the total cost of the two cases above using:

- (i) The existing costing method;
- (ii) Activity based costing.

(20 marks)

B. Compare and comment briefly on your answers to A (i) and (ii).

(5 marks)

C. One of the junior clerks is unsure of the differences between the following management accounting terms:

Direct costs and indirect costs

Cost pool and cost driver

Paul Kirwan has asked you to provide brief written explanations of these terms and include a relevant example of each for the clerk. (Each part carries equal marks)

(10 marks)

(Total: 35 marks)

Question Three

Eurolex Ltd. produces a component called the D170 for the medical devices industry. Greg Murphy is the production manager at Eurolex and has provided you with the following forecasted information on the manufacture and sales of D170 for the first four months of next year.

Sales volumes for the first four months of the forthcoming year have been forecast to be as follows:

	January	February	March	April
D170	2,000	3,200	2,100	2,500

The budgeted selling price for D170 is €400 per unit for January and February with a increase to €500 per unit in March. All purchases of materials made by the company are paid for in the month after purchase. All sales are on one month's credit. The following opening balances are expected to be included in the ledger at the start of January:

Bank	€220,000 (DR)
Creditors/Trade Payables	€56,000 (CR)
Debtors/Trade Receivables	€94,000 (DR)

The company's inventory policy requires that sufficient finished stock of D170 be held at the end of every month to cover 50% of the following month's sales. It is expected that at the start of January, 1,000 units of D170 will be in stock. Raw material stock requirements are based on Greg's estimations below.

The direct materials and labour inputs required for the production of one unit of each of D170 are budgeted to be as follows:

D170	
Material 1 (kg)	3
Material 2 (kg)	4
Direct Labour (hrs)	2

Material 1 is budgeted to cost €24 per kg. It is expected that 360 kg of Material 1 will be in stock at the start of January. Greg requires the following quantities of Material 1 in stock at the **end** of each of the first three months of the year:

	January	February	March
Quantity (in kg)	480 kg	455 kg	520kg

Material 2 is expected to cost €28 per kg. It is expected that 760 kg of Material 2 will be in stock at the beginning of January. Greg requires the following quantities of Material 2 in stock at the **end** of each of the first three months of the year:

	January	February	March
Quantity (in kg)	825 kg	920 kg	960 kg

The following additional information is also available:

- The direct labour rate is €15.50 per hour. Labour costs are paid for in the month they are incurred.
- Every month fixed overheads of €6,000 are incurred, including €900 per month for depreciation and are paid for in the month in which they are incurred.
- Variable selling and distribution expenses of €20 per unit sold are also paid for in the month in which they are incurred.
- The company will make a dividend payment in February of €75,000
- The company intends to purchase a new machine in February for €80,000 which it will pay for in March.

REQUIRED:

(e) Prepare a production budget (in units) for XY for the first three months of the forthcoming year. (4 marks)

(f) Prepare the raw material purchase budgets (in kg and in €) for Material 1 and Material 2 for the first three months of the forthcoming year. (6 marks)

(g) Prepare a cash budget for Eurolex Ltd. for the first three months of the year which shows receipts and payments for each month and in total for the period. (20 marks)

(h) Identify and briefly discuss the common factors of successful budgets. (5 marks)
(Total: 35 marks)

Question Four

White Valley Chocolates Ltd. is an Irish artisan handmade chocolate producer. Currently the company has a small production facility and until recently this was sufficient to supply demand mainly from local retailers and restaurants. However, last month the company and its products received an Outstanding Food award and were featured in several national and international newspapers. As a result, domestic and international demand has grown very quickly. The directors of the company are investigating the possibility of moving to a larger premises and hiring more staff but for now want to focus on producing an optimal mix of products to maximise profits. The following information relating to the company for the year ahead is provided below:

The company makes three main types of chocolate bars:

75% Madagsacan Bean (MB)

75% Venezuelan Bean (VB)

80% Costa Rican Bean (CRB)

Budgeted selling and distribution expenses are estimated to be €10,540 per quarter and budgeted fixed production overhead is €8,460 per month.

The company has 9,792 labour hours available for the production of its handmade bars for the year.

