**Foreword**

This resource material was developed to provide teachers with examples of graded assignments for reference and is by no means exhaustive. Teachers are advised to adapt the materials according to the diverse learning needs of students if deemed necessary.

Graded Assignment 5: Marginal and Absorption Costing

Elementary Level – Question Paper

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|  | | |
| Peter Company commenced business on 1 January 2019 to produce a special type of headphone, ‘B20’. The estimated fixed production overheads were $160,000 and would be allocated on the basis of production units. The estimated production and sales units for the year were 20,000. The actual production and actual sales units for 2019 were 24,000 units and 23,000 units respectively. Other actual data for 2019 was as follows: | | |
|  | $ per unit |
| Selling price | 28 |
| Direct materials | 5 |
| Direct labour | 4 |
| Variable production overheads | 3 |
| Variable selling overheads | 1 |
|  | $ |
| Fixed production overheads | 108,000 |
| Fixed selling overheads | 9,000 |
| Fixed administrative overheads | 17,000 |

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| **REQUIRED:** | |
| (a) | Prepare an income statement for the year ended 31 December 2019 using absorption costing.  (8 marks) |
| (b) | Prepare an income statement for the year ended 31 December 2019 using marginal costing.  (7 marks) |
| (c) | Based on your answers in (a) and (b) above, explain the reason for the difference in the value of ending inventory under the two costing methods and discuss the impact of this difference on the reported net profits in 2019. (3 marks) |
|  | (Total: 18 marks) |

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| Graded Assignment 5: Marginal and Absorption Costing  Elementary Level – Student Worksheet |  |

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| (a) | Peter Company  Income Statement for the year ended 31 December 2019 (under absorption costing) | | | |  |
|  |  | | $’000 | $’000 |
|  | Sales *(Selling price×Actual sales units)* ($ \_\_\_\_\_× \_\_\_\_\_\_\_\_units) | | |  |
|  | Less: | Cost of goods sold |  |  |
|  | \*Cost per unit x Actual production units | Direct materials \*($ \_\_\_\_\_× \_\_\_\_\_\_\_\_units) |  |  |
|  |  | Add: Direct labour\* ($ \_\_\_\_\_× \_\_\_\_\_\_\_\_units) |  |  |
|  |  | Add: Variable production overheads\*  ($ \_\_\_\_\_× \_\_\_\_\_\_\_\_units) |  |  |
|  |  | Add: Fixed production overheads absorbed (Working 1) |  |  |
|  |  |  |  |  |
|  |  | Less: Closing inventory (Working 2) |  |  |
|  |  |  |  |  |
|  |  | \_\_\_\_\_: \_\_\_\_\_\_\_\_\_\_\_\_-absorbed production overheads (Working 3) |  |  |
|  |  |  |  |  |
|  | Gross profit | |  |  |
|  | Less: | Selling overheads (Working 4) |  |  |
|  |  | Administrative overheads |  |  |
|  | Net profit | |  |  |

Working 1

Under absorption costing, predetermined fixed production overhead absorption rate is adopted to allocate the fixed production overheads to the production:

*Predetermined fixed production overhead absorption rate*

*= Estimated fixed production overheads ÷ Estimated production units*

= $ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ ÷ \_\_\_\_\_\_\_\_\_\_\_\_\_ units = $ \_\_\_\_\_\_\_\_\_ per unit

*Fixed production overheads absorbed*

*= Predetermined fixed production overhead absorption rate x Actual production units*

= $ \_\_\_\_\_\_\_\_\_ per unit x \_\_\_\_\_\_\_\_\_\_\_\_\_ units = $ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Working 2

Closing inventory value = Product cost per unit x Number of units in closing inventory

Product cost per unit under absorption costing

*= Direct materials + Direct labour + Variable production overheads + Fixed production overheads*

= $\_\_\_\_\_\_\_\_\_\_ + $\_\_\_\_\_\_\_\_\_\_ + $\_\_\_\_\_\_\_\_\_\_ + $\_\_\_\_\_\_\_\_\_\_\_\_

= $\_\_\_\_\_\_\_\_\_\_

Fixed production overheads per unit is equal to the predetermined fixed production overhead absorption rate

Number of units in closing inventory

*= Production units – Sales units*

= \_\_\_\_\_\_\_\_\_ units - \_\_\_\_\_\_\_\_\_units = \_\_\_\_\_\_\_\_\_\_ units

Closing inventory value = $\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_units = $\_\_\_\_\_\_\_\_\_\_\_\_\_

Working 3

As the overheads absorbed is an estimated amount, adjustments should be made in the cost of goods sold for any over/under absorption of fixed production overheads (FPOH):

*If Absorbed FPOH > Actual FPOH => Over-absorbed FPOH*

*If Absorbed FPOH < Actual FPOH => Under-absorbed FPOH*

If FPOH is over-absorbed, the cost of goods sold will be overstated. Over-absorbed FPOH should be deducted from the cost of goods sold.

