ADM 3346 X
Mid Term Examination
Cost Accounting
Spring/Summer 2012
Solutions

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2 hours

Student Name: _____

Student #: _____

Section: (Prof. Robert Collier)

Instructions:

1. This examination comprises 5 questions over 15 pages. The exam booklet is not to be removed from the examination room. You may separate the pages but ensure that you put them back together stapled before handing your exam in.

2. Limit your answer to the space provided. A blank sheet for rough work and supporting calculations is given at the end of the exam on the last page (page 14).

3. This exam is out of 65 marks and is 2 hours long. You should budget approximately 1.8 minutes per mark.

4. Please do **not** ask the invigilator or the professor any questions, as they will **not** be answered. State reasonable assumptions, if you feel they are necessary.

5. Language dictionaries (non-electronic) are allowed if the invigilator permits them.

6. You ***must*** sign the Statement of Academic integrity on page 2 of this exam.

	Marks
Question No. 1 – Cost Estimation	**/14**
Question No. 2 – Job Costing	**/14**
Question No. 3 – CVP Analysis	**/12**
Question No. 4 – Process Costing	**/18**
Question No. 5 – ABC	**/7**
Total	**/65**

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Statement to be signed by the student:
I have read the text on academic integrity and I pledge not to have committed or attempted to commit academic fraud in this examination.

Signed:_____

Note: an examination copy or booklet without that signed statement will not be graded and will receive a final exam grade of zero.

Question No. 1 (14 marks)

Armer Company is accumulating data to use in preparing its annual profit plan for the coming year. The cost behavior pattern of the maintenance costs must be determined. The accounting staff has suggested the use of linear regression to derive an equation for maintenance hours and costs. Data regarding the maintenance hours and costs for the last year and the results of regression analysis follow:

Month	Hours of Activity	Maintenance Costs
January	480	$4,200
February	320	3,000
March	400	3,600
April	300	2,820
May	500	4,350
June	310	2,960
July	320	3,030
August	520	4,470
September	490	4,260
October	470	4,050
November	350	3,300
December	340	3,160
Sum (Σ)	4,800	43,200
Average (μ)	400	3,600

Regression Statistics	
Adjusted R-Square	0.99724
Standard Error of the Estimate	34.469
Observations	12
a (intercept)	684.65
b coefficient	7.2884
t-value for β	60.105

Required:

(a) If Armer Company uses the high-low method of cost estimation, write the equation for the relationship between hours of activity and maintenance costs. (4 marks)

(b) Using the data from the regression statistics, calculate budgeted maintenance costs assuming activity in a given month is 420 hours. (2 marks)

(c) What is the total variance (in percentage terms) that can be explained by the regression equation? (2 marks)

(d) Assume the ρ-value for the slope in the regression analysis has a value of 0.01. Explain the meaning of this ρ-value. (2 marks)

(e) Armer Company is considering adding additional cost drivers and performing multiple regression analysis. Name four (4) assumptions inherent in the use of multiple regression analysis. (4 marks)

Question No. 1 (continued) (14 marks)

Answer:

(a) *($4,470 – $2,820)/(520 - 300) = $7.50;*
$4,470 – 520 x $7.50 = $570
Y = 570 + 7.5x

(b) *$684.65 + 420 x $7.2884 = $3,745.78*

(c) *99.724%*

(d) *The 0.01 p-value means there is a 1% probability that the variable element for maintenance costs related to hours of activity could be zero instead of $7.50 per hour.*

(e)

(i) *there is a linear relationship between the dependent variable and the independent variables;*
(ii) *the error terms are normally distributed;*
(iii) *the error terms have a constant variance for all the observations;*
(iv) *the error terms are not correlated with each other;*
(v) *there is little or no correlation between the independent variables;*
(vi) *the number of observations must be greater than the number of independent variables.*

Question No. 2 (14 marks)

Anderson Printing Incorporated (API) has a job costing system with two direct cost pools (direct material and direct manufacturing labor) and one indirect cost pool (manufacturing overhead, which is allocated using direct manufacturing labor costs). You are reviewing the following incomplete accounts of API through January 31, 2012. Consider the data that appear in the T-accounts below as well as additional information given in items (a) through (i).

Materials Inventory Control	
12/31/2011	
Balance 15,000	

Wages Payable Control	
	1/31/2012
	Balance 3,000

Work in Process Inventory Control	

Manufacturing Department Overhead Control	
Jan - 57,000	

Manufacturing Overhead Allocated	

Finished Goods Inventory Control	
12/31/2011	
Balance 20,000	

Cost of Goods Sold	

Question No. 2 (continued) (14 marks)

Additional Information:

(a) Manufacturing department overhead is allocated using a budgeted rate set every December. Management forecasts 2012 manufacturing overhead and direct manufacturing labor costs at $600,000 and $400,000, respectively.