Details relating to the three products are as follows:

Sales:	MB	VB	CRB
Sales demand for the year (bars)	56,600	27,100	31,500
Selling price per bar	€5.50	€4.60	€5.70

Variable Costs:

	MB	VB	CRB
Direct labour: @ €15 per hour	0.10 hour	0.05 hour	0.10 hour

Direct materials: -

MB mix 0.3Kg @ €1.70 per Kg

VB mix 0.3Kg @ €1.20 per Kg

CRB mix 0.3Kg @ €1.50 per Kg

Variable overhead: 100% Direct labour cost

REQUIRED:

- A. The directors are concerned that they do not have enough production capacity available to meet the sales demands for the year ahead. State whether White Valley Ltd. has sufficient production capacity to satisfy sales demand for the year ahead, providing calculations to support your answer.

(7 marks)

- B. Compute and show the ranking for the optimal production plan for White Valley Ltd. for the year, clearly showing total profit expected.

(18 marks)

- C. Briefly explain the limitations of your analysis in Part B above to the Directors of White Valley Chocolates

(4 marks)

- D. Another larger chocolate producer has offered to supply up to 4,000 bars, of any of the three types, to White Valley Ltd. during the year for a fixed price of €4.00 per bar. Evaluate this offer and provide a recommendation to the directors if the company should avail of this offer or not.

(6 marks)

(Total: 35 marks)



SEMESTER II EXAMINATIONS

ACADEMIC YEAR 2018/19

ACC 20020

Management Accounting

Dr. Martin Quinn

Professor Anthony Brabazon

Professor Eamonn Walsh

Dr. Rebecca Maughan*

Time Allowed: 2 Hours

Instructions for Candidates

Answer Question One (Compulsory) and Two Other Questions

Instructions for Question One:

- For Items 1 to 5 you are required to circle the correct answer in GRID A.
- For Items 6 to 15 you are required to clearly write your answer in GRID B.
- Any workings should be included in your workbook and not in the grids.

Instructions for Invigilators

Use of non-programmable calculators is permitted

This examination paper must be collected at the end of the examination.

Student Number

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Seat Number

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Student Number

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GRID A

ITEM NO.

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E

Student Number

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GRID B

ITEM NO.

6	
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Question One (Multiple Choice and Short Answer) - Compulsory (30%)

- For Items 1 to 5 you are required to circle the correct answer in GRID A.
- For Items 6 to 15 you are required to clearly write your answer in GRID B.
- Any workings should be included in your workbook and not in the grids.
- All items in question one carry equal marks – 15 x 2 marks = 30 marks in total

Item 1

Which of the following statements correctly reflects a step cost?

- (a) The total cost increases in steps as the level of inflation increases.
- (b) The cost per unit increases in steps as the level of inflation increases.
- (c) The cost per unit increases in steps as the level of activity increases.
- (d) The total cost increases in steps as the level of activity increases.
- (e) None of the above

Item 2

Which of the following are objectives of cash budgeting?

- (a) To anticipate shortages and surpluses
- (b) To enable necessary funds to be made available
- (c) To monitor sales revenue
- (d) a, b and c
- (e) a and b only

Item 3

Which of the following describes a flexed budget?

- (a) A budget that can be varied by any circumstances
- (b) A budget that is adjusted for inflation
- (c) A budget that is adjusted to the actual level of activity achieved
- (d) A budget to allow new product development
- (e) None of the above

Item 4

The selling price of a product is €400 per unit and the product cost per unit is €160. In relation to this product, which of the following statements is CORRECT?

- (a) The margin is 40% and the markup is 250%
- (b) The margin is 150% and the mark-up is 60%.
- (c) The margin is 60% and the mark-up is 150%.
- (d) The margin and mark-up are the same.
- (e) There is not enough information given to calculate the gross profit margin and the mark-up

/over....

Question One (Continued)

Item 5

When is the break-even point achieved?

- (a) When the total contribution is equal to total fixed costs
- (b) When the total variable costs are equal to total contribution
- (c) When the total variable costs are equal to total fixed costs
- (d) When the total contribution is equal to total costs
- (e) When the total contribution is equal to total costs and the required profit for the period

The following information relates to Items 6 and 7

Critter Plc makes and sells three products:

	A	B	C
Direct labour hours per unit	0.5	1.5	1
Direct material kgs per unit	1.5	1.25	2
Maximum demand per period (units)	1,520	2,080	960
Contribution per unit	32	30	45

Item 6

Total labour hours per period are limited to 5,200 and the supply of material is limited to 5,800 kgs per period. What is the company's limiting factor?