If FPOH is under-absorbed, the cost of goods sold will be understated. Under-absorbed FPOH should be added to the cost of goods sold

|  |  |  |
| --- | --- | --- |
|  |  | $ |
|  | Actual fixed production overheads |  |
|  | Less: Absorbed fixed production overheads (from Working 1) |  |
|  | (Over / Under)# -absorbed fixed production overheads |  |

# Circle the correct answer

Working 4

Selling overheads = Variable selling overheads + Fixed selling overheads

= (Cost per unit x Actual sales units) + Fixed selling overheads

= ($\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_ units) + $ \_\_\_\_\_\_\_\_\_\_\_\_

= $\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| (b) | Peter Company  Income Statement for the year ended 31 December 2019 (under marginal costing) | | | |
|  |  | | $’000 | $’000 |
|  | Sales *(Selling price* × *Actual sales units)* ($ \_\_\_\_\_× \_\_\_\_\_\_\_\_units) | | |  |
|  | Less: | Variable cost of goods sold |  |  |
|  |  | Direct materials \*($ \_\_\_\_\_× \_\_\_\_\_\_\_\_units) |  |  |
| Add: Direct labour\* ($ \_\_\_\_\_× \_\_\_\_\_\_\_\_units) |  |  |
|  | Add: Variable production overheads\*  ($ \_\_\_\_\_× \_\_\_\_\_\_\_\_units) |  |  |
|  |  |  |  |  |
|  |  | Less: Closing inventory (Working 1) |  |  |
|  |  |  |  |  |
|  | Less: | Variable selling overheads  *(Cost per unit x Actual sales units)*  ($ \_\_\_\_\_× \_\_\_\_\_\_\_\_units) |  |  |
|  | Contribution margin | |  |  |
|  | Less: | Fixed production overheads *(Actual figure)* |  |  |
|  |  | Fixed selling overheads |  |  |
|  |  | Fixed administrative overheads |  |  |
|  | Net profit | |  |  |
|  |  |  |  |  |

\*Cost per unit x Actual production units

|  |  |  |  |  |
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|  |  |  |  |  |
| Working 1  Closing inventory value = Product cost per unit x Number of units in closing inventory  Product cost per unit under marginal costing  *= Direct materials + Direct labour + Variable production overheads*  = $\_\_\_\_\_\_\_\_\_\_ + $\_\_\_\_\_\_\_\_\_\_ + $\_\_\_\_\_\_\_\_\_\_  = $\_\_\_\_\_\_\_\_\_\_  Number of units in closing inventory  = Production units – Sales units  = \_\_\_\_\_\_\_\_\_ units - \_\_\_\_\_\_\_\_\_units = \_\_\_\_\_\_\_\_\_\_ units  Closing inventory value = $\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_units = $\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | |
|  |  | |  |  |
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| (c) | Fill in the following blanks with the appropriate word given below:  period fixed expensed higher product |
|  | Absorption and marginal costing differ in how they handle (a) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ production overheads in arriving product cost.  Under absorption costing, fixed production overheads are treated as (b) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cost and assets until the products are sold.  Under marginal costing, fixed production overheads are treated as (c) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cost and are (d) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the current period’s income statement.  Therefore, the net profit reported under the absorption costing was (e) \_\_\_\_\_\_\_\_\_\_\_\_\_\_ than the net profit under the marginal costing by $8,000 ($8 × 1,000 units). |

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| Graded Assignment 5: Marginal and Absorption Costing  Elementary Level – Suggested Solution and Explanatory Notes |  |

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| (a) | Peter Company  Income Statement for the year ended 31 December 2019 (under absorption costing) | | | | | | |  |
|  |  | | | | $’000 | | $’000 |  |
|  | Sales *(Selling price × Actual sales units)* ($28 × 23,000 units) | | | |  | | 644 |  |
|  | Less: Cost of goods sold | | | |  | |  |
|  |  | | Direct materials ($5 × 24,000) | | 120 | |  |  |
|  |  | | Add: Direct labour ($4 × 24,000) | | 96 | |  |
|  |  | | Add: Variable production overheads ($3 × 24,000) | | 72 | |  |
|  |  | Add: Fixed production overheads absorbed (Working 1) | | 192 | | |  |  |
|  |  |  | | 480 | | |  |
|  |  | Less: Closing inventory (Working 2) | | 20 | | |  |
|  |  |  | | 460 | | |  |
|  |  | Less: Over-absorbed production overheads (Working 3) | | 84 | | | 376 |
|  | Gross profit | | |  | | | 268 |
|  | Less: | Selling overheads (Working 4) | | 32 | |  | |  |
|  |  | Administrative overheads | | 17 | | 49 | |
|  | Net profit | | |  | | 219 | |
|  | Working 1 | | |  | | | |
|  | Predetermined fixed production overhead absorption rate  = $ 160,000 ÷ 20,000 units = $ 8 per unit    Fixed production overheads absorbed  = $ 8 per unit x 24,000 units = $ 192,000  Working 2 | | |  | | | |  |
|  | Product cost per unit under absorption costing  = $5 + $4 + $3 + $8  = $20  Number of units in closing inventory  = 24,000 units – 23,000 units = 1,000 units  Closing inventory value = $20 x 1,000 units = $20,000 | | | | | | |  |

