LuTK, OyKKK, KaTK, TTK, TST ja BMTK (Linnanmaan tentit)
SCI, OBS, OMS, TECH, ITEE and BMM (Linnanmaa campus)

OULUN YLIOPISTO
UNIVERSITY of OULU

YLIOPISTOTENTTI - UNIVERSITY EXAM

Opiskelijan nimi / Student name:	**Opiskelijanumero / Student number:**

Opintojakson koodi and nimi / The code and the name of the course: **Koodi /** Code 721134A **Tentin nimi /** Name **Cost Management Systems**	
Tiedekunta / Faculty: OyKKK	
Tentin pvm / Date of exam: 9.5.2016	**Tentin kesto tunteina / Exam in hours:** 4
Tentin nro / No. of the exam: 3rd exam (2nd retake)	**Opintopistemäärä / Credit units:** 6
Tentaattori(t) / Examiner(s): Janne Järvinen, Erkki Lassila	**Sisäinen postios. / Internal address:** 6OyKKK
Sallitut apuvälineet / The devices allowed in the exam: ☒ Nelilaskin / Standard calculator ☒ Funktiolaskin / Scientific calculator ☐ Ohjelmoitava laskin / Programmable calculator ☐ Muu materiaali, tarkennettu alla / Other material, specified below:	
Tenttiin vastaaminen / Please answer the questions: ☒ Suomeksi / in Finnish ☒ Englanniksi / in English	
Kysymyspaperi on palautettava / Paper with exam questions must be returned: ☐ Kyllä / Yes ☒ Ei / No	

This test has four questions and a maximum of 40 pts. Please use complete sentences when answering the essay questions (no bullets, lists etc.)!

Kysymyksiin saa vastata suomeksi.

1) The concepts of life-cycle costing target costing and Kaizen costing in management accounting. How do these concepts relate to each other?
(10pts).

2) Pitfalls of the DCF (discounted cash flow) method in evaluating strategic investments (according to Kaplan and Atkinson) (10 pts)

3) The course textbook introduced the Shannonfield Cabinets –example (see ***Appendix 1*** for the beginning of that example). The example presented three cases in short term planning: (i) equal sales objective, (ii) total sales objective and (iii) profit maximizing objective. Using the example, answer the following questions:

a) Using the example, explain why the company would benefit from access to accurate and reliable cost information in short term planning. What harm may be incurred from inaccurate cost estimates?

b) What would be the effects of process improvements in this case? Illustrate your answer with an example. How visible the effects would be?

c) What would be the Theory-of-Constraints (TOC) approach to process improvements here? Illustrate your answer with an example.

4) Reapportionment of service department costs

JR Co. Ltd's budgeted overheads for the forthcoming period applicable to its *production* departments are as follows:

	(£000)
1	950
2	700

The budgeted total costs for the forthcoming period for the *service* department are as follows:

	(£000)
G	200
H	80

The use made of each of the services has been estimated as follows:

	Production department		Service department	
	1	2	G	H
G(%)	50	30	-	20
H(%)	55	20	25	-

Required:

Apportion the service department costs to production departments:

i. using the *step-wise* (Specified order of closing) method, starting with H, (4p)
ii. using the *reciprocal* (Simultaneous equation) method, (5p)
iii. commenting briefly on your figures (1p)

Please remember to show all the calculations

THE EXAMPLE

Shannonville Cabinets manufactures and sells five types of large steel electrical cabinets. Annual sales of cabinet 1 are made uniformly through the first and last four months of the year. Annual sales of cabinet 2 are made uniformly through the last six months of the year. Annual sales of cabinet 3 are made uniformly through the first six

months of the year. Annual sales of cabinet 4 are made uniformly throughout the year. Annual sales of cabinet 5 are made in equal amounts in June and December. Production is on a just-in-time basis. That is, the amount produced in any month equals the amount sold in that month. The exception is cabinet 5, for which production occurs uniformly through the year. Shannonville Cabinets maintains a minimum cash balance of $50,000 and finances any short-term working capital requirements with a line of credit. Interest is charged each month at the rate of 0.5% of the opening line of credit balance that month. On average, bad debts amount to 5% of sales revenues.

Workers initiate the production process by removing sheet steel from storage, transporting the steel to the cutting area, and inserting the sheet steel into a programmable cutting machine. After the machine cuts the cabinet parts from the sheet steel, the parts are moved to an assembly area where the cabinets are built. The cabinets are then moved to a shipping area for packaging and shipping.

The following are the characteristics of the five cabinets. The amount of work required by each of the cabinets in each activity area is shown as the number of work units.

CABINET	SELLING PRICE	MATERIALS & LABOR COST	SCHEDULING RESOURCE UNITS	MOVING RESOURCE UNITS	SETUP RESOURCE UNITS	CUTTING RESOURCE UNITS	ASSEMBLY RESOURCE UNITS	SHIPPING RESOURCE UNITS
C1	$14,000	$1,300	2	7	3	3	2	4
C2	$20,000	$1,600	4	3	4	6	5	4
C3	$19,000	$1,500	5	2	6	4	3	7
C4	$15,000	$1,450	3	5	7	2	4	2
C5	$22,000	$1,750	6	4	5	6	5	3
Capacity costs			$70,000	$170,000	$260,000	$800,000	$650,000	$150,000
Monthly capacity units			2,600	3,000	3,500	2,900	2,400	3,200
Flexible cost per unit used			$180	$300	$780	$900	$720	$240

SHORT-TERM PLANNING AND BUDGETING

Note that each resource has a certain capacity that is available for production (measured in appropriate capacity units). In addition, each unit of used capacity also requires a certain amount of flexible resources, principally materials and supplies, whose unit costs are reported in the bottom row of the table. With this information, planners at Shannonville Cabinets can choose a production plan to achieve some objective and then forecast the financial consequences of that production plan.