Item 7

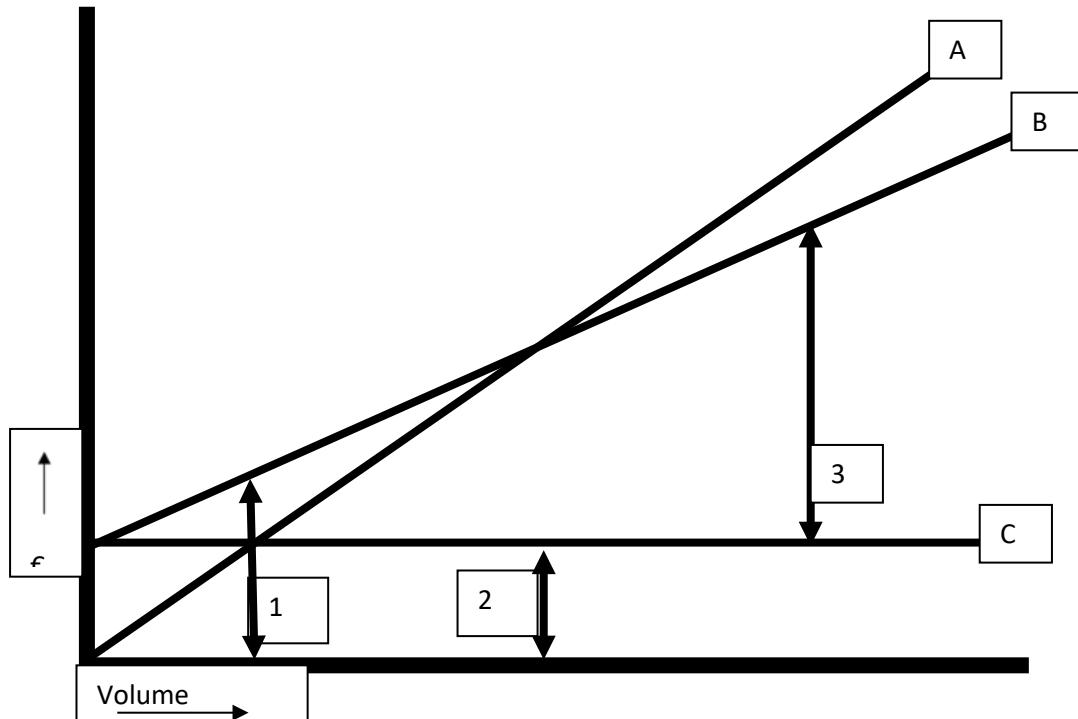
In what order should Critter plc produce the three products to maximize profits?

/over....

Question One (Continued)

The following information relates to Items 8 to 11

The following diagram is a cost volume profit chart.



Item 8

Of the three lines labelled A, B and C on the cost volume profit chart above. Which line represents fixed costs?

Item 9

Of the three lines labelled A, B and C on the cost volume profit chart above. Which line represents total costs (fixed and variable costs)?

Item 10

Of the three lines labelled A, B and C on the cost volume profit chart above. Which line represents sales revenue?

Item 11

Three vertical arrows have been labelled 1,2,3 at different levels of activity on the cost volume profit chart above. Which arrow indicates the total contribution at that level of activity?

/over....

Question One (Continued)

The following information relates to Items 12 and 13

Sales are budgeted as follows for the next five months for Pacey Ltd:

	<u>Units</u>
June	15,000
July	18,000
August	20,000
September	17,000
October	12,000

The budgeted selling price per unit is €30. The company makes all sales on credit, collecting 20% in the month of sale and 80% in the month after sale. The opening balance in debtors/trade receivables on 1 June is expected to be €84,000.

Item 12

What are the expected cash receipts for Pacey Ltd for June?

Item 13

What are the expected cash receipts for Pacey Ltd for July?

Item 14

Tisivi produced 120,000 units of product in February. The standard quantity of material allowed per unit was four kgs at a standard cost of €6.00 per kg. If there was a favourable materials usage variance of 90,000, what was the actual quantity of materials used?

Item 15

16,000 direct labour hours were worked at a factory at a standard cost of €6 per hour. If the labour rate variance was €4,000 unfavourable, what was the actual cost per labour hour?