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|  | Working 3   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  | | $ | | | Actual fixed production overheads | | 108,000 | | | Less: Absorbed fixed production overheads (from Working 1) | | 192,000 | | | (Over / Under)# -absorbed fixed production overheads | | 84,000 | | |  |
|  |  |  |
|  | Working 4 |  |
|  | Selling overheads = ($1 x 23,000 units) + $9,000 = $32,000 |  |
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| (b) | Peter Company  Income Statement for the year ended 31 December 2019 (under marginal costing) | | | |
|  |  | | $’000 | $’000 |
|  | Sales ($28 × 23,000) | |  | 644 |  |
|  | Less: | Variable cost of goods sold |  |  |
|  |  | Direct materials ($5 × 24,000) | 120 |  |
|  |  | Add: Direct labour ($4 × 24,000) | 96 |  |
|  |  | Add: Variable production overheads ($3 × 24,000) | 72 |  |
|  |  |  | 288 |  |
|  |  | Less: Closing inventory (Working 1) | 12 | 276 |
|  |  |  |  | 368 |
|  | Less: | Variable selling overheads ($1 × 23,000) |  | 23 |
|  | Contribution margin | |  | 345 |
|  |  |  |  |  |
|  | Less: | Fixed production overheads | 108 |  |
|  |  | Fixed selling overheads | 9 |  |
|  |  | Fixed administrative overheads | 17 | 134 |
|  | Net profit | |  | 211 |
|  |  | |  |  |

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| Working 1 |  |
| Product cost per unit under marginal costing  = $5 + $4 + $3 = $12  Number of units in closing inventory  = 24,000 units – 23,000 units = 1,000 units  Closing inventory value = $12 x 1,000 units = $12,000 | |

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| (c) | Absorption and marginal costing differ in how they handle (a) fixed production overheads in arriving product cost. Under absorption costing, fixed production overheads are treated as (b) product cost and assets until the products are sold.Under marginal costing, fixed production overheads are treated as (c) period cost and are (d) expensed on the current period’s income statement. Therefore, the net profit reported under the absorption costing was (e) higher than the net profit under the marginal costing by $8,000 ($8 × 1,000 units) |

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| **Points to be noted:** |
| Definitions: |
| 1. Product costs - They are those production costs, both direct and indirect, of producing a product. 2. Period costs - They are those costs other than product costs.   Important formulas:  Absorption Costing   1. Product cost under absorption costing = Direct materials + Direct labour + Direct expenses + Variable production overheads + Fixed production overheads 2. Net profit under absorption costing = Sales – Costs of goods sold – Expenses   = Sales – Production costs – Non-production costs  Marginal Costing   1. Product cost under marginal costing = Direct materials + Direct labour + Direct expenses + Variable production overheads 2. Contribution margin = Sales – Variable costs (both production and non-production costs) 3. Net profit under marginal costing = Sales – Variable costs – Fixed costs   = Contribution margin – Fixed costs |

Steps of calculating over/under-absorption of fixed production overhead

1. Calculate the predetermined fixed production overhead absorption rate:

Estimated fixed production overheads (FPOH) ÷ Estimated production units

1. Calculate absorbed FPOH

Predetermined fixed production overhead absorption rate × actual production units

1. Reconcile actual FPOH incurred with absorbed FPOH

If Absorbed FPOH > Actual FPOH = Over-absorbed FPOH => deduct from cost of goods sold

If Absorbed FPOH < Actual FPOH = Under-absorbed FPOH => add to cost of goods sold

|  |  |
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| Common mistakes: | |
| 1.  2. | Fail to compute the predetermined fixed production overhead absorption rate and overheads absorbed.  Mistakenly treat the overheads absorbed as actual overheads without incorporating over/under absorption in the calculation of cost of goods sold. |
| 3. | Cannot identify all the production costs to compute the gross profit. |
| 4. | Wrong classification of product cost and period cost. |
| 5. | Mix up the calculations under absorption costing and marginal costing. For instance, fail to differentiate between gross profit and contribution margin. |

Graded Assignment 5: Marginal and Absorption Costing

Standard Level – Question Paper

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|  | | |
| Peter Company commenced business on 1 January 2019 to produce a special type of headphone, ‘B20’. The estimated fixed production overheads were $160,000 and would be allocated on the basis of production units. The estimated production and sales units for the year were 20,000. The actual production and actual sales units for 2019 were 24,000 units and 23,000 units respectively. Other actual data for 2019 was as follows: | | |
|  | $ per unit |
| Selling price | 28 |
| Direct materials | 5 |
| Direct labour | 4 |
| Variable production overheads | 3 |
| Variable selling overheads | 1 |
|  | $ |
| Fixed production overheads | 108,000 |
| Fixed selling overheads | 9,000 |
| Fixed administrative overheads | 17,000 |

|  |  |
| --- | --- |
| **REQUIRED:** | |
|  |  |
| (a) | Prepare an income statement for the year ended 31 December 2019 using absorption costing.  (8 marks) |
| (b) | Prepare an income statement for the year ended 31 December 2019 using marginal costing.  (7 marks) |
| (c) | Based on your answers in (a) and (b) above, explain the reason for the difference in the value of ending inventory under the two costing methods and discuss the impact of this difference on the reported net profits in 2019. (3 marks) |
|  | (Total: 18 marks) |

