2024/2025

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Problem 1: XPTO Company

The XPTO Company is a manufacturing company that produces product A by converting raw material X. Consider the following information regarding year N:

Movements in raw material X

Opening stocks	10 000 units at 20 €/unit
Purchases	5 000 units at 25 €/unit
Consumption	12 000 units

Other manufacturing costs

- Depreciation of the production equipment: 70 000 €
- Rent of the factory: 50 000 €
- Direct labour costs: 420 000 €
- Utilities expenses of the factory: 30 000 €
- Manufacturing indirect labour costs: 250 000 €

Movements in finished goods

Opening stocks	1 000 units at 200 €/unit
Production	5 000 units
Sales	4 000 units

Assignment:

Compute the cost of goods manufactured (COGM) and the cost of goods sold (COGS) using as the method of inventory valuation:

1.1) First in, first out (FIFO)

1.2) Last in, first out (LIFO)

1.3) Weighted average cost (WAC)

Problem 2: MA Company

The **MA Company**, which uses **First In, First Out (FIFO)**, has provided the following data regarding year N:

Inventory value:

	Opening inventory	**Closing inventory**
Of finished goods	139 000 €	?
Of work in progress goods	13 000 €	9 000 €
Total	**152 000 €**	**?**

Breakdown of the current costs by function:

Financial revenues	**Manufacturing costs**	**Selling costs**	**General and Administrative costs**	**Financial costs**
25 000 €	550 000 €	50 000 €	42 500 €	22 500 €

Movements in finished goods:

	Units	
Opening stock	10 000	= 139 000 €
Production	40 000	
Sales	30 000	SP = 18 €/unit
Closing stock	20 000	

Assignment:

2.1) Determine the costs of goods manufactured (COGM), the profit before taxes and the value of the closing inventory of finished goods in year N.

2.2) Prepare the Profit and Loss Account (P&L Account) according to Financial Accounting of the MA Company in year N. To this end, assume that the 642 500 € amount of manufacturing costs, selling costs and administrative costs previously presented corresponds to the following costs in Financial Accounting:

Cost of materials used	**Miscellaneous costs (FSE)**	**Personnel costs**	**Depreciation costs**
100 000 €	162 500 €	230 000 €	150 000 €

FSE: Fornecimento de Serviços Externos

Problem 3: The Alimentar Company

The **Alimentar Company** manufactures only one product. The following information concerning the month of December of year N is available (assume the company adopted **FIFO** to value inventory):

Inventory value

	Opening inventory	**Closing inventory**	**Change in inventory**
Finished goods	300 000 €	262 600 €	- 37 400 €
Work in progress goods	26 500 €	27 500 €	+ 1 000 €
Total	**326 500 €**	**290 100 €**	**- 36 400 €**

Revenues

	Revenues
Sales	1 320 000 €
Financial revenues	39 000 €
Total	**1 359 000 €**

Breakdown of the current costs by function:

Financial Accounting items	**Manufacturing costs**	**Selling costs**	**General and Administrative costs**	**Financial costs**	**Total**
C.M.S.M.U.*	310 000 €	10 000 €	5 000 €	-	325 000 €
Miscellaneous costs	245 000 €	27 500 €	12 500 €	-	285 000 €
Personnel costs	341 000 €	49 500 €	48 000 €	-	438 500 €
O.O. Expenses**	-	-	3 500 €	-	3 500 €
Depreciation	115 000 €	21 000 €	16 500 €	-	152 500 €
Financial expenses	-	-	-	63 000 €	63 000 €
Total	**1 011 000 €**	**108 000 €**	**85 500 €**	**63 000 €**	**1 267 500 €**

Movements in the finished goods inventory:

	Units	**€**
Opening inventory	150 000	300 000 €
Production	500 000	-
Sales	520 000	-
Closing inventory	130 000	262 600 €

** Cost of merchandises sold and of materials used*
*** Other operating expenses*

Assignment:

3.1) Based on **First in First Out (FIFO)**:

A) Calculate the cost of the goods manufactured (COGM)

B) Prepare both the P&L by Function and according to Financial Accounting

3.2) Assuming **Weighted Average Cost (WAC)** instead of FIFO:

A) Re-value the closing inventory of finished goods

B) Prepare both the P&L by Function and according to Financial Accounting

3.3) Redo question 3.2), now assuming **Last in First Out (LIFO).** Explain the difference in the results obtained using FIFO, WAC and LIFO.

Problem 4: Alfa Company

Alfa Company manufactures Product A from direct material X. The following information concerning the month of December is available:

Costs of the month:

Water consumption:	
• In the factory	5 000 €
• In the headquarters' offices	1 300 €
• In the sales branches	500 €
Hotel accommodation of the salesmen	550 €
Energy:	
• In the factory	50 000 €
• In the headquarters' offices	10 000 €
• In the sales branches	5 000 €
Miscellaneous costs of the headquarters' offices	5 000 €
Rent of the sales branches	20 000 €
Rent of the computers being used by the accounting department	12 500 €
Costs of maintenance of the production equipment	2 500 €
Fire insurance:	
Of the factory	4 000 €
Of the headquarters' offices	1 200 €
Of the sales branches	600 €
Cost of printing advertising brochures of Product A	600 €
Fuel for the factory	7 000 €
Fees to the lawyer	1 200 €
Wages of the members of the board of directors	12 400 €
Direct labour wages	225 000 €
Representative expenses of the members of the board of directors	1 250 €
Wages of the other personnel of the factory	85 000 €
Wages of the administrative staff	40 000 €
Wages of the Sales staff	32 000 €
Commissions of the Sales staff	50 000 €
Depreciation:	
Building and equipment of the factory	70 000 €
Equipment at the headquarters' offices	10 000 €
Equipment at the sales branches	2 500 €

Inventory of Finished Goods

- Opening ……. 1 000 tonnes at 120 €/tonne
- Production ……. 5 000 tonnes
- Sales ……. 3 500 tonnes

Inventory of Direct Material X

- Opening ……. 1 000 units at 50 €/unit
- Purchases ……. 2 800 units at 53 €/unit
- Closing ……. 800 units

Work-in-progress (WIP) goods

- Opening inventory: 1 100 €
- Closing inventory: 1 000 €

- The company uses the **FIFO as the method of inventory valuation**.
- The **selling price** of Product A is 230 €/tonne.

Assignment:

4.1) Calculate:

A) The cost of goods manufactured.

B) The costs of the non-manufacturing areas.

4.2) Prepare the Profit & Loss Account

A) By Function

B) According to the Financial Accounting

Problem 5: Metalex Company

The **Metalex Company** manufactures one product and the accounting elements in September were the following:

Accounting elements	Amounts
a) Opening inventories	
Direct materials (DM)	4 100 €
Work-in-progress goods	500 €
Finished goods	6 500 €
b) Other information	
Purchases of DM	33 250 €
Trade discounts on purchases of DM	2 625 €
Transport costs of DM purchased*	2 125 €
Miscellaneous costs:	**5 000 €**
Rent of the factory (monthly)	1 750 €
Fuel for Salesmen's cars	3 000 €
Pens for the offices	250 €
Salaries and wages (including social charges):	**61 875 €**
Manufacturing personnel**	25 000 €
Sales staff	14 000 €
Administrative staff	11 000 €
Employer social security charges paid (real = 23.75%)	11 875 €
Depreciation:	**75 000 €**
Manufacturing equipment	30 000 €
Vehicles used to deliver goods	20 000 €
Office equipment	25 000 €
Financial costs	**3 000 €**
Sales	200 000 €
Return of sales	10 000 €
c) Closing inventories	
Direct materials	5 850 €
Work-in-progress products	2 000 €
Finished goods	7 000 €

** These costs are supported by the Metalex Company.*

*** It respects to direct labour.*

- The breakdown of costs by function (excluding social security charges) was:

	Manufacturing costs ***	**Selling costs**	**Administrative costs**	**Financial costs**	**Total**
Total	56 750 €	37 000 €	36 250 €	3 000 €	**133 000 €**

**** Without the inclusion of direct material costs.*

- Salaries and wages must cover theoretical social charges of 57.5%.

Assignment:

5.1) Prepare the P&L account according to Financial Accounting adopting the following format:

P&L Account according to FA for September
Sales
Changes in inventories of WP and FG
Total Revenues
Cost of merchandises sold and of materials used
Miscellaneous costs (FSE)
Personnel costs
EBITDA
Depreciation costs
EBIT
Financial Costs
Financial Revenues
EBT

5.2) Prepare the P&L account by function.

5.3) Explain the difference in profit between the two different P&L Accounts that were prepared.

Problem 6: Reparadora Company

The following information for the month of October concerning the **Reparadora Company** was available:

Breakdown of current costs and revenues

	Manuf. costs	**Selling costs**	**Administ. costs**	**Financial costs**	**Total**
Purchase of direct materials					15 000 €
Costs:					
Miscellaneous costs	5 000 €	2 000 €	1 500 €		8 500 €
Salaries and wages*	9 900 €	4 950 €	4 950 €		19 800 €
Depreciation	8 000 €	3 000 €	3 000 €		14 000 €
Financial costs				2 200 €	2 200 €
Total	**22 900 €**	**9 950 €**	**9 450 €**	**2 200 €**	
Revenues:					
Sales					63 000 €
Financial revenues					1 900 €

Inventories

	Opening stock	**Closing stock**
Direct materials	3 000 €	1 500 €
Work-in-progress goods	700 €	600 €
Finished goods	-	500 Units

Assignment:

Knowing that the company produced 5 000 units in October:

6.1) Calculate the cost of goods manufactured.

6.2) Prepare the P&L Account according to Financial Accounting and by function. Then, explain the difference between them.

** Includes 23.75% of social charges paid during the month.* ***Theoretical social charges are 60%.***

Problem 7: DoceAroma Company

The **DoceAroma Company** manufactures the perfume "Cheiroso" and imports the commodity "Pétalas de Flores", part of which is sold in the internal market.

The company is currently negotiating a loan with its bank. For this purpose, the Company included, in the application file and among others, the following items:

P&L Account according to Financial Accounting (January)

Sales of finished goods	96 000 €
Sales of commodities (Pétalas de Flores)	30 000 €
Changes in the finished goods inventories	- 3 000 €
Total operating revenues	**123 000 €**
C.M.S.M.U.*	46 390 €
Miscellaneous costs	25 500 €
Personnel costs - Wages	18 000 €
Personnel costs - Social Security Charges	4 275 €
Other operating costs	1 500 €
Total operating costs	**95 665 €**
EBITDA	**27 335 €**
Impairment loss (from clients)	2 500 €
Depreciation costs	5 000 €
EBIT	**19 835 €**
Financial costs	1 800 €
Financial revenues	1 500 €
Earnings Before Taxes (EBT)	**19 535 €**

** Cost of Merchandise Sold and Materials Used*

P&L Account by function

Description	Manufacturing Goods	Commodity	Total
Sales	96 000 €	30 000 €	126 000 €
Cost of goods sold	66 100 €	13 890 €	79 990 €
Gross profit	**29 900 €**	**16 110 €**	**46 010 €**
Selling costs			13 690 €
Administrative costs			14 310 €
Other operating costs			5 600 €
R&D Costs			0 €
Operating profit			**12 410 €**
Financial revenues – Financial costs			- 300 €
Earnings (Profit) before taxes			**12 110 €**

- Production: 6 000 units
- Unit selling price of perfume “Cheiroso”: 15 €
- The wages and salaries must cover **theoretical social charges of 65%.**

Assignment:

Given that the method of inventory valuation used by the company is the **LIFO**:

7.1) Calculate the cost of the materials used.

7.2) Calculate the value of the opening inventory of finished goods, knowing that there were 2 000 units.

7.3) Explain the difference between EBT obtained in the two P&L Accounts.

Problem 8: BETA Company

The **BETA Company** manufactures Products A and B. The following information concerning the month of January is known:

Movements of materials

	Opening stocks	**Purchases**	**Closing stocks**
Direct Material Product A	32 000 €	56 000 €	20 000 €
Direct Material Product B	48 000 €	84 000 €	30 000 €
Indirect Materials*	5 000 €	14 800 €	10 000 €

Current costs (indirect costs of the products):

Miscellaneous costs	10 000 €
Personnel (wages) costs	100 000 €
Depreciation costs	5 000 €

The breakdown of the current costs by function is as follows:

Costs	**Manufacturing (CC)**	**Selling**	**Administrative**
Miscellaneous costs	60%	25%	15%
Personnel costs	65%	20%	15%
Depreciation costs	50%	35%	15%

- The Company allocates its Conversion Costs using, as allocation base, the cost of Direct Materials used to produce Product A and Product B (i.e., the company is using a single overhead rate to assign manufacturing indirect costs/overheads to the products).
- Assume that all the production started in each month is finished in that same month.

Assignment:

8.1) Determine the single (blanket) overhead rate used by the company, as well as the cost of goods manufactured (COGM) for each product.

** The consumption of indirect materials refers to the manufacturing function.*

Problem 9: Eletronics Company

Electronics Company manufactures two large-screen television models: Zodiac and Novelle. Its profit and loss account for the last quarter of year N is presented below:

	Zodiac	**Novelle**	**Total**
Sales revenues	4 640 000 €	20 020 000 €	24 660 000 €
COGS	3 232 000 €	13 024 000 €	16 256 000 €
Gross margin	**1 408 000 €**	**6 996 000 €**	**8 404 000 €**
Over-recovery of overheads			692 300 €
Non-manufacturing overhead	?	?	?
Operating profit			**?**

The COGM per unit for the Zodiac and Novelle models is as follows:

	Zodiac	**Novelle**
Direct materials	655 €	363 €
Direct labour	49 €	21 €
Manufacturing overhead	?	?
COGM per unit	?	?

