Université d'Ottawa * University of Ottawa

École de gestion   School of Management

ADM 2341 Winter 2004

Solution !!!!!!!!!!!!!!!!!!!!!!!!!!! **FINAL EXAM**

Check √ your section
Professors:

Collier	Section A	☐
Eden	Section B	☐
Collier	Section C	☐
Gibson	Section D	☐
Eden	Section E	☐
LaRochelle	Section F	☐
Miles	Section G	☐

Student Name: (printed):... Student Number:......................................

QUESTION	MAX. GRADE
Short Answer	__/13
Exercises	
E.1	__/8
E.2	__/8
E.3	__/7
E.4	__/7
E.5	__/8
	/38
Problems	
P.1	__/15
P.2	__/17
P.3	__/17
	/49
Total	__/100

Grades for the questions are in brackets.

Plan your time by 1.8 minutes per point

1. Books and notes **are not** permitted.
2. Calculators **are** permitted, not programmable .
3. All questions are to be answered in this examination paper. No other paper will be corrected.
4. Do not remove any page from this paper.
5. In order to receive all of the marks which you have earned, **you must**:
   Show the calculations that you have made in arriving at your answer (the calculations are an integral part of the grading scheme);
6. Time allotted: 180 minutes

Short Answer Questions

S.1. **(2 points)** A firm has a negative contribution margin per unit. To reach break-even, it must:

* a. increase the unit selling price
b. increase the sales volume
c. decrease the sales volume
d. decrease fixed costs
e. none of the above

S.2. **(1 point)** If total contribution margin is decreased by a given amount, operating profit:

a. remains unchanged
* b. decreases by the same amount
c. decreases by more than the given amount
d. increases by the same amount
e. does none of the above

S.3. **(2 points)** A company's break-even point is increased by:

a. a decrease in variable costs per unit
b. a decrease in fixed costs
c. an increase in selling price per unit
* d. an increase in variable costs per unit
e. none of the above

S.4. **(2 points)** Last month, 75,000 kilograms of direct materials were purchased, and 71,000 kilograms were used. If the actual purchase price per kilogram was $0.50 more than the standard purchase price per kilogram, what was the materials price variance?

75,000* $0.50 = $37,500U . . . . . .

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S.5. **(2 points)** Expense A is a fixed cost; expense B is a variable cost. During the current year, the activity level has increased but is still within the relevant range. In terms of cost per unit of activity, you would expect which of the following statements to be true?

a) Expense A has remained unchanged.
b) Expense B has decreased.
* c) Expense A has decreased.
d) Expense B has increased.
e) None of the above

S.6. (4 points) Using the following data, calculate the beginning work-in-process inventory:

Cost of goods sold, $70
Direct labour, $20
Direct materials used, $15
Cost of goods manufactured, $80
Work-in-process ending, $10
Finished goods ending, $15
Manufacturing overhead, $30

Solution:

Direct Materials	15
Direct Labour	20
Overhead	30
Total manufacturing costs	65 **2 points**
Beginning work-in-process	?? **2 points**
Less ending work-in-process	(10)
Cost of goods manufactured	80

Solving for the unknown, beginning work-in-process is $25. **4 points** . . . . . .

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Exercises:

E.1.(8 points) Western Alliance Insurance Company insures clients in BC, Alberta, Saskatchewan, and Manitoba. The company uses a flexible overhead budget for its application-processing department. The firm offers five types of policies, with the following standard hours allowed for clerical processing.

Automobile . . . . . 1 hour
Renter's . . . . . 1 hour
Homeowner's . . . . . 2 hours
Health . . . . . 2 hours
Life . . . . . 5 hours

The following numbers of insurance applications were processed during July:

Automobile 250
Renter's 200
Homeowner's 100
Health 400
Life 200

Western Alliance's controller estimates that the variable overhead rate in the application-processing department is $4.00 per hour, and that fixed overhead costs are budgeted at $2,000 per month.

