Absorption Costing

Why Absorption Costing?

A Factory producing different products needs to know:

1) What is the cost of operating each cost centre / department?
2) What is the cost of each of the products manufactured?
3) What prices shall be charged to each product?

Features of Absorption Costing

1) All Overheads (Variable and Fixed) are included to calculate total cost of the product
2) Fixed costs are included so that its costs can be recovered from customers
3) Absorption costing is acceptable by IAS 2 for inventory valuation in external reporting

Limitations of Absorption Costing

1) Difficulty in comparison and control of cost
2) Not helpful in managerial decisions
3) Cost modified because of fixed cost included in inventory valuation
4) Fixed cost inclusion in cost not justified
5) Apportionment of fixed overheads by arbitrary methods
6) Not helpful for preparation of flexible budget

Example (Inventory Valuation Marginal v Absorption Costing)

Unit Cost Card

Direct Material	10
Direct Labor	10
Direct Expenses	10
Prime Cost	**30**
Add: Variable Production Overheads	5
Variable Production Costs	**35**
Add: Fixed Production Overheads	10
Full Production Cost	**45**
Add: Non Production Overheads	5
Total Cost / Unit	**50**

Steps in Absorption Costing

1) Overhead **Allocation**
(Directly allocate costs to departments to which they are related)

2) Overhead **Apportionment**
(Divide common / joint / shared costs amongst all departments that use them)

3) Overhead **Re-Apportionment**
(Move overhead from service departments to production departments)

4) Overhead **Absorption**
(Absorb overheads to products using some activity)

Cost Center
A Cost centre is a production or service location, activity or equipment, individual for which costs are determined.

Production Cost Center
are cost centre that are directly involved in production activities. E.g. cutting, painting, molding, finishing, pressing, shaping, welding, binding etc

Service Cost Center
are cost center that are not directly involve in production else they indirectly support the production process. E.g. canteen, maintenance, stores, personnel dept etc

Cost Unit
is a unit of product or service to which costs can be attached e.g. cost / unit / kg / liter / km etc. it is a unit which absorbs the cost center's costs.

Overhead	Basis of Apportionment
Building related expenses like rent, rates, cleaning, heating, lighting, repairs, depreciation and insurance of building	Cost / Book Value of Buildings or Floor Area
Employee related costs like canteen, supervision, personnel, medical and welfare costs	No of workers / employees / Hrs
Machine related costs such as repairs, depreciation , insurance	Cost / Book Value of Machines / Machine Hrs
Store related costs	No / Value of stores requisitions
Power / Electricity costs	Kilo watt hours / power usage
Maintenance costs	Maint hours / maint calls / value of assets

Overhead Absorption

$$OAR = \frac{\text{Budgeted Overhead}}{\text{Budgeted Activity}}$$

Budgeted Activity ?

Single Product = No of Units
Multiple Products = No of Hrs
Labour Intensive = No of Labour Hrs
Machine / Capital Intensive = No of Machine Hrs

Other Basis for Absorption (last resort)

As a %age of Direct Material Costs
As a %age of Direct Labour Costs (Recommended in Costs)
As a %age of Prime Costs etc

OAR = Budgeted Overhead x 100 (If base is also in $ / Costs)
Budgeted Activity

Single / Blanket / Factory Wide Rate
When only one OAR (Overhead absorption rate) is calculated for whole factory. Used normally when we have only one product and all departments contribute almost equally in producing the product.

Departmental / Specific Rates
When separate rates are calculated for each department. Used normally when we have multiple products and departments spend different time in producing the products.

Advantages of Departmental Rates

- Facilitates better control as dept managers are responsible for the costs in their departments
- Cost per unit and in total are more accurate
- Profit markup and selling price is more realistic

Disadvantages of Departmental Rates

- Basis selected for absorption may not be a true reflection of costs actually incurred
- The Departmental managers may not have a significant role in overhead apportionment

Actual v Predetermined Absorption Rates
Overhead absorption rates can be calculated based on budgeted or actual figures.

Advantages of Predetermined Rates

- Enable Overheads to be absorbed immediately after production
- Make it easier to estimate per unit or total cost of the job
- Fluctuations in unit costs can be smoothed out if activity is uneven

Why Actual Overhead Absorption Rates are not used?