Question Two

Opti Ltd. specialises in novelty products and is considering the manufacture of a new range of items to coincide with a major sporting event. The range will initially comprise of two products, flags and bunting. Production of this range will begin in July. To assist with budgeting, Opti Ltd. has collated the following projected information for the month of July:

Projected Sales

	Quantity	Revenue per unit
Flags	8,000	€18
Bunting	4,000	€50

There is no opening or closing work in progress. The projected finished goods inventories are as follows:

	Flags	Bunting
1st July	0	0
31st July	1,000	500

Two materials are required for the production of the products. The production requirement is given in metres below:

	Flags	Bunting
Material A	0.5m	4m
Material B	1m	3m

Material A costs €4 per metre and Material B costs €2 per metre

Materials Inventory

	Material A	Material B
1st July	6,000m	20,000m
31st July	10,200m	14,000m

The standard direct labour required to produce each flag unit is 30 minutes and a bunting unit takes 1 hour to produce. The labour rate per hour for the production of flags is €10 per hour and for bunting is €12 per hour.

Total variable overheads are projected at €27,000 for the budgeted production and are to be absorbed into production on the basis of direct labour hours. Fixed overheads are projected to be €50,000 for the month.

/over....

Question Two (Continued)

Requirement:

- A. Prepare the following Budget Statements:
- i. Sales Revenue Budget
 - ii. Production Budget
 - iii. Materials Usage and Purchasing Budgets (units and euros)
 - iv. Labour Usage and Cost Budgets (hours and euros)
- (20 marks)
- B. Calculate the projected standard contribution per unit for flags and bunting.
- (6 marks)
- C. Calculate the breakeven point in units for the month of July
- (3 marks)
- D. The marketing manager of Opti Ltd has suggested that the company should become an official merchandising company for the sporting event. This would incur additional fixed costs of €15,000 in July. The marketing manager expects that this would increase sales of flags by 1,000 and bunting by 1,500.
Discuss with relevant workings whether or not Opti should implement the marketing manager's suggestion?
- (6 marks)
- (Total: 35 marks)**

Question Three

Chumi Ltd. designs and manufactures jewellery for the Irish and international market. Currently the company uses a traditional costing system to allocate production overheads to products based on direct labour hours. The production manager has suggested to you that an activity based costing approach would give a better allocation of production overheads and has asked you to carry out some calculations. You have collected the following information on the three product lines produced by Chumi Ltd:

	Bracelet	Necklace	Earrings
Units produced	1,000	2,000	1,000
No of Sales Orders	30	50	20
No. of Material Orders	20	30	40
No. of Requisitions	30	100	70
No. of Production Runs	24	40	36
Machine hours per unit	1	1	2
Direct labour hours per unit	1	1.2	2
Direct Labour Cos per hour	€20	€20	€20
Direct Materials per unit	€20	€30	€40
Production Overheads	€		
Set Up Costs	109,000		
Cost of Ordering Materials	81,000		
Cost of Handling Materials	35,000		
Utility Costs	175,000		
Packaging Costs	32,000		

You have identified the following cost drivers for each of the overhead cost pools:

Cost Pool	Cost Drivers
Set Up Costs	No. of Production Runs
Cost of Ordering Materials	No. of Material Orders
Cost of Handling Materials	No. of Requisitions
Packaging Costs	No of sales orders
Utility Costs	Machine hours

Chumi Ltd applies a 120% mark-up on production cost to each of the three product lines.

Requirement

- A. Calculate the total production cost, the unit production cost and unit selling price for each of the three products using:
 - i. The existing costing method (overheads absorbed on a direct labour basis)
 - ii. Activity based costing

(22 marks)

/over....

Question Three (Continued)

- B. Discuss the appropriateness of introducing activity based costing to Chumi Ltd given the company's particular circumstances. **(8 marks)**
- C. Briefly explain the term customer profitability analysis and discuss how activity based product costing can be extended to customer profitability analysis. **(5 marks)**

Question Four

InSport plc. manufactures and sells sports equipment. From time to time, the company buys in products rather than produce them, if it is better value to do so. One of InSport plc's customers wants to place an order for 4,600 footballs. The management of InSport plc. are currently deciding on whether to purchase the footballs from another company at a total price of €18,500 or to produce them themselves.

The following information relates to the production of the footballs in-house.