Other information pertaining the last quarter of year N:

- Manufacturing overhead was applied based on machine hours at a budgeted rate of 26 €
- Over-recovery of overheads in the period was 692 300 €
- There were no opening stocks of finished goods. Closing stocks of finished goods were:
  - Zodiac: 200 units
  - Novelle: 3 000 units
- Each manufactured unit of Zodiac consumed 4 machine hours while each manufactured unit of Novelle consumed 8 machine hours
- Non-manufacturing overheads were 7 398 000 €. These costs were allocated to products based on current sales revenues
- There were no stocks of working in progress

Assignment:

9.1) Complete the missing information in the Profit and Loss account for the last quarter of year N.

9.2) Calculate the manufacturing overhead costs the company supported in the quarter.

Problem 10: ÉFACIL Company

The **ÉFACIL Company** is an Italian based company, which manufactures two products (product A and product B). Data on the production, sales and costs incurred for the last year is provided in the table below.

	Product A	**Product B**	**Total**
Production and Sales	1 000 000 units	25 000 units	
Selling Price per Unit	87 €	133 €	
Direct Material			
Raw Material W	120 000 Kg	4 000 Kg	1 488 000 €
Raw Material Z		2 500 units	240 000 €
Direct Labour	7 500 000 €	250 000 €	
Production Overheads			31 775 000 €

Assignment:

10.1) Assuming the company assigns manufacturing indirect costs to products A and B using a blanket overhead rate based on direct labour costs:

A) Compute the COGM for each product.

B) Prepare the profit & loss account.

C) If the estimated fixed overhead rate is 4 € per euro of direct labour costs, what will be the COGM for each product? Present the profit & loss account.

10.2) Consider now the company is divided into two production departments (department 1 and department 2). Department 1 is a labour-intensive department whereas department 2 is capital intensive. Both products are processed in departments 1 and 2. The company allocates production overhead costs to products using departmental overhead rates based on direct labour hours for department 1 and machine hours for department 2.

Production Overheads	**Product A**	**Product B**	**Total Cost**
Department 1	300 000 Lh	10 000 Lh	19 220 000 €
Department 2	200 000 Mh	51 100 Mh	12 555 000 €

A) Calculate the COGM for each product.

B) Prepare the profit & loss account.

Problem 11: Finish Manufacturing Co

The **Finish Manufacturing Co** produces customized electronic components. The company operates two service departments and two production departments. Manufacturing overhead costs and quantities of activities for each department are shown as follows:

	Service Departments		**Production Departments**	
	Factory Administration	**Maintenance**	**Machining**	**Assembly**
Manufacturing overheads directly assigned	100 000 €	200 000 €	400 000 €	300 000 €
Number of employees (excluding those working at the factory administration)		10	10	60
Maintenance hours	2 000		7 000	1 000
Machine hours			10 000	1 000
Direct labour hours			1 000	10 000

The costs of the Factory Administration department are allocated based on employees (excluding those working at the Factory Administration department) and the costs of the Maintenance department are allocated based on maintenance hours. Besides, the Machining department uses machine hours as its unit of work and the Assembly department uses direct labour hours as its unit of work.

Assignment:

Answer to the questions posed below, using the three allocation methods you learned (i.e., the direct allocation method, the sequential allocation method, and the simultaneous equation method):

11.1) What are the overhead rates for each production cost centre?

11.2) The company needs to notify (bid) a price to a client for job 781, which requires 3 machine hours of the Machining department and 5 direct labour hours of the Assembly department. The expected direct materials and direct labour costs incurred in job 781 are 450 €. To cover non-manufacturing costs and allow for profit the company adds 30% to the manufacturing costs of job 781. What will be the price of job 781 to be notified to the client?

Problem 12: Movilinda Company

The Movilinda Company manufactures furniture. For accounting purposes, the company's plant is organized in the following homogeneous cost pools (or cost centres):

- **Cutting** where the wood shavings the parts making up the furniture are cut. The defined unit of work of this cost centre is machine hours (Mh).

- **Assembly -** where the parts obtained in the Cutting cost centre are assembled giving rise to the furniture. The defined unit of work of the Assembly cost centre is labour hours (Lh).

- **Maintenance -** this cost centre carries out the maintenance of the mechanical and electrical equipment, as well as of the plant buildings. Its unit of work is machine hours (Mh).

- **Cleaning** - This cost centre carries out the specialized cleaning of the plant. Its unit of work is labour hours (Lh).

For the month of October, we know the following:

Production

- The order No. 076, which consisted of 200 tables for a school, was finished. The cost of this order at the beginning of month was as follows:
  - Direct Materials: 2 350 €
  - Conversion Costs: 1 650 €

- The order No. 081, consisting of 150 room furniture, was started and completed.

- The order No. 082 of 80 living room tables, was started but not concluded at the end of the month (thus, work-in-progress)

Consumption of direct materials:

- Order No. 076 8 750 €
- Order No. 081 7 500 €
- Order No. 082 4 750 €

Direct labour consumed in the manufacturing process:

- Order No. 076 3 000 €
- Order No. 081 2 450 €
- Order No. 082 4 100 €

Activity of the homogeneous cost pools (or cost centres):

Users	**Suppliers**			
	Cutting	**Assembly**	**Maintenance**	**Cleaning**
Order No. 076	70	1.000	-	-
Order No. 081	80	800	-	-
Order No. 082	90	500	-	-
Cutting	-	-	300	450
Assembly	-	-	100	500
Maintenance	-	-	-	50
Cleaning	-	-	100	-
Total	**240 Mh**	**2.300 Lh**	**500 Mh**	**1 000 Lh**

Manufacturing overhead costs directly assigned to each homogeneous cost pool:

	Cutting	**Assembly**	**Maintenance**	**Cleaning**	**Total**
Wages	1 100 €	4 600 €	400 €	2 200 €	**8 300 €**
Social security charges	660 €	2 760 €	240 €	1320 €	**4 980 €**
Depreciation	400 €	160 €	150 €	190 €	**900 €**
Insurance	55 €	60 €	5 €	25 €	**145 €**
Other materials	110 €	480 €	90 €	195 €	**875 €**
Electricity	90 €	75 €	10 €	75 €	**250 €**
Other costs	210 €	990 €	230 €	1 770 €	**3 200 €**
Total	**2 625 €**	**9 125 €**	**1 125 €**	**5 775 €**	**18 650 €**

Non-manufacturing costs: 3 100 €

Sales

- The finished orders were invoiced to the customers, respectively by 34 000 € and 28 000 € (Order No. 076 and Order No. 081).

Assignment:

12.1) Elaborate the map with the costs of each homogeneous cost pool (enclosed) using the sequential (or step-down) allocation method.

12.2) Calculate the cost of each order.

12.3) Prepare the profit and loss account by function.

Description	unit of work	UC									Total
			Q	V	Q	V	Q	V	Q	V	
1- MO directly assigned											
Total 1.											
2- Reallocation of the costs of the service centres											
Total 2.											
TOTAL (1+2)											
Unit cost											

Problem 13: White Flour, Ltd.

White Flour, Ltd. manufactures and sells two different products: wheat flour for domestic use **(DF)** sold in bags of 1kg to supermarkets; and wheat flour for industrial use **(IF)** sold in large bags of 50 kg directly to bakeries.

The company is divided in the following manufacturing production cost centres:

- **Preparation**: where wheat grains bought from suppliers are washed and prepared for milling (volume of wheat purchased in the month is its unit of work)
- **Milling**: wheat grains are crushed to get bulk wheat flour (machine hours is the unit of work)
- **Packing**: bulk flour is packed in paper bags of 1Kg and 50 kg to get flour for domestic use and flour for industrial use, respectively (number of bags used to pack flour for domestic and industrial uses monthly produced is its unit of work)

Additionally, there are two manufacturing service cost centres:

- **Power generator** (unit of work: Kw). Its total costs are allocated according to the amount of Kw provided to other cost centres
- **General manufacturing overheads**: which costs are allocated to the remaining manufacturing cost centres proportionately to their directly assigned manufacturing costs

The company has available the following information regarding May year N:

Direct materials consumption per unit of product produced:

Description	Physical unit	Bulk flour (tonne)	Flour - Domestic Use (bag)	Flour - Industrial Use (bag)
Wheat	Tonne	1.2	-	-
Bulk flour	Kg	-	1	50
Packing material	Bags	-	1	1

Production and sales:

Description	Physical unit	Production volume	Sales volume	Selling price
Flour for domestic use	Bags	3 625 000	3 550 000	0.4 €
Flour for industrial use	Bags	217 500	218 000	13 €

Purchases:

Description	Physical unit	Volume	Unitary costs
Wheat	Tonne	18 500	15.5 €
1 Kg Bags	Bags	3 650 000	0.05 €
50 Kg Bags	Bags	230 000	1.75 €

Opening stocks of direct materials:

Description	Physical unit	Volume	Unitary costs
Wheat	Tonne	2 500	11.30 €
1 Kg Bags	Bags	420 000	0.05 €
50 Kg Bags	Bags	100 000	1.75 €

Opening stocks of finished goods:

Description	Physical unit	Volume	Unitary costs
Bulk flour	Tonne	1 500	140 €
Flour for domestic use	Bags	125 000	0.20 €
Flour for industrial use	Bags	32 500	8 €

Manufacturing overheads directly assigned

	Preparation	Milling (2 500 Mh)	Packing	Power generator	General Overheads
Direct costs	484 500 €	783 500 €	204 500 €	179 500 €	154 000 €

Kw provided by Power generator

	Preparation	Milling (2 500 Mh)	Packing	Power generator	General Overheads
Kw provided	50 000 Kw	65 000 Kw	30.000 Kw	-	10 000 Kw

Additional information:

- Closing stocks of bulk flour: 0 tonnes
- Non-manufacturing costs amount to 347 800 €
- The company adopts weighted average cost as the method of inventory valuation

- The company uses Total Full Costing and adopts the homogeneous cost pool method

Note: 1 Tonne = 1 000 Kg

Assignment:

13.1) Prepare the map with the costs of each cost centre based on simultaneous equation method.

13.2) Calculate the COGM and the COGM per tonne and per bag of:

A) Bulk flour

B) Flour for domestic use

C) Flour for industrial use

13.3) Prepare the P&L account by function of May, year N.

Problem 14: Flat High Company

The **FLAT HIGH Company** manufactures **Product A and Product B**. The manufacturing process is divided in five cost centres, for which we know the following information:

Cost centres information

- **Operating Centre 1 (OC1)** whose activity is 5 000 Mh to Product A and 2 520 Mh for Product B. The cost of each unit of work is 2.5 €.

- **Operating Centre 2 (OC2)** whose activity is 11 375 Lh. The Product A uses 9 375 LH and product B uses 2 000 Lh.

- **Service Centre 1 (SC1)** –The cost of this centre is allocated as follow:
  - 6 000 € to **OC1**
  - 100 Lh to **OC2**
  - 100 Lh to **SC2**
  - Consider that the activity of SC1 amounts to 1 000 Lh.

- **Service Centre 2 (SC2)** –The cost of this centre is allocated as follow:
  - 20 MH to **OC1**
  - 25 MH to **OC2**
  - 5 MH to **SC1**

- **Service Centre 3 (SC3)** –The cost of this centre is allocated as follow:
  - 50% to **OC1**
  - 50% to **SC2**

Direct materials used:

Product A	Product B
7 500 €	12 000 €

Direct costs:

OC1	OC2	SC1	SC2	SC3	Total
11 000 €	9 000 €	7 175 €	2 000 €	1 000 €	30 175 €

Information about finished goods and work-in-progress:

	Product A	**Product B**
Opening finished goods	2 000 units at 2.5 €/unit	3 000 units at 3 €/unit
Production	10 000 units	12 000 units
Closing finished goods	1 000 units	0 units
Opening work-in-progress	4 750 €	0 €
Closing work-in-progress	15 000 €	0 €

The company adopts **FIFO** as the method of inventory valuation.

Assignment:

14.1) Present the map with the costs of each homogeneous cost pool.

14.2) Determine the cost of goods manufactured (COGM) of product A (assume that each unit of work of OC2 is 2 €).

Problem 15: Massaltaliana Company

The **Massaltaliana Company** manufactures ties of Italian pasta. The manufacturing process has the following phases:

- The **wheat** is purchase and after stored in a silo.
- The manufacturing process starts with the entrance of the wheat at the **Mixer Homogeneous Cost Pool**. Here the wheat seeds (material) are homogenized and mixed with water.
- The mixture obtained in the previous phase goes to the **Drying Homogeneous Cost Pool** where it is subjected to a process of pressing into moulds and to a drying process.

Here, the Semi-Product **Pasta** is obtained**.** This **Pasta** is stored in the factory silo. Later, according to the needs of the production, the **Pasta** will go to the **Packing Homogeneous Cost Pool.** Here the **Pasta** is involved in a **Plastic Film Material**, resulting in the final product of the company: the **Packing Pasta**.

For the well-functioning of the process, the Company has also two **service cost centres**:

- **Maintenance** – Ensures the maintenance and repair of the manufacturing equipment. Has Lh as the unit of work.
- **General manufacturing overheads** – The total Lh's worked in this cost centre are allocated every month to all the other cost pools (or cost centres) proportionately to their directly assigned manufacturing costs.

The activity of each of these homogeneous cost pools (or cost centres) regarding December as well as some additional information is available below:

Movement of materials

	Wheat	**Plastic Film Material**
Opening stock	21 ton. at 250 €/ton.	0 units
Purchases	200 ton. at 275 €/ton.	2 000 units at 1.5 €/un.
Closing stock	26 ton.	0 units

Movement of products

	Pasta	**Packing Pasta**
Opening stock	25 ton. at 875 €/ton.	0 units
Production	100 ton.	90 000 units
Closing stock	35 ton.	10 000 units

Direct labour:

- Pasta: 3 000 €
- Packing Pasta: 9 000 €

Other information:

- The unit selling price of Packing Pasta is 1.20 €
- The non-manufacturing costs are 32 000 €
- There are no work-in-progress products

Assignment:

Knowing that the company uses the **FIFO as the method of inventory valuation**:

15.1) Characterize the production process with respect to the type of costing applied.

15.2) Elaborate the map with the costs of each homogeneous cost pool (enclosed) using both the sequential or step-down method and the simultaneous equation method.