(b) The only job unfinished on January 31, 2012 is Job No. 419 on which direct manufacturing labor costs are $2,000 (based upon 125 direct manufacturing labor hours) and direct material costs are $8,000.

(c) Total material placed into production during January is $90,000.

(d) Cost of goods completed and transferred to finished goods during January is $180,000.

(e) Material inventory at January 31, 2012 is $20,000.

(f) Finished goods inventory at January 31, 2012 is $15,000.

(g) All plant workers earn the same wage rate. Direct manufacturing labor hours utilized during January total 2,500. Other indirect labor and supervision costs total $10,000.

(h) All personnel are paid on a weekly basis. The gross plant payroll on each weekly payday during January totals $52,000. Ignore withholdings.

(i) Actual manufacturing department overhead costs incurred during January are $57,000 and have already been posted.

Required:

(a) Calculate the following: (10 marks)

(i) Material purchased during January
(ii) Cost of Goods Sold during January
(iii) Manufacturing Overhead Allocated during January
(iv) Balance, Wages Payable Control, December 31, 2011
(v) Balance, Work in Process Inventory Control, January 31, 2012
(vi) Balance, Work in Process Inventory Control, December 31, 2011
(vii) Balance, Finished Goods Inventory Control, January 31, 2012

(b) Assume that API considers any overhead overapplied or underapplied to be material and that API disposes of any overapplied or underapplied overhead by prorating it according to the ending balances in cost of goods sold, beginning work-in-process inventory, and finished goods inventory. Prepare the necessary journal entry. (4 marks)

Answer:
(a)

(i) *$15,000 + PURCHASES - $20,000 = $90,000.*
PURCHASES = $95,000

(ii) *$20,000 + $180,000 - $15,000 = $185,000*

(iii) *DL = $2,000 / 125 = $16/DLH * 2,500 HRS = $40,000*
*OHD $600,000 / $400,000 = 150% DL cost * $40,000 = $60,000*

(iv) *BEGIN A/P + $50,000 - $52,000 = $3,000; BEGIN A/P = $5,000*

Question No. 2 (continued) (14 marks)

(v) *$8,000 + $2,000 + ($2,000 * 150%) = $13,000*

(vi) *BEGIN WIP + $90,000 + $40,000 + $60,000 - $180,000 = $13,000 BEGIN WIP = $3,000*

(vii) *$20,000 + $180,000 - $185,000 = ENDING FG = $15,000*

(b)

OHD APPLIED	*$60,000*
OHD ACTUAL	*57,000*
	$ 3,000 overapplied

ENDING BAL CGS	*$185,000*	*86.86%*	*$2,606*
ENDING BAL WIP	*13,000*	*6,10%*	*$ 183*
ENDING BAL FG	*15,000*	*7.04%*	*$ 211*
TOTAL	*$213,000*	*100.0%*	*$3,000*

Manufacturing Overhead Allocated	*$3,000*	
Cost of Goods Sold		*$2,606*
Ending WIP Inventory		*183*
Ending FG Inventory		*211*

Question No. 3 (12 marks)

Laguna Cay Convenience is a popular food store at a well-known beach resort. Nick Ankstrom, the co-owner, is in the process of deciding how much shelf space to devote to four different juices that are used in specialty cocktail drinks. Data relating to these four juices are as follows:

	Guava Juice	**Kiwi Juice**	**Orange Juice**	**Mango Juice**
Selling price per case	$19.80	$21.12	$29.04	$42.24
Variable costs per case	14.85	16.72	22.11	33.22
Cases sold daily/metre of shelf space	25	24	4	5

Ankstrom has a maximum front shelf space of 12 metres to devote to the four juices. He wants a minimum of 1 metre and a maximum of 6 metres of front shelf space for each juice.