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| Graded Assignment 5: Marginal and Absorption Costing  Standard Level – Student Worksheet | | |  |
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| (a) | Hint 1: Calculate the fixed production overheads absorbed using the predetermined overhead absorption rate  Predetermined overhead absorption rate  = Estimated fixed production overheads (FPOH) ÷ Estimated production units  Fixed production overheads absorbed  = Predetermined overhead absorption rate x actual production units | |
|  |  |  | |  |
| Hint 2: As the overheads absorbed is an estimated amount, adjustments should be made in the cost of goods sold for any over/under absorption of fixed production overheads (FPOH): | |  | |  |

If Absorbed FPOH > Actual FPOH => \_\_\_\_\_\_\_\_-absorbed FPOH

=> \_\_\_\_\_\_\_\_ from costs of goods sold

If Absorbed FPOH < Actual FPOH => \_\_\_\_\_\_\_\_\_-absorbed FPOH

=> \_\_\_\_\_\_\_\_\_ to costs of goods sold

Hint 3: Classify the costs as product cost or period cost (put a tick in the following table)

|  |  |  |
| --- | --- | --- |
|  | Product cost | Period cost |
| 1. Direct materials |  |  |
| 1. Direct labour |  |  |
| 1. Variable production overheads |  |  |
| 1. Variable selling overheads |  |  |
| 1. Fixed production overheads |  |  |
| 1. Fixed selling overheads |  |  |
| 1. Fixed administrative overheads |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | | | | | | |  |
|  | Peter Company  Income Statement for the year ended 31 December 2019 (under absorption costing) | | | | | | |  |
|  |  | | | | $’000 | | $’000 |
|  |  | | | |  | |  |
|  |  | | | |  | |  |
|  | Less: | | Cost of goods sold | |  | |  |
|  |  | |  | |  | |  |
|  |  | |  | |  | |  |
|  |  |  | |  | |  | |
|  |  |  | |  | |  | |
|  | Add: Fixed production overheads absorbed  ($\_\_\_\_\_\_\_\_\_\_\_\_ ÷ \_\_\_\_\_\_\_\_ units × \_\_\_\_\_\_\_\_ units) | | |  | |  | |
|  |  |  | |  | |  | |
|  |  | Less: Closing inventory  [$( \_\_\_\_ + \_\_\_\_ + \_\_\_\_ + \_\_\_\_) × ( \_\_\_\_\_\_ units - \_\_\_\_\_\_units)] | |  | |  | |
|  |  |  | |  | |  | |
|  | \_\_\_\_\_\_\_: \_\_\_\_\_\_\_\_\_\_\_\_-absorbed production overheads  ($ \_\_\_\_\_\_\_\_\_\_\_\_ - $ \_\_\_\_\_\_\_\_\_\_\_\_ ) | | |  | |  | |
|  | Gross profit | | |  | |  | |
|  | Less: | Selling overheads  [($\_\_\_\_\_\_\_\_\_\_\_ ×\_\_\_\_\_ units) + $\_\_\_\_\_\_\_\_\_\_\_] | |  | |  | |
|  |  |  | |  | |  | |
|  |  |  | |  | |  | |
|  |  |  | |  | |  | |
|  | Net profit | | |  | |  | |

(b)

Hint 1 : Calculate the total contribution margin

= [Selling price – Variable costs per unit (both production and non-production)] × Actual sales unit

= ($ \_\_\_\_\_\_\_\_ - $ \_\_\_\_\_\_\_\_ - $ \_\_\_\_\_\_\_\_ - $ \_\_\_\_\_\_\_\_ - $ \_\_\_\_\_\_\_\_ ) x \_\_\_\_\_\_\_ units

= $\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hint 2: Classify the costs as product cost or period cost (put a tick in the following table)

|  |  |  |
| --- | --- | --- |
|  | Product cost | Period cost |
| 1. Direct materials |  |  |
| 1. Direct labour |  |  |
| 1. Variable production overheads |  |  |
| 1. Variable selling overheads |  |  |
| 1. Fixed production overheads |  |  |
| 1. Fixed selling overheads |  |  |
| 1. Fixed administrative overheads |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Peter Company  Income Statement for the year ended 31 December 2019 (under marginal costing) | | | |
|  |  | | $’000 | $’000 |
|  |  | |  |  |
|  | Less: | Variable cost of goods sold |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  | Less: Closing inventory  [$( \_\_\_\_ + \_\_\_\_ + \_\_\_\_) × ( \_\_\_\_\_\_ units - \_\_\_\_\_\_units)] |  |  |
|  |  |  |  |  |
|  | Less: |  |  |  |
|  | Contribution margin | |  |  |
|  | Less: |  |  |  |
|  |  |  |  |  |
|  | Net profit | |  |  |

