



ADM 3346 X
Mid Term Examination
Cost Accounting
Spring/Summer 2011
Suggested Solutions

2 hours

Student Name: _____

Student #: _____

Section: (Prof. Robert Collier)

Instructions:

1. This examination comprises 5 short-answer questions and 3 longer-answer problems over 14 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
<u>Short-Answer Questions</u>	
Q.1	/4
Q.2	/3
Q.3	/7
Q.4	/6
Q.5	/6
<u>Long-Answer Problems</u>	
P.1	/12
P.2	/12
P.3	/15
Total	/65

Statement of Academic Integrity

The Telfer 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.

Signed: _____

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

SHORT-ANSWER QUESTIONS**Question No. 1 (4 marks)**

Jones Corporation prepared the following budgeted income statement at the beginning of the current year:

Expected sales (80,000 units)		\$400,000
Operating costs:		
Variable costs	\$220,000	
Fixed costs	<u>100,000</u>	<u>320,000</u>
Operating income		<u>\$ 80,000</u>

During the middle of the year, the managers estimated that regular sales would amount to only 70,000 units. Recently, a foreign company requested a special order for 10,000 units at a price of \$4. If the order is accepted, each unit must be stamped with the customer's name. This would require the purchase of a stamping machine for \$6,000 that could only be used for this order. Variable costs associated with this special order would be \$2.90

Required:

Calculate the dollar value increase or decrease in overall company profitability if the order is accepted. (4 marks)

Solution:

		Accept	Do not accept
Revenues		\$ 390,000	\$ 350,000
Variable costs	221,500	192,500	
Fixed costs	<u>106,000</u>	<u>100,000</u>	
Profit	\$ <u>62,500</u>	\$ <u>57,500</u>	

or
(in favour of acceptance)

Difference in revenue:	$[(70,000 * 5) + (10,000 * 4)] - (70,000 * 5)$	=	\$ 40,000
Difference in VC	$[(70,000 * 2.75) + (10,000 * 2.90)] - (70,000 * 2.75)$	=	(29,000)
Difference in FC		=	(6,000)
Increase in profitability		=	<u>\$ 5,000</u>

Question No. 2 (3 marks)

A product with a 40% contribution margin broke even at a sales level of \$120,000. New safety regulations will raise fixed costs by \$20,000.

Required:

If no other cost changes occur, what will be the new breakeven point? (3 marks)

Solution:

$40\% \times \$120,000 = \$48,000$ fixed costs originally. New fixed costs = \$68,000.
So, new sales = $\$68,000 / .4 = \underline{\$170,000}$

Question No. 3 (7 marks)

Alonzo Corporation produces and sells three products: chairs, tables, and artificial plants. Data related to the three products appears in the table below:

	<u>Chairs</u>	<u>Tables</u>	<u>Artificial Plants</u>
Expected sales volume (units)	800	200	150
Price per unit	\$50.00	\$70.00	\$20.00
Variable cost per unit	12.00	30.00	3.00

Total fixed costs are \$9,000, and Alonzo's tax rate is 30%.

Required:

Based on the preceding information, calculate:

- the break-even point in units for each product; and (5 marks)
- the margin of safety in units for the company as a whole. (2 marks)

Solution:

(a) Sales mix is:

$$\begin{aligned} \text{Chairs } 800 / 1150 &= 70\% \text{ rounded } (69.565\%) \\ \text{Tables } 200 / 1150 &= 17\% \text{ rounded } (17.391\%) \\ \text{Plants } 150 / 1150 &= 13\% \text{ rounded } (13.044\%) \end{aligned}$$

Weighted average CM based upon above sales mix is:

$$.70 (\$50 - \$12) + .17 (\$70 - \$30) + .13 (\$20 - \$3) = \underline{\$35.61}$$

Therefore, overall BEP (in units): $\$9,000 / \$35.61 = 252.74$ units (253 units rounded)

BEP for each product: (rounded)

$$\begin{aligned} \text{Chairs } .70 \times 253 \text{ units} &= 177 \text{ chairs} \\ \text{Tables } .17 \times 253 \text{ units} &= 43 \text{ tables} \\ \text{Plants } .13 \times 253 \text{ units} &= 33 \text{ plants} \end{aligned}$$

(b) Margin of safety (in units) for the company as a whole:

Total unit sales	1,150 units
BEP (units)	<u>253 units</u>
MOS (units)	<u>897 units</u>

Question No. 4 (6 marks)

Smeethers Steel operates a machine shop in which it mills custom parts out of titanium, steel, aluminum, and other metals. During April 2011, the company completed Job #356, which consisted of titanium parts, for a total cost of \$20,000. During April, titanium scrap worth \$1,000 was accumulated from all jobs. In May 2011, the scrap was sold for \$1,000. The company's accountant considers the value of titanium scrap to be material.