ACTIVITIES, RESOURCE USE, AND COSTS

This example illustrates the nature of the issues facing short-run production planners. Each product consumes varying amounts of the six constraining factors of production. Two elements of cost associated with each of the factors of production are: a committed cost, which is fixed in the short run and does not vary with use; and a flexible cost, which varies in proportion to the amount of the factor that is used[1]. Each factor of production, or activity, has a unique flexible cost, which we assume is known to the production planners. The facility-sustaining costs, which are unrelated to activity levels, are $12,000,000 per year and are incurred and paid in equal monthly amounts.

We can develop the following table, which summarizes the calculation for each product's contribution margin (CM, net selling price less flexible cost).[2]

	C1	C2	C3	C4	C5
Price	$14,000	$20,000	$19,000	$15,000	$22,000
Material	1,300	1,600	1,500	1,450	1,750
Scheduling	360	720	900	540	1,080
Moving	2,100	900	600	1,500	1,200
Setup	2,340	3,120	4,680	5,460	3,900
Cutting	2,700	5,400	3,600	1,800	5,400
Assembly	1,440	3,600	2,160	2,880	3,600
Shipping	960	960	1,680	480	720
Total	$11,200	$16,300	$15,120	$14,110	$17,650
CM	$ 2,800	$ 3,700	$ 3,880	$ 890	$ 4,350

OPTIMIZING THE USE OF SHORT-TERM RESOURCES

Equal Sales Objective

Suppose that the initial production plan seeks to make the annual sales of all products equal. This objective results in the following planned level of operations and profit[3].

Shannonville Cabinets
Summary of Optimal Solution
Equal Annual Production Units Objective

		Product	Units
Income	$ 51,903		
Sales (net)	$111,919,500	C1	1,309
Flexible costs	$ 97,363,420	C2	1,309
Capacity costs	$ 2,100,000	C3	1,309
Other costs	$ 12,000,000	C4	1,309
Interest costs	$ 404,177	C5	1,309
		Total	6,545

continued

Resource	Units Available	Maximum Used
Scheduling	2,600	2,400
Moving	3,000	2,782
Setup	3,500	3,109
Cutting	2,900	2,673
Assembly	2,400	2,400
Shipping	3,200	2,727

In this production plan, the Assembly Department is used to capacity. Since this department constrains any additional production, efforts to expand productive capacity, either through acquiring additional resources or through launching initiatives to improve the efficiency of existing resources, would focus on increasing capacity in the Assembly Department.[4]

Total Sales Objective

Instead of planning production and sales by projecting past numbers, suppose that the planners at Shannonville Cabinets choose a production plan that maximizes total annual sales given existing capacity. Using this criterion, the planners at Shannonville Cabinets would choose the following production plan.

Shannonville Cabinets
Summary of Optimal Solution
Maximize Total Sales Objective

Income	$2,393,761
Sales (net)	$116,500,278
Flexible costs	$99,673,341
Capacity costs	$2,100,000
Other costs	$12,000,000
Interest costs	$353,176

Product	Units
C1	1,826.2
C2	1,427.4
C3	1,588.7
C4	568.2
C5	1,355.0
Total	6,745.4

Resource	Units Available	Maximum Used
Scheduling	2,600	2,600
Moving	3,000	3,000
Setup	3,500	3,170
Cutting	2,900	2,884
Assembly	2,400	2,400
Shipping	3,200	3,200

Short-Run Profit Objective

Finally, suppose that the criterion used by the planners at Shannonville Cabinets is to maximize the income provided by the production plan. In this case, the chosen production plan would be as follows.

Shannonville Cabinets
Summary of Optimal Solution
Maximize Contribution Margin Objective

		Product	Units
Income	$3,126,478	C1	2,003.6
Sales (net)	$113,876,758	C2	1,325.8
Flexible costs	$96,253,725	C3	1,531.5
Capacity costs	$2,100,000	C4	0.0
Other costs	$12,000,000	C5	1,645.6
Interest costs	$396,555	Total	6,506.6

Resource	Units Available	Maximum Used
Scheduling	2,600	2,600
Moving	3,000	2,965
Setup	3,500	2,969
Cutting	2,900	2,900
Assembly	2,400	2,291
Shipping	3,200	3,200

Note that this approach creates the largest value, about $3,126,000, for short-run profit as reported in the income cell, because the production plan for this approach explicitly took this as the performance measure to maximize. Note also that the optimality of this production plan is based on the planners' understanding of the revenues and materials cost of each of the five products, the flexible costs and availability of each of the resources required for production, and the consumption of each activity by each product. Also we have assumed that there is no opportunity to change the resource supply (that is, the level of committed resources).