(c)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Graded Assignment 5: Marginal and Absorption Costing

Standard Level – Suggested Solution and Explanatory Notes

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|  |  | | | | | | |  |
| (a) | Peter Company  Income Statement for the year ended 31 December 2019 (under absorption costing) | | | | | | |  |
|  |  | | | | $’000 | | $’000 |  |
|  | Sales ($28 × 23,000) | | | |  | | 644 |
|  | Less: Cost of goods sold | | | |  | |  |
|  |  | | Direct materials ($5 × 24,000) | | 120 | |  |
|  |  | | Add: Direct labour ($4 × 24,000) | | 96 | |  |
|  |  | | Add: Variable production overheads ($3 × 24,000) | | 72 | |  |
|  |  | Add: Fixed production overheads absorbed  ($160,000 ÷ 20,000 units × 24,000 units) | | 192 | | |  |
|  |  |  | | 480 | | |  |
|  |  | Less: Closing inventory  [$(5 + 4 + 3 + 8) × (24,000 – 23,000)] | | 20 | | |  |
|  |  |  | | 460 | | |  |
|  |  | Less: Over-absorbed production overheads  ($192,000 - $108,000) | | 84 | | | 376 |
|  | Gross profit | | |  | | | 268 |
|  | Less: | Selling overheads ($1 × 23,000 units + $9,000) | | 32 | |  | |
|  |  | Administrative overheads | | 17 | | 49 | |
|  | Net profit | | |  | | 219 | |
|  |  | | |  | | | |
|  |  | | |  | | | |
|  | Explanatory notes   1. Steps to calculate over / under - absorbed fixed production overheads (FPOH)   Step 1: Calculate absorbed FPOH:  Predetermined FPOH absorption rate x Actual production units    Step 2: Reconcile actual FPOH incurred with absorbed FPOH    If Absorbed FPOH > Actual FPOH => **Over-absorbed** **FPOH**  => Deduct from cost of goods sold  If Absorbed FPOH < Actual FPOH => **Under-absorbed FPOH**  => Add to cost of goods sold | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 1. Cost classification under absorption costing  |  |  |  | | --- | --- | --- | |  | Product cost | Period cost | | 1. Direct materials | √ |  | | 1. Direct labour | √ |  | | 1. Variable production overheads | √ |  | | 1. Variable selling overheads |  | √ | | 1. Fixed production overheads | √ |  | | 1. Fixed selling overheads |  | √ | | 1. Fixed administrative overheads |  | √ | |  |

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| --- | --- | --- | --- | --- |
| (b) | Peter Company  Income Statement for the year ended 31 December 2019 (under marginal costing) | | | |
|  |  | | $’000 | $’000 |
|  | Sales ($28 × 23,000) | |  | 644 |
|  | Less: | Variable cost of goods sold |  |  |
|  |  | Direct materials ($5 × 24,000) | 120 |  |
|  |  | Add: Direct labour ($4 × 24,000) | 96 |  |
|  |  | Add: Variable production overheads ($3 × 24,000) | 72 |  |
|  |  |  | 288 |  |
|  |  | Less: Closing inventory  [($5 + $4 + $3) × (24,000 – 23,000)] | 12 | 276 |
|  |  |  |  | 368 |
|  | Less: | Variable selling overheads ($1 × 23,000) |  | 23 |
|  | Contribution margin | |  | 345 |
|  |  |  |  |  |
|  | Less: | Fixed production overheads | 108 |  |
|  |  | Fixed selling overheads | 9 |  |
|  |  | Fixed administrative overheads | 17 | 134 |
|  | Net profit | |  | 211 |
|  |  | |  |  |
|  |  | |  |  |
|  |  | |  |  |  |

Product cost under absorption costing includes all production costs while period cost includes all non-production costs.

Explanatory notes

(1) Contribution margin is the difference between sales and all the variable costs

= [Selling price – Variable costs per unit (both production and non-production)] × Actual sales units

= ($ 28 - $ 5 - $ 4 - $ 3 - $ 1 ) x 23,000 units

= $345,000

(2) Cost Classification under marginal costing

|  |  |  |
| --- | --- | --- |
|  | Product cost | Period cost |
| 1. Direct materials | √ |  |
| 1. Direct labour | √ |  |
| 1. Variable production overheads | √ |  |
| 1. Variable selling overheads |  | √ |
| 1. Fixed production overheads |  | √ |
| 1. Fixed selling overheads |  | √ |
| 1. Fixed administrative overheads |  | √ |

Product cost under marginal costing includes only variable production costs while fixed production costs are treated as period cost which are expensed on the income statement for the current period.