Required:

- Assume that 50% of the scrap can be associated with Job #356, but that the rest of the scrap resulted from several other jobs and was not traced individually. Prepare any journal entries required for April and May if the company's policy is to record titanium scrap during the month of production. (3 marks)
- Describe one advantage and one disadvantage for Smeethers Steel recording scrap at the time of production. (3 marks)

Question No. 4 (continued) (6 marks)Solution:

(a) April JE:

Scrap inventory	\$1,000	
Work-in-process (Job 356)		\$500
Overhead control		\$500

May JE:

Cash	\$1,000	
Scrap inventory		\$1,000

- (b) Advantages of recording scrap at the time of production include establishing control over the titanium scrap (which, according to the problem, are material for this company) and more quickly recognizing the value of scrap in the cost of jobs and in overhead. Disadvantages include: (i) the time and effort to measure and maintain records of the physical quantities and values; (ii) if scrap prices fluctuate rapidly, then this method also distorts costs (until the scrap is ultimately sold).

Question No 5 (6 marks)

Benedict Legal Services employs five full-time attorneys and eight paraprofessionals. Budgeted annual salaries for 2011 include \$90,000 for each attorney and \$35,000 per paraprofessional. For 2010, indirect costs were budgeted at \$217,500, but actually amounted to \$225,000. Actual salaries were \$94,000 for each attorney and \$37,500 for each paraprofessional.

Direct and indirect costs were applied on a professional labour-hour basis, which includes both attorney and paraprofessional hours. Total budgeted hours were 30,000; however, actual labour hours were 35,000.

Required:

Calculate the costs to be allocated to a client using a normal costing system when 1,500 professional labour hours were used. (6 marks)

Answer:

For a normal costing system, direct costs are traced to the cost object (the client) using actual direct cost rates multiplied by the actual quantity of the direct cost input (professional labour hours) and indirect costs are allocated to the cost object using budgeted indirect cost rates multiplied by the actual quantity of the cost allocation base (professional labour hours).

Therefore:

$$\begin{aligned} \text{Direct:} \quad & 5 \times \$94,000 = \$470,000 \\ & 8 \times \$37,500 = \underline{\$300,000} \\ & \$770,000 \div 35,000 \text{ DLH} = \$22.00 \text{ per DLH} \end{aligned}$$

$$\text{Indirect:} \quad \$217,500 \div 30,000 \text{ DLHs} = \$7.25 \text{ per DLH}$$

Costs to be allocated to a client when 1,500 professional labour hours were used:

$$(\$22.00 + \$7.25) \times 1,500 \text{ DLHs} = \$33,000 + \$10,875 = \underline{\underline{\$43,875}}$$

LONG-ANSWER PROBLEMS**Problem No. 1 (12 marks)**

Following are the results from two different simple regression analyses, estimating the costs of the purchasing department using number of purchase orders and number of vendors as potential cost drivers.

Purchasing costs vs. Number of purchase orders			
Variable	Coefficient	t-statistic	p-value
Intercept	497.25	3.39	0.04
Number of purchase orders	18.72	5.48	0.001
Adjusted R-square = 0.79			

Purchasing costs vs. Number of vendors			
Variable	Coefficient	t-statistic	p-value
Intercept	691.15	1.45	0.25
Number of vendors	115.88	2.75	0.15
Adjusted R-square = 0.53			

Required:

- Using the data above, describe three reasons why the number of purchase orders is a better cost driver to use than the number of vendors. Write the corresponding cost function. (6 marks)
- For the next month, the number of vendors is estimated to be 150, while the number of purchase orders is estimated to be 340. Estimate the total cost for next month. (2 marks)
- Describe two limitations inherent in the use of regression analysis in this particular situation. Be specific in your answer. (4 marks)

Solution:

- Three reasons why the number of purchase orders is a better cost driver to use are:
 - a higher t-statistic of 5.48; the t-statistic measures the significance of the X-independent variable and, in this case, means that the coefficient of the independent variable (number of purchase orders) is significantly greater than zero;
 - a lower p-value of 0.001; the p-value measures the probability that the coefficient of the X-independent variable is not different from zero; in this case the probability of this result is almost zero;
 - a higher adjusted R² value of 79% showing how well the variation in purchasing costs is explained by the no. of purchase orders as a measure of goodness of fit;

The corresponding cost function is: $\$497.25 + \$18.72X$ (where X = number of purchase orders)

- Total purchasing costs = $\$497.25 + \$18.72X$
 = $\$497.25 + \$18.72(340)$
 = $\$497.25 + \$6,364.80$
 = $\$6,862.05$
- Uncertainties/limitations that could affect accuracy of the cost function include:
 - The R² is only 79% which could mean normal variations could still occur in the amount of resources devoted to purchases orders issued.
 - Past cost information may either not be available or be unreliable.
 - Better cost estimates in purchasing costs will only result if the time period is short.
 - An unanticipated salary increase could take place affecting purchase employees, or a new employee may be hired who cannot keep up with the work forcing a temporary worker to be brought in until the new worker is trained, which could result in future purchasing costs being distorted.
 - Assumptions used (linearity, normal distribution of the error term, presence of heteroskedasticity) may not be met.

