Principles of Management Accounting

(MAC2601)

TUTORIAL LETTER 202
(Solution of assignment 2 – unique number: 279997)

DEPARTMENT OF MANAGEMENT ACCOUNTING

BAR CODE

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CONTENTS

1   INTRODUCTION

Dear Student

Enclosed please find the suggested solution for assignment 02/2013 (first semester). It is in your own interest to compare the suggested solutions with your own answers and, should there be any differences, to establish whether calculation errors or errors of principle have been made.

Kind regards,

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LECTURERS: MAC2601

2   SUGGESTED SOLUTION

QUESTION 1 – COST CONCEPTS AND ESTIMATION (10 marks)

OBSERVATION N	VOLUME x (Independent variable)	TOTAL COSTS y (Dependent variable)	xy	x²
1	180	311 000	55 980 000	32 400
2	195	333 000	64 935 000	38 025
3	160	278 500	44 560 000	25 600
4	175	301 000	52 675 000	30 625
5	200	345 000	69 000 000	40 000
6	210	350 000	73 500 000	44 100
7	215	348 000	74 820 000	46 225
8	240	395 000	94 800 000	57 600
9	240	393 000	94 320 000	57 600
10	205	348 000	71 340 000	42 025
11	185	318 000	58 830 000	34 225
12	170	290 000	49 300 000	28 900
∑	2 375	4 010 500	804 060 000	477 325

Substituting these values into the normal equation, we obtain:

$$804\ 060\ 000 = a\ (2\ 375) + b\ (477\ 325) \qquad ③$$

$$4\ 010\ 500 = a\ (12) + b\ (2\ 375) \qquad ④$$

Note from lecturers (this paragraph is for illustrative/explanatory purposes only):

We solve **b** by eliminating **a**. To do this, we need to have the same coefficient for **a** in each equation. This is done by multiplying equation ③ by 12 and equation ④ by 2 375. By obtaining the difference between the two new equations, **a** is eliminated, and **b** can be solved.

We then obtain the following:

$$9\ 648\ 720\ 000 = 28\ 500\ a + 5\ 727\ 900\ b \qquad ⑤\ (③ \times 12)$$

$$\underline{9\ 524\ 937\ 500 = 28\ 500\ a + 5\ 640\ 625\ b} \qquad ⑥\ (④ \times 2\ 375)$$

$$123\ 782\ 500 = 87\ 275\ b \qquad ⑦\ (⑤ - ⑥)$$

Solving equation ⑦ for **b**, we obtain

$$b = \underline{\qquad\qquad}$$

$$b = \underline{1\ 418{,}30}\ \text{(rounded off to two decimals)}$$

Solve **a** by substituting the value of **b** into any of the equations containing **a**. Doing this in equation ④, we obtain:

12a	=	4 010 500 – 2 375 (1 418,30)
12a	=	4 010 500 – 3 368 462,50
12a	=	642 037,50
a	=	R53 503,13 (rounded off to two decimals)

The resulting cost estimation equation is:

Total costs (y) = R53 503,13 + R1 418,30x

Answer: Variable cost per unit   **R1 418,30**

Fixed costs for the year   R53 503,13 per month x 12 months

= **R642 037,56**

QUESTION 2 – ACCOUNTING FOR MATERIAL, LABOUR AND OVERHEADS (10 marks)

INDEPENDENT PART A – MATERIAL

(a)   We ignore the warehouse rent, as it is a fixed cost that does not vary with the size of the order.

Steel pipes EOQ   = $\frac{\overline{}}{}$

= $\frac{\overline{}}{}$

= $\frac{\overline{}}{\overline{}}$

= $\frac{\overline{}}{\overline{}}$

=   623 steel pipes per order (rounded off to the nearest integer)

> Note from lecturers:
>
> Problems with the printing of the square root symbols ($\sqrt{}$) are sometimes experienced, so in some places we have typed out in words that we calculate the square root of a number. In hand-written answers, students have to use the normal symbol to embrace the number they are calculating the square root of.