|  |  |
| --- | --- |
| (c) | Absorption and marginal costing differ in how they handle fixed production overheads in arriving product cost. Under absorption costing, fixed production overheads are treated as product cost and asset until the products are sold.Under marginal costing, fixed production overheads are treated as period cost and are expensed on the current period’s income statement. Therefore, the net profit reported under the absorption costing was higher than the net profit under the marginal costing by $8,000 ($8 × 1,000 units) |

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| --- |
| **Points to be noted:** |
|  |
| Definitions: |
| * Product costs - They are those production costs, both direct and indirect, of producing a product. * Period costs - They are the costs other than product costs. |

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| **Differences Between Absorption Costing and Marginal Costing** | | |
|  | **Absorption Costing** | **Marginal Costing** |
| **Purposes** | External reporting | Short-term decision making (e.g. cost control, product pricing, production planning) |
| **Presentation Format** | Gross profit  = Sales – Total production costs  Net profit  = Gross profit – Total non-production costs | Contribution margin  = Sales – Total variable costs  Net profit  = Contribution margin –Total fixed costs |
| **Product Costs** | Direct materials (DM) + Direct labour (DL) + Direct expenses (DE) + Variable production overheads (VPOH) + Fixed production overheads (FPOH) | Direct materials (DM) + Direct labour (DL) + Direct expenses (DE) + Variable production overheads (VPOH) |
| **Period Costs** | Selling expenses + Administrative expenses | Fixed production overheads + Selling expenses + Administrative expenses |
| **Inventory Valuation** | DM + DL + DE + VPOH + FPOH | DM + DL + DE + VPOH |

|  |  |
| --- | --- |
| Common mistakes: | |
| 1. | Fail to include the absorbed fixed production overheads in calculating the production costs under absorption costing. |
| 2. | Cannot identify all the variable costs (e.g. selling expenses) to compute the correct contribution margin. |
| 3. | Fail to differentiate estimated fixed overheads, fixed overhead absorbed and actual fixed overheads. |
| 4.  5. | Cannot differentiate between gross profit and contribution margin.  Mistakenly treat variable selling expenses as product cost under marginal costing. |

Graded Assignment 5: Marginal and Absorption Costing

Advanced Level – Question Paper

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|  | | |
| Peter Company commenced business on 1 January 2019 to produce a special type of headphone, ‘B20’. The estimated fixed production overheads were $160,000 and would be allocated on the basis of production units. The estimated production and sales units for the year were 20,000. The estimated figures were given below: | | |
|  | $ |
| Sales | 560,000 |
| Direct materials | 100,000 |
| Direct labour | 80,000 |
| Variable production overheads | 60,000 |
| Variable selling overheads | 20,000 |
| Fixed selling overheads | 9,000 |
| Fixed administrative overheads | 17,000 |

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| During the year, 24,000 units were produced and 23,000 units were sold at the estimated selling price. Actual unit variable costs were as same as the estimated costs while the actual fixed production overheads amounting $108,000 were incurred. |

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| **REQUIRED:** | |
| (a) | Prepare an income statement for the year ended 31 December 2019 using absorption costing.  (8 marks) |
| (b) | Prepare an income statement for the year ended 31 December 2019 using marginal costing.  (7 marks) |
| (c) | Based on your answers in (a) and (b) above, explain the reason for the difference in the value of ending inventory under the two costing methods and discuss the impact of this difference on the reported net profits in 2019. (3 marks) |
|  | (Total: 18 marks) |

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| Challenging question |
| |  |  | | --- | --- | | (d) | Accidentally the accountant found that there were 600 units of ‘B20’ which had been outsourced to an external manufacturer at a cost of $20 each missing on the stock sheet. Assume that the company decided to use marginal costing method to determine its net income and weighted average cost method for the valuation of inventory. Calculate the unit cost of ending inventory on 31 December 2019.  (3 marks) | |

Graded Assignment 5: Marginal and Absorption Costing

Advanced Level – Student Worksheet

(a)

(b)

(c)

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Challenging question

(d)

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| Graded Assignment 5: Marginal and Absorption Costing  Advanced Level – Suggested Solution and Explanatory Notes |

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|  |  | | | | | | |
| (a) | Peter Company  Income Statement for the year ended 31 December 2019 (under absorption costing) | | | | | | |
|  |  | | | | $’000 | | $’000 |
|  | Sales ($560,000 ÷ 20,000 × 23,000) | | | |  | | 644 |
|  | Less: Cost of goods sold | | | |  | |  |
|  |  | | Direct materials ($100,000 ÷ 20,000 × 24,000) | | 120 | |  |
|  |  | | Add: Direct labour ($80,000 ÷ 20,000 × 24,000) | | 96 | |  |
|  |  | | Add: Variable production overheads  ($60,000 ÷ 20,000 × 24,000) | | 72 | |  |
|  |  | Add: Fixed production overheads absorbed  ($160,000 ÷ 20,000 × 24,000) | | 192 | | |  |
|  |  |  | | 480 | | |  |
|  |  | Less: Closing inventory  [$480,000 ÷ 24,000 × (24,000 – 23,000)] | | 20 | | |  |
|  |  |  | | 460 | | |  |
|  |  | Less: Over-absorbed production overheads  ($192,000 - $108,000) | | 84 | | | 376 |
|  | Gross profit | | |  | | | 268 |
|  | Less: | Selling overheads ($9,000 + $20,000 ÷ 20,000 × 23,000) | | 32 | |  | |
|  |  | Administrative overheads | | 17 | | 49 | |
|  | Net profit | | |  | | 219 | |
|  |  | | |  | | | |
|  |  | | |  | | | |