Required:

(a) Calculate the flexible budget for <u>total</u> overhead cost in July. **(6 points)**

Policy Type	Standard hours per application	Actual Activity	Standard Hours Allowed
Automobile	1	250	250
Renter's	1	200	200
Homeowner's	2	100	200
Health	2	400	800
Life	5	200	1,000
Total			**<u>2,450</u>**

Flexible budget for <u>total</u> overhead cost is:

= Budgeted VOH + Budgeted FOH
= ($4.00 x 2,450 hours allowed) + $2,000
= $9,800 + $2,000
= **$<u>11,800</u>**

(b). Comment on the feasibility of basing the flexible budget on the number of applications processed instead of the number of clerical hours allowed

Different types of applications required different amounts of clerical time and VOH is related to the use of clerical time. Basing the flex budget on the number of applications would produce a misleading estimate of overhead costs. <u>Example</u>: Processing 100 life insurance applications would entail much more overhead cost than processing 100 automobile insurance applications. **(2 points)**

E.2. (8 points) Tilson Company has projected sales and production in units for April and May of the coming year as follows:

	April	May
Sales	55,000	45,000
Production	65,000	55,000

Cash-related production costs are budgeted at $7 per unit produced. Of these production costs, 40% are paid in the month in which they are incurred and the balance in the following month. Selling and administrative expenses will amount to $110,000 per month. The accounts payable balance on March 31 totals $193,000, which will be paid in April.

All units are sold on account for $16 each. Cash collections from sales are budgeted at 60% in the month of sale, 30% in the month following the month of sale, and the remaining 10% in the second month following the month of sale. Accounts receivable on April 1 totaled $520,000 ($100,000 from February's sales and the remainder from March).

Required:
a) Prepare a schedule for each month showing budgeted cash disbursements for Tilson Company.
b) Prepare a schedule for each month showing budgeted cash receipts for Tilson Company.

Solution:

	April	May	
Production units	65,000	55,000	
Cash required per unit	$7	$7	
Production costs	$455,000	$385,000	0

Cash disbursements:

	April	May	
Production this month (40%)	$182,000	$154,000	
Production prior month (60%	193,000	273,000	
Selling and administrative	110,000	110,000	
Total disbursements	$485,000	$537,000	**4 points**

Payments relating to the prior month (March) in April represent the balance of accounts payable at March 31.

	April	May
Sales units	55,000	45,000
Sales price	X $16	X $16
Total sales	$880,000	$720,000

	April	May	
Cash receipts:			
February sales	$100,000		
March sales	315,000*	$105,000	
April sales	528,000	264,000	
May sales		432,000	
Total receipts	$943,000	$801,000	**4 points**

* March sales = 420,000/.4 = 1,050,000
Collections = .30*1050000 = 315,000

E.3. (7 points) **Dropping a product - complementary effects**. The Face Care Division of DeVoe & Co. makes three products in the same factory. Following are the revenue and cost data for a typical month, in thousands of dollars.

	Product			
	Razors	After-Shave	Shaving Cream	Total
Sales	$ 400	$ 600	$ 400	$1,400
Variable costs	300	240	120	660
Contribution margin	$ 100	$ 360	$ 280	$ 740
Fixed costs				
Avoidable	$ 120	$ 150	$ 70	$ 340
Unavoidable, allocated on basis or relative sales dollars	80	120	80	280
Total fixed costs	$ 200	$ 270	$ 150	$ 620
Income (loss)	$(100)	$ 90	$ 130	$ 120

Required:

1. Determine total income if the division dropped razors from the product line.

2. Suppose that if razors were dropped, the sales of after-shave would decline by 20% and those of shaving cream by 10%. Determine income for the company if razors were dropped.

1. *$140,000. The quickest analysis is (in thousands of dollars)*

Lost contribution margin	*$100*	
Saved fixed costs	*120*	
Gain from dropping razors	*20*	
Current income	*120*	
Income if razors dropped	*$140*	***4 points***

Alternatively, working with the totals of the remaining products,

	After-Shave	*Cream*	*Total*
Contribution margin	*$360*	*$280*	*$640*
Avoidable fixed costs	*150*	*70*	*220*
Segment margin	*$210*	*$210*	*420*
Joint fixed costs			*280*
Income			*$140*

2. $40,000

Lost contribution margin:			
Razors	*$100*		
Blades (20% x $360)	*72*		
Cream (10% x $280)	*28*		
Total lost contribution margin		*$200*	
Saved fixed costs, razors		*120*	
Net loss from dropping razors		*80*	
Current income		*120*	
Income if razors dropped		*$ 40*	***3 points***

E. 4. (7 points) Make or buy. Walls, Inc. manufactures 100,000 units of part A-996 annually, which it uses in one of its products. The controller has collected the following cost data related to the part.

