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ADM 3346X
COST ACCOUNTING
Spring/Summer 2015
Mid Term Exam
Solutions

. . . . . / 80 marks

NAME: _____ **STUDENT #:** _____

1. This examination comprises 5 questions over 15 pages. The last page (page 15) is an extra page for rough work and any additional supporting calculations. Answer all questions directly in this booklet. The booklet is not to be removed from the examination room. You may separate the pages but ensure that you put them back together and staple them before handing in.

2. Limit your answer to the space provided. Blank sheets for rough work and supporting calculations are given at the end of each question. You must show, where appropriate, supporting calculations.

3. This exam is out of 80 marks and is 2½ 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. They must be shown to the invigilator before the start of the exam.

6. The use of electronic communication devices such as cell phones is strictly prohibited during the exam.

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

	Marks
Question No. 1 – Process Costing	**/18**
Question No. 2 – Quantitative Analyses of Cost Functions	**/14**
Question No. 3 – Job Costing	**/14**
Question No. 4 – Activity Based Costing	**/17**
Question No. 5 – Cost Volume Profit Analysis	**/17**
Total	**/80**

Statement of Academic Integrity:

The School of Management does not condone academic fraud, an act by a student that may result in a false academic evaluation of that student or of another student. Without limiting the generality of this definition, academic fraud occurs when a student commits any of the following offences: plagiarism or cheating of any kind, use of books, notes, mathematical tables, dictionaries or other study aid unless an explicit written note to the contrary appears on the exam, to have in his/her possession cameras, radios (radios with head sets), tape recorders, pagers, cell phones, or any other communication device which has not been previously authorized in writing.

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.

Name:_____ (signature)

Note:
A quiz received without the signature of the student will not be graded and will receive a score of zero.

Question No. 1 (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	?

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. The firm uses the FIFO method of process costing.

Required:

Prepare a Cost of Production Report for the Finishing Department for Graybill Company for the month of January.

Question No. 1 (continued) (18 marks)

Answer:

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 (100%)*	*0*	*3,750 (75%)*
Started and completed	*48,000*	*48,000*	*48,000*	*48,000*
Ending WIP (25%)	*2,000*	*2,000 (100%)*	*2,000 (100%)*	*500 (25%)*
Accounted for	*55,000*			
Work done in current period (1)		*50,000*	*50,000*	*52,250*
Cost reconciliation				
Beginning WIP	*$ 15,000*			
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*

[*] *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. The total costs incurred in the Molding Department are: $300,000 DM (given) + $50,000 CC (given) = $350,000. This 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. There are, however, $40,000 in conversion costs incurred in the Finishing Department (given).*

[***] *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).*

Question No. 2 (14 marks)

Mountainvale Company is accumulating data to use in preparing its annual profit plan for the coming year 2015. 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 maintenance hours of activity and corresponding and costs for 2014 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 Mountainvale Company uses the high-low method of cost estimation, formulate 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) Mountainvale Company is considering adding additional cost drivers and performing a multiple regression analysis. Name any four (4) assumptions inherent in the use of a valid multiple regression analysis. (4 marks)

Question No. 2 (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 that we would be wrong one out of 100 times by concluding that the slope of the regression line (i.e. slope = $7.50 per hour) is not random as it relates to maintenance costs.*

(e)
(i) *there is a linear relationship between the dependent variable and the independent variables within the relevant range of the activity being considered;*
(ii) *the error or residual terms are randomly distributed with no apparent pattern about the independent variables (i.e. there is a normal distribution);*
(iii) *the error terms have a constant variance for all the observations;*
(iv) *the error terms are not correlated with each other (i.e. autocorrelation);*
(v) *there is little or no correlation between the independent variables (i.e. no multicollinearity); and*
(vi) *the number of observations must be greater than the number of independent variables.*

Question No. 3 (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. 3 (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 (BEG RM INV + PURCHASES – $20,000 (END RM INV) = $90,000. Therefore, DM PURCHASES = $95,000*

(ii) *$20,000 (given) + $180,000 (CGM) – $15,000 = $185,000 CGS*

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

(iv) *BEG WAGES PAYABLE + (40,000 DL+10,000 IDL) – $52,000 = $3,000*
Therefore, BEG WAGES PAYABLE = $5,000 (Jan 1/12)

Question No. 3 (continued) (14 marks)

(v) *$8,000 DM + $2,000 DL+ ($2,000 * 150%) OHD ALLOCATED = $13,000 (Ending WIP on Jan 31, 2012)*

(vi) *BEG WIP + $90,000 DM USED + $40,000 DL + $60,000 (OHD ALLOCATED) – $180,000 (CGM) = $13,000 END WIP (from (v) above. Therefore, BEG WIP = $3,000 (Jan 1/12)*

(vii) *$20,000 (given) + $180,000 (CGM) – $185,000 (CGS) = ENDING FG = $15,000 (Jan 31/12)*

(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. 4 (17 marks)

A company produces two car models: the XL and the XLS. Recently, the company has incurred losses and, because it does not have detailed information on the costs incurred to manufacture both models under its existing cost information system, it has decided to implement an activity-based costing (ABC) system in order to improve cost management and control.

This year, the unit prices charged to customers were $16,000 for the XL and $22,000 for the XLS. Production costs for each car model are as follows:

	XL	**XLS**
Direct material per unit	$4,250	$6,750
Direct labour per unit	$1,500	$2,000

Outlined below are the costs incurred during the last month for the company's four categories of overhead costs:

Purchasing	$ 350,000
Machine operating	550,000
Handling	250,000
Shipping	300,000
Total	$1,450,000

Currently, overhead costs are applied to each car model based on machine hours used. There are 480 machine hours available each month and the manufacturing capacity is fully used. Other relevant information follows:

	XL	**XLS**
Number of units produced by month	70	67.5
Number of hours of purchasing by month	60	80
Number of machine hours used to produce 1 unit	3	4
Number of handling moves by month	4	8
Percentage of shipments	20%	80%

Question No. 4 (17 marks)

Required:

(a) Calculate the cost of producing each car model using the traditional costing system.
(b) Calculate the cost of producing each car model using the new ABC system.
(c) According to the results in part (b), which car model seems to be priced too low?
(d) Is it possible for the company to make a profit if it sells the XL model for $14,000? Explain.