Problem No. 2 (12 marks)

Turbo Savings and Loan Limited collects fees for 3 service activities: credit risk assessments, loan processing, and miscellaneous services. During March 2011, the overhead costs related to these three service activities totalled \$500,000. Activity information and pertinent data for the month were as follows:

<u>Service</u>	<u>Events</u>	<u>Employee Time</u>	<u>Overhead Costs</u>
Credit risk assessment	60,000	150 hours	\$300,000
Loan processing	1,000	260 hours	130,000
Miscellaneous services	9,000	90 hours	70,000

Required:

- (a) Assume Turbo allocates overhead using an office-wide rate based upon employee time. Calculate the rate and the amount of overhead allocated to each service. (2½ marks)
- (b) One of the commercial clients, Desert Dune Buggies, had 1,000 credit risk assessments done, 50 loans processed, and 80 miscellaneous services performed, this month. The total employee time used for Desert Dune Buggies was estimated to be about 11 hours, of which 8 hours were for processing loans. How much overhead would be allocated to this client using the office-wide rate? (2 marks)
- (c) The overhead costs can be separated by service activity, so that all costs are traced to the service department where possible, and then costs that cannot be traced are allocated. Using this method, credit risk assessment costs were \$120,000, loan processing costs were \$200,000, and miscellaneous service costs were \$180,000. Number of credit risk assessments is used as the allocation base for credit checks, employee hours are used to allocate the costs of loan processing, and number of events (services) is used for miscellaneous services. How much overhead would be allocated to Desert Dune Buggies under this system? (3½ marks)
- (d) Why are the amounts allocated in parts (b) and (c) different? Be specific in your answer. (2 marks)
- (e) Suppose Turbo's managers would like to compare the profitability from Desert Dune Buggies with the profitability from other commercial clients. Under what cost behaviour situation may the costs that you calculated in part (c) not represent the incremental cost of overhead associated for the Desert Dune Buggies account? (2 marks)

Solution:

- (a) Allocation rate = $\$500,000/500 \text{ hours} = \$1,000 \text{ per employee hour}$
 Credit risk assessment gets $(150/500 \times \$500,000) = \$150,000$
 Loan processing gets $260/500 \times \$500,000 = \$260,000$
 Miscellaneous services gets $(90/500 \times \$500,000) = \$90,000$

- (b) The amount of overhead allocated to Desert Dune Buggies using the office-wide rate = $11 \text{ hours} \times \$1,000 \text{ per employee hour} = \$11,000$

- (c) Allocation rates:
 Credit risk assessments = $\$120,000/60,000 = \2 per assessment
 Loan processing = $\$200,000/260 = \$769.23/\text{employee hour}$
 Miscellaneous services = $\$180,000/9,000 = \20 per event .
 Therefore, the total costs for Desert Dune Buggies are:

Credit risk assessment ($\$2 \times 1,000$)	\$2,000
Loan processing ($\$769.23 \times 8$)	6,154
Miscellaneous services ($\$20 \times 80$)	<u>1,600</u>
Total	<u>\$9,754</u>

Problem No. 2 (continued) (12 marks)

- (d) Under the office-wide rate system, the overhead costs were combined into a single cost pool and then allocated based on employee time. Employee time may or may not be related to costs in the overhead pool. However, under ABC the overhead costs are divided into three cost pools that relate to specific types of services performed. The cost pools are then allocated using cost drivers that are more likely to reflect the use of resources. The cost driver for loan processing (employee time) is the same as under the office-wide rate. However, the cost drivers for the credit risk assessment and miscellaneous services differ from the allocation based used under the office-wide rate. Therefore, the ABC allocations more closely match the use of resources.
- (e) If a high proportion of the overhead costs are fixed (and often overhead does include a large proportion of fixed costs), then the ABC allocations would not provide a reasonable estimate of the incremental overhead cost for the Desert Dune Buggies account.