Materials	$40,000
Direct labor	90,000
Variable overhead	80,000
Fixed overhead	180,000
Total costs	$390,000

Laidlaw Company offers to supply a functionally equivalent part for $3.10 per unit. If Walls accepts the offer, it will be able to rent some of the facilities it devotes to making the part to another company for $20,000 annually and will also be able to reduce its fixed overhead costs by about $50,000.

Required:

Should Walls accept the offer?

No. Its income would fall by $30,000. **1 point**

	Make		*Buy*
Purchase price		*$ 0*	*$310,000*
Materials	**1 point**	*40,000*	**1 point**
Direct labor	**.5 point**	*90,000*	
Variable overhead	**.5 point**	*80,000*	
Avoidable fixed overhead	**2 points**	*50,000*	
Foregone rent	**1 point**	*20,000*	
Net cost		*$280,000*	*$310,000*

The $20,000 rent, an opportunity cost, could be subtracted from the cost of buying. The $180,000 total fixed overhead could be shown under the make decision, with $130,000 ($180,000 - $50,000) shown under the buy decision as cost that the company would not avoid by buying. Any such manipulations still show that the advantage to making is $30,000.

7 points . . . . . .

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E.5. (8 points) ROI and RI on a special order. The Appliance Division of TVM Industries has the opportunity to sell 250,000 units of one of its principal lines to a large chain store at $24 per unit. Selected data follow.

Annual unit volume	1,700,000
Normal selling price	$40
Unit variable cost	$18
Annual fixed costs	$30,000,000
Divisional investment	$25,000,000

The manager of the Appliance Division expects a 50,000 unit decline in sales at the normal price if she supplies the chain. She also expects fixed costs to increase by $100,000 and investment to increase by $1,200,000 if she accepts the order.

Required:

1. Determine whether the manager of the Appliance Division should accept the order, assuming that she is evaluated based on ROI.

2. Determine whether the manager of the Appliance Division should accept the order, assuming that she is evaluated based on RI and that the minimum required ROI is 20%.

Answer:

1 . CM gain = 250k*(24-18) = $1500k . . . . . .
CM lost = 50k*(40-18) = (1100k)
FC increase = 100k
Profit increase = 300k

Old profit = 1700k*(40-18)CM - 30,000(FC) = $37,400k- $30,000k = $7,400k
Old ROI = $7400k/25,000k = 29.6%

New ROI: New profit = $7,400k + $300k = $7,700k
New investment = $25,000k + $1,200k = $26,200k
New ROI = 7700/26200 = 26.38%
So Reject

2.
RI on project = $300k - 20%*$1,200k = +60k

or Old RI = $7,400k - 20%*$25,000k = +$2,400
New RI = $7,700k - 20%*$26,200k = +$2,460

So, accept
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Problems

P.1. **(15 points)** Vernon Mills, Inc. is a large producer of men's and women's clothing. The company uses standard costs for all of its products. The standard costs and actual costs per unit of product for a recent period are given below for one of the company's product lines:

	Standard Cost	Actual Cost
Direct Materials		
Standard: 4.0 meters at $5.40 per meter	$21.60	
Actual: 4.4 meters at $5.05 per meter		$22.22
Direct Labour:		
Standard: 1.6 hours at $6.75 per hour	$10.80	
Actual: 1.4 hours at $7.30 per hour		$10.22
Variable Overhead:		
Standard: 1.6 hours at $2.70 per hour	$ 4.32	
Actual: 1.4 hours at $3.25 per hour		$ 4.55
Total Cost per Unit	$36.72	$36.99

During this period, the company produced 4,800 units of this product. A comparison of standard and actual costs for the period on a total cost basis is given below:

Actual Costs: 4,800 units at $36.99	$177,552
Standard Costs: 4,800 units at $36.72	$176,256
Difference in Cost-Unfavourable	$ 1,296

There was no inventory of materials on hand at the beginning of the period. During the period, 21,120 meters of materials were purchased, all of which were used in production.