15.3) Determine the cost of the two goods manufactured: **Pasta** and **Packing Pasta** using the sequential (or step-down) allocation method (to answer you need to pay attention to the data included in the map shown in the next page).

Description	**Unit of work**	**Mixer (974 Mh)**		**Drying (1 000 Mh)**		**Packing (500 Mh)**		**Maintenance (580 Lh)**		**GMO (308 Lh)**		**TOTAL (in €)**	
		Q	**V**	**Q**	**V**	**Q**	**V**	**Q**	**V**	**Q**	**V**		
1 - Direct Costs			**21 000**		**10 000**		**9 000**		**4 000**		**3 080**	**47 080**	
Subtotal 1			**21 000**		**10 000**		**9 000**		**4 000**		**3 080**	**47 080**	
2 - Reallocation of the costs of the service centres													Total Lh
GMO	Lh	147		70		63		28		-			**308**
Maintenance	Lh	235		100		200		-		45			**580**
Subtotal 2													
Total (1 + 2)													
Unit cost													

Problem 16: Online retailer

An **Online retailer** operates two operating departments and two service departments.

The retailer uses the number of employees to allocate the costs of the Human Resources department and processing time to allocate the costs of the Information Systems department.

The following data is available for the month of June:

	Operating departments		**Service departments**	
	Corporate Sales	Consumer Sales	Human Resources	Information Systems
Directly assigned costs	900 000 €	500 000 €	70 000 €	250 000 €
Number of employees (excluding those working at the HR department)	40 emp	40 emp	-	20 emp
Processing time (minutes)	2 000 min	1 600 min	400 min	

Assignment:

16.1) Which cost reallocation method would you recommend to determine the costs of each operating cost centre?

16.2) What are the costs of the two operating departments based on the method you recommended?

Problem 17: Raçãoforte Company

The **Raçãoforte Company** manufactures two types of diets (I and II). The manufacturing process is the following:

Cereals are processed in the **Grinding homogeneous cost pool**, giving rise to flour that passes over to the **Mixer homogeneous cost pool**. In the latter, additives are mixed to get the final products. The main difference between the two types of diets is the materials used in production.

The Company has also two more homogeneous cost pools: **Maintenance** and **Power Generator**.

Information about the month of April can be found below.

Production and Sales

	Diet Type I	**Diet Type II**
Opening stock	100 tons. at 34 €/ton.	80 tons. at 30.55 €/ton.
Production	300 ton.	500 ton.
Opening working-in-progress	1 200 €	1 500 €
Closing working-in-progress	1 270 €	830 €
Sales	250 tons. at 50 €/ton.	500 tons. at 48 €/ton.

Direct materials and direct labour consumed in the manufacturing process

	Diet Type I	**Diet Type II**	**Cost per ton**
Cereal A	270 ton.	-	25 €
Cereal B	-	280 ton.	15 €
Cereal C	-	150 ton.	20 €
Additive D	30 ton	-	5 €
Additive E		70 ton.	10 €
Direct labour	3 000 €	5 000 €	

Activity of the homogeneous cost pools

Suppliers **Users**	Maintenance	Power generator	Grinding	Mixer
Maintenance	-	5 000 Kw	-	-
Power generator	50 Lh	-	-	-
Grinding	180 Lh	8 000 Kw	-	-
Mixer	170 Lh	7 000 Kw	-	-
Diet Type I	-	-	80 Mh	50 Mh
Diet Type II	-	-	120 Mh	130 Mh
Total	**400 Lh**	**20 000 Kw**	**200 Mh**	**180 Mh**

Manufacturing costs (in Euros) directly assigned to each homogeneous cost pool:

Maintenance	Power generator	Grinding	Mixer
1 460.00 €	2 142.50 €	3 317.00 €	4 235.30 €

Non-manufacturing costs:

- Variable costs are 2.5% of Sales
- Fixed costs are 6 000 €

Assignment:

Knowing that the company uses **weighted average cost** as the method of inventory valuation:

17.1) Elaborate the map with the costs of each homogeneous cost pool based on simultaneous equation method.

17.2) Calculate the cost of each order.

17.3) Prepare the profit and loss account by function.

Problem 18: SumoCalda Company

The SumoCalda Company manufactures two products: **Peach syrup**, sold in cans and **Peach juice**, sold in bottles. The company is divided in the following homogeneous cost pools:

- **Preparation** (machine hours as the unit of work), where the peaches are selected and peeled.
- **Transformation** (machine hours as the unit of work), where the prepared product is converted and put into bottles or cans.
- **Power generator** (Kw as the unit of work).
- **Cleaning services** (labour hours as the unit of work).
- **General manufacturing overheads**, which are allocated to the production centres proportionately to their directly assigned manufacturing costs.

The following information about last year was made available:

Consumption and production

	Peach syrup	**Peach juice**
Peach consumption	105 tons	520 tons
Package consumption	790 000 cans	1 150 000 bottles
Consumption of other direct materials	104 300 €	27 420 €
Production (in units)	780 000 cans	1 130 000 bottles

Direct labour consumed in the manufacturing process:

- Syrup peach: 7 800 €
- Peach juice: 11 300 €

The activities of the homogeneous cost pools:

Users	**Suppliers**			
	Preparation	**Transformation**	**Power generator**	**Cleaning services**
Preparation	-	-	8 500 kw	250 Lh
Transformation	-	-	10 500 kw	150 Lh
Power generator	-	-	-	100 Lh
Cleaning services	-	-	1 000 kw	-
Peach syrup	950 Mh	850 Mh	-	-
Peach juice	1 230 Mh	950 Mh	-	-
Total	**2 180 Mh**	**1 800 Mh**	**20 000 kw**	**500 Lh**

Manufacturing costs directly assigned to each homogeneous cost pool:

Preparation	Transformation	Power generator	Cleaning services	General overheads
30 000 €	27 780 €	4 150 €	3 010 €	2 340 €

Opening inventories

Peach	25 ton at 250 €/ton
Cans	100 000 units at 0.23 €/unit
Peach syrup	40 000 cans valued at 0.45 €/can

Purchase of materials

Peach	625 ton at 260 €/ton
Cans	750 000 units at 0.25 €/unit
Bottles	1 250 000 units at 0.20 €/unit

WIP: 0€

Non-manufacturing costs:

Variable with Peach syrup	0.10 €/sold can
Variable with Peach juice	0.20 €/sold bottle
Fixed*	162 600 €

**Allocated proportionately to the sales volume of each product.*

Sales

Peach syrup	800 000 cans at 0.90 €/can
Peach juice	1 120 000 bottles at 0.75 €/bottle

Assignment:

Knowing that the company uses the **LIFO** as the method of inventory valuation.

18.1) Prepare the map with the costs of each homogeneous cost pool (enclosed) based on simultaneous equation method

18.2) Calculate the costs of production.

18.3) Prepare the profit and loss account by function.

Problem 19: BomAzulejo Company

The **BomAzulejo Company** manufactures **Decorative Tiles** per order. The Company is also the only importer of a shiny gold paint for painting, with the reference "metaldouro246", which is sold in the Portuguese market. The company is divided in the following homogeneous cost pools:

- **Painting** (Lh as the unit of work), where the tiles are painted.
- **Oven** (Mh as the unit of work), where the tiles are glazed.
- **Cleaning** – cleans the factory. The defined unit of work is labour hours (Lh).
- **Maintenance -** Ensures the maintenance and repair of the manufacturing and cleaning equipment. Has Lh as the unit of work.
- **General manufacturing overheads (GMO)** – These costs are allocated every month to all other cost pools (or cost centres) proportionately to their directly assigned manufacturing costs.

Elements of the month of January:

Manufacturing costs directly assigned to each homogeneous cost pool (in Euros):

Costs	Painting	Oven	Cleaning	Maintenance	GMO
Miscellaneous costs	750 €	1 250 €	880 €	750 €	750 €
Wages	5 000 €	2 000 €	1 200 €	2 000 €	-
Depreciation	100 €	2 000 €	200 €	150 €	-
Other costs	750 €	250 €	88 €	100 €	1 000 €
Total	**6 600 €**	**5 500 €**	**2 368 €**	**3 000 €**	**1 750 €**

Orders

- The order nº 3276, which initiated in December of previous year, was finished in January. The cost of this order in the beginning of the month of January was 6 658 €.
- The order No. 4001 was started and completed.
- The order No. 4002 was started but was not concluded by the end of the month

Direct materials used

Order nº 3276	Order nº 4001	Order nº 4002
3 300 €	5 200 €	2 800 €

Direct labour used in the manufacturing process:

Order nº 3276	Order nº 4001	Order nº 4002
1 000 €	3 500 €	1 100 €

The activities of the homogeneous cost pools:

Suppliers / **Users**	**Painting**	**Oven**	**Cleaning**	**Maintenance**
Order nº 3276	400	200	-	-
Order nº 4001	1 000	500	-	-
Order nº 4002	600	300	-	-
Painting	-	-	400	150
Oven	-	-	200	250
Maintenance	-	-	200	-
Cleaning	-	-	-	100
Total	2 000 Lh	1 000 Mh	800 Lh	500 Lh

Inventories of shiny «metaldouro246»

- Opening stock 200 litres at 5 €/l
- Purchases 1 000 litres at 5.50 €/l
- Closing stock 400 litres

The decorative tiles in production during January did not consume this paint.

Non-manufacturing costs

- Selling 2 500 €
- Administrative 5 000 €
- Financial 1 500 €

Sales

- The orders no 3276 and 4001 have been delivered and invoiced by 25 000 € and 30 000 €, respectively, to the customers.
- 6 880 € of the shiny «metaldouro246.

Assignment:

Knowing that the company uses the **FIFO as the method of inventory valuation**:

19.1) Elaborate the map with the costs of each homogeneous cost pool based on the most accurate reallocation method of the costs of the service cost centres.

19.2) Calculate the cost of each order.

19.3) Prepare the profit and loss account by function.

19.4) State the main advantages of the Homogeneous Cost Pool method.

Problem 20: X Company

The **X Company** manufactured and sold products A and B as follows:

(period: 1 year)	**Product A**	**Product B**
Production and sales	10 000 units	500 units
Selling price (per unit)	50 €	100 €
Direct material cost (per unit)	10 €	20 €
Direct labour cost (per unit)	20 €	30 €

Product A was produced in batches of 1 000 units each and product B in batches of 10 units each. Total manufacturing overheads for the period were 100 000 €. The firm has been using a direct labour rate to allocate manufacturing overhead to products.

Assignment:

20.1) Under the current allocation system:

A) Determine the cost of manufacturing products A and B using the traditional costing system adopted by the company.

B) Calculate the gross profit for products A and B.

More recently, the X Company decided to change to activity-based costing system (ABC) to refine product costing. After conducting interviews with the relevant personnel, the steering committee, which was assisted by consultants, identified four activity cost centres, their cost drivers and corresponding volumes, which can be seen in the following two tables:

Activities	**Activity cost**	**Activity cost driver**
Materials handling	12 000 €	No. of parts (p)
Setting-up (machines)	21 000 €	Set-up time (h)
Operating production machines	45 000 €	Machine hours (h)
Inspection	22 000 €	Inspection hours (h)

Activities	**Product A**	**Product B**	**Total**
Materials handling	1 800 p	200 p	2 000 p
Setting-up machines	5 h/batch	7 h/batch	
Operating production machines	1 000 h	500 h	1 500 h
Inspection	4 000 h	1 000 h	5 000 h

20.2) Under ABC:

A) Determine the cost of manufacturing products A and B using ABC.

B) Calculate the gross profit for product A and product B.

C) Compare results using ABC and traditional costing.

Problem 21: Supermercado da Estrela

The **Supermercado da Estrela** decided to expand its facilities. For this purpose, it needs information on the operating profit of each product line: soft drinks, fresh products and packaged food. As such, the following information was collected regarding year N:

Year N	Soft Drinks	Fresh products	Packaged food
Sales (€)	317 400 €	840 240 €	483 960 €
Cost of merchandises sold (€)	240 000 €	600 000 €	360 000 €
Return of empty bottles (No. of bottles)	4 800	0	0
Number of purchase orders	144	336	144
Number of deliveries received	120	876	264
Hours used to restock shelves	216	2 160	1 080
Products sold	50 400	441 600	122 400

The **Supermercado da Estrela** also prepared the following information for the same year:

Activity	Activity's description	Total Costs*	Cost drivers
Bottles' return	To return empty glass bottles	4 800 €	Direct assignment to soft drinks
Orders made	To carry out purchases' orders	62 400 €	624 purchase orders
Deliveries received	To receive goods	100 800 €	1 260 deliveries
Replenishment	To restock the shelves	69 120 €	3 456 hours of restocking
Customer Service	To pack, etc	122 880 €	614 400 products sold

** Excluding cost of merchandising sold*

***Assignment*:**

21.1) Calculate the operating profit of each product line, knowing that the company currently allocates the total costs of the supermarket using the cost of goods sold as the allocation base.

21.2) Calculate the operating profit of each product line and of the Supermercado as a whole by using the activity-based costing system (ABC).

21.3) Comment on the values found in 1 and 2 and refer the advantages of ABC.

Problem 22: Santa Isabel Clinic

The **Santa Isabel Clinic** undertakes the rehabilitation of patients with problems, like **alcohol** and **drugs**, and provides an **aftercare service**. The Year N budget is as follows:

4 Doctors x 140 000 €	560 000 €
18 Psychologists x 70 000 €	1 260 000 €
20 Nurses x 30 000 €	600 000 €
Personnel wages	2 420 000 €
Medicines and other medical supplies	300 000 €
Indirect costs (administrative, rents, etc.)	1 320 000 €
Total costs	**4 040 000 €**

The personnel is occupied in the various programs as follows:

	Alcohol	Drugs	Aftercare	Total
Doctors	-	4	-	4
Psychologists	6	4	8	18
Nurses	4	6	10	20

Recently, the director of the clinic heard about activity-based costing as a method to improve product (service) costing. For ABC purposes, the following information was collected:

- The consumption of medicines and other medical supplies depends on the number of patients.