INDEPENDENT PART B – OVERHEADS

(b)

Overhead	Basis	Production		Service		
		Victor R	Whiskey R	X-ray R	Yankee R	TOTAL R
Primary allocation	Given	600 000	200 000	100 000	50 000	950 000
Secondary allocation						
Allocation of Yankee	Floor area - m²	35 000	10 000	5 000	-50 000	
		635 000	210 000	105 000		
Allocation of X-ray	No. of employees	82 500	22 500	-105 000		
		717 500	232 500			

Calculation of overhead allocation rate for Whiskey:

_____   _____

Allocation rate	R38,75
Rounded to the nearest Rand	**R39**

QUESTION 3 – FIFO AND WEIGHTED AVERAGE (10 marks)

(a) FIFO METHOD

Inventory ledger card:

Date	Receipts			Issues			Balance		
May	Quantity	Price R	Amount R	Quantity	Price R	Amount R	Quantity	Price R	Amount R
1							300	9,00	2 700,00
4	250	9,80①	2 450,00				300	9,00	2 700,00
							250	9,80	2 450,00
7				300	9,00	2 700,00			
				10	9,80	98,00	240	9,80	2 352,00
11	(40)	(9,80)	(392)				200	9,80	1 960,00
15				(10)	(9,80)	(98,00)	210	9,80	2 058,00

Inventory value (15 May 2013):

R2 058

Explanations:

> Note from lecturers:
>
> Students are not required to show the following explanations; however, where freight charges are applicable, the relevant calculations (see calculations in bold in the explanation for 4 May below) should be shown and cross-referenced to in the inventory ledger card.

QUESTION 3 – FIFO AND WEIGHTED AVERAGE (continued)

<u>Date</u>

4 Two batches are available: 300 units @ R9,00, which came in first, and 250 units @ R9,80, which came in last. (The freight charges of R75 must be added to the cost of the batch.)

   ①   **(250 x R9,50) + R75 = R2 450; R2 450 ÷ 250 = R9,80)**

7 A quantity of 310 units is issued: 300 units @ R9,00 are issued first, then the balance of 10 units (310 – 300) from the 250 units @ R9,80.

11 The 40 units are returned @ the price at which they were purchased on 4 May 2013.

   (Returns to suppliers are treated as negative receipts and subtracted from the balance.)

15 The units returned from the factory are from the last issue. Returns from the factory are treated as negative issues and added to the balance.

(b) WEIGHTED AVERAGE METHOD

Inventory ledger card:

Date	Receipts			Issues			Balance		
	Quantity	Price	Amount	Quantity	@ average price	Amount	Quantity	Average price (calc)	Amount
May		**R**	**R**		**R**	**R**		**R**	**R**
1							300	9,00	2 700,000
4	250	9,800②	2 450,000				300		2 700,000
							250		2 450,000
							550	9,364	5 150,000
7				310	9,364	2 902,840	240	9,363③	2 247,160
11	(40)	(9,800)	(392,000)				240		2 247,160
							(40)		(392,000)
							200	9,276	1 855,160
15				(10)	(9,364)	(93,640)	200		1 855,160
							10		93,640
							210	9,280	1 948,800

②   From (a)

Note from lecturers:

③ Although, in principle, issues to the factory or manufacturing department do not lead to a change in the weighted average price, there might be a small difference from one balance's average price to the next after an issue, so we expect you to calculate the "new" weighted average price after an issue as well. It can be calculated as the **amount** of the latest balance divided by the **quantity** of the latest balance, for example: R2 247,160 / 240 units = R9,363 per unit after the issue on 7 May.

Explanations:

Note from lecturers:

Students are not required to show the following explanations.

Date

4	The average price of the units in inventory after the receipt must be calculated:				
	Add the units	(300	+	250	=	550)
	and the total cost	(R2 700	+	R2 450	=	R5 150)
	Divide the total cost by the total units to obtain the average price per unit.	(R5 150	÷	550	=	R9,364)
7	All the units are issued at the average price. Refer to the lecturers' note ③ above. The rounding causes a small change in the average.	(310	x	R9,364	=	R2 902,840)
		(550	-	310	=	240)
		(R5 150,000	-	R2 902,840	=	R2 247,160)
		(R2 247,160	÷	240	=	R9,363)
11	Units are returned to the supplier at the actual cost price on 4 May. A new average price is calculated.	(R1 855,16	÷	200	=	R9,276)
15	Units are returned from the factory at the average price at which they were last issued. The last issue was on 7 May at R9,364 per unit.					

