**SCM 500 Finance and Accounting for SCM**

**Final Exam – Part 1**

Summer 2018

**PREFACE:** This exam consists of 3 problems on 5 pages (excluding this cover page).

**NOTES and INSTRUCTIONS:**

1. This exam is open book, open notes—but it is individual, not group work. You may not communicate with any other individual—except the instructor or the TA—about material related to this course once you have opened and/or downloaded the exam. Even after you have turned your exam in, you may not discuss it with anyone until the exam deadline has passed.
2. Point values are provided at the beginning of each part.
3. FORMATTING: Clearly label your answers to each of the questions. There is no need to include the questions with your submitted answers. There are no limits in terms of number of pages.
4. If possible, please submit your work on one pdf or word file. This will facilitate the grading process. Provide numerical support for your answers whenever possible. Please be organized in your response. Partial credit will not be awarded if your work cannot be interpreted.
5. Note that submitting a supporting excel spreadsheet will not be helpful. Graders will not be looking at excel formulas and will rely on whatever is presented on the face of your submitted exam.
6. In answering an essay question, you may outline your answer (e.g., using bullets).
7. Please turn in your exam by submitting online via Canvas, with the file containing your exam responses as an attachment. The deadline is 11:59 pm on **Saturday, August 18, 2018**.
8. Submission of your exam implies adherence to the following honor code statement: ***“I have neither given nor received inappropriate aid on this work. Nor have I observed any academic misconduct on the part of others pertaining to this work.”***
9. Failure to follow instructions will result in point deduction penalties.

**PROBLEM I.** *(25 points)* Ollivander is a wholesale distributor supplying a wide range of magical equipment and knick-knacks to large chain stores. The company has a Games and Sports (G&S) Department that is currently manufacturing fancy broomsticks used in the age-old game of Quidditch. Ollivander is able to produce and sell 8,000 broomsticks annually at $86 each, making full use of its direct-labor capacity at available work stations. The unit costs (at this level of production and sales) associated with Ollivander’s broomsticks are as follows:

Materials $ 25.00

Direct labor ($15.00 per hour) 18.75

Manufacturing overhead 12.50

Selling and administrative costs 9.00

In the G&S Department, Ollivander uses direct-labor hours as the application base for manufacturing overhead. Included in the manufacturing overhead for the current year is $50,000 of factorywide, fixed manufacturing overhead. In addition, the selling and administration costs are fixed expenses allocated equally to each product.

1. What is the inventoriable cost per unit of each broomstick that Ollivander will record on its balance sheet?
2. Determine Ollivander’s margin of safety at its current sales level.
3. Production manager Gil Grindenwald recently received a proposal from Dolly Umbridge, a representative from an outside vendor of a new broomstick-making machine that has just been recently developed. The machine can be leased for $180,000 per year, and will significantly reduce the labor needed to manufacture each broomstick. After looking through the production costs of Ollivander, Umbridge estimates that labor and variable overhead can be reduced by 80 percent if the machine were used to manufacture broomsticks. No other costs are expected to change. Would you recommend that Gil lease the new machine? Support your answer with both quantitative (i.e., compute the net benefit or cost of leasing the machine) and qualitative considerations.

Refer to the original data, and assume from this point on that Grindenwald declines Umbridge’s offer and decides to stick to Ollivander’s original manufacturing process. Because Ollivander’s sales manager believes the firm could sell a maximum of 9,000 broomsticks if it had sufficient manufacturing capacity, the company has looked into the possibility of purchasing the broomsticks for distribution. Gregorovitch Goods, a steady supplier of quality products, would be able to provide up to 9,000 broomsticks per year **at a cost of $60 per broomstick**. Gregorovitch will only accept an all-or-nothing contract (i.e., they will agree to provide Ollivander 9,000 units or none at all). The manufacturing overhead can be reduced by 40% if the facilities in the G&S Department were no longer used to manufacture broomsticks; selling and administrative costs will, on the other hand, be unaffected. Gregorovitch will deliver the broomsticks to Ollivander’s facility.

1. What is the maximum unit price Ollivander would be willing to pay Gregorovitch for each broomstick, again assuming that Gregorovitch will only accept an all-or-nothing contract?
2. If, on the other hand, Gregorovitch will be willing to produce any number of broomsticks for Ollivander, how many broomsticks should Ollivander produce and how many should it purchase to maximize profit? Determine total profit based on your recommendation.