Indirect costs breakdown:

Rent and maintenance of the clinic	270 000 €
Costs of laundry, food and patients' records	900 000 €
Laboratory services	150 000 €
Indirect costs	**1 320 000 €**

Other information:

	Alcohol	Drugs	Aftercare	Total
Space used by each program	9 000 m2	9 000 m2	12 000 m2	30 000 m2
Number of patients	40	50	60	150
Number of lab tests	400	1.400	700	2.500

Assignment:

22.1) After selecting the cost drivers, use the activity-based costing system to calculate the cost per patient of each program.

22.2) What are the benefits to **Santa Isabel Clinic** of implementing ABC?

Problem 23: Jane

Jane manufactures large puzzles by order, which are very different, depending on the customer specifications, such as the design, size, number of pieces, etc.

The puzzles may be performed on slabs of wood or PVC of high quality. The price difference (by square meters of the materials) is so significant, that Jane now uses the value of these materials consumed (wood and PVC) to allocate all the indirect costs to the several orders.

The size of the puzzle is the same as the size of the direct material used to manufacture the puzzle (there is no wastage of direct material).

The selling price is equal to the cost of goods manufactured plus a markup of 25% over that cost.

During the month of February, Jane worked in orders 101, 102 and 103 with the following characteristics:

	Puzzle 101	**Puzzle 102**	**Puzzle 103**
Wood used	1.5 m2 at 6 €/m2	-	-
PVC used	-	0.5 m2 at 18 €/m2	3.0 m2 at 18 €/m2
Other DM used	15 €	10 €	20 €
Drawing prepared by Jane	No	Yes	No
Nr of puzzle pieces	100	170	70

Assignment:

23.1) Knowing that the indirect costs are 400 €, calculate the cost of manufacturing each Puzzle.

After an analysis of the indirect costs, Jane concludes that they are incurred by four activities:

Activity	**Cost drivers**	**Amount**
Preparing draws	Number of Labour Hours	105 €
Painting of draws	Area (square meters)	50 €
Cutting the pieces	Number of pieces	170 €
Packing the puzzles	Number of puzzles manufactured	75€

23.2) According to Activity Based Costing, calculate the cost of goods manufactured of each order. Do you agree with how the current sales prices are calculated?

23.3) Given the available information, if Jane wants to use a single (blanket) overhead rate for allocating indirect costs, which would be your advice and why?

Problem 24: Lusitano Bank

The **Lusitano Bank** wants to do a profitability analysis of the **Premium accounts** of its clients.

The bank gets an annual 2% spread - i.e., the difference between the rate charged on loans (6%) and the rate paid to savers (4%) on their average balance deposited in the bank.

Each **Premium account** allows the free use of unlimited services, expressed in the table below.

Only the clients who have less that 1.000 € as average balance in their account in the bank, must pay 15 € monthly.

To calculate the cost of the services provided to clients the bank implemented activity-based costing.

Concerning the information of last year, we have the following data:

	Unit *cost driver*	Clients/nr of services provided		
		Almeida	**B**arbosa	**C**ardoso
Deposits made at the bank branch	1.80 €	40	30	5
Deposits made at the machines	0.60 €	10	20	30
Issue of chequebooks	6.00 €	12	4	2
Withdrawals in foreign currency	9.00 €	6	1	14
Information about the balance of account	0.75 €	12	24	8
Average monthly balance in the Premium account		1 200 €	800 €	25 000 €

The clients Almeida and Cardoso had always an average monthly balance above 1 000 € in their Premium account. However, Barbosa had an average monthly balance of less than 1 000 € in his account in ten months of the year.

Assignment:

24.1) Compute the return (profit) for the bank on the Premium accounts of each client. Comment your results.

Problem 25: M Company

The **M Company** performs the following activities creates sheets of materials, studies its productive capacities, improves the manufacturing processes, trains personnel and designs work tools.

The company had the following costs in these 5 activities:

Wages	75 000 €
Depreciation of the equipment	40 000 €
Other costs	10 000 €
Total	**125 000 €**

The equipment is used in 2 activities: to improve the manufacturing processes (35%) and to design work tools (65%).

Wages concern two engineers. One receives 50 000 € and the other 25 000 €. The engineer who earns 50 000 € spends 40% of her time training personnel and 60% improving the manufacturing processes. The other engineer spends equal time in all the activities.
The other costs are used as follows:

	%
To create sheets of materials	25%
To study the productive capacities	10%
To improve the manufacturing processes	20%
To train personnel	25%
To design work tools	20%

Assignment:

25.1) What is the cost assigned to the activity “Improve the manufacturing processes”?

A) 51 000 €

B) 46 000 €

C) 43 750 €

D) 25 000 €

E) None of the above

Answer:

Problem 26: LiquidAdub Company

The **LiquidAdub Company** produces a **liquid fertilizer**. The main direct material used in the manufacturing process is a liquid, which has normal losses during production. These losses can have either some value (a residual selling value or in other words, scrap value) or no value at all.

During the month of January, the direct materials that entered into the manufacturing process were 10 000 litres at a manufacturing cost of 100 000 €.

The opening and closing stocks are 0 €.

Assignment:

26.1) Calculate for each of the following five hypotheses:

A) The cost of goods manufactured per unit.

B) The P&L Account, knowing that the selling price is 30 €.

Hypothesis	**Direct Materials** (units)	**Production** (units)	**Normal losses** (units)	**Abnormal losses** (units)	**Abnormal gain** (units)	**Scrap value** (€/litre)
A	10 000	10 000	0	0	0	0 €
B	10 000	8 000	2 000	0	0	0 €
C	10 000	7 000	2 000	1 000	0	0 €
D	10 000	8 000	2 000	0	0	5 €
E	10 000	7 000	2 000	1 000	0	5 €

Problem 27: BoaPinga Company

The **BoaPinga Company** bottles wine, which is bought in the market. Concerning year N, we know the following information:

P&L prepared using Full Costing and Full Costing based on Practical Capacity

Description	A	B
1. Sales	3 000 000 €	3 000 000 €
2. Cost of sales + under-recovery of overheads	1 651 400 €	1 650 000 €
3. = 1 - 2	1 348 600 €	1 350 000 €
4. Selling costs		
Fixed	150 000 €	150 000 €
Variable	300 000 €	300 000 €
5. Administrative costs		
Fixed	140 000 €	140 000 €
6. Operational profit	**758 600 €**	**760 000 €**
7. Financial costs		
Fixed	150 000 €	150 000 €
8. Profit before taxes	**608 600 €**	**610 000 €**

Other information:

Sales	1 500 000 litres
Real Production	1 520 000 litres
Practical capacity of production	1 900 000 litres
Opening stock of finished goods	0 litres
Manufacturing costs:	
Variable	1 140 000 €
Fixed	532 000 €

Assignment:

27.1) Identify which cost accumulation system is used in each P&L above.

27.2) Justify and quantify the difference in profit before taxes (P.B.T) obtained with each cost accumulation system.

27.3) What is the P.B.T using variable costing? Explain the difference in P.B.T when compared with total full costing and full costing based on practical capacity.

27.4) Suppose now that the Company estimates an annual production of 1 600 000 litres and the expected manufacturing fixed costs are 496 000 €. What is the new P.B.T. if the company uses full costing based on budgeted activity?

Problem 28: Agricultural Fertilizers Co

Agricultural Fertilizers Co offers two products: Liquid Fertilizer and Grain Fertilizer. The major difference between these two products is the texture as the Grain Fertilizer is solid whereas the Liquid Fertilizer is liquid.

The Agricultural Fertilizers Co's plant is divided in the following homogeneous cost pools:

- **Preparation** (machine hours as the unit of work), where the direct materials are processed and separated
- **Assembly** (labour hours as the unit of work), where the fertilizers are turn into packages
- **Quality Control** (labour hours as the unit of work) which carries out specialised quality tests during the whole production process
- **Maintenance** (labour hours as the unit of work) which carries out specialised maintenance of the plant and its equipment
- **Cleaning** (labour hours as the unit of work) which cleans the plant

In the last month the Agricultural Fertilizers Co showed the following elements:

Consumption, production and sales (no opening inventories)

	Liquid Fertilizer	**Grain Fertilizer**
Direct materials consumption	37 500 €	42 250 €
Package consumption	4 200 €	3 300 €
Production	420 000 units	388 800 units
Sales	90% of the Production	90% of the Production
Selling price	0.5 €/unit	0.6 €/unit

Activities of the homogeneous cost pools:

Users	**Suppliers**				
	Preparation	**Assembly**	**Quality Control**	**Maintenance**	**Cleaning**
Preparation	-	-	20 Lh	10 Lh	40 Lh
Assembly	-	-	20 Lh	20 Lh	30 Lh
Cleaning	-	-		10 Lh	-
Maintenance	-	-	-	-	20 Lh
Quality Control	-	-	-	10 Lh	10 Lh
Liquid Fertilizer	100 Mh	400 Lh	-	-	-
Grain Fertilizer	100 Mh	1 100 Lh	-	-	-
Total	**200 Mh**	**1 500 Lh**	**40 Lh**	**50 Lh**	**100 Lh**

Costs directly assigned to each cost pool:

	Variable	**Fixed**	**Total**
Preparation	20 000 €	15 000 €	**35 000 €**
Assembly	30 000 €	20 000 €	**50 000 €**
Quality Control	2 000 €	5 000 €	**7 000 €**
Maintenance	1 000 €	3 000 €	**4 000 €**
Cleaning	0 €	4 000 €	**4 000 €**
Total	**53 000 €**	**47 000 €**	**100 000 €**

Assignment:

28.1) Calculate the profits before taxes (PBT) of each product assuming:

A) the Agricultural Fertilizers Co uses total full costing

B) the company uses variable costing

28.2) Justify the difference of PBT using full costing and variable costing.

Problem 29: Alfalinha Company

The **Alfalinha Company** prepared the following P&L Account by function for the month of January using variable costing:

	Amount
Sales	885 000 €
Cost of sales	265 500 €
Under-recovery of overheads	450 000 €
Administrative costs (fixed costs)	15 000 €
Selling costs	
Variable	35 400 €
Fixed	15 000 €
Operating profit	**104 100 €**

Additional information:

Selling price	75€ per ton
Real Production	12 000 tons
Practical Capacity	15 000 tons

- There is no opening inventory of finished goods.

Assignment:

29.1) What is the operating profit using full costing based on practical capacity?

29.2) Explain the difference in operating profit obtained using the two different cost accumulation systems.

29.3) Without preparing the P&L Account for the same period, determine the operating profit and the cost of sales using total full costing.

29.4) Calculate the break-even point and the safety margin, explaining their significance.

Problem 30: Smith Company

The **Smith Company** produces only one product. The following information is available for periods 1 and 2:

Unit selling price	20 €
Unit manufacturing variable cost	12 €
Manufacturing fixed costs per each period	300 €
Practical capacity production	150 units
Non-manufacturing costs	100 monetary units

	Period 1	**Period 2**
Units sold	100	150
Units produced	120	130

Assignment:

If the Smith Company uses variable costing, total full costing or full costing based on practical capacity:

30.1) Which is the COGM per unit in the two periods in each of these costing systems?

30.2) Which of these three costing systems generates a higher profit in P1? And in P2? Why? Calculate and explain the difference in profit in P1 and in P2 using all these three costing systems.

30.3) Considering the information on the table below, which of these costing systems generates a higher profit in P3? Again, calculate and explain the difference in profit in each period using all the three accumulation costing systems.

	Period 3
Units sold	130
Units produced	160

Problem 31: Alcoólica Company

The **Alcoólica Company** produces alcohol. Concerning the month of December, the company prepared the following P&L based on **variable costing system**:

Description	Amount
Sales	53 200 €
Cost of sales	19 760 €
Gross margin	**33 440 €**
Non-manufacturing variable costs	750 €
Contribution margin	**32 690 €**
Fixed costs:	
Under-recovery of overheads	7 500 €
Non-manufacturing costs	8 000 €
Operating profit	**17 190 €**

Other information:

Practical capacity production	2 500 Liters
Actual production	2 000 Liters
Sales	1 900 Liters

Assignment:

Given that the method of inventory valuation used by the company is the **LIFO**:

31.1) And without doing any calculations, compare the operating profit in the P&L above with the one obtained by using **total full costing system**.

31.2) Calculate the cost of goods manufactured and the operating profit using **full costing based on practical capacity**.

31.3) Knowing that the annual budgeted production is 23 400 Liters and that the expected annual manufacturing fixed costs are 93 600 €, prepare the P&L adopting full costing based on **budgeted activity**.

31.4) Calculate the break-even point.

31.5) Calculate the safety margin, explaining its significance.

31.6) Based on the break-even point concept and assuming that the sold units are 2 400 litres, determine the operating profit of the month.

Problem 32: Vertex, Ltd.

VERTEX, Ltd. produces products A and B. Revenues and expenses for April/year N were as follows:

	Production volume	**Sales volume**	**Selling price**
Product A	1 500 tonnes	1 200 tonnes	17.5 €/tonne
Product B	1 000 tonnes	950 tonnes	15 €/tonne

Manufacturing costs

- Total manufacturing fixed costs: 7 500 €
- Total manufacturing variable costs
  - Product A: 10 500 €
  - Product B: 4 500 €

Non-manufacturing costs

- Total non-manufacturing fixed costs: 5 250 €
- Total non-manufacturing variable costs
  - Product A: 2 400 €
  - Product B: 2 375 €

Assignment:

32.1) Assuming VERTEX adopts Variable Costing, prepare its Profit & Loss statement (by product) for April/N.

32.2) Calculate the breakeven point in units and euros for the whole company. How many units of product A and product B does VERTEX need to sell to breakeven? And what is the breakeven in euros for each product?

Problem 33: Solo, Ltd.