Problem No. 3 (15 marks)

The Fontana Manufacturing Company operates under a first-in, first-out (FIFO) method of process costing and produces plastic toys. It has two departments: Moulding and Assembly. For both departments, conversion costs are incurred uniformly throughout the manufacturing process. Direct materials are added at the beginning of the process in the Moulding Department, and additional direct materials are added at the end in the Assembly Department. Costs and unit production data for the month of May 2011 follow. All unfinished work at the end of May is 25% completed as to conversion costs. The beginning inventory on May 1 was 80% completed as to conversion costs on May 1. All completed work is transferred to the next department.

	Moulding Department	Assembly Department
<u>Beginning Inventories</u>		
Moulding: \$1,200 direct materials, \$960 conversion costs	\$ 2,160	
Assembly: \$7,740 previous department costs (transferred-in) And \$2,940 conversion costs		\$ 10,680
<u>Costs Added during Current Period</u>		
Direct materials	\$ 10,800	\$ 768
Conversion costs	\$ 9,600	\$ 5,940
<u>Physical Units</u>		
Units in beginning inventory	1,000	3,000
Units started this month	9,000	7,400
Good units completed and transferred out	7,400	6,000
Normal spoilage	740*	300**
Abnormal spoilage	260	100

* Normal spoilage in the Moulding Department is 10% of good units completed and transferred out.

** Normal spoilage in the Assembly Department is 5% of good units completed and transferred out.

Additional information

- Spoilage is assumed to occur at the end of each of the two processes when the units are inspected. Spoiled units are disposed of at zero net disposal price.
- Carry all units cost information to three decimal places where necessary. Calculate final totals to the nearest dollar.
- The cost of goods transferred into the Assembly Department during May was \$19,536.

Required:

Prepare a properly labeled Cost of Production Report for the Assembly Department of Fontana Manufacturing Company for the month of May using FIFO. Show all relevant supporting calculations where necessary. (15 marks)

Problem No. 3 (continued) (15 marks)Solution:**Equivalent Units**

<i>Physical Flow</i>	<i>Physical</i>		<i>Transferred-in</i>	
	<i>Units</i>		<i>Costs</i>	<i>Materials</i> <i>Conversion</i>
<i>Beginning WIP</i>	3,000		3,000 (100%)	0 (0%) 2,400 (80%)
<i>Started into production</i>	<u>7,400</u>			
<i>To account for</i>	<u>10,400</u>			
<i>To complete beginning WIP</i>	3,000		0 (0%)	3,000 (100%) 600 (20%)
<i>Started and completed</i>	3,000		3,000	3,000 3,000
<i>Normal spoilage</i>	300	300	300	300
<i>Abnormal spoilage</i>	100	100	100	100
<i>Ending WIP</i>	<u>4,000</u>	<u>4,000</u> (100%)	0 (0%)	1,000 (25%)
<i>Accounted for</i>	<u>10,400</u>			
<i>Work done in current period (1)</i>			<u>7,400</u>	<u>6,400</u> <u>5,000</u>
Cost reconciliation				
<i>Beginning WIP</i>	\$ 10,680*			
<i>Added this period (2)</i>	<u>26,244</u>	<u>19,536**</u>	<u>768</u>	<u>5,940</u>
<i>Costs to account for</i>	<u>\$ 36,924</u>			
<i>Cost per equivalent unit this period (2)/(1)</i>			\$2.64	\$0.12 \$1.188
Cost assignment				
<i>Beginning WIP</i>	\$ 10,680		7,740	0 2,940
<i>To complete beginning WIP***</i>	1,073		0	360 713
<i>Started and completed***</i>	11,844		7,920	360 3,564
<i>Normal spoilage***</i>	<u>1,184</u>	<u>792</u>	<u>36</u>	<u>356</u>
<i>Total cost of units completed and transferred out</i>	<u>24,781</u>	<u>16,452</u>	<u>756</u>	<u>7,573</u>
<i>Abnormal spoilage***</i>	395		264	12 119
<i>Ending WIP***</i>	<u>11,748</u>	<u>10,560</u>	<u>0</u>	<u>1,188</u>
<i>Total costs accounted for</i>	<u>\$36,924</u>	<u>27,276</u>	<u>768</u>	<u>8,880</u>

* The beginning WIP consists of \$7,740 in transferred in costs and \$2,940 in conversion costs.

** The cost of goods transferred into the Assembly Department is given as \$19,536.

*** Costs to complete beginning WIP, cost of units started and completed, costs of normal spoilage and abnormal spoilage, and costs of ending work-in-process inventory are equal to the appropriate number of equivalent units for each component multiplied by the cost per equivalent unit for that component.

Note that materials are added in the Assembly Department at the end of the process. Therefore WIP does not include any new materials.