Required:

(a) The other co-owner, Niklaus Svensson, has recommended that Nick maximize the shelf space devoted to those juices with the highest contribution margin per case. Evaluate this recommendation. (2 marks)

(b) What specific shelf allocation for the four juices would you recommend for Laguna Cay? Calculate the daily contribution margin that will be generated by each juice and in total based upon your recommendation. Provide supporting calculations. (10 marks)

Question No. 3 (continued) (12 marks)

Answer:

(a) The argument fails to recognize that shelf space is the constraining factor. There are only 12 metres of front shelf space to be devoted to drinks. Sexton should aim to get the highest daily contribution margin per metre of front shelf space:

(b)

	Guava Juice	***Kiwi Juice***	***Orange Juice***	***Mango Juice***
Selling price per case	*$19.80*	*$21.12*	*$29.04*	*$42.24*
Deduct variable costs per case	*14.85*	*16.72*	*22.11*	*33.22*
Contribution margin per case	*$ 4.95*	*$ 4.40*	*$ 6.93*	*$ 9.02*

	Guava Juice	***Kiwi Juice***	***Orange Juice***	***Mango Juice***
Contribution margin per case	*$ 4.95*	*$ 4.40*	*$ 6.93*	*$ 9.02*
Sales (number of cases) per metre of shelf space per day	*× 25*	*× 24*	*× 4*	*× 5*
Daily contribution per metre of front shelf space	*$123.75*	*$105.60*	*$27.72*	*$45.10*

Therefore, the allocation that maximizes the daily contribution from juice sales is:

Metres of Shelf Space	***Daily Contribution per Metre of Front Shelf Space***	***Total Contribution Margin per Day***	
Guava	*6*	*$123.75*	*$ 742.50*
Kiwi	*4*	*105.60*	*422.40*
Orange Juice	*1*	*45.10*	*45.10*
Mango Juice	*1*	*27.72*	*27.72*
			$1,237.72

The maximum of six metres of front shelf space will be devoted to Guava Juice because it has the highest contribution margin per unit of the constraining factor. Four metres of front shelf space will be devoted to Kiwi Juice, which has the second highest contribution margin per unit of the constraining factor. No more shelf space can be devoted to Kiwi Juice because each of the remaining two products, Orange Juice and Mango Juice (that have the second lowest and lowest contribution margins per unit of the constraining factor) must each be given at least one metre of front shelf space.

Question No. 4 (18 marks)

Graybill Company produces plastic photo frames. Two departments, Molding and Finishing, are involved in the manufacturing process. The Molding Department fills the molds with hot liquid plastic at the beginning of the production process. The plastic is left to cool and the molds are then opened. The finishing department removes the plastic frame from the mold and strips the edges of the frames of any surplus plastic. The following information is available for the month of January:

	January 1		**January 31**	
Work-in-Process Inventory	**Quantity (pounds)**	**Cost**	**Quantity (pounds)**	**Cost**
Molding Department	None	None	None	None
Finishing Department	5,000	$15,000	2,000	?

Question No. 4 (continued) (18 marks)

The $15,000 beginning work-in-process inventory in the Finishing Department comprises $10,000 in direct materials and $5,000 in conversion costs. The beginning and ending work-in-process inventory in the Finishing Department are both 25% complete. Conversion costs are incurred uniformly in both departments.

Production costs incurred during January are:

Costs of Production	Materials Used	Conversion Costs Incurred
Molding Department	$300,000	$50,000
Finishing Department	None	$40,000

The total amount of liquid plastic used in the Molding Department was 50,000 pounds. Normal spoilage is negligible. The firm uses the FIFO method of process costing.

Required:

(a) Prepare a Cost of Production Report for the Finishing Department for Graybill Company for the month of January. (15 marks)

(b) Identify three limitations associated with use of process costing. (3 marks)

Answer:

(a)

Graybill Company
Cost of Production Report
Finishing Department

		Equivalent Units		
Physical Flow	*Physical Units*	*Transferred-in Costs*	*Materials*	*Conversion*
Beginning WIP	*5,000*			
Units (molds) transferred in	*50,000**			
To account for	*55,000*			
To complete beginning WIP	*5,000*	*0*	*0*	*3,750 (75%)*
Started and completed	*48,000*	*48,000*	*48,000*	*48,000*
Ending WIP (25%)	*2,000*	*2,000 (100%)*	*0*	*500 (25%)*
Accounted for	*55,000*			
Work done in current period (1)		*50,000*	*48,000*	*52,250*
Cost reconciliation				
Beginning WIP	*$ 15,000*	*(cost of work done before current period)*		
Added this period (2)	*390,000*	*350,000**	*0***	*40,000*
Costs to account for	*$ 405,000*			
Cost per equivalent unit in January period (2)/(1)		*$7.00*	*$0.00*	*$0.76555*
Cost assignment				
Beginning WIP	*$ 15,000*	*10,000*	*0*	*5,000*
*To complete beginning WIP****	*2,871****	*0*	*0*	*2,871*
*Started and completed****	*372,746*****	*336,000*	*0*	*36,746*
Total cost of units completed and transferred out	*$390,617*	*346,000*	*0*	*44,617*
*Ending WIP****	*14,383******	*14,000*	*0*	*383*
Total costs accounted for	*$405,000*	*360,000*	*0*	*45,000*