Solo, Ltd. makes and sells a single product. The following profit & loss account was prepared using Full Costing based on Practical Capacity and refer to January / year N:

	A
Sales Revenues	90 000 €
COGS + Under-recovery of overheads	40 500 €
Gross Profit	**49 500 €**
Selling and Administrative Expenses	
Variable	1 800 €
Fixed	31 000 €
Profit Before Taxes	**16 700 €**

Other information regarding January / year N:

- Selling price: 15 €/tonne
- Real production: 75% of practical capacity production
- Opening stocks: 1 000 tonnes
- Closing stocks: 2 500 tonnes
- The company adopts LIFO as the method of stock valuation
- 22 500 € of fixed manufacturing costs are included in COGM when using Full Cost based on Practical Capacity

Assignment:

33.1) Without doing the P&L according to Variable costing, explain the difference of profit before taxes between Variable costing and Full costing based on Practical capacity, using calculations.

33.2) Based on Cost-Volume-Profit (CVP) analysis, calculate the expected profit before taxes if the company sales are 12 000 tonnes (you should assume total manufacturing fixed costs are 22 500 € and manufacturing variable costs per unit is 3 €).

Problem 34: ZATA Company

The **ZATA Company** manufactures a single product. Concerning the month of November, we have the following information:

P & L Account prepared through **variable costing**

Description	Amount
Sales	210 000 €
Cost of sales	120 000 €
Gross profit	**90 000 €**
Non-manufacturing variable costs	18 000 €
Contribution margin	**72 000 €**
Manufacturing Fixed costs	60 000 €
Non-manufacturing Fixed costs	6 000 €
Operating profit	**6 000 €**

Additional information

- There are no opening stocks
- The unit sales price is 35 €
- The cost of sales determined using total full costing exceeds the cost of sales calculated using full costing based on practical capacity in 6 000 €
- The under-recovery of overheads in FCPC is 10 000 €.
- Actual (real) production lower than practical production by 2 000 units

Assignment:

34.1) Without doing any P&L, explain the difference in profits generated by total full costing and full costing based on practical activity.

34.2) Calculate the units of real production.

Problem 35: Vinho Espirituoso Company

The **Vinho Espirituoso Company** produces two different types of wine: **Abafadinho** and **Moscatel**. The Company prepared the following P&L Account by function for May adopting **variable costing**:

Description	Abafadinho	Moscatel	Total
Sales	120 960 €	130 200 €	**251 160 €**
Cost of sales	54 000 €	62 000 €	**116 000 €**
Gross profit	66 960 €	68 200 €	**135 160 €**
Non-manufacturing variable costs	5 760 €	3 410 €	**9 170 €**
Contribution margin	61 200 €	64 790 €	**125 990 €**
Fixed costs:			
Manufacturing			**74 400 €**
Non-manufacturing			**22 000 €**
Operating profit			**29 590 €**

Products movements:

	Abafadinho	Moscatel
Opening stocks	0	0
Production	72 000 litres	32 000 litres
Sales	72 000 litres	31 000 litres

Production based on practical capacity:

- 72 000 litres/month for the wine Abafadinho
- 40 000 litres/month for the wine Moscatel

The company is testing the impact on profit of a change in the cost accumulation system. The cost of goods manufactured per unit for each type of wine, using the total full costing system, is:

- Abafadinho: 1.25 €/litre
- Moscatel: 3.20 €/litre

Assignment:

35.1) Prepare the P&L Account using **full costing based on practical capacity**.

35.2) Drawing on the manufacturing fixed costs explain the difference in profits generated by the two different costing systems (variable and full costing based on practical activity).

35.3) Calculate the break-even point in units for each type of wine.

35.4) Assuming the same product mix and a sales volume of 300 000 €, calculate the new operating profit.

Problem 36: SoftGest Company

The **SoftGest Company** sells ZAPO software for sales management purposes. The company plans to sell at the beginning of next year the upgrade 5.0 of that software to two different customer segments - new and current clients who have already bought a license and previous upgrades. Prices and marketing variable costs will be different for each segment and as follows:

(amounts per unit)	New clients	Current clients
Selling price	320 €	180 €
Variable costs		
Manufacturing	38 €	38 €
Marketing	102 €	25 €
Unit contribution margin	**180 €**	**117 €**

If the SoftGest Company expects to sell 67 500 units of the upgrade 5.0 to new clients and 40 000 units to current clients and that total fixed costs amount to 14 609 375 €, you are required to:

Assignment:

36.1) Calculate the BEP in volume and in value for the whole company and for each customer segment.

36.2) What is the safety margin for SoftGest? Explain the meaning of your result.

36.3) Assuming the same product mix, what is the expected profit for SoftGest if total sales amount to 30 000 000 €?

Problem 37: SoMóveis

The **SoMóveis** company manufactures a single product – a rocking chair. Based on experience, the cost of wood used to make each rocking chair is estimated at 25 €.

Past results indicate that the cost of labour needed for each rocking chair is 30 € and the costs of the supplies is 5 €.

SoMóveis incurs variable selling and shipping costs of 20 € for each rocking chair sold. Fixed costs per year amount to 400 000 €. These costs relate to the depreciation of factory equipment and on the head office building. They include also the wages paid to production supervisors, sales managers and to the head office staff.

The company sells its rocking chairs for 300 € a piece.

***Assignment*:**

37.1) Indicate the profit equation for SoMóveis company.

37.2) Draw the CVP chart for the company, highlighting the revenue, total cost and profit associated with various levels of rocking chairs made and sold.

37.3) Compute the breakeven level of sales (in units and euros).

37.4) How many rocking chairs will have to be sold to earn a target profit of 20% of revenues.

37.5) Suppose that SoMóveis pays a tax rate of 30%. How many rocking chairs must be made and sold to generate a net profit of 100 000 €?

37.6) The sales manager at the SoMóveis believes that a 25 000 € advertising campaign will increase rocking chair sales by 5% over the current level of 3 000 units. Is this advertising campaign financially attractive?

37.7) Suppose that the company has expanded and, in addition to making rocking chairs, it is making a kitchen chair. The kitchen chair has variable costs totalling 60 € per chair and it sells for 200 € per chair. Fixed costs have increased to 624 000 € with the addition of the chair operations since the kitchen chairs required the acquisition of some new machinery and equipment and production supervisors. Assuming a target mix of 20% rocking chairs and 80% kitchen chairs:

A) Compute current profit for a total volume of sales of 6 000 units.

B) Calculate the BEP in volume and value for the company and for each type of chair.

C) What is the safety margin for the 6 000 units total volume of sales?

Problem 38: Great Travels

Great Travels owns a single jet aircraft, which operates between Lisbon and Cancun (Mexico). Flights leave Lisbon on Mondays and Thursdays and depart from Cancun on Wednesdays and Saturdays. Only tourist-class seats are available on its planes. An analyst has collected the following information:

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	14 000 € per flight
Food and beverage service cost (no charge to passenger)	20 € per passenger
Commission to travel agents paid by Great Travels	8% of fare
Fixed annual lease costs	11 024 000 €
Fixed annual ground services (maintenance, check in, baggage handling) costs	1 456 000 €
Fixed annual flight crew salaries	832 000 €

For simplicity, assume that fuel costs are unaffected by the actual number of passengers on a flight.

Assignment:

38.1) Prepare the annual profit & loss account by function of **Great Travels** using a contribution margin format.

38.2) How many flights **Great Travels** needs to perform to break even each year? And how many passengers per each of the 208 flights Great Travels needs to transport to break even?

38.3) Without preparing the P&L estimate profit if the company performs 80 flights in a year (assume the average number of passengers is 200).

38.4) The Market Research Department of **Great Travels** indicates that lowering the average one-way fare to 480 € will increase the average number of passengers per flight to 212. Without preparing the P&L and based on the concept of relevant costs and revenues advise the company about if it should lower the flights fare.

Problem 39: Fill the table

Assignment:

Fill in the **missing data** for each of the following independent cases (ignore income taxes):

	1	**2**	**3**	**4**
Sales revenues	55 000 €	?	160 000 €	?
Variable costs	11 000 €	60 000 €	?	120 000 €
Total contribution margin	?	?	30 000 €	240 000 €
Fixed costs	?	60 000 €	?	?
Operating profit	19 000 €	?	?	150 000 €
Break-even sales revenue	?	80 000 €	160 000 €	?

Problem 40: Estrelas de Alvalade

The **Estrelas de Alvalade**, a roller hockey team, play their weekly games at a stadium in Lisboa. The stadium holds 6 000 people and tickets sell for 20 € each. The team's management estimate that the team's annual fixed costs are 360 000 € and that the variable cost per ticket sold is 12 €.

***Assignment*:**

40.1) Draw a cost volume profit graph for the sports team. Label the axes, the break-even point, profit and losses areas, fixed costs, variable costs, total cost line and total revenue line.

40.2) If the stadium is two-thirds full for each game, how many games must the team to play to break even?

40.3) What is the safety margin if the team plays a 10-game season, and the team management expects the stadium to be 45 percent full for each game?

40.4) If the team plays a 10-game season and the stadium is 40 per cent full for each game, what ticket price would the team have to charge in order to break even?

Problem 41: SóRodas

The **SóRodas** is a bicycle shop that sells 24-speed racing bicycles. For the purposes of a cost volume profit analysis, the shop owner has divided sales into two categories, as follows:

Product type	Sales price	Invoice cost	Sales commission
Road bikes	1 000 €	550 €	50 €
Track bikes	600 €	270 €	30 €

Seventy per cent of the shop's sales are track bikes. The shop's annual fixed costs are 148 500 €.

***Assignment*:**

41.1) Calculate the unit contribution margin for each product type.

41.2) What is the shop's sales mix?

41.3) Calculate the weighted average unit contribution margin, assuming a constant sales mix.

41.4) What is the shop's break-even sales volume in euros? Assume a constant sales mix.

41.5) How many bicycles of each type must be sold to earn a target operating profit of 99 000€?

Problem 42: Sótintas Company

The **Sótintas Company** is specialized in the manufacturing of three kinds of white paint. Concerning the next quarter, we have the following estimates:

	Superior Quality	**Intermediate Quality**	**Low Quality**
Expected demand (units)	3 000	4 000	5 000
Selling price per unit	275 €	225 €	150 €
Variable cost per unit	185 €	165 €	100 €
Fixed costs allocated per unit	55 €	45 €	30 €
Total cost per unit	240 €	210 €	130 €
Profit per unit	35 €	15 €	20 €
Working hours required per unit	5 h	2.5 h	2 h

Estimated fixed costs were allocated to products on the assumption that the expected demand will be met by production. However, due to the damage of one machine, the capacity of production will be reduced to 30 000 hours in the next quarter.

***Assignment*:**

42.1) Based on the unit contribution of each type of white paint, the Company decided to only produce **Superior** and **Intermediate Quality** products in the next quarter. Assuming that none of the estimated fixed costs is avoidable, what will be the expected profit?

42.2) Now imagine that the Sótintas Company decided to also produce units of Low Quality to utilize the remaining available working hours. In this case, what will be the expected profit?

42.3) Based on the results you got in 2, was that a good decision? Why?

42.4) Calculate the product-mix that delivers the highest profit to the company given the capacity of production restriction. Explain your answer.

Note: Questions 1, 2 and 3 should be answered without preparing the P&L account.

Problem 43: Maxipesca Company

The **MaxiPesca Company** manufactures two types of **Fishing Rods**: Top and Low Cost. Due to a fisheries' international event the demand of rods increased significantly. Therefore, the Company doesn´t have enough labour hours to satisfy all demand.

The Company provides the following information:

	Top Fishing Rods	**Low-Cost Fishing Rods**
Demand (in units)	3 000	12 000
Unit selling price	8 €	4 €
Unit variable costs	2 €	1.5 €
Unit fixed costs	1.2 €	1.2 €
Number of direct labour hours needed to manufacture a unit of product	2 Lh	1 Lh

Note: Fixed costs were allocated to the products on the assumption that total demand will be met by production.

Assuming that direct labour is a fixed cost and totalling 5 000 €, which corresponds to 15 000 Lh**:**

Assignment:

43.1) Determine the Mix of production that maximizes the operating profit.

43.2) The Company could hire Direct Labour (variable cost) for 3 € per h. In this case, what will be the best mix of production?

43.3) The Company was contacted by a customer who needs a special Fishing Rod and who proposes to pay 24 € for it. To be able to produce this special rod, the company will have to incur in 7 € of variable costs and 6 h of Direct labour. What is the relevant cost of this special rod, knowing that the Company can hire direct labour at 3 € per h?

Problem 44: Danoly

Danoly is a company that manufactures 3 products: Milk, Natural Yoghurt and Fruit Yoghurt. The company is divided in 3 profit centres, each producing one product. Until now, each division must satisfy the internal demand before it can satisfy the demand from the external market. **The selling price for internal or external demand is the same**.

Two units of milk are needed to produce one unit of natural yoghurt, and one unit of natural yoghurt is needed to produce one unit of fruit yoghurt.

The expected Profit & Loss Account for next year is as follow:

	Milk	**Natural yoghurt**	**Fruit yoghurt**
Sales	400 000 €	200 000 €	350 000 €
Direct materials			
Gross milk	200 000 €	-	-
Milk	-	100 000 €	-
Natural yoghurt	-	-	200 000 €
Fruit	-	-	20 000 €
Other variable costs	150 000 €	20 000 €	80 000 €
Contribution margin	**50 000 €**	**80 000 €**	**50 000 €**
Fixed costs	30 000 €	20 000 €	10 000 €
EBT	**20 000 €**	**60 000 €**	**40 000 €**

Other information:

	Milk	**Natural yoghurt**	**Fruit yoghurt**
External Demand (units)	300 000	100 000	50 000
Internal Demand (units)	100 000	50 000	0
Installed capacity (units)	500 000	50 000	100 000
Used capacity	**80%**	**100%**	**50%**
Market selling price per unit	1 €	4 €	7 €
No. of machine hours per unit produced	**1**	**3**	**2**

However, due to the damage of a machine (used to produce all the 3 products), the capacity of production will have to be reduced to 200 000 Machine hours (Mh).