In a company meeting, Grindelwald proposed to add a new product line. He has come to the conclusion that the company could make better use of its G&S Department by manufacturing molded magic wands, which has been increasing in popularity. Grindelwald has a market study that indicates an expanding market for wands and a need for additional suppliers. Grindelwald believes that Ollivander could easily sell 16,000 wands annually at a price of $45.00 per wand. At this expected volume, he estimates the unit costs for producing each wand in the G&S Department with the same facilities used for producing and distributing broomsticks below.

Materials $17.00

Direct labor ($15.00 per hour) 7.50

Manufacturing overhead 5.00

Selling and administrative cost 4.50

1. How many wands and broomsticks should be manufactured? How many broomsticks should be purchased? Support your answer and calculate the net incremental benefit of your recommendation over the status quo of selling 8,000 broomsticks. (Assume in this case that Gregorovitch agrees to manufacture however many broomsticks Ollivander would be willing to purchase.)
2. Luna Lovegood, a cost accountant, has prepared a detailed analysis of the selling and administrative (S&A) costs, and has found that these costs are not necessarily all fixed. Using monthly data on broomsticks, she ran a regression of S&A costs on number of units sold. Results are shown below.



How will this new information change your answers to (8) above?

1. What qualitative factors should the management of Ollivander consider in the decisions to use current facilities to produce wands?

**PROBLEM II.** *(25 points)* Robert (Bertie) Botts was worried. His company, Botts Bottling, showed declining profits over the past several years despite an increase in revenues. With profits declining and revenues increasing, Botts suspected there must be a problem with costs.

Information about the company’s current products follows below.

Diet Regular Mint Almond Total

Direct materials $25,000 $20,000 $4,680 $550 $50,230

Direct labor and fringe benefits $14,000 $11,200 $2,520 $280 $28,000

Volume 50,000 40,000 9,000 1,000 100,000

Unit price $ 1.50 $ 1.50 $ 1.55 $ 1.65

Botts sent an e-mail to his executive team under the subject heading, “How do we get Botts Bottling back on track?” Meeting in Bertie’s spacious office, the team began brainstorming solutions to the declining profits problem. Some members of the team wanted to add products. (These were marketing people.) Some wanted to fire the least efficient workers. (These were finance people.) Some wanted to empower the workers. (These people worked in the Human Resources Department.) And some people wanted to install a new computer system. (It should be obvious who these people were.) Botts listened patiently. When all participants had made their cases, Botts said, “We made money when we were a smaller, simpler company. We have grown, added new product lines, and added new products to old product lines. Now we are going downhill. What’s wrong with this picture? What should we be doing?” The room was silent for a moment, then everybody started talking at once. Nobody could see any actionable problems based on the data in the report, but all made suggestions to Botts ranging from “add another cola product” to “cut costs across the board” to “we need a new computer system so that managers can get this information more quickly.” A not-so-patient Botts stopped the discussion abruptly and adjourned the meeting.

He then turned to Helga Hufflepuff, the accountant, and said, “I am suspicious of these cost data, Helga. Here we are assigning indirect costs to these products using a rate calculated on the basis of direct labor costs. I really wonder whether that rate is accurate for all products. I want you to dig into the indirect cost data, figure out what drives those costs, and see whether you can give me more accurate cost numbers for these products.” An investigation of the accounting records yielded the following breakdown of indirect costs.

Indirect labor and fringe benefits $ 28,000

Information technology 10,000

Machinery-related costs 12,000

Energy 2,000

Total $ 52,000

Helga then began a series of interviews with department heads to see how to assign these costs to cost pools. She found that one-half of indirect labor was for scheduling or for handling production runs, including purchasing, preparing the production run, releasing materials for the production run, and performing a first-time inspection of the run. Another 40 percent of indirect labor was used to set up machinery to produce a particular product. The time to set up the products varied. The remaining 10 percent of indirect labor was spent maintaining records for each of the four products, monitoring the supply of raw materials required for each product, and improving the production processes for each product. Interviews with people in the Information Technology Department indicated that eighty percent of the information technology cost was for scheduling production runs. Twenty percent of the cost was for record-keeping for each of the four products. The rest of the overhead was used to supply machine capacity of 10,000 hours of productive time. Helga found the following cost driver volumes from interviews with production personnel.

* Setups: 560 person hours doing setups
* Production runs: 110 production runs
* Machine-hour capacity: 10,000 hours
* Record-keeping costs are estimated to be roughly equivalent for each of the four products.

In addition, Helga learned that production people had difficulty getting the taste just right for the Mint and Almond colas, so Mint and Almond colas required more time per setup than either Diet or Regular cola did. She summarized her findings on cost driver volumes below.