Required:

a) For direct materials, compute the price and quantity variances for the period.
b) For direct labour, compute the rate and efficiency variances
c) Give possible reasons for why the material variances are offsetting.
d) Give possible reasons for why the labour variances are offsetting.

(a) Materials Price Variance:

Actual Quantity of Inputs, at Actual Price:
4,800 units* 4.4 metres per unit* $5.05 per metre **1 mark** $106,656
Actual Quantity of Inputs, at Standard Price:
4,800 units* 4.4 metres per unit* $5.40 per metre **1 mark** $114,048
Materials Price Variance **1 mark $7,392 F**

Materials Quantity Variance:
Actual Quantity of Inputs, at Standard Price:
4,800 units*4.4 metres per unit*$5.40 per metre **1 mark** $114,048
Standard Quantity of Inputs, at Standard Price:
4,800 units*4.0 metres per unit* $5.40 per metre **1 mark** $103,680
Materials Quantity Variance **1 mark $10,368 U**

(b) Labour Rate Variance:
Actual Hours of Input, at the Actual Rate:
4,800 units*1.4 hours* $7.30 per hour **1 mark** $49,056
Actual Hours of Input at the Standard Rate:
4,800 units*1.4 hours*$6.75 per hour **1 mark** $45,360
Labour Rate Variance **1 mark $3,696 U**

Labour Efficiency Variance:
Actual Hours of Input, at the Standard Rate:
4,800 units*1.4 hours* $6.75 per hour = **1 mark** $45,360
Standard Hours of Input, at the Standard Rate:
4,800 units*1.6 hours*$6.75 per hour = **1 mark** $51,840
Labour Efficiency Variance **1 mark $6,480 F**

(c) Used inferior materials which resulted in a higher usage due to failures but were less expensive or other reasonable scenarios. **2 marks**

(d) Used more experienced labour which cost more but were more productive or other reasonable scenarios. **1 mark**

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P.2. (17 points) Processing decisions. Ayers Sawmill buys pine logs and saws them into boards of two grades, A and B. The grade is determined by factors such as the number of knotholes and quality of the grain. Bark and Shavings also emerge from the sawing operation. Each log usually produces, by volume, about 35% A-grade boards, 55% B-grade boards, and 10% bark and shavings. Charles Ayers, the owner, has just received the income statement for a typical month's operations. Ayers expects much the same results in the foreseeable future.

	Total	Grade A	Grade B	Bark / Shavings
Sales	$ 80,000	$ 36,000	$ 41,000	$ 3,000
Costs:				
Logs	$ 42,000	$ 14,700	$ 23,100	$ 4,200
Sawing	17,000	5,950	9,350	1,700
Trimming	3,200	2,340	860	
Sanding	7,700	4,320	3,380	
Shipping	4,500	1,550	2,430	520
Total	$ 74,400	$ 28,860	$ 39,120	$ 6,420
Income (loss)	$ 5,600	$ 7,140	$ 1,880	$ (3,420)

Sawing costs include wages, depreciation, and other costs of running the sawmill, The cost of logs and of sawing are allocated based on volume (35%, 55%, 10%). Trimming, sanding, and shipping costs are direct and avoidable. Ayers was disturbed at the results. He told an employee, "The bark and shavings are really hurting me. I might as well throw the stuff out rather than sell it."

Required:

1. Tell Ayers whether he should continue selling bark and shavings or throw it out. Explain the reasons for your decision.

2. A chain of lawn and garden stores has offered to buy Ayer's output of bark and shavings if Ayers will grind it into mulch. The grinding would cost about $1,500 per month for wages and equipment rental. The chain will pick up the mulch at the mill, so Ayers will not incur shipping costs. What monthly revenue does Ayers need to make it profitable to do the grinding?

3. A furniture manufacturer has approached Ayers with an offer to buy all of the sawmill's output of grade B lumber for $30,000 per month as it comes out of the sawing operation. Ayers would not have to trim or sand the lumber. Shipping costs would be $1,200. Determine whether Ayers should accept the offer.