***Assignment*:**

44.1) Which product mix will maximize the profit for the company as a whole? What is the expected contribution margin?

44.2) Imagine now that the company could repair/fix the machine on time of the production for next year and the installed capacity available is the one mentioned in Table B. The Natural yoghurt division receives a special order for a new client that is willing to pay 50 500 € for it. This order requires 20 000 units of milk and 23 000 € of other variable costs. If the division accepts this special order, it will reduce the production of natural yoghurt in 5 000 units.

Do you think that the Company as a whole, should accept this special order? Show your supporting calculations.

Problem 45: Safety & Cheap Airlines

Safety&Cheap Airlines operates 35 scheduled roundtrips flights each week between Rome and Paris. It charges a fixed one-way fare of 200 € per passenger. Safety&Cheap Airlines can carry 150 passengers per one-way flight. Fuel and other flight-related costs are 5 000 € per one-way flight. On-flight meal and refreshment costs average 5 € per passenger. Flight crew, ground crew, advertising, and other administrative expenditures for the Rome-to-Paris route amount to 400 000 € each week.

***Assignment*:**

45.1) Assuming the load factor is 60% on all flights (that is, the flights are 60% full), and that Safety & Cheap Airlines adopts Variable Costing prepare a weekly profit and loss account.

45.2) How many passengers must each of the 70 one-way flights have on average to break even each week?

Problem 46: Armazéns Populares

Armazéns Populares, a chain of retail stores, sells books and music CDs. Condensed monthly profit data are presented below for November.

	City Stores	Mall Stores	Total
Sales	240 000 €	360 000 €	**600 000 €**
Variable costs	96 000 €	252 000 €	**348 000 €**
Contribution margin	**144 000 €**	**108 000 €**	**252 000 €**
Fixed costs	60 000 €	120 000 €	**180 000 €**
Operating profit	**84 000 €**	**- 12 000 €**	**72 000 €**

Additional information:

- Management estimates that closing the mall stores would result in a 10 per cent decrease in city store sales, while closing the city stores would not affect mall store sales.
- One-quarter of each store's fixed costs would continue until 31 December next year if either store were closed.
- The operating results for November are typical of all months.

***Assignment*:**

46.1) Calculate the increase or decrease in Armazéns Populares' monthly operating profit during the forthcoming year if the mall stores are closed.

46.2) The management of Armazéns Populares are considering a promotional campaign at the mall stores that would not affect the city stores. Annual promotional costs at the mall stores would be increased by 180 000 €, spread equally over 12 months, to increase mall store sales by 10 per cent. What would be the effect of this promotional campaign on the company's monthly operating profit during the forthcoming year?

46.3) One-half of the mall stores' euros sales are from items sold at their variable cost to attract customers to the store. Armazéns Populares' management are considering the deletion of these items, a move that would reduce the mall stores' direct fixed costs by 15 per cent and result in the loss of 20 per cent of the mall stores' remaining sales volume. This change would not affect the city stores. What would be the effect on Armazéns Populares' monthly operating profit if the items sold at their variable costs were discontinued?

Problem 47: Few Hours and Many Orders Company

The **Few Hours and Many Orders Company** manufactures three products: A, B and C. Concerning next year the information is as follows:

Description	**Product A**	**Product B**	**Product C**
Quantity demanded	1 000	2 000	1 500
Selling price per unit	15 €	50 €	67 €
Variable cost per unit	7 €	16 €	25 €
Fixed cost per unit (including depreciation of machinery)	5 €	15 €	20 €
Mh used per unit manufactured	1	4	4

The company has currently 10 machines, each with a capacity of 1 000 Mh per year. The lack of satisfaction of the demand for any product has no impact on future demand of these products.

Assignment:

Assuming that the main objective of the company is to maximize profits:

47.1) What must be the mix of production chosen? Justify your answer.

47.2) What would be the new mix of production if the company can rent additional machines for an annual cost of 9 800 € per machine?

47.3) A customer placed an order to the company, willing to pay 27 500 € for it. The order involves the consumption of the following resources:

- 2 000 Mh
- Additional variable costs of 8 000 €.

Should the company accept this order? Assume that the company can reduce its current production to meet this order (and that additional machines cannot be rented).

Problem 48: The Auto Hoje Company

The Auto Hoje Company manufactures and sells various cars components. As the company suspects that it is not very competitive in the manufacturing of component Z1, it decided to consult one of its suppliers to produce component Z1 on an outsourcing basis. The company currently produces **10 000 units** per year of component Z1, and the costs of production are given in the following table:

	10 000 units of Z1
Direct materials	120 000 €
Direct labour costs (variable cost)	100 000 €
Other variable conversion costs	10 000 €
Fixed manufacturing costs	80 000 €
Fixed administrative costs	50 000 €
Total costs	360 000 €

The supplier has made an offer to produce 10 000 units of component Z1 at a guaranteed unit price of 30 € per unit. If the option is outsourcing, **Auto Hoje** will be able to reduce its fixed manufacturing costs in 10 000 €, but fixed non-manufacturing costs will remain unchanged.

***Assignment*:**

48.1) Indicate whether the company should make or buy component Z1, knowing that there is no alternative use for the installed capacity required to manufacture this component.

48.2) Assume now that you can use the installed capacity to produce 10 000 units of product P, which unit selling price is 32 €. The fixed and variable costs remain unchanged, except for direct materials that must be replaced by another one, which unit cost is 13 €. In this case, which decision should be made by the company?

Problem 49: Depressa&Bem Industries

Depressa&Bem Industries manufactures control units that are used in high-speed production systems such as pulp and paper manufacturing. The company has two major products: the XR244 and the XR276. Henriqueta, the sales manager at Depressa&Bem, is preparing a production plan for the upcoming year and is evaluating a new product opportunity. She is currently studying the following information provided by the finance group at Depressa&Bem industries:

	XR244	**XR276**
Selling price	785 €	955 €
Unit variable costs	305.5 €	386.75 €
Maximum sales (units)	10 000 units	15 000 units
Machine hours (per unit)	2.5 Mh	3 Mh

In recent years the sales mix has been 40% XR244 and 60% XR276 and Henriqueta is wondering, given that XR276 is more profitable, whether a better production mix would include more sales of the XR276.

Depressa&Bem industries has 48 000 machine hours available for the production of these two products. A conversation with the plant accountant suggests to Henriqueta that about 65% of product costs vary with the level of production and that Depressa&Bem's total fixed costs amount to 7 500 000 €.

As she was considering these opportunities, Henriqueta received an e-mail from a customer offering to buy 2 000 units of a specialty product that would sell for 1 200 € per unit, have a variable cost of 533 € per unit, and would require 3.5 hours per unit of production time to produce.

Assignment:

49.1) Calculate how many units of each product would Henriqueta have to sell to break even given the 40/60 mix.

49.2) What is the maximum number of units she can sell given the machine hours constraint that she faces and given the 40/60 sales mix? What is the profit at that sales level?

49.3) Is there a better product mix that the 40/60 split?

49.4) Should Henriqueta accept the offer and, if so, what would be the resulting production levels and profit?

Problem 50: Mecanex Company

The **Mecanex Company** is considering the possibility of adding a new product to the actual portfolio.

For next year, the expected sales of the new product are 10 000 units. Each unit requires 6 kg of direct material. Right now, the Company has 40 000 kgs in stock, which were bought at 2.40 €/kg. The existing stock is the result of excessive shopping from a previous contract. The current (actual) unit purchasing price of direct material is 2.60 €/kg. If the company wants to sell this direct material, the price it will get is only 1.80 €/kg.

Assignment:

50.1) What is the relevant cost of the direct material?

Problem 51: Canoex Company

The **Canoex Company** was contacted by a client to repair one of his boats. To accept this work, the Company must use specialized labour who earns 8 € per hour. The repair work of the boat requires 240 hours of direct labour, and the specialized workers will have to be removed from the production of canoes. Each canoe requires 12 h of direct labour to be produced and the selling price of each canoe is 240 €. The sheet cost of each canoe is:

	Cost per Canoe
Direct materials	40 €
Direct labour (variable cost)	96 €
Variable manufacturing overhead	20 €
Fixed manufacturing overhead*	60 €
Total cost	**216 €**

Assignment:

51.1) What is the relevant cost of the direct labour for this repair?

** Allocated based on the assumption that the entire demand will be met.*

Problem 52: Industrial Company

Industrial Company, specialized in producing building insulation, must decide if it accepts to do a new project, which lasts for one year, with very specific requirements in terms of labour and materials required.

With respect to labour, this project requires 4 specialized workers, which can be hired outside the Company at an annual cost of 60 000 € per worker. The supervision of these workers will be done by a manager who works already at the Company and earns 90 000 € per year. The new project requires 10% of the manager time. Alternatively, the company can train existing workers, each of whom earns 45 000 € per year. The total training cost is 22 500 €. If these employees are assigned to the new project, they will have to be replaced by others at a total cost of 150 000 €.

With respect to materials, you can find the relevant information below:

Materials

	Units needed	**Units in stock**	**Original purchasing price**	**Realizable value (if sold)**	**Current purchasing price**
L	800	-	-	-	20 €
M	460	200	31 €	25 €	32 €
N	700	400	24 €	11.5 €	29.5 €
P	340	280	11.5 €	6 €	24.5 €
Q	240	240	20 €	-	34 €

- Material M is used in other products and the stock must be replaced.
- The quantities of the materials N, P and Q which are currently in stock, result from previous excess purchases.
- Material N has no alternative use, but material P can be used to replace 450 units of material R that is purchased at 5,00 € per unit.
- Material Q has no alternative use, and the Company was informed that it will have to incur in a cost of 160 € to remove the materials from the factory.

Assignment:

52.1) Calculate the relevant cost of the direct labour associated to this new project.

52.2) Calculate the relevant cost of the materials associated to this new project.

Problem 53: The Imaginária Company

The following information concerning **The Imaginária Company** is available:

Balance Sheet on April 1

ASSETS	
Noncurrent Assets	
Vehicles	42 000 €
Buildings	500 000 €
Equipment	124 000 €
Accumulated depreciation	- 100 900 €
Current Assets	
Direct materials inventory*	?
Finished goods inventory**	?
Debtors (Receivables from clients)	24 698.4 €
Cash (includes deposits in banks)	4 790 €
TOTAL ASSETS	**?**
EQUITY	?
LIABILITIES	
Creditors (Payables to suppliers)	5 535 €
State (VAT)	3 583.4 €
TOTAL EQUITY AND LIABILITIES	**?**

** 100 units*
*** 110 units of product A*

Expected movements in inventories from April to June

Units	**April**	**May**	**June**
Sales	84	96	94
Production	75	90	90
Purchases of Direct Materials	95	85	85

Expected conversion costs from April to June

	April	**May**	**June**
Variable (65 €/unit)	4 875 €	5 850 €	5 850 €
Fixed (excluding depreciation)	1 200 €	1 200 €	1 200 €

Direct materials usage: 1 unit of direct material per 1 unit of production.

Other relevant information:

- The company supports VAT on direct materials purchases at a rate of 23% and charges VAT on sales at the same rate. The difference between VAT charged to customers and VAT paid to suppliers in February and March amounts to 2 226.4 € and 1 357 €, respectively. These amounts should be paid to State according to the payment terms of 2 months.
- The company has negotiated a loan of 110 000 € with its bank; this amount will be credited in the deposit account of the company next June 1 and will bear annual interest payments at an interest rate of 7.5% per annum.
- Suppliers' payment terms: 1 month* after the acquisition
- Sales collection period: 2 months
- Conversion costs are paid in the same month they are incurred
- February sales + VAT = 11 906.4 €; March sales + VAT = 12 792 €
- March direct materials purchase + VAT= 5 535 €
- Planned materials' purchase price: 45 € per unit
- Planned selling price: 219 € per unit
- Next June the company will have to purchase and pay for a new equipment which costs 112 000 €
- Depreciation expense in the 3 months, including the new equipment: 14 424 €

When preparing the budget, it is assumed that the units in inventory at the beginning of the budgeting period are valued at the same value considered to prepare the budget.

Assignment:

Assuming that The Imaginária Company uses the **Total Full Costing** system, prepare:

53.1) The monthly Sales Budget.

53.2) The budgeted monthly stock levels (in units).

53.3) Direct materials purchase budget.

53.4) The budget of the cost of goods manufactured (for the whole three-months period).

53.5) The monthly Cash Budget.

53.6) The monthly Financial Budget.

53.7) The P&L Account for the three-months period and the budgeted Balance Sheet on June 30.

** Assume all months have 30 days*

Problem 54: StrictuSensus Company

The **StrictuSensus Company** is preparing the annual budget for year N. As such, the following elements are available:

Sales budget for year N

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Sales	800 000 €	1 000 000 €	900 000 €	1 610 000 €

Partial Cash Budget for year N:

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Receipts				
- Sales of year N-1	375 000 €	0 €	0 €	0 €
- Sales of year N				
Payments				
- Purchases of materials	220 000 €	295 000 €	295 000 €	341 000 €
- Other payments	125 000 €	100 000 €	100 000 €	126 000 €
- Wages	450 000 €	450 000 €	450 000 €	536 000 €
- Taxes	50 000 €	-	-	-
- Purchase of a machine	-	-	-	100 000 €

- The company expects to have 75 000 € in Cash at 01/01/N
- Cash at the end of each quarter will have to be 75 000 €
- Sales collection period: 1.5 months
- If needed, the Company can borrow funds from the bank (loans) at the first day of each quarter. The interest rate in the loans is 2% per quarter*.
- If sources of funds exceed uses of funds, the excess will be used to reimburse the funds borrowed from the bank at the first day of the quarter.
- If the company still has funds after reimbursing loans, it can make a short-term financial investment in the beginning of quarter. Banks offer an annual interest rate of 2% and pay interests in the beginning of the following quarter.
- Payment of interests will be done in the first day of the subsequent quarter.

Assignment:

Determine:

54.1) The value of Sales in the budgeted P&L.

54.2) The value of Receivables from Clients in the budgeted Balance Sheet at 31/12/year N.