- Actual costs and activity may not be known until the end of the period
- Fluctuation In activity may cause fluctuations in costs

Over / Under Absorption of Overheads

Over / Under
Absorption = Actual Overhead Incurred -- Amount Absorbed

Amount Absorbed = OAR x Actual Activity

Reasons for Over / Under Absorption of Overheads

1) Difference between budgeted and actual Overheads
2) Difference between budgeted and actual Activity
3) A Combination of both

Over Absorbed means **more** overhead have been charged than **actual** incurred.This ariseswhen **actual overhead** is **less than budgeted** and **actual activity** is **more than budgeted.**

Under Absorbed means **less** overhead have been charged than **actual** incurred. This arises when **actual overhead** is **more than budgeted** and **actual activity** is **less than budgeted.**

Job Order Costing

Job costing is used by organizations which manufacture products or render services against specific requirements by customers. E.g. designer and builders, accounting and law firms, vehicle repair shops

Features

- It is possible to physically identify each job separately
- Each job has a short duration
- Production is for customer's order and not for our inventory
- Each job is unique and need special treatment
- Each job is assigned a separate number
- A Separate job cost card is maintained to record costs relating to each job

Batch Costing

A batch is a cost unit which consists of a group of identical items. Batch costing is a variant of job costing which is used when a batch of units are manufactured at each time.

Examples of industries using batch costing are garments and shoe manufacture, spare parts and components, cakes etc

Overheads and Absorption Costing

Q1. Wigmore Ltd uses one factory overhead recovery rate which is a percentage of total direct labour costs. The rate is calculated from the following budgeted data.

Department	Factory overheads $	Direct labour costs $	Direct labour hours	Direct machine hours
Production	150 000	500 000	120 000	7 000
Assembly	450 000	1 000 000	225 000	10 000
Packing	360 000	900 000	200 000	–

The cost sheet for job 787 shows the following information.

Department	Direct labour costs $	Direct labour hours	Direct machine hours	Direct material costs $
Production	2 400	400	80	180
Assembly	1 100	700	90	150
Packing	1 000	650	–	170

General administration expenses of 20% are added to the total factory cost. The selling price to the customer is based on a 25% net profit margin.

REQUIRED

(a) Calculate the current factory overhead rate for Wigmore Ltd.

(b) Prepare a detailed cost statement to calculate the selling price for job 787.

(c) Calculate the overhead rate for **each department** using the following methods:

(i) Percentage of direct labour cost

(ii) Direct labour hour rate

(d) Using the direct labour hour rates calculated in **(c) (ii)**, prepare a detailed cost statement to calculate the new selling price for job 787.

(e) **(i)** Discuss the problems associated with using predetermined overhead absorption rates.

(ii) State the effect on profits if the factory **does not** operate at full capacity.

Q2. Winston Ltd had estimated the following factory indirect costs for its financial year ended 30 April 2012.

	$
Indirect wages	2 120 000
Repairs and maintenance of machinery	410 000
Rent and rates	53 000
Machinery insurance	24 000
Premises insurance	28 000
Electricity – power	48 000
Depreciation of machinery	14 000
Consumables	21 150

The company calculated a suitable overhead absorption rate for each of its two production departments using the following information.

	Production departments		Service departments	
	Machining	Assembly	Maintenance	Canteen
Machine cost ($)	617 500	332 500	–	–
Direct machine hours	202 500	22 500	–	–
Direct labour hours	55 500	314 500	–	–
Floor area (square metres)	9 000	8 000	2 000	1 000
Power usage (%)	55	35	5	5
Number of employees	70	104	16	10
Consumables ($)	9 550	9 800	550	1 250

The proportion of work done by each service department was:

	Machining	Assembly	Maintenance
Canteen (%)	35	60	5
Maintenance (%)	80	20	–

REQUIRED

(a) Complete the following table to calculate the total overheads for **each** production cost centre.

Cost	Basis	Machining	Assembly	Maintenance	Canteen

(b) Calculate the appropriate overhead absorption rate for each production department.

The actual results for the year ended 30 April 2012 were as follows:

	Machining	Assembly
Factory indirect costs ($)	1 410 000	1 312 000
Direct machine hours	195 000	21 000
Direct labour hours	57 000	318 000

REQUIRED

(c) Calculate the amount of overhead which would be over or under-absorbed by each production department.

