Tentin päivämäärä / Date of exam: 11.9.2014
The code and the name of the course and number of the exam: **Advanced Cost Accounting**
Examiner(s): Janne Järvinen
The devices allowed in the exam: xCalculator (not graphic, programmable) □ Dictionary □ Other material, specified below
Please answer the questions X in Finnish **X** in English
Paper with exam questions must be returned: □ Yes **x** No

Please use complete sentences when answering the essay questions (i.e., no bullets, lists etc.).

Kysymyksiin saa vastata suomeksi.

1) Relating to Zimmerman's economic analysis of cost allocation
- **a)** Internal vs. external reasons/rationales to allocate costs according to Zimmerman
- **b)** Zimmerman's economic analysis of cost allocations as a system for taxing inter-company externalities'. Especially, what is the relationship between firm's marginal costs, average costs and cost allocations/overhead rates?

2) Relating to activity-based costing:
- **a)** What principles should guide the decision over how many activities and cost drivers should there be in an ABC system (Cooper and Kaplan, Zimmerman)?
- **b)** How does TDABC differ from the traditional ABC solution in terms of activities and cost drivers?

3) Relating to absorption costing:
- **a)** External reporting as an incentive to develop cost accounting systems
- **b)** Consider three possible alternatives:
  - i. inventory is constant
  - ii. Sales exceed production
  - iii. Production exceeds sales

  How does the interrelationship between absorption costing and profit measurement work in these cases? What are the incentive effects according to Zimmerman?
- **c)** What solutions does Zimmerman recommend to the problem illustrated in b)?

4) In *Appendix 1* you will find Siemens –case. Using the case material, illustrate why did Siemens need to introduce a new type of product cost system
- **a)** As briefly as possible, explain what is wrong with the old system from the viewpoint of
  - i. 'high diversity rule' (Cooper and Kaplan)
  - ii. accuracy –cost -tradeoff

Required

1. Prepare the revised set of cost estimates and treatment profit and loss statements for HD and PD, using the information gathered during Phase I. What led to any major difference between the RCC method for allocating cost and the Phase I ABC method?

Phase II

Thomas was uncomfortable with the consensus estimate that nursing and equipment costs should be split 85:15 between HD and PD treatments, respectively. In particular, he knew that just the nursing resource category contained a mixture of different types of personnel: registered nurses (RNs), licensed practical nurses (LPNs), nursing administrators, and machine operators. He thought it was unlikely that each of these categories would be used in the same proportion by the two different treatments. In the next phase of analysis, Thomas disaggregated the nursing service category into four resource pools and, as with general overhead, selected an appropriate cost driver for each resource pool (see below):

NURSING SERVICES RESOURCE POOL	SIZE OF POOL	COST DRIVER
Registered nurses	$239,120	Full-time equivalents (FTEs)
Licensed practical nurses	404,064	Full-time equivalents
Nursing administration and support staff	115,168	Number of treatments
Dialysis machine operators	124,928	Number of clinic treatments
Total	$883,280	

NURSING SERVICES COST DRIVER	HD	PD	TOTAL
RNs, FTE	5	2	7
LPNs, FTE	15	4	19
Total number of dialysis treatments	14,343	20,624	34,967
Number of clinic dialysis treatments	14,343	0	14,343

Thomas felt that the 85:15 split was still reasonable for the durable equipment use, and, in any case, the relatively small size of this resource expense category probably did not warrant additional study and data collection.

Required

2. Use the information on the distribution of nursing and machine operator resources to calculate revised product-line income statements and profit and loss for individual treatments.
3. Analyze the newly produced information and assess its implications for managers at Western Dialysis Clinic. What decisions might managers of the clinic make with this new information that might differ from those made using information from the RCC method only?
4. What improvements, if any, would you make in developing an ABC model for Western Dialysis Clinic?

SIEMENS ELECTRIC MOTOR WORKS (A) (ABRIDGED)

Ten years ago our electric motor business was in real trouble. Low labor rates allowed the Eastern Bloc countries to sell standard motors at prices we were unable to match. We had become the high cost producer in the industry. Consequently, we decided to change our strategy and become a specialty motor producer. Once we adopted our new strategy, we discovered that while our existing cost system was adequate for costing standard motors, it gave us inaccurate information when we used it to cost specialty motors.