54.3) The value of the financial investment and loan in the budgeted Balance Sheet at 31/12/year N.

54.4) Financial costs and revenues of each quarter in the budgeted P&L.

** You should assume that all months have 30 days.*

Problem 55: Industrex da Beira Litoral Company

Concerning the **Industrex da Beira Litoral Company,** we have the following elements regarding the first quarter of the year:

Balance Sheet on January 1st

ASSETS	
Noncurrent Assets	282 550 €
Current Assets	
Direct materials inventory	2 160 €
Finished goods inventory	0 €
Receivables (from Clients)*	11 119.2 €
Cash	3 395 €
TOTAL ASSETS	**299 224.2 €**
EQUITY	**295 967.3** €
LIABILITIES	
Suppliers	1 168.5 €
State (VAT)**	2 088.4 €
TOTAL EQUITY and LIABILITIES	**299 224.2 €**

** 4 723.2 € from sales occurred in the second half of November and 6 396 € from sales occurred in December of previous year.*

*** 1 329.4 € from VAT of November and 759 € from VAT of December of previous year.*

The expected manufacturing costs determined through Variable Costing System:

	January	**February**	**March**	**Total**
Materials used	1 575 €	1 710 €	2 025 €	**5 310 €**
Variable conversion costs	1 225 €	1 330 €	1 575 €	**4 130 €**
Total Cost	**2 800 €**	**3 040 €**	**3 600 €**	**9 440 €**
Unit Cost	80 €	80 €	80 €	**-**

The expected fixed costs:

	January	**February**	**March**	**Total**
Depreciation	500 €	500 €	500 €	**1 500 €**
Wages	2 500 €	2 500 €	2 500 €	**7 500 €**
Other manufacturing costs	500 €	500 €	500 €	**1 500 €**
Total	**3 500 €**	**3 500 €**	**3 500 €**	**10 500 €**

Financial information:

- Sales collection period: 1.5 months*
- Suppliers' payment period: 15 days
- The remaining costs are paid in cash
- Cash in the end of each month will have to be 5 000 €
- The Company can borrow funds (loans) in the first day of each month.
- The interest rate of the loans is 2%/month.
- If sources of funds exceed uses of funds, the excess will be used to repay the loans.
- Payment of interests will be done in the first day of the subsequent month.
- The difference between VAT charged to customers and VAT paid to suppliers should be calculated in the end of each month and paid to State according to the payment terms of 2 months.
- Variable and fixed conversion costs are paid in the same month they occur.

The expected movements in stocks:

Units	**January**	**February**	**March**	**Total**
Sales	30 un	32 un	40 un	**102 un**
Production	35 un	38 un	45 un	**118 un**
Purchase of materials	40 un	40 un	42 un	**122 un**

Assignment:

Knowing that the selling price is 220 € per unit, the purchasing price per unit of material is 45 €, and that the company charges VAT on sales at a rate of 23% and supports VAT on direct materials purchases at the same rate prepare for the first quarter:

55.1) The monthly Cash Budget.

55.2) The monthly financial budget.

55.3) The budgeted P&L Account by function for the first quarter.

55.4) The budgeted Balance Sheet on March 31.

Note: Assume the company adopts Variable Costing.

** You should assume that all months have 30 days.*

Problem 56: OrçamentaBem Company

The **OrçamentaBem Company** is preparing its budget for the first quarter.
For this purpose, the following elements have been already prepared:

Sales budget*

	January	**February**	**March**
Product P	9 225 €	9 532.5 €	9 840 €

Direct materials purchase budget*

	January	**February**	**March**
Material M	2 706 €	3 075 €	3 444 €

** Includes VAT at a rate of 23%*

Cash Budget

	January	**February**	**March**
RECEIPTS			
Sales previous year	8 610 €	-	-
Sales current year			
Total Receipts			
PAYMENTS			
Purchases DM previous year	1 599 €	2 460 €	-
Purchases DM current year			
VAT of previous year	1 081 €	1 150 €	-
VAT of current year			
Other payments	6 100 €	6 650 €	6 030 €
Total Payments			
Monthly Balance			

Other information:

- Sales collection period: 1 month**
- Suppliers' payment period: 2 months
- Opening cash in January is 1 750 €
- Cash at the end of each month should be 1 500 €
- If needed, the Company can borrow funds in the first day of each month.
- The interest rate of loans is 1%/month.

- If sources of funds exceed uses of funds, the excess will be used to repay the loans in the beginning of the month, in case they exist, or otherwise to make a short-term financial investment in the beginning of the month.
- Assume that the bank offers an interest rate of 0.5% per month for financial applications.
- Interests are paid in the beginning of the subsequent month of the financial application. Financial applications can be sold whenever the company needs funds.
- Payment of interests related to bank loans will be done in the first day of the subsequent month.
- The company calculates the difference between VAT charged to customers and VAT supported in direct materials' purchases on a monthly basis.
- Payment terms to State (VAT) = 60 days.
- The reimbursement of financial investments is done on the first day of the month

Assignment:

56.1) Complete the cash budget for the quarter.

56.2) Prepare the financial budget for the quarter.

56.3) Indicate the amount of Financial Costs and Revenues in the budgeted P&L.

*** You should assume that all months have 30 days.*

Problem 57: Bright, Ltd

Bright, Ltd. manufactures product X in department P. Its cash budget for November and December year N-1 are as follows:

	November	December	Balance Sheet	Collection / Payment Period
Receipts				
Sales	150 000 €	165 000 €	147 000 €	30 days
Total receipts	**150 000 €**	**165 000 €**	**147 000 €**	
Payments				
Purchases	54 000 €	55 000 €	52 500 €	30 days
Conversion costs				
Variable costs	42 000 €	41 600 €	19 600 €	15 days
Fixed costs	32 000 €	32 000 €	64 000 €	60 days
Selling costs	5 250 €	5 200 €	2 450 €	15 days
Total Payments	**133 250 €**	**133 800 €**		
Cash Balance	**+ 16 750 €**	**+ 31 200 €**		

Financial Information

- Opening cash in November/year N-1 is expected to be 7 500 €. Cash at the end of November and December/year N-1 should be 12 000 €
- In 1/November/N-2 the company obtained a long-term loan of 300 000 € for a period of 5 years. The loan bears annual payments of capital of 60 000 € and interest (starting at 1/November/N-1). The annual interest rate is 2%
- The company can borrow funds (short-term loans) at the first day of each month at an annual interest rate of 10%. If source of funds exceeds uses of funds, the excess can be used to repay the short-term loans, in case they exist, or otherwise to make a short-term financial investment (annual interest rate: 1%)
- Payment of interests related to short-term loans occurs in the beginning of the subsequent month. Likewise, interests of financial investments are received in the subsequent month of the financial application

Other information

- Stocks of direct materials
  - Opening stocks 1/November/N-1: 100 units
  - Closing stocks 31/December/N-1: 90 units
- The expected price of each purchased unit is 50 €
- Variable conversion costs in October/N-1 are 40 000 €
- Depreciation expenses (all related to department P) are 11 500 € / month
- Fixed conversion costs are constant throughout the year
- The company adopts Total Full Costing

Assignment:

57.1) Present the Financial Budget for November and December/year N-1.

57.2) Calculate the following items:

A) Consumption (in euros) of direct materials in the two-months period (November/ December year N-1).

B) Conversion costs to include in the COGM of the two-months period (November/December year N-1).

C) Based on the whole information provided in the case indicate items and respective amounts to be included in the Balance Sheet on December 31, year N-1.

Problem 58: Boston Company

Boston Company, a merchadising firm that sells one product, estimates it will sell 12 000 units of its product at 60 € per unit in December/year N. Other relevant information for preparing December budget is provided below:

Merchandise inventory, December 1	2 000 units
Desired merchandise inventory for December 31	3 000 units
Cost per unit of merchandise purchases	40 €
Selling and administrative expenses for December	200 000 €
Opening cash, December 1	30 000 €
Desired closing cash, December 31	50 000 €

Additional information

- The company estimates that 60% of each month's sales are collected in the month of sale and that the remaining 40% is collected in the month after sale.
- The company pays for half of merchandise purchases during the month of purchase and pays for the remainder during the month following purchase.
- The 200 000 € of selling and administrative expenses includes 40 000 € of depreciation.
- Selling and administrative expenses are paid in January/year N+1.
- On September 1, year N the company has received a (long-term) loan of 200 000 € from its bank. The loan bears annual interest payments (with the following interest payment scheduled for September 1, year N+1) at an interest rate of 4% per annum.
- If needed, the company can borrow funds from the bank (sort-term loan) at the beginning of December (interest rate: 5% per annum, to be paid in the following month).
- The company has negotiated with its bank the possibility of making a financial investment at the beginning of the month in case of excess of funds. Interests are paid in the beginning of January/year N+1 at an annual interest rate of 2%;
- The company estimates a positive cash balance of 172 000 € for December/year N.

Assignment:

58.1) Prepare the Financial Budget for December/year N for Boston Company.

58.2) Present the budgeted Profit and Loss account for December/year.

58.3) Based on the information provided indicate all items and amounts to be considered in the Balance Sheet at December 31, year N.

Problem 59: Fill the Blanks

Assignment:

59.1) Fill in the missing amounts in the following schedules:

Accumulated depreciation, 31/12/year N-1	405 000 €
Depreciation expense during year N	75 000 €
Accumulated depreciation, 31/12/year N	**(A)**
Retained earnings, 31/12/year N-1	1 537 500 €
Net profit for year N	300 000 €
Dividends paid in year N	0 €
Retained earnings, 31/12/year N	**(B)**
Accounts receivable, 31/12/year N-1	1 700 000 €
Credit sales during year N	4 500 000 €
Collections of accounts receivable during year N	3 900 000 €
Accounts receivable, 31/12/year N	**(C)**
Accounts payable, 31/12/year N-1	600 000 €
Purchase of goods and services on credit during year N	2 400 000 €
Payment of accounts payable during year N	**(D)**
Accounts payable, 31/12/year N	800 000 €

Sales Budget:

	July N	**August N**	**September N**
Sales	240 000 €	**(E)**	**(F)**

Cash Budget:

Cash receipts:	**July N**	**August N**	**September N**
From cash sales	**(G)**	**(I)**	135 000 €
From credit sales	**(H)**	102 000 €	**(J)**

Sales collection policy

- Half of each month's sales are on credit (the remaining half relates to cash sales). June sales were 180 000 €.
- 60% of credit sales are collected in the month of the sales; 40% are collected in the following month.

Problem 60: Beautiful Dress

Beautiful Dress is a women's clothing retailer. The following information relates to its activity in November and December of year N:

- Sales were budgeted at 54 000 € for November/N and 40 000 € for December/N. Sales in January/N+1 are expected to be 45 000 €.
- Collections are expected to be 70% in the month of sale and 30% per cent in the month following the sale.
- The gross margin is budgeted at 30% of sales.
- Merchandise is purchased on credit and payable in the following month.
- 70% of the merchandise is purchased in the month prior to the month of sale, and 30% is purchased in the month of sale.
- Other expenses, which are paid in the month they incur, were budgeted for November and December at 8 120 € and 20 300 €, respectively. These expenses include depreciation on shop fixtures and fittings budgeted at 3 600 € per month.

Budgeted balance sheet on October 31st, year N:

Assets:	
Cash	4 400 €
Accounts receivable (1)	15 200 €
Inventory	26 460 €
Fixtures and fittings	173 940 €
Total Assets	**220 000 €**
Liabilities and Owners' Equity:	
Accounts payable (2)	37 100 €
Owners' equity	182 900 €
Total Liabilities and Owners' Equity	**220 000 €**

(1) From sales budgeted for October / year N.
(2) From purchases budgeted for October / year N.

Assignment:

60.1) Prepare the cash budget for November and December / N for Beautiful Dress retailer, indicating the value to consider in the accounts receivable and accounts payable in the Balance Sheet on December 31, year N.

60.2) Compute the Cost of Goods Sold of November and December / year N and the inventory value at the end of year N.

Problem 61: Adams Company

Adams Company, a merchandising firm that sells one product, estimates it will sell 12 000 units of its product at 60 € per unit in December. In November, the company prepared other information to prepare a budget for December, as shown below:

Merchandise inventory, December 1	2 000 units
Desired merchandise inventory for December 31	3 000 units
Cost per unit of merchandise purchases	40 €
Selling and administrative expenses	200 000 €
November sales	60 000 units

Additional information

- The company estimates that 60% of each month's sales are collected in the month of sale and that the remaining 40% is collected in the month after sale.
- The 200 000 € of selling and administrative expenses includes 40 000 € of depreciation
- The company pays for half of merchandise purchases during the month of purchase and pays the remainder during the month following purchase. Estimated merchandise purchases for November are 340 000 €.
- All other out-of-pocket expenses are paid for in cash.

Assignment:

61.1) How many units of merchandise will Adams budget to purchase in December? What is the euro amount of Adams' budgeted merchandise purchases for December?

61.2) Prepare a budgeted profit and loss account for the month ended December for Adams Company.

61.3) Prepare the operating cash budget for the month ended December for Adam Company.

Problem 62: Consultex Company

The **Consultex Company** is a consulting company. Its controller prepared the following document about variance analysis, which highlights that actual results were lower than expected in almost 18 000 €.

Variance Analysis

	Static Budget	**Actual P&L**	**Actual - Static**
Nr of hours sold	1 200	1 100	
Average selling price per hour	100 €	90 €	
Revenues	120 000 €	99 000 €	- 21 000 € A
DL hours	1 200	1 150	
Average wage rate	40 €	38.5 €	
DL Cost	48 000 €	44 275 €	3 725 € F
Transport variable costs: = 5% of revenues	6 000 €	5 200 €	800 € F
Fixed indirect costs	35 000 €	36 500 €	1 500 € A
Total costs	89 000 €	85 975 €	3 025 € F
Operating profit	31 000 €	13 025 €	- 17 975 € A

Assignment:

62.1) Which information can the reader of this document get, and which is its main limitation?