Question No. 4 (continued) (18 marks)

[*] *There is no beginning or ending WIP in the Molding Department. Therefore, the 50,000 molds that were started in the Molding Department must have all been completed and transferred out. They represent the transferred-in units of the Finishing Department. The total costs incurred in the Molding Department are: $300,000 (given) + $50,000 (given) = $350,000. This, therefore, represents the transferred-in costs in the Finishing Department.*

[**] *There are no materials added in the Finishing Department. Hence, there are no direct materials costs incurred in the Finishing Department.*

[***] *Costs to complete beginning WIP = $2,871 (3,750 CC equivalent units x $0.76555 per equivalent unit).*

[****] *Cost of molds completed and transferred out = $372,746: (48,000 TI equivalent units x $7.00) + (48,000 DM equivalent units x $0.00) + (48,000 CC equivalent units x $0.76555)*

[*****] *Costs to complete the ending WIP = $14,383: (2,000 TI equivalent units x $7.00) + (2,000 DM equivalent units x $0) + (500 CC equivalent units x $0.76555).*

(b) Three limitations associated with the use of process costing systems are:

(i) Process costing is based upon average costs and sometimes does not properly represent relevant costs for decision-making;

(ii) It is often difficult to determine when and how costs are incurred in the production process, including normal and abnormal spoilage thereby affecting the ability of managers to exercise and/or monitor cost control; and

(iii) The stage of completion of the WIP is usually an estimate which will affect calculations for equivalent units and equivalent unit costs, thereby creating possible distortions in the information contained in Cost of Production Reports.

Question No. 5 (7 marks)

Donnegan, Inc. manufactures and sells a wide variety of consumer products. The products are viewed as sufficiently profitable, but recently some product line managers have complained about the charges for the call centre that handles phone calls from customers about the products. Product lines are currently charged for call centre support costs based on product sales revenues. The manager of The Widget is particularly upset because he has just obtained a report that includes the following information for last year:

Product	**The Widget**	**The Gadget**
Number of calls for information	2,000	4,000
Average length of calls for information	3 minutes	5 minutes
Number of calls registering complaints	200	1,000
Average length of complaint calls	5 minutes	10 minutes
Sales volume	$400,000	$100,000

The Widget is simple to use and consumers have little concern about adverse health effects. The Gadget is more complex to use and has many health hazard warnings on its label. Donnegan currently allocates call centre support costs using a rate of 5% of sales dollars. The manager of The Widget argues that the current system does not properly trace call centre resource usage to each product to more accurately reflect resource consumption.

Required:

(a) Suppose Donnegan announces that it will now allocate call centre support costs based on an activity-based cost (ABC) system that uses minutes of calls as the activity cost driver. Suppose also that the rate is 70 cents per minute. Calculate the call centre cost allocations to The Widget and The Gadget under the previous system and under the newly proposed ABC system. (3 marks)

Question No. 5 (continued) (7 marks)

(b) Evaluate the argument of the manager of the Widget. Provide calculations to properly support your answer. (4 marks)

Answer:

(a) *Previous system:*
Assignment of costs to the Widget: *.05*$400,000 = $20,000*
Assignment of costs to The Gadget: *.05*$100,000 = $5,000*

New system:
Assignment of costs to The Widget: *(2000*3) + (200*5) = 7,000 minutes*
*7000 * $0.70 = $4,900*
Assignment of costs to The Gadget: *(4000*5) + (1000*10) = 30,000 minutes*
*30,000 * $0.70 = $21,000*

(b) *The manager of the Widget is correct. Under the current system the Widget absorbed 80% of costs ($20,000 / $25,000) but only handled 18.9% of call time (7,000 minutes / 37,000 minutes). The reverse is true for the gadget. The gadget only absorbs 20% of costs ($5,000 / $25,000) but handled 81.9% of call time (30,000 minutes / 37,000 minutes). It is call time that drives overhead costs at the call centre. This is clearly an example of product cost cross-subsidization. Under the current system, the widget is carrying the bulk of the overhead costs but using less of the service.*

The proposed ABC system would eliminate product cost cross-subsidization and will appropriately increase cost allocations to gadgets ($5,000 up to $21,000) and decrease cost allocations to widgets ($20,000 down to $4,900). This makes sense from a profitability perspective for the company since gadgets are only 20% of sales ($100,000/$500,000) but use 81% of call time (30,000/37,000 minutes).