(d) Explain how the results in **(c)** could have occurred.

(e) Explain the problems associated with using predetermined overhead absorption rates in calculating the price of a product.

Q3. Tattersall Ltd manufactures a single product. They have two production and two service departments.

The following information relates to a four-week period.

	Production Departments		**Service Departments**	
	Machining	Assembly	Maintenance	Canteen
Overheads	$143 500	$154 700	$165 800	$176 900
Direct machine hours	18 845	14 050	–	–
Direct labour hours	6 065	20 350	–	–

The service departments' overheads are apportioned to the production departments on the following basis:

	Machining	Assembly	Canteen
Maintenance	60%	30%	10%
Canteen	40%	60%	–

REQUIRED

(a) Prepare an overhead absorption apportionment table clearly showing the reapportionment of the service departments' overheads to the appropriate departments for one period.

(b) Calculate the overhead absorption rate for **each** production department.

State the bases used.

Show your answer to **two** decimal places.

The manager of Tattersall Ltd calculates selling price per unit based on full cost plus a 25% mark-up.

The costs per unit are:

Materials	3 metres at $4 per metre
Labour	7 hours at $8 per hour

Each unit takes 3 hours in the machining department and 4 hours in the assembly department.
All overheads are fixed.

REQUIRED

(c) Calculate the full cost per unit.

(d) Calculate the selling price per unit.

Q4. Mandar Limited manufactures components for the agricultural industry. The following budgeted information is available for the year ended 30 April 2009.

		$	$
Direct materials			2 300 000
Direct labour:			
Cutting department	(76 000 hours)	501 600	
Pressing department	(72 000 hours)	450 000	
Production department	(104 000 hours)	702 000	
Assembly department	(44 000 hours)	264 000	
			1 917 600
Prime cost			4 217 600
Factory overheads:			
Cutting department		364 800	
Pressing department		439 200	
Production department		509 600	
Assembly department		233 200	
			1 546 800
Cost of production			5 764 400
Administration costs			1 152 880
Total costs			6 917 280

Additional information

1 Factory overheads are absorbed by departmental direct labour hours.

2 Administration costs are absorbed as a percentage of the cost of production.

REQUIRED

(a) Calculate the following for **each** department.

(i) The budgeted direct labour cost per hour.

(ii) The budgeted factory overhead absorption rate per direct labour hour.

Mandar Limited has received a request for some components, Job Number SMC20.

The following direct costs have been estimated.

	$	$
Direct materials		140 156
Direct labour:		
Cutting department	13 200	
Pressing department	9 000	
Production department	16 200	
Assembly department	6 000	
		44 400
Prime cost		184 556

The direct labour costs are based on budgeted hourly rates.

REQUIRED

(b) Prepare a detailed statement showing the total cost of Job Number SMC20.

(c) The selling price of Mandar Limited's components is cost plus 25%.

Calculate the selling price of Job Number SMC20.

(d) Explain why Mandar Limited absorbs its overheads using direct labour hours.

(e) State **two** alternative methods the business could use to absorb their overheads.

Q5. Newstead Furniture Ltd produces **three** types of wooden bench – single-seat, two-seat and three-seat. These are manufactured in two departments, Assembly and Finishing. There are also two service departments, Canteen and Maintenance.

Estimated data for the year ended 31 December 2007 is as follows:

	Single-seat	Two-seat	Three-seat
	$	$	$
Unit selling price	80	100	120
Unit production costs			
Direct materials	18	25	28
Direct labour – Assembly	20	13	14
Direct labour – Finishing	3	4	5
Estimated production in units	12 000	10 000	5 000
Machine hours per unit	2	3	4

Estimated overheads for the year ending 31 December 2007 are as follows:

	Assembly	Finishing	Maintenance	Canteen	Total
	$	$	$	$	$
Space costs					55 000
Depreciation of Equipment					120 000
Allocated Overheads	28 100	30 200	9 400	11 000	78 700
					253 700

Additional information:

Floor area (square metres)	3 000	3 800	2 000	2 200
Number of employees	10	9	6	5
Cost of equipment	$175 000	$200 000	$100 000	$125 000

REQUIRED

(a) Use the table below to prepare an overhead analysis sheet for the year ending 31 December 2007 detailing overheads for the Assembly and Finishing departments. Canteen costs are shared amongst all other departments on the basis of the number of employees. Maintenance costs are shared between the Assembly and Finishing departments on the basis of 60 % Assembly and 40 % Finishing.