Raw materials required:

Rubber	7,500 kgs
Poly-cotton	5,000 kgs
Latex	3,000 kgs
Skilled direct labour required	400 hrs
Unskilled direct labour required	160 hrs

The following additional information is available:

1. InSport plc. use three types of material in the production of its product and have sufficient stock on hand for the production of the footballs. The following price data is available in respect of each of these raw materials:

	Rubber €per kg	Poly-Cotton €per kg	Latex €per kg
Original purchase price	5.5	6	2.5
Current purchase price	6.25	7	4
Current realisable value	5	6	Nil

InSport plc. always maintains a stock of Rubber as it is used in many of its production processes. The stock on hand of Poly-cotton was purchased several years ago for another project which was cancelled at short notice. Management does not have any use for Poly-cotton other than in the production of the footballs. If the stock of Latex is not used in the production of the footballs it will have to be disposed of at cost of €0.80 per kg.

2. Skilled direct employees are paid a fixed weekly wage of €600 and are currently under-utilised. It is expected that the hours of skilled labour required to produce the footballs will be resourced out of what is currently classified as 'idle time'.
3. The unskilled direct labour relates to hours worked by casual employees who are employed as required and paid an hourly rate of €11 per hour.

/over....

Question Four (Continued)

4. The project will require a production manager to oversee the work. InSport plc. currently employs a manager with the necessary experience to oversee the production line at another of their production sites. This manager currently earns €78,000 per annum. This production manager can be replaced by a temporary manager who will be paid €5,400 per month. Production of the footballs is expected to take two months
5. Variable overhead costs are €14 per skilled direct labour hour.
6. If the company decides to produce the footballs it is estimated that additional fixed production overheads incurred directly in respect of producing the footballs will amount to €9,600.
7. If the equipment need for the production of the footballs is not used for this order, it may be hired out for €600 per month.
8. The depreciation charge for the machinery is expected to be €2,000 per month.
9. Pre-production design costs of €4,300 have already been incurred by InSport plc.
10. InSport adds 15% on to the production cost of any order as an allowance against its fixed administrative costs.

Requirement

- A. On the basis of the financial information provided above, recommend whether InSport plc. should produce the footballs internally or purchase them from another company. Your answer should include relevant workings and a discussion of the qualitative factors InSport should consider before arriving at a decision whether to produce the footballs internally or source them externally.

(30 Marks)

- B. Provide a brief explanation of each of the following terms:

- i. Relevant cost
- ii. Sunk cost
- iii. Avoidable cost

(5 Marks)

(Total: 35 marks)

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**SEMESTER II EXAMINATIONS
ACADEMIC YEAR 2021/22**

ACC 20020

Management Accounting

Dr. Michelle Carr

Professor Anthony Brabazon

Professor Gerardine Doyle

Dr. Rebecca Maughan*

Time Allowed: 2 Hours

Instructions for Candidates

Answer Question One (Compulsory) and Two Other Questions

Instructions for Question One:

- For Items 1 to 5 you are required to circle the correct answer in GRID A.
- For Items 6 to 15 you are required to clearly write your answer in GRID B.
- Any workings should be included in your workbook and not in the grids.

Instructions for Invigilators

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Student Number

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Seat Number

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Student Number

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GRID A

ITEM NO.

1	A	B	C	D	E
2	A	B	C	D	E
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4	A	B	C	D	E
5	A	B	C	D	E

Student Number

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GRID B

ITEM NO.

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Question One (Multiple Choice and Short Answer) - Compulsory (30%)

- For Items 1 to 5 you are required to circle the correct answer in GRID A.
- For Items 6 to 15 you are required to clearly write your answer in GRID B.
- Any workings should be included in your workbook and not in the grids.
- All items in question one carry equal marks – 15×2 marks = 30 marks in total

Item 1

A management accountant communicating information without bias is following which of these ethical standards?

- Integrity
- Competence
- Objectivity
- Confidentiality
- None of the above

Item 2

Which one of the following would be classified as indirect labour?

- Assembly workers on a car production line.
- Bricklayers in a house building company.
- Machinists in a factory producing clothes.
- Forklift truck drivers in the warehouse of an engineering company.
- None of the above.

Item 3

In a manufacturing company, which budget is usually the first to be prepared in the budgeting process?