Mr. Karl-Heinz Lottes, Director of Business Operations, EMW

This case was prepared by Professor Robin Cooper and Professor Karen Hopper Wruck.

head, containing costs associated with material acquisition, was allocated to products based on their direct materials costs. Production-related overhead was directly traced to the 600 production cost centers. A production cost center had been created for each type of machine. Cost centers with high labor intensity used direct labor hours to allocate costs to products. For centers with automated machines whose operation required few direct labor hours, machine hours was used as the allocation base. Support-related overhead was allocated to products based on manufacturing costs to date: the sum of direct materials and direct labor costs, materials overhead, and production overhead. The breakdown of each cost category as a percent of total costs was as follows:

	PERCENT OF TOTAL COSTS	BURDEN RATE
Direct materials	29%	
Direct labor	10%	
Materials overhead	2%	6% of materials cost
Production overhead	33%	DM/DLH or DM/MH (600 rates)
Support-related overhead	26%	35% of other manufacturing costs
Total	100%	

Two years after the change in strategy, problems with the traditional cost system became apparent. The traditional cost system seemed unable to capture the relation between the increased support costs and the change in product mix. Management felt that most support costs related more closely to the number of orders received or the number of customized components in a motor rather than to materials expense or to the quantity of labor and machine hours required to build the motor.

An extensive study was undertaken to identify the support costs that management believed were driven by the processing of orders and the processing of special components. The following departments' costs were most affected by the large increases in number of orders and number of special components.

Costs Related to Order Processing
- Billing
- Order receiving
- Product costing and bidding
- Shipping and handling

Costs Related to Special Components
- Inventory handling
- Product costing and bidding
- Product development
- Purchasing
- Receiving
- Scheduling and production control
- Technical examination of incoming orders

An analysis of the Order Processing costs revealed that the same resources were required to process an order of one custom motor as for an order of 200 standard motors. A similar analysis indicated that the number of different types of special components in each motor design determined the work load for the departments affected by Special Components. The demand for work in these departments was not strongly affected by the total number of special components produced. For example, an order of five custom motors requiring ten special components per unit generated the same amount of work as an order of one custom motor with a design requiring ten special components. In 1987, the factory used 30,000 different special components to customize their motors. The special components were processed 325,000 different times for customized orders.

The costs in each support department associated with these two activities were removed from the support related cost pool and assigned to two new cost pools. Exhibit 2 illustrates, for 1987, the formation of the two new cost pools. The first column presents total costs grouped by traditional costing system definitions. The new cost system removes 6.3 million from engineering support costs, and 27.0 million from administrative support costs. These expenses are then assigned to the new cost pools, 13.8 million to order processing costs, and 19.5 million to special components costs. Over 1 million special components were manufactured during the year.

Exhibit 3 shows the cost buildup for five typical mo-

EXHIBIT 3 Manufacturing Costs for Five Motor Orders

	A	B	C	D	E
Cost of base motor (without assignment from new cost pools)	304.0	304.0	304.0	304.0	304.0
Cost of all special components* (without assignment from new cost pools)	39.6	79.2	118.8	198.0	396.0
No. of different types of special components per motor	1	2	3	5	10
No. of motors ordered	1	1	1	1	1

	BASE MOTOR COST	SPECIAL COMPONENTS COST
Materials	90	12.0
Materials Overhead	5	0.7
Direct labor	35	4.5
Production-related	117	15.0
Overhead	247	32.2
Support-related overhead†	57	7.4
Unit manufacturing costs	304	39.6

**For illustrative purposes, all different types of special components are assumed to cost 39.6 apiece.*
†Support-related overhead excludes the expenses associated with processing individual customer orders and handling special components.

JOHN DEERE COMPONENTS WORKS (A) (ABRIDGED)

The phone rang in the office of Keith Williams, manager of Cost Accounting Services for Deere & Company. On the line was Bill Maxwell, accounting supervisor for the Gear and Special Products Division in Waterloo, Iowa. The division had recently bid to fabricate component parts for another Deere division. Maxwell summarized the situation:

> They're about to award the contracts, and almost all of the work is going to outside suppliers. We're only getting a handful of the parts we quoted, and most of it is low-volume stuff we really don't want. We think we should get some of the business on parts where our direct costs are lower than the outside bid, even if our full costs are not.

Williams asked, "How did your bids stack up against the competition?" Maxwell replied:

> Not too well. We're way high on lots of parts. Our machinists and our equipment are as efficient as any in the business, yet our costs on standard, high-volume products appear to be the highest in the industry. Not only are we not competitive with outside suppliers, but our prices are also higher than two other Deere divisions that quoted on the business.

Deere & Company

The company was founded in 1837 by John Deere, a blacksmith who developed the first commercially successful steel plow. One hundred years later, Deere & Company was one of seven full-line farm equipment manufacturers in the world and, in 1963, had displaced International Harvester as the number one producer. During the 1970s, Deere spent over a billion dollars on plant modernization, expansion, and tooling.

This case was prepared by Research Associate Artemis March, under the supervision of Professor Robert S. Kaplan.