Newstead Furniture Ltd	Assembly	Finishing	Maintenance	Canteen
	$	$	$	$
Allocated overheads	.....	.....	.....	.....
Space costs	.....	.....	.....	.....
Depreciation	.....	.....	.....	.....
Canteen	.....	.....	.....	.....
Maintenance	.....	.....	.....	.....
Total	.....	.....	.....	.....

(b) Calculate, correct to **two** decimal places, the overhead recovery rate for:

(i) the Assembly department, based on direct wages;

(ii) the Finishing department, based on machine hours.

(c) State the reason for using different methods of calculating the overhead recovery rate in **(b)**.

(d) Calculate, to **two** decimal places, the total cost of **one** two-seat bench.

Q6. Argon is a manufacturing business divided into three separate departments, machining, finishing and stores.

The total estimated costs for the three months ending 31 October 2013 are as follows:

	$
Depreciation of plant	6 000
Lighting and heating	4 500
Plant insurance	4 800
Rent	18 000
Supervision	25 000

The following information is available for the three departments:

	Machining	Finishing	Stores
Floor area (sq metres)	5000	4500	500
Number of employees	12	8	5
Value of plant ($000's)	86	8	2
Number of orders from Stores	3600	1480	-
Budgeted machine hours	4250	820	-
Budgeted direct labour hours	1200	4950	-

REQUIRED

(a) (i) Apportion the costs to the **three** departments using the most suitable basis. Clearly state the basis you have used.

(ii) Re-apportion stores costs to each production department on the basis of the number of orders.

(b) Calculate **to two decimal places** the forecast overhead absorption rate for the machining and finishing departments for the three months ending 31 October 2013.

Actual figures for the three months ended 31 October 2013 are:

	Machining	Finishing
Direct labour hours	1 430	5 000
Machine hours	6 000	805
Overheads incurred	$48 340	$22 780

REQUIRED

(c) Calculate the amount of overhead absorbed for each production department for the **three** months ended 31 October 2013.

(d) Calculate the amount of under **or** over absorption for each production department.

(e) Explain what is meant by over and under absorption of overheads and how each will arise.

Q7. Tellwright Limited started trading on 1 January 2015. It produced two products, the Mynor and the Hanbridge. After three months of trading the following information was available.

	Mynor	Hanbridge
Units produced	800	600
Units sold	700	400
Direct materials per unit	2 kilos at $6 per kilo	3 kilos at $5 per kilo
Direct labour per unit	4 hours at $9 per hour	4.5 hours at $10 per hour
Selling price per unit	$90	$120

REQUIRED

(a) Complete the following table to show the **total** direct cost incurred for **each** product in the three month period ended 31 March 2015.

	Mynor $	Hanbridge $
Direct materials		
Direct labour		
Total		

[4]

Additional information

In addition to the two production departments there was also a sales and administration department.

Data relating to the three departments were as follows.

	Mynor	Hanbridge	Sales and administration
Floor area (square metres)	2500	2000	500
Power usage (kilowatt hour)	12000	15000	3000
Non-current assets (cost at start of trading)	$9000	$8000	$3000

Following information is also available.

1 The factory supervisor is paid $23 600 a year. His time is spent in proportion to the direct labour hours worked in each production department.

2 The lease specifies that the rent is $50 000 a year.

3 The invoice for power used in the first three months of trading amounted to $6000.

4 Depreciation is charged at a rate of 20% per annum on cost.

5 Sales and administration costs amounted to $13 550 for the three months. These are regarded as fixed costs by the business.

6 No inventory of raw materials is kept.

7 Inventory of finished goods is valued on the basis of absorption cost.

REQUIRED

(b) Complete the following table to value inventory by allocating overhead costs across the three departments for the three months ended 31 March 2015. (Where there is no allocated cost enter a zero.)

	Total $	Mynor $	Hanbridge $	Sales and administration $
Supervisor's salary				
Rent				
Power				
Depreciation				
Sales and administration				
Total				

[7]

(c) Complete the following table to show the value of inventory of **each** product at 31 March 2015.

	Mynor $	Hanbridge $
Value per unit		
Number of units in inventory		
Total value of inventory		

[6]

(d) Prepare the manufacturing account for the three months ended 31 March 2015.