- The production budget
- The materials purchase budget
- The variable overhead budget
- The sales budget
- The cashflow budget

Item 4

If actual production output is lower than budgeted output which of the following cost would you expect to be lower than the original budget?

- Fixed costs per unit.
- Variable costs per unit.
- Total variable costs.
- Total fixed costs.
- Depreciation of machinery.

Item 5

An additional cost that results from a particular course of action is known as a(an):

- a. Sunk cost.
- b. Opportunity cost.
- c. Net present cost
- d. Fixed cost
- e. Incremental cost

Item 6

List four common environmental costs for an organisation.

Item 7

List four of the main advantages of budgeting.

The following information applies to Items 8 and 9:

Output level in units and corresponding production overhead costs for Orion Ltd for 3 months are as follows:

	Output (Units)	Production overhead costs
January	160,000	€56,000
February	110,000	€416,000
March	240,000	€780,000

Production overheads include both a fixed and variable element.

Item 8

Calculate variable production overhead costs per unit.

Item 9

Calculate total fixed production overhead costs.

Item 10

The following information relates to the Machining department of Optimum Ltd

	Budget	Actual
Production overhead	€256,000	€280,320
Direct labour hours	25,000	25,600

What is the under/over absorbed production overhead for the machining department?

Item 11

Budgeted data for the four months to April is given below:

	Jan	Feb	March	April
Credit Sales	250,000	250,000	250,000	260,000
Cash Sales	60,000	60,000	65,000	75,000

80% of credit sales is received in the month after sale, 10% two months after sale and 8% three months after sale. The balance is written off as a bad debt. Calculate the cash receipts for April.

The following information applies to Items 12 and 13:

Miller Company produces speakers for home stereo units. The speakers are sold to retail stores for €30. Manufacturing and other costs are as follows:

Variable costs per unit:	Fixed costs per year:
Direct materials	€9.00
Direct labour	4.50
Factory overhead	3.00
Distribution	<u>1.50</u>
Total	<u>€18.00</u>

The variable distribution costs are for transportation to the retail stores. The current production and sales volume is 20,000 per year. Capacity is 25,000 units per year.

Item 12

Tockler manufacturing company has offered a one-year contract to supply speaker parts at a cost of €6.00 per unit. If Miller Company accepts the offer, it will be able to reduce variable costs by 30 per cent and rent unused space to an outside firm for €18,000 per year. All other information remains the same as the original data. What is the effect on profits if Miller Company buys accepts the offer from Tockler?

Item 13

San Diego Wholesale company has proposed to place a special one-time order of 10,000 units at a reduced price of €24 per unit. The wholesaler would pay all distribution costs, but there would be additional fixed selling and administrative costs of €3,000. All other information remains the same as the original data. What is the effect on profits if the special order is accepted?

The following information applies to Items 14 and 15:

Topaz Ltd prepares budgets annually. Stocks of finished goods are budgeted at half a month's sales, based on budgeted sales for the following month. The following selected data are available:

	July	Aug.	Sept.	Oct.
Budgeted unit sales	30,000	40,000	50,000	20,000

Item 14

Calculate the number of units of finished goods to be produced in July?

Item 15

Calculate the number of units of finished goods to be produced in August?

Question Two

Opal Ltd produces a variety of products for the Irish and European markets. The following budgeted and actual information relates to one of its most popular products.

Budgeted information for the month of March:

Production and sales in units 50,000

	€
Direct materials	725,000
500,000 kgs	
Direct labour	
175,000 hours	2,178,750
Variable production overheads	542,500
Fixed production overheads	195,000

Actual information for the month of March:

Actual production and sales in units 54,000

	€
Direct materials	789,744
526,500kgs	
Direct labour	
194,400 hours	2,381,400
Variable production overheads	612,360
Fixed production overheads	210,000

Notes:

1. Variable production overheads are applied to products based on budgeted labour hours.
2. The budgeted selling for March was €100 and the actual selling price was €95

REQUIREMENT

(a) Calculate the standard cost for one unit of product.

(4 marks)

(b) Prepare a profit and loss statement showing the original budget, flexed budget and actual results.

(6 marks)

(c) Prepare a statement identifying cost and revenue variances which will reconcile the budgeted and actual profit in as much detail as the information permits.

(16 marks)

(d) Explain incremental budgeting and discuss its advantages and disadvantages.