Inventory value (15 May 2013):

R1 948,80

QUESTION 4 – DIRECT AND ABSORPTION COSTING (15 marks)

(a)   (i) FIFO: Direct costing

SAGOLE

Contribution statement of comprehensive income for the year ended 31 December 2013

	R
Sales (7 500 x R600)	4 500 000
Less: Variable costs	(2 865 000)
Opening inventory (1 500① x R330②)	495 000
Variable manufacturing costs (8 000 x R370③)	2 960 000
Cost of goods available for sale	3 455 000
Less: Closing inventory (2 000① x R370③)	(740 000)
Variable manufacturing cost of sales	2 715 000
Variable selling and admin costs (7 500 x R20)	150 000
Contribution	1 635 000
Less: Fixed costs	(830 000)
Selling and admin (R35 000 + R25 000)	60 000
Manufacturing (given)	770 000
Net profit before tax	805 000

(ii) FIFO: Absorption costing

SAGOLE

Statement of comprehensive income for the year ended 31 December 2013

	R
Sales (from (i))	4 500 000
Less: Cost of sales	(3 467 500)
Opening inventory (④)	670 000
Variable manufacturing costs (from (i))	2 960 000
Fixed manufacturing costs (given)	770 000
Cost of goods available for sale	4 400 000
Less: Closing inventory	(932 500)
(2000①/8000 x R3 730 000⑤)	
Gross profit	1 032 500
Less: Selling and administration costs	(210 000)
Variable (from (i))	150 000
Fixed (from (i))	60 000
Net profit before tax	822 500

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QUESTION 4 – DIRECT AND ABSORPTION COSTING (continued)

① **Calculation of opening and closing inventory in <u>units</u>:**

Units	2012	2013
Opening inventory	2 000	1 500
Add: Production	6 000	8 000
Available for sale	8 000	9 500
Less: Sales	(6 500)	(7 500)
Closing inventory	1 500	2 000

② R150 + R120 + R60 = R330

③ R150 + R140 + R80 = R370

④ Total production costs for 2012:

	R
Variable manufacturing costs (6 000 x R330②)	1 980 000
Fixed manufacturing costs	700 000
	2 680 000

Opening inventory value:

$$\text{———} \quad \times \quad \text{R2 680 000} \quad = \quad \text{R670 000}$$

⑤ Total production costs for 2013:

	R
Variable manufacturing costs (from (i))	2 960 000
Fixed manufacturing costs (given)	770 000
	3 730 000

(b)   Reconciling net profit before tax:

	R
Net profit before tax according to:	
Direct costing	805 000
Absorption costing	822 500
Difference to be reconciled	17 500
Opening inventory according to:	
Direct costing	495 000
Absorption costing	670 000
Difference	175 000

QUESTION 4 – DIRECT AND ABSORPTION COSTING (continued)

Closing inventory according to:

Direct costing	740 000
Absorption costing	932 500
Difference	192 500

Reconciliation in rand value:

Opening inventory difference	175 000
Closing inventory difference	192 500
Difference in profits before tax	17 500

Reconciliation in units:

Fixed costs in opening inventory (R700 000/6 000 x 1 500)	175 000
Fixed costs in closing inventory (R770 000/8 000 x 2 000)	192 500
Difference	17 500

Note from lecturers:

Should a reconciliation of net profits according to the direct and absorption costing methods be asked in **an exam and:**

- the question count three marks or less, and

- the question does not specify whether you have to do the reconciliation in rand value, in
  units, or both

then the reconciliation in units should be the shortest and, therefore, the recommended method.

QUESTION 5 – ABC (15 marks)

(a)   Calculation of the activity rates (also called "activity cost rates"):

Activities	*(A)* Overhead	*(B)* Total cost driver	*(A) ÷ (B)* Activity rate
Safety inspections	R 180 000	60 safety inspections	R3 000 per safety inspection
Nuclear inspections	R 500 000	25 nuclear inspections	R20 000 per nuclear inspection
Ordering	R 60 000	60 orders	R 1 000 per order

QUESTION 5 – ABC (Continued)

(b)   Calculation of the total manufacturing cost per product:

	Gamma-ray R	Delta-ray R	Echo-ray R
Direct material	125 000[1]	60 000[1]	160 000[1]
Direct labour	187 500[2]	80 000[2]	320 000[2]
Safety inspections	81 000[3]	45 000[3]	54 000[3]
Nuclear inspections	100 000[4]	200 000[4]	200 000[4]
Ordering costs	15 000[5]	30 000[5]	15 000[5]
Total manufacturing cost	**508 500**	**415 000**	**749 000**