Answer:

1. *Ayers should sell bark and shavings because the revenues of $3,000 cover the avoidable costs of $520, leaving an incremental profit of $2,480. The costs of the logs and of cutting them up are joint to the products.*
3 points

2. *More than $3,980. Ayers must earn $2,480, the current incremental profit, plus the additional processing costs of $1,500 to be indifferent to the two choices.*

Current incremental profit, sell at split-off	*$2,480*
Additional processing costs	*1,500*
Required revenue	*$3,980*

5 points

3. *Ayers should not accept the offer because he would be $5,530 worse off. Essentially, Ayers now has the opportunity to sell the grade B lumber at the split-off point rather than process it further.*

Revenue after further processing		*$41,000*
Less further processing costs:		
Trimming	*$ 860*	
Sanding	*3,380*	
Shipping	*2,430*	*6,670*
Margin from further processing		*34,330*
Revenue at split-off	*$30,000*	
Less shipping costs	*1,200*	
Incremental profit		*28,800*
Advantage to further processing		*$ 5,530*

9 points

P.3. (17 points) Transfer pricing. The Games Division of Toys-and-Stuff Inc. uses 500,000 batteries per year for its products. Currently, Games buys the batteries from an outside supplier for $1.20 each. Power Division of Toys-and-Stuff makes batteries of the type used by Games Division and sells them at $1.30 each. Power's variable cost to produce each battery is $0.70. Power Division has ample manufacturing capacity to serve its regular customers and also meet the needs of Games Division.

Required:

Answer each of the following questions independently.

1. If Power agrees to supply the batteries at $1.00, what will be the effect on the incomes of each of the divisions and on Toys-and Stuff as a whole?

2. Why might Power's manager accept an offer as low as $0.70 per battery from Games?

3. Assuming that Power has no excess capacity and so would lose outside sales if it supplies the batteries to Games, find the lowest per-battery price that Power's manager would accept for the 500,000 batteries.

4. Assuming that Power has only 200,000 units of excess capacity and so would lose outside sales of 300,000 units if it is supplies the 500,000 batteries needed by Games, what is the lowest price that Power can accept for 500,000 units without reducing its income?

Answer:

1. Games gains $100,000 and Power gains $150,000. Toys-and-Stuff gains $250,000, which is also the sum of the net changes in the incomes of the individual divisions.

Games saves [500,000 x ($1.20 - $1.00)]	$100,000
Power gains the contribution margin from sales of 500,000 more units at $0.30 ($1.00 - $0.70)	$150,000
Toys-and-Stuff saves ($1.20 - $0.70) x 500,000	$250,000

6 points

2. Power's manager might want to keep busy, so that he avoids losing skilled workers who might leave the area because a temporary decline in demand prompted a layoff. Because the order is a break-even proposition, Power's manager might accept it in a spirit of cooperation. The manager might also believe that accepting the order could lead to other, profitable orders in the future.

2 points

3. Min TP = VC + Lost CM = .70 + (1.30 - .70) = $1.30 **3 points**

or more long winded

Games gains $100,000 (see requirement 1); Power's income declines by $150,000 [500,000 x ($1.30 - $1.00)] because it is simply trading sales at $1.00 for sales at $1.30; and Toys-and-Stuff's income declines by $50,000.

Toys-and-Stuff:	
Saves the $0.50 noted in requirement 1	$250,000
Loses the contribution margin on outside sales 500,000 x ($1.30 - $0.70)	300,000
Net change in income (decrease)	$(50,000)

In the absence of excess capacity, Power's manager is not likely to accept any price below the market price of $1.30.

4. $1.06. The price has to bring contribution margin on 500,000 units to equal the contribution margin lost from 300,000 units sold at regular prices.

Contribution margin to be lost	=	Contribution margin needed on order
300,000 x ($1.30 - $0.70)	=	500,000 x (P - $0.70)
$180,000	=	500,000 P - $350,000
$350,000	=	500,000 P
P	=	$1.06

or Min TP = VC + lost CM

= .70 + ($180,000/500,000) = $1.06 **6 points**