(e) Prepare the income statement for the three months ended 31 March 2015.

Q8. Chester Limited manufactures clothing. The work takes place in three production departments – cutting, sewing and finishing. In addition, the business has two service departments – stores and maintenance.

The budgeted overheads for the year ending 31 March 2014 were as follows:

	$
Indirect wages	185 400
Rent and rates	38 500
Power	32 600
Light and heat	18 800
Machine depreciation	73 700
Buildings insurance	18 200

	Cutting	Sewing	Finishing	Stores	Maintenance
Number of indirect employees	3	5	3	4	5
Floor space (square metres)	5 000	6 000	3 000	3 000	4 000
Net book value of machinery ($)	86 000	64 000	12 000	-	5 000
Machine hours	40 000	50 000	4 000	-	-
Direct labour hours	84 000	22 000	56 000	-	-
Raw material issues	75%	17.5%	2.5%	-	5%

Chester Limited uses a single overhead rate to absorb all overheads on a direct labour hour basis.

REQUIRED

(a) State **one** advantage and **one** disadvantage to Chester Limited of using a single overhead absorption rate.

(b) Calculate, correct to **two** decimal places, the overhead absorption rate for the year ending 31 March 2014.

Additional information

The directors of Chester Limited are considering changing the basis for recovering overheads to calculate a separate overhead absorption rate for each production department.

REQUIRED

(c) Apportion the costs to the five departments and re-apportion the service departments' costs to production departments using a suitable basis.

(d) Calculate, correct to **two** decimal places, appropriate overhead absorption rates for **each** production department.

Additional information

The actual results for the year were as follows:

	Cutting	Sewing	Finishing
Factory overheads	$168 180	$146 320	$51 870
Direct labour hours	85 200	20 950	58 140
Direct machine hours	42 330	52 450	4 280

REQUIRED

(e) Calculate the under- or over-absorption of overheads for **each** production department.

(f) Manufacturing businesses classify costs by function. State **three** functional groups of costs.

Q9. Highlander Limited has two production departments, Machining and Assembling, and one service department, Maintenance.

The following estimates had been made for year 1.

Annual budgeted information

	Machining	Assembling	Maintenance	Total
Number of employees	160	120	120	400
Floor area (square metres)	7 000	5 000	4 000	16 000
Power (kilowatt hours)	70 000	52 500	17 500	140 000
Direct machine hours	14 000	400	-	14 400
Direct labour hours	1 000	6 000	-	7 000
	$	$	$	$
Indirect material	300	268	320	888
Indirect wages	2 720	1 480	860	5 060
Value of machinery	52 000	48 000	-	100 000

Annual budgeted overheads

	$
Rent	12 800
Machinery depreciation	10 000
Power	7 200
Supervision of employees	6 400
Indirect materials	888
Indirect labour	5 060
Total overheads	42 348

REQUIRED

(a) Apportion the budgeted overheads to the three departments and re-apportion the maintenance department costs to the two production departments on the basis of the value of machinery.

Additional information

The Machining department overhead absorption rate is applied on a machine hour basis.
The Assembling department overhead absorption rate is applied on a direct labour hour basis.

REQUIRED

(b) Calculate overhead absorption rates for each of the **two** production departments.
Calculations should be to **two** decimal places.

Additional information

The following information relates to Job 68 which was completed during year 1.

	Machining	Assembling
	$	$
Direct materials	3 500	100
Direct labour	500	1 400
Machine hours	100	10
Direct labour hours	20	60

REQUIRED

(c) (i) Prepare a statement to show the total cost of Job 68.
Clearly identify the prime cost and the total overhead cost.

(ii) Calculate the selling price of Job 68 if the profit margin is 20% of selling price.
Round-up your answer to the nearest whole number.

Additional information

At the end of year 1 the **estimated** cost figures were compared with the **actual** cost figures.

Machining department

Indirect wages amounted to $2020 and not the $2720 estimated.

Assembling department

Actual direct labour hours used in the department totalled 5570 hours and not the 6000 hours estimated.

REQUIRED

(d) Explain the meaning of the following terms. Illustrate your answer by reference to the additional information and, where appropriate, your answer to part **(b)**.

(i) Overhead over absorption

(ii) Overhead under absorption