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| --- | --- | --- | --- | --- |
| (b) | Peter Company  Income Statement for the year ended 31 December 2019 (under marginal costing) | | | |
|  |  | | $’000 | $’000 |
|  | Sales ($560,000 ÷ 20,000 × 23,000) | |  | 644 |
|  | Less: | Variable cost of goods sold |  |  |
|  |  | Direct materials ($100,000 ÷ 20,000 × 24,000) | 120 |  |
|  |  | Add: Direct labour ($80,000 ÷ 20,000 × 24,000) | 96 |  |
|  |  | Add: Variable production overheads  ($60,000 ÷ 20,000 × 24,000) | 72 |  |
|  |  |  | 288 |  |
|  |  | Less: Closing inventory  [$288,000 ÷ 24,000 × (24,000 – 23,000)] | 12 | 276 |
|  |  |  |  | 368 |
|  | Less: | Variable selling overheads  ($20,000 ÷ 20,000 × 23,000) |  | 23 |
|  | Contribution margin | |  | 345 |
|  |  |  |  |  |
|  | Less: | Fixed production overheads | 108 |  |
|  |  | Fixed selling overheads | 9 |  |
|  |  | Fixed administrative overheads | 17 | 134 |
|  | Net profit | |  | 211 |
|  |  | |  |  |

|  |  |
| --- | --- |
| (c) | Absorption and marginal costing differ in how they handle fixed production overheads in arriving product cost. Under absorption costing, fixed production overheads are treated as product cost and asset until the products are sold. Under marginal costing, fixed production overheads are treated as period cost and are expensed on the current period’s income statement. Therefore, the net profit reported under the absorption costing was higher than the net profit under the marginal costing by $8,000 ($8 × 1,000 units) |

|  |
| --- |
| Challenging question  (d) Unit product cost under marginal costing = ($100,000 + $80,000 + $60,000) ÷ 20,000 = $12 |
| Unit cost of ending inventory = ($20 × 600 + $12 ×1,000) ÷ (1,000 + 600) = $15 |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Points to be noted:**  1. Comparison between product cost and period cost   |  |  |  | | --- | --- | --- | |  | **Product cost** | **Period cost** | | **Definition** | They are those production costs, both direct and indirect, of producing a product | They are the costs other than product costs | | **Accounting treatment** | * Included in the inventory valuation * Charged to cost of goods sold on the income statement only when the goods are sold | * Not included in the inventory valuation * Expensed on the income statement once they are incurred | | **Classification under absorption costing** | * Direct materials * Direct labour * Direct expenses * Variable production overheads * Fixed production overheads | * Selling overheads * Administrative overheads | | **Classification under marginal costing** | * Direct materials * Direct labour * Direct expenses * Variable production overheads | * Selling overheads * Administrative overheads * Fixed production overheads | |

2. Differences Between Absorption Costing and Marginal Costing

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Absorption costing** | **Marginal costing** | |
| **Purposes** | External reporting | Short-term decision making (e.g. cost control, product pricing, production planning) | |
| **Presentation Format** | Gross profit  = Sales – Total production costs  Net profit  = Gross profit – Total non-production costs | Contribution margin  = Sales – Total variable costs  Net profit  = Contribution margin –Total fixed costs | |
| 3. Relationship between change in inventory level and profits under two costing methods | | |

|  |  |  |
| --- | --- | --- |
| **Relation between production and sales (Units)** | **Effect on inventories (Units)** | **Relation between the Net Incomes ($)** |
| 1. Production > Sales | Inventories increase | Absorption costing > Marginal costing\* |
| 2. Production < Sales | Inventories decrease | Absorption costing < Marginal costing\*\* |
| 3. Production = Sales | No change in inventories | Absorption costing = Marginal costing |