(4 marks)

- (e) Discuss the common behavioural issues that may arise as part of an annual budgeting process

(5 marks)

(Total 35 marks)

Question Three

Amber Ltd presently uses a traditional pre-determined overhead absorption rate for allocating production overhead to its products based on direct labour hours. Total production overhead cost is €2,450,000 and it has been determined that four major activities contribute towards this cost as follows:

Set Up	857,500
Stores	735,000
Production Control	490,000
Quality Control	367,500
Total	2,450,000

The company is investigating the use of activity based costing and has ascertained the following production information in relation to its range of products:

	X	Y	Z	Total
No. of units produced	4,000	100,000	20,000	124,000
Direct Labour Hours used	20,000	280,000	50,000	350,000
No. of Set Ups	80	10	160	250
Inspections	80	-	70	150
Production Orders	100	50	100	250
Stock requisitions	800	60	640	1500

REQUIREMENT

- (a) Calculate the production overhead charged to Products X, Y and Z per unit using the pre-determined overhead absorption rate used by Amber Ltd, based on traditional costing methods. (7 marks)
- (b) Identify cost drivers, calculate activity based overhead absorption rates for Amber Ltd, and show the revised production overhead charged to products X, Y and Z per unit. (10 marks)
- (c) Discuss which set of calculations is most accurate. (6 marks)
- (d) Explain why companies use a pre-determined overhead absorption rate. (4 marks)
- (e) Opal Ltd has received an order for a batch of 4,000 customised units of Product Z. The order can be produced in one production run (requiring one production order, set up and inspection), in addition the job will require materials estimated at €4,800 (requiring 3 stock requisitions) and 500 hours of labour at €4.35 per hour. Distribution costs are charged at 20% of full production costs and a profit margin of

25% will be charged on the order. Calculate the price per unit of this order, using the activity based cost information.

(8 marks)

(Total 35 marks)

Question Four

Walker Ltd has developed a new range of high quality affordable hiking boots using sustainable materials. The company has already received some sales orders for the boots and production is due to commence next month. The following projections have been prepared for the trading year ahead: (Production and sales of 200,000 pairs of boots)

Sales		5,500,000
Cost of sales		
Direct materials	1,238,000	
Direct labour (Note 1)	822,000	
Production overhead (Note 2)	472,000	2,532,000
Gross profit		2,968,000
Administration expenses (Note 2)		673,000
Selling and distribution expenses (Note 2)		290,000
		2,005,000

Notes:

1. It is assumed that the company will pay workers based on a fixed time basis i.e. hours worked regardless of output achieved.
2. The production, administration, and selling and distribution costs have been analysed and the cost behaviour is shown below:

	Fixed element	Variable element
Production overhead	30%	70%
Administration expenses	100%	n/a
Selling and distribution expenses	80%	20%

REQUIREMENT

- (a) Calculate the break-even point in units (pairs of boots) and revenue. (11 marks)
- (b) Calculate the margin of safety as a percentage. (3 marks)
- (c) How many pairs of boots must Walker Ltd sell to make an after tax profit of €2,250,000? The tax rate is 20%. (3 marks)
- (d) Walker Ltd is considering changing the basis of paying staff from a fixed time basis to a piece rate system. Under the new system employees will be paid €4.25 per pair of boots produced. If the company introduces this new system it will have to employ an extra production supervisor who will be paid a salary of €60,000 per year.

Assuming that the company implements the new pay system:

- i. What is the new break-even point in units (pairs of boots)?
(6 marks)
- ii. How many pairs of boots must be sold to achieve the current projected level of profit (i.e. €2,005,000)?
(2 marks)
- iii. Which of the pay systems (fixed time or piece rate) would you recommend for the company? Give reasons for your answer.
(3 marks)
- (e) Due to the introduction of the new line of hiking boots Walker Ltd will have limited machine hours available for the production of two of its existing types of hiking boots. Based on the information below prepare an optimal production plan for these products.

	Standard Boot	Deluxe Boot
Selling price per unit	25	40
Total sales demand in units	40,000	30,000
Machine hours required per unit	1.50	3
Total Machine hours available	70,000	
Variable costs per unit	€	€
Direct materials	6.00	10
Direct labour (variable)	3.00	4
Variable production overhead	1.50	1.50
Variable selling and distribution	0.20	0.20

(7 marks)

(Total 35 marks)