[1]**Direct material**

Gamma-ray R50 x 2 500 units = R125 000; Delta-ray R30 x 2 000 units = R60 000; Echo-ray R40 x 4 000 units = R160 000

[2]**Direct labour**

Gamma-ray R75 x 2 500 units = R187 500; Delta-ray R40 x 2 000 units = R80 000; Echo-ray R80 x 4 000 units = R320 000

[3]**Safety inspections: R3 000 per safety-inspection**

Gamma-ray R3 000 x 27 = R81 000; Delta-ray R3 000 x 15 = R45 000; Echo-ray R3 000 x 18 = R54 000

[4]**Nuclear inspections: R20 000 per nuclear inspection**

Gamma-ray R20 000 x 5 = R100 000; Delta-ray R20 000 x 10 = R200 000; Echo-ray R20 000 x 10 = R200 000

[5]**Ordering costs: R1 000 per order**

Gamma-ray R1 000 x 15 = R15 000; Delta-ray R1 000 x 30 = R30 000; Echo-ray R1 000 x 15 = R15 000

QUESTION 6 – JOB COSTING (15 marks)

THE TOWNHOUSE POOL COMPANY

GENERAL LEDGER

Material Inventory Control

Opening balance	100 500	WIP (111 000 + 46 000)	157 000
Creditors (47 000 + 43 000)	90 000	Factory overhead control	6 900
Creditors	10 200	Balance b/d	36 800
	200 700		200 700
Balance b/f	36 800		

WIP Control

Opening balance	40 800	Finished goods	325 800
Materials control	157 000		
Factory Salaries + Wages control	140 000		
Factory overhead control	112 000	Balance b/d	124 000
	449 800		449 800
Balance b/f	124 000		

Finished Goods Control

Opening balance	10 000	COS	255 800
WIP	325 800	Balance b/d	80 000
	335 800		335 800
Balance b/f	80 000		

Factory Salaries and Wages Control

Salaries payable	200 000	WIP	140 000
		Factory overhead control	60 000
	200 000		200 000

Factory Overhead Control

Materials control	6 900	WIP (140 000 × 80%)	112 000
Factory salaries + wages control	60 000	COS (Under-applied OH)	1 200
Creditors (6 300 + 10 900 + 3 600 + 5 500 + 20 000)	46 300		
	113 200		113 200

Cost of Sales (COS)

Fin. Goods	255 800	Trading account	257 000
Factory overhead control	1 200		
	257 000		257 000

Creditors

Balance b/d	146 500	Materials control	90 000
		Materials control	10 200
		Factory OH control	46 300
	146 500	Balance b/f	146 500

Trading Account

Cost of sales	257 000	Sales	350 000
Profit and loss (I/s)	93 000		
	350 000		350 000

Salaries and Wages Payable

Balance b/d	252 000	Factory Salaries + Wages control	200 000
		Non-manufacturing salaries + wages	52 000
	252 000	Balance b/f	252 000

Non-manufacturing Salaries and Wages

Salaries and Wages payable	52 000	Profit and loss (I/s)	52 000

Debtors

Sales	350 000	Balance b/d	350 000
Balance b/f	350 000		350 000

Sales

		Trading account	350 000	Debtors	350 000

Note from lecturers:

- We have assumed that all purchases and sales are on credit, as it was not specified whether they were for cash or on credit. If students had "Bank" instead of "Creditors" or "Debtors" (as applicable), this would also have been correct.

- The most important of the above **general ledger** accounts are Materials inventory control, WIP control, Finished goods control, Factory Salaries and Wages Control, Factory Overhead Control, Cost of Sales (COS) and Sales. If this was an exam question, the majority of marks would have been awarded to these accounts and the cost ledger. Remember to balance your accounts.