Answer:

(a) Traditional costing system, overhead based on machine hours used:

	XL	***XLS***
Direct material per unit	*$ 4,250*	*$ 6,750*
Direct labour per unit	*$ 1,500*	*$ 2,000*
Overhead costs	*9,063*[1]	*12,083*[2]
Total costs per unit	*$14,813*	*$20,833*

[1] *$1,450,000 x (70 units x 3 hours per unit / 480 hours total) = $634,375*
$634,375 / 70 units = $9,063 per unit

[2] *$1,450,000 x (67.5 units x 4 hours per unit / 480 hours total) = $815,625*
$815,625 / 67.5 units = $12,083 per unit

(b) Overhead allocation using ABC:

XL:		***Model***
Purchasing	*$350,000 x 60 / 140*	*$150,000*
Machine operating	*$550,000 x (3 x 70 / 480)*	*240,625*
Handling	*$250,000 x 4/12*	*83,333*
Shipping	*$300,000 x 20%*	*60,000*
Total		*$533,958*

Overhead cost per unit: *$533,958 / 70 = $7,628*[1]
Total cost per unit: *$4,250 DM + $1,500 DL + $7,628 Overhead = $13,378*

[1] *Alternative:*

Purchasing:	*$2,143*
Machine operating:	*3,438*
Handling:	*1,190*
Shipping:	*857*
	$7,628

XLS:		***Model***
Purchasing	*$350,000 x 80 / 140*	*$200,000*
Machine operating	*$550,000 x (4 x 67.5 / 480)*	*309,375*
Handling	*$250,000 x 8/12*	*166,667*
Shipping	*$300,000 x 80%*	*240,000*
Total		*$916,042*

Overhead cost per unit: *$916,042 / 67.5 = $13,571*[2]
Total cost per unit: *$6,750 DM + $2,000 DL + $13,571 Overhead = $22,321*

[2] *Alternative:*

Purchasing:	*$2,963*
Machine operating:	*4,583*
Handling:	*2,469*
Shipping:	*3,356*
	$13,571

Question No. 4 (continued) (17 marks)

(c) *The price of the model XLS, $22,000, is too low because the costs incurred for the XLS are $22,321 according to the ABC system, and the company would be losing $321 per car.*

(d) *The company can still make a profit because, according to the ABC system, the total cost of the XL model is $13,378. Hence, at a price of $14,000, a profit of $622 is still possible.*

Question No. 5 (17 marks)

Last summer (2014), Rheo Butler ran a fish stand near a popular summer resort. He sold only family size cartons of fish and chips and had sales of 5,000 cartons at $50,000 and variable costs of $30,000. His fixed costs for rent of the stand and equipment and for employee salaries were $5,000 and $7,000, respectively.

This summer (2015), Rheo plans to add shrimp to his sales items. He expects to sell the shrimp for $7.00 per carton with variable costs per carton of $2.50. Rheo will require a larger refrigerator that will add $5,000 to fixed costs. The refrigerator will be used for both fish and shrimp. Rheo expects to sell 3,000 cartons of shrimp this summer. However, he also expects that introduction of shrimp will reduce his fish sales by 10 percent from last summer's level.

Total fixed costs are common to both products.

Required:

(a) What is Rheo's expected operating income for 2015 with the inclusion of shrimp? (6 marks)

Answer:

	Fish		*Shrimp*		*Total*
Sales in cartons	*4,500 (5000 −10%)*		*3,000*		*7,500*
Sales in dollars	*@10*	*$45,000*	*@7*	*21,000*	*$66,000*
VC	*@ 6*	*27,000*	*@2.50*	*7,500*	*34,500*
CM	*@4*	*18,000*	*@4.50*	*13,500*	*31,500*
FC					*17,000*
Operating Income					***$14,500***

(b) What will be his breakeven point in total cartons in 2015 at the expected sales mix? What will be the breakeven point in cartons of fish and in cartons of shrimp at the expected sales mix? (5 marks)

Answer:

Average CM per unit = $31,500/7,500 = $4.20 ***or*** *(.60)($4) + (.40)($4.50) = $4.20*

BEP in units = $17,000/4.20 = 4048 cartons (rounded)

Fish = (4500/7500) x 4048 = 2429
Shrimp = (3000/7500) x 4048 = 1619

(c) With the inclusion of shrimp, calculate the degree of operating leverage expected for 2015. (2 marks)

Answer:

DOL = CM / Operating Income = $31,500/14,500= 2.1724

Question No. 5 (continued) (17 marks)

(d) Using your answer in (c) above, if the total number of cartons sold (fish and shrimp) increased to 9,000 cartons, calculate the new expected operating income. (2 marks)

Answer:

$14,500 x (DOL 2.1724 x 20% x $14,500) =$20,800 (rounded)*

* an increase from 7,500 cartons to 9,000 cartons represents a 20% increase.

(e) For the year 2016, Rheo expects that the shrimp will become more popular and there will be a sales shift to more shrimp. Without preparing calculations, will Rheo's breakeven sales in cartons increase or decrease? Explain your answer. (2 marks)

Answer:

CM on shrimp = 4.50, CM on fish = 4.00 so average CM will go up; BEP will go down.