62.2) Prepare a report with the relevant information regarding variance analysis of the Consultex Co. Explain.

Problem 63: Max Company

Max Company has developed the following standards for one of its products:

Direct materials	15 Kg at 16 €/Kg
Direct labour	4 hours at 24 €/hour
Variable overhead	4 hours at 14 €/hour

The following activities occurred during the month of October:

Materials purchased (and used)	7 200 Kg at 17 €/Kg
Units produced	500 units
Direct labour	2 300 hours at 23.60 €/hour
Actual variable overhead	30 000 €

The company records materials price variances at the time of purchase.

Assignment:

63.1) Compute Max's variable standard cost per unit.

63.2) Determine the following variances:

A) materials price variance.

B) materials usage variance.

C) labour rate variance.

D) labour efficiency variance.

Problem 64: Taxis PéLigeiro

The **Taxis PéLigeiro Company** operates a fleet of Taxis. Below you can find information about the Company's activity regarding July:

Expected activity for July:

- Expected sales of 40 000 km at a selling price of 1€ per km.
- According to past experience, to be able to charge 1 km to the client the taxi driver must drive 2.5 km.
- 10 Taxi Drivers for July.
- The expected costs are as follows:
    - Wages per Taxi Driver: 1 000 €/month
    - Fuel: 0.08 €/km
    - Variable overhead: 0.05 €/km
    - Fixed overhead:9 000 €/month

Note: Direct labour is a fixed cost.

Actual information regarding July:

- The revenues are 36 100 € generated by 38 000 kms charged to clients.
- During the month, the taxis drove 105 000 kms.
- Real costs:
    - Wages: 9 600 € (for 9 taxi drivers)
    - Fuel: 8 820 €
    - Variable overhead: 5 040 €
    - Fixed overhead: 9 300 €

Assignment:

64.1) Determine the variance between actual and expected profit.

64.2) Calculate the following variances based on the **flexible budget**:

A) Sales margin volume variance

B) Sales price variance

C) Direct material price variance

D) Direct material usage variance

E) Variable overhead price variance

F) Variable overhead efficiency variance

G) Fixed costs variance

64.3) Comment the variances calculated before, identifying possible causes for them.

Problem 65: ABC, Ltd

Consider the following information for company **ABC, Ltd** in May/year N:

	Actual	Flex Budget	Static Budget
Sales Revenues	9 000 units at 90 € = 810 000 €	?	?
Direct Materials			
• M1	?	?	20 000 Kg at 10 € = 200 000 €
• M2	141 400 €	135 000 €	150 000 €
Direct Labour	?	?	30 000 h at 9 € = 270 000 €
Variable Overheads	?	?	?
Contribution Margin	134 000 €	180 000 €	?

Additional information:

- Budgeted sales volume is 10 000 units
- Sales margin price variance: 18 000 € Favorable
- Materials usage variance for material M1: 10 000 € Adverse
- Materials price variance for material M1: 19 000 € Adverse
- Wage rate variance: 17 100 € Adverse
- Actual wage rate is 9.60 €/hour
- Manufacturing overheads are charged to production on the basis of direct labour hours (DLH). The budgeted overhead rate is 2 € / DLH
- Variable overhead efficiency variance: 3 000 € Adverse
- Variable overhead expenditure variance: 5 000 € Favourable
- Sales margin volume variance: 20 000 € Adverse
- The company uses a standard variable costing system

Assignment:

65.1) Fill in the missing data.

65.2) Present the reconcilliation of budgted and actual contribution margin.

Problem 66: Sector Industrial Company

Sector Industrial Company is a manufacturing company that produces product A. The standard cost of one unit of Product A is as follows:

- Direct Materials: 4 kgs at 0.75 € per kg
- Direct Labour: 2 hours at 1.60 € per hour

Actual information about December:

Direct labour hours	74 000 hours
Production	38 000 units
Direct materials used	157 000 kg
Cost of the used materials	109 500 €
Direct labour cost	136 500 €

Assignment:

66.1) Compute the following variances:

A) material's price variance

B) direct labour's efficiency variance

Recently, Sector Industrial acquired a small firm that manufactures product B. Before the acquisition, the P&L below was provided. The expected production and sales were 10 000 units whereas the real production and sales were 9 000 units.

P&L	**Budget**	**Actual**
Sales	**800 000 €**	**756 000 €**
Direct materials costs	100 000 €	96 000 €
Direct labour costs (variable cost)	180 000 €	184 000 €
Variable manufacturing overheads	120 000 €	104 000 €
Fixed manufacturing overheads	240 000 €	232 000 €
Total Costs	**640 000 €**	**616 000 €**
Profit	**160 000 €**	**140 000 €**

Assignment:

66.2) Compute the following variances with respect to product B:

A) sales price variance

B) sales margin volume variance

Problem 67: Happy Company

Happy Company sells product A. During the month of January, the General Manager congratulated the 3 managers of the company, because, even in crisis times, actual profit was higher in 1% compared with the expected profit in the static budget, i.e., (3 030 – 3 000)/3 000 = + 1%.

Actual and static budget P&Ls for January were as follows:

	Actual P&L	**Budget P&L**
Sales	13 500 €	10 000 €
Direct Materials	5 100 €	3 000 €
Conversion Costs	3 360 €	2 000 €
Contribution Margin	**5 040 €**	**5 000 €**
Fixed Costs	2 010 €	2 000 €
Operating profit	**3 030 €**	**3 000 €**

Other available information:

- The expected quantity of sales was 1 000 units
- The actual unit selling price was 9 €
- The Direct Materials Cost (Price) Variance was 0 €
- The actual relationship between the usage (efficiency) of the resource and its purchasing price is the same as the expected relationship in the static budget
- The expected unit cost of conversion costs was 4 €
- The Conversion Cost Efficiency Variance is unfavourable in 200 €

***Assignment*:**

67.1) Determine the sales margin volume variance (show your calculations).

67.2) Based on the information available, would you congratulate the Purchasing Manager? What about the Production Manager? Justify your answer with values and explain them.

67.3) What is the actual unit cost of the conversion costs? Show your calculations.

Problem 68: Fast & Safe Transport Ltd.

Fast & Safe Transport Ltd., a haulage contractor, operates a variable standard costing system and has prepared the following reconciliation of budgeted and actual profits for December, year N:

Budgeted contribution margin	**24 000 €**
Sales variances	
Sales margin price	3 560 € Favourable
Sales margin volume	880 € Adverse
Direct cost variances:	
Direct labour:	
Wage rate	1 086 € Favourable
Labour efficiency	933.33 € Favourable
Fuel	
Fuel price	420 € Adverse
Fuel usage	693.33 € Adverse
Variable Overhead	
Expenditure	?
Efficiency	700 € Favourable
Actual contribution margin	**28 566 €**

The company uses delivery miles as its cost unit. The following details have been taken from the budget for December, year N:

- Expected activity: 200 000 delivery miles
- Charge to customers: 0.3 € per delivery mile
- Expected variable cost per delivery mile:
  - Direct labour: 0.02 hours at 4 €/hour
  - Fuel: 0.1 litres at 0.4 €/litre
  - Variable overhead: 0.02 hours at 3 €/hour

The following additional information has been determined from the actual records for December, year N:

- Fuel price: 0.42 €/litre
- Direct labour hours: 3 620 hours

***Assignment*:**

Calculate for December, year N:

68.1) The actual number of delivery miles

68.2) The actual number of litres of fuel consumed

68.3) The actual variable overhead expenditure.

Problem 69: Moa Bem Company

The **Moa Bem Company** manufactures **Flour**, which is sold in Bags of 50 Kg each. The following information was made available.

Expected contribution margin for January:

Description		Amount
Sales	200 Bags at 50 € Each	10 000 €
Cost of sales:		
Wheat	12 ton. at 250 €/ton	3 000 €
Paper Bags	220 kg. at 1 €/kg	220 €
Variable conversion costs	1 500 Mh at 3 €/Mh	4 500 €
Total contribution margin		**2 280 €**

Actual information for the month of January:

- Sold 180 Bags of 50 kg. at 55 €/bag
- Used 9.9 ton. of Wheat, at 260 €/ton
- Used 198 kg. of Paper Bags at 1.10 €/kg
- The variable conversion costs were 4 788 € and corresponded to 1 368 Mh

Assignment:

Determine:

69.1) Sales price variance

69.2) Wheat usage variance

69.3) Conversion costs price (rate) variance

69.4) Conversion costs efficiency variance

Problem 70: JOC Company

The CFO of **JOC Company** prepared a report of the variance analysis of last year. However, a fire destroyed most of the information prepared, leaving only available the following elements:

Part of the variance analysis report:

P&L	Actual	Flexible Budget	Static Budget	Variance (Actual – Static Budget)
Sales			8 000 €	0 €
Variable costs: Materials Conversion costs			2 000 €	
Contribution margin	4 400 €			
Fixed costs	3 200 €			
Profit	1 200 €	200 €		200 €

Other information:

- The materials price variance is favourable in 400 €.
- The variance between the actual value spent and the flexible budget of the materials is 0 €.
- The sales margin volume variance is unfavourable in 800 €.

Other information:

	Actual	**Expected**
Sales (units)	800	1 000
Purchasing price of materials per unit		1 €
Price of conversion costs per unit		2 €

Assignment:

Determine:

70.1) The actual selling price.

70.2) The actual units of used materials.

70.3) The expected units of variable conversion costs.

70.4) The expected fixed costs.

Problem 71: The ATLANTIDA Company

The **ATLANTIDA Company** manufactures 2 Products: A and B. The expected information for next period is as follows:

	Prod A	**Prod B**
Units	100	200
Selling price	2 €	3.5 €
Unit contribution	1 €	1.3 €

At the end of the budget period, the company presented the following (actual) information:

	Prod A	**Prod B**
Units	80	240
Unit sale price	1.8 €	4 €
Unit contribution	0.9 €	1.4 €

71.1) The sales margin mix variance was:

A) 8 € unfavourable

B) 8 € favourable

C) 40 € unfavourable

D) 60 € favourable

Answer:

Problem 72: Perfect Glass, Ltd

PerfectGlass, Ltd. sells two models of wine glasses - 'Model Chic' and 'Model Home'. PerfectGlass provided the following information for sales in the month of June, year N:

Static-budget total contribution margin	5 600 €
Budgted units to be sold of all glasses in June, year N	2 000 units
Budgeted contribution margin per unit of Chic	2 €/unit
Budgeted contribution margin per unit of Home	6 €/unit
Sales yied (quantity) variance for Home	600 € Adverse
Actual sales-mix percentage of Chic	60%

Assignment:

Regarding June, year N:

72.1) Calculate the Sales margin volume variance for Chic and Home.

72.2) Split the sales margin volume variance into sales margin mix variance and sales yield (quantity) variance for each of the two products. How do you explain the sales margin volume variance?

Appendix 1: Glossary of terms in Portuguese

English	Portuguese
Absorption or full costing system	Sistema de custeio total
Break-even point	Ponto crítico das vendas
Capital charge on the investment	Custo implícito do investimento
Cash budget	Orçamento de tesouraria
Contribution margin	Margem de contribuição
Conversion costs	Custos de transformação (MOD + GGF)
Cost drivers (ABC)	Geradores de custo
Cost of goods sold (COGS)	Custo industrial da Produção Vendida (CIPV)
Cost of the goods manufactured (CGM)	Custo industrial da Produção Acabada (CIPA)
Decisions with capacity constraints	Decisões sobre recursos limitados
Direct labour (DL)	Mão de obra direta
Direct materials variance	Desvio de matérias diretas
Financial budget	Orçamento financeiro
Finished goods	Produtos acabados
Fixed overhead expenditure variance	Desvio de Gastos Gerais fixos (ou desvio de custos fixos)
Flexible budget	Orçamento flexível ou orçamento ajustado
Full costing based on budgeted activity	Sistema de custeio com base em quota teórica
Full costing based on practical capacity	Sistema de custeio total racional (SCTR)
Homogeneous Cost Pool Method	Método das Secções Homogéneas
Production cost pools (or cost centres)	Secções industriais principais
Service cost pools (or cost centres)	Secções auxiliares

Reallocation to production cost centres of the costs assigned to service cost centres	Reembolsos
Direct allocation method	Método de distribuição direta
Sequential allocation method	Método de distribuição sequencial
Repeated distribution / simultaneous equation method	Método das prestações recíprocas
Job costing system	Método de custeio por obra (associado ao regime de produção descontínua)
Labour variance	Desvio de mão-de-obra direta
Manufacturing costs	Custos industriais
Manufacturing Costs (incurred in a period) or Production Costs	Custo industrial da produção num determinado período (CIP)
Manufacturing overhead (MO)	Gastos gerais de fabrico (GGF)
Margin of Safety	Margem de segurança
Overhead costs	Custos indiretos ou gastos gerais
Practical capacity	Capacidade normal
Process costing system	Método de custeio por processo (associado ao regime de produção contínua)
Production budget expressed in quantities	Programa de produção
Profit & Loss Account by function	Demonstração de resultados por funções
Replacement cost	Custo de substituição
Responsibility centres	Centros de responsabilidade
Sales margin mix variance	Desvio do mix de vendas com base na margem de contribuição
Sales margin quantity variance	Desvio de quantidades nas vendas com base na margem de contribuição
Sales margin volume variance	Desvio da margem de contribuição

Sales price variance	Desvio do preço de venda
Sales variance	Desvio de vendas
Single overhead rate	Base de imputação única
Spare capacity	Capacidade instalada excedentária
Standard cost	Custo padrão
Static budget	Orçamento estático
Sunk cost	Custo afundado
Total Full Costing	Sistema de custeio total completo (SCTC)
Transfer price	Preço de transferência interna (PTI)
Under-recovery of overheads	Custos industriais não incorporados (CINI)
Unit contribution margin	Margem de contribuição unitária
Variable costing	Sistema de custeio variável (SCV)
Variable overhead variance	Desvio de gastos gerais variáveis
Variance analysis	Análise de desvios
Work-in-progress	Produtos em vias de fabrico