Diet Regular Mint Almond Total

Setup hours 200 60 240 60 560

Production runs 40 30 30 10 110

Total machine hours 5,000 4,000 900 100 10,000

1. Compute cost unit costs for each product under the current system.
2. Compute unit costs for each product using the activity-based costing (ABC) data provided.
3. Prepare 2 critical recommendations to Bertie based on the information you have gathered. Justify the recommendations, and state why these are critical in your opinion.
4. Assume that all facts in still hold except that the practical capacity of the machinery was 20,000 hours instead of 10,000 hours.

a. What would be the effect on unit costs if costs were computed on the basis of practical capacity instead of expected production? Answer qualitatively—no calculations required.

b. Calculate the cost of unused capacity.

c. Discuss the pros and cons of using practical capacity to allocate costs.

1. Continue to assume that practical capacity is 20,000 machine hours. Botts has been approached by Aberforth Dumbledore, the owner of the Leaky Cauldron (a popular and innovative bar), regarding a one-time order of Butterbeer cola, which Dumbledore had developed himself. Based on his market research, Dumbledore expects that Butterbeer cola would be in high demand in Botts Bottling’s market, and he projects sales of anywhere between 30,000 to 50,000 bottles in the coming year. He describes the process of producing Butterbeer, and based on his description, Botts estimates that it would take 0.10 hours to produce each unit of Butterbeer. (Recall that the machine capacity in this case is 20,000 hours, while Diet, Regular, Mint, and Almond consume only 10,000 hours.) Botts also estimates that Butterbeer cola’s per-unit costs would be identical to those of Diet cola except for the machine usage costs. Dumbledore is unsure of the potential of Butterbeer to sell beyond the coming year, because of the novelty of the product.

a. What would be minimum unit price that Botts would be willing to accept from Dumbledore to produce Butterbeer?

b. What other factors must Botts consider in deciding whether to accept this special order?

**PROBLEM III.** *(15 points)* Griffyndor Products is an independently owned do-it-yourself (DIY) retail store. Rapid expansion has created the need for careful planning of cash requirements to ensure that the store is able to replenish stock adequately and meet payment schedules to creditors. Harry Potter, founder of the store, has established a banking relationship with Gringotts Regional Bank that provides a $200,000 line of credit to Griffyndor. The bank requires that a minimum balance of $10,000 be kept in the store’s checking account at the end of each month. When the balance goes below $10,000, the bank automatically extends the line of credit in multiples of $1,000 so that the checking account balance is at least $10,000 at month-end.

Griffyndor attempts to borrow as little as possible and repays the loans quickly in multiples of $1,000 plus 1 percent monthly interest on any outstanding loan balance. Borrowings are assumed to take place at the beginning of the month that the borrowing is needed. Any interest payments and principal payments are assumed to be paid at the end of each month. The store currently has no outstanding loans.

The following cash receipts and disbursements data apply to the fourth quarter of the current year:

Estimated beginning cash balance: $10,100

Estimated cash sales:

October $14,000

November 29,000

December 44,000

Sales on account:

July (actual) $130,000

August (actual) 104,000

September (actual) 128,000

October (estimated) 135,000

November (estimated) 142,000

December (estimated) 188,000

Projected cash collection of sales on account is estimated to be 70 percent in the month of the sale, 20 percent in the month following the month of sale, and 6 percent in the second month following the sale. The 4 percent beyond the second month following the sale is determined to be uncollectible. In addition, the store is scheduled to receive $13,000 cash on a note receivable in October.

All inventory purchases are made on account as the store has excellent credit with all vendors because of a strong payment history. The following information regarding inventory purchases is available:

Inventory Purchases (at cost):

September (actual) $120,000

October (estimated) 112,000

November (estimated) 128,000

December (estimated) 105,000

All cash disbursements for inventory are made in the month after the purchase is made. For instance, purchases in January are paid for in February. Monthly cash disbursements for operating expenses during October, November, and December are estimated to be $38,000, $51,000, and $66,000, respectively. Depreciation expense is estimated to be $7,000 per month.

1. Prepare Griffyndor’s cash budget for the months of October, November, and December, showing all receipts, disbursements, and financing activity, where applicable.
2. Assume that Griffyndor expects large net cash outflows for the first quarter of the next year. What alternatives are available to Griffyndor’s managers, apart from the credit line mentioned above, that could alleviate any problems accompanying this expected outcome?