THE TOWNHOUSE POOL COMPANY

COST LEDGER

Job 1

Opening balance	40 800	Sold	255 800
Direct material	105 000	Finished goods ledger	70 000
Direct labour	100 000		
Applied manufacturing OH (80% x 100 000)	80 000		
	325 800		325 800

Job 2

Direct material	52 000	Balance b/d	124 000
Direct labour	40 000		
Applied manufacturing OH (80% x 40 000)	32 000		
	124 000		124 000
Balance b/f	124 000		

QUESTION 7 – PROCESS COSTING (15 marks)

(a)   Quantity statement: WP = 40%; weighted average method

Physical units				Equivalent units				
Input		Output		Raw materials		Conversion cost	
(units)	Details	(units)	Units	%	Units	%
25 000	*Input* Opening WIP						
180 000	Put into production						
	Output						
	Completed and transferred	120 000	120 000	100	120 000	100
	Normal loss	① 9 000	9 000	100	3 600	40
	Abnormal loss	② 16 000	16 000	100	6 400	40
	Closing WIP	60 000	60 000	100	42 000	70
205 000		205 000	205 000		172 000	

①   205 000 – 25 000   =   180 000

       180 000 x 5%   =   9 000

②   Balancing figure

(b)   Production cost statement – Weighted average method

	Total R	Material R	Conversion cost R
Opening WIP	872 000	508 000	364 000
Current production cost	10 486 050	4 348 450	6 137 600
Total	11 358 050	4 856 450	6 501 600
Equivalent units - per quantity statement		205 000	172 000
Equivalent cost per unit	61,49 =	R23,69 +	R37,80

(c)   Calculation of the Rand value of the normal loss in terms of _conversion_ only

3 600 x R37,80 = R136 080

(d)   Allocation of the Rand value of the normal loss in terms of _material only_

	Units	Calculation	R
Completed and transferred	120 000	120 000 / 196 000 x R213 210	130 537
Abnormal loss	16 000	16 000 / 196 000 x R213 210	17 405
Closing WIP	60 000	60 000 / 196 000 x R213 210	65 268
TOTAL	196 000		**213 210**

Note from lecturers:

Although the opening WIP has already passed the wastage point in the previous period, the exception on page 290 of your Guide 1 is applicable and opening WIP will therefore be included in the above allocation (in "Completed and transferred"). The abnormal loss is also included in the allocation, as it

occurs at the same stage as the normal loss. The closing WIP is also included in the allocation, as closing WIP passes the wastage point in the current period.

QUESTION 8 – JOINT AND BY-PRODUCTS (10 marks)

(a)

(i) Physical standard method

Joint products	Production (litres)	Allocation of joint costs R
BichroPhyl	3 500	210 000①
ChloroPhyl	2 500	150 000②
DechloPhyl	2 000	120 000③
Total	8 000	480 000

① 3 500/8 000 x R480 000 = R210 000

② 2 500/8 000 x R480 000 = R150 000

③ 2 000/8 000 x R480 000 = R120 000

(ii) Market value at split-off point method

Joint products	Sales value at split-off point R	Allocation of joint costs R
BichroPhyl	252 000 (R72 x 3 500)	170 847①
ChloroPhyl	240 000 (R96 x 2 500)	162 712②
DechloPhyl	216 000 (R108 x 2 000)	146 441③
Total	708 000	480 000

① 252 000/708 000 x R480 000 = R170 847

② 240 000/708 000 x R480 000 = R162 712

③ 216 000/708 000 x R480 000 = R 46 441

(iii) Net realisable value at split-off point (NRV method)

Joint products	NRV @ split-off point R	Allocation of joint costs R
BichroPhyl	180 000 (R120 x 3 500 - R240 000)	77 838①
ChloroPhyl	480 000 (R240 x 2 500 – R120 000)	207 568②
DechloPhyl	450 000 (R360 x 2 000 – R270 000)	194 595③
Total (allocated)	1 110 000	480 001
Total joint costs		480 000

16

Rounding difference   (1)

① 180 000/1 110 000 x R480 000   =   R 77 838

② 480 000/1 110 000 x R480 000   =   R207 568

③ 450 000/1 110 000 x R480 000   =   R194 595

> Note from lecturers: It is important that students use the market price of the FINAL product when they apply the NRV method (see Guide 1, page 329). Note that there were no selling and admin costs in the question, but students also need to know how to handle these.

(b)

(i)   A product that is insignificant in value to the joint products, incidental to the manufacturing process and on which the organisation's survival is *not* dependent (Study guide 1, page 327 or 359).

(ii)   A by-product with no sales value, which sometimes may lead to costs when the organisation gets rid of it in terms of health or environmental regulations (Study guide 1, page 328 or 369).

> Note from lecturers: Do not write down unnecessary headings or re-write the "required" in an exam. Please just make sure your numbering is exactly the same as in the question paper.