|  |  |
| --- | --- |
| \* Net income is higher under absorption costing because part of fixed production overheads is absorbed in the ending inventory and deferred to be expensed as inventories increase.  \*\* Net income is lower under absorption costing because the fixed production overheads are released from the beginning inventory brought forward from the previous period and expensed in the income statement for the current period as inventories decrease.  4. Steps to calculate over / under absorbed Fixed Production Overhead (FPOH): | |
| Step 1: | Calculate predetermined fixed production overhead absorption rate =  Estimated fixed production overheads ÷ estimated production units |
| Step 2: | Calculate absorbed FPOH =  Predetermined fixed production overhead absorption rate × actual production units |
| Step 3: | Reconcile actual FPOH incurred with absorbed FPOH |
|  | * Case (1): Absorbed FPOH > Actual FPOH = Over-absorbed FPOH |
|  | * Case (2): Absorbed FPOH < Actual FPOH = Under-absorbed FPOH |
|  |  |
| Treatment for over / under – absorbed FPOH: | |
| Case 1: | If FPOH is over-absorbed, the cost of goods sold will be overstated. Over-absorbed FPOH should be deducted from the cost of goods sold. |
| Case 2: | If FPOH is under-absorbed, the cost of goods sold will be understated. Under-absorbed FPOH should be added to the cost of goods sold. |

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| Common mistakes: | |
| 1. | Fail to work out the over-absorbed fixed production overheads due to wrongly comparing the absorbed overheads with the estimated overheads instead of actual overheads. |
| 2. | Fail to adopt weighted average cost method to calculate the unit cost of ending inventory. |
| 3. | Fail to elaborate how the difference on the treatment of fixed production overheads between the marginal and absorption costing methods affect the reported net profits. |

Graded Assignment 5: Marginal and Absorption Costing

Marking Scheme

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| (a) | Peter Company  Income Statement for the year ended 31 December 2019 (under absorption costing) | | | | |  |
|  |  | | | $’000 | $’000 |  |
|  | Sales | | |  | 644 | *(0.5)* |
|  | Less: | | Cost of goods sold |  |  |  |
|  |  | | Direct materials | 120 |  | *(0.5)* |
|  |  | | Add: Direct labour | 96 |  | *(0.5)* |
|  |  | | Add: Variable production overheads | 72 |  | *(0.5)* |
|  |  | | Add: Fixed production overheads absorbed | 192 |  | *(1)* |
|  |  | |  | 480 |  |  |
|  |  | | Less: Closing inventory [$20\* × (24,000 – 23,000)] | 20 |  | *(1)* |
|  |  | |  | 460 |  |  |
|  |  | | Less: Over-absorbed production overheads  ($192,000 - $108,000) | 84 | 376 | *(1)* |
|  | Gross profit | | |  | 268 | *(0.5)* |
|  | Less: | | Selling overheads | 32 |  | *(1)* |
|  |  | | Administrative overheads | 17 | 49 | *(0.5)* |
|  | Net profit | | |  | 219 | *(1)* |
|  |  | | |  |  |  |
|  | \* | Product cost per unit under absorption costing  = DM + DL + VPOH + FPOH = $5 + $4 + $3 + $8 = $20 | |  |  |  |
|  |  |  | |  | (Total: 8 marks) | |
|  |  |  | |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| (b) | Peter Company  Income Statement for the year ended 31 December 2019 (under marginal costing) | | | |  |
|  |  | | $’000 | $’000 |  |
|  | Sales | |  | 644 | *(0.5)* |
|  | Less: | Variable cost of goods sold |  |  |  |
|  |  | Direct materials | 120 |  | *(0.5)* |
|  |  | Add: Direct labour | 96 |  | *(0.5)* |
|  |  | Add: Variable production overheads | 72 |  | *(0.5)* |
|  |  |  | 288 |  |  |
|  |  | Less: Closing inventory [$12\* × (24,000 – 23,000)] | 12 | 276 | *(1)* |
|  |  |  |  | 368 |  |
|  | Less: | Variable selling overheads |  | 23 | *(0.5)* |
|  | Contribution margin | |  | 345 | *(1)* |
|  | Less: | Fixed production overheads | 108 |  | *(0.5)* |
|  |  | Fixed selling overheads | 9 |  | *(0.5)* |
|  |  | Fixed administrative overheads | 17 | 134 | *(0.5)* |
|  | Net profit | |  | 211 | *(1)* |
|  |  | |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | \* | Product cost per unit under marginal costing  = DM + DL + VPOH = $5 + $4 + $3 = $12 |  |  |  |
|  |  |  |  | (Total: 7 marks) | |
|  |  |  |  |  | |
| (c) | Absorption and marginal costing differ in how they handle fixed production overheads in arriving product cost. *(1)* Under absorption costing, fixed production overheads are treated as product cost and asset until the products are sold.Under marginal costing, fixed production overheads are treated as period cost and are expensed on the current period’s income statement. *(1)* Therefore, the net profit reported under the absorption costing was higher than the net profit under the marginal costing by $8,000 ($8 × 1,000 units). *(1)* | | | |  |

(Total: 3 marks)

|  |
| --- |
| Challenging question  (d) |
| Unit product cost under marginal costing = ($100,000 + $80,000 + $60,000) ÷ 20,000 = $12 *(2)* |
| Unit cost of ending inventory = ($20 × 600 + $12 ×1,000) ÷ (1,000 + 600) = $15 *(1)* |
| (Total: 3 marks) |