Klausur: Accounting Theory Sommersemester 2013

Prüfer: Prof. Schöndube-Pirchegger 20813 Accounting Theory

The following aids can be used: A calculator in accordance with the instructions given by the Board of Examiners and a dictionary.

Name:_____ Matr.No.:_____

There are four problems. Each problem has to be solved.

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1) (15 points) A single product firm wants to produce q units of output. It uses two different input factors: z_1 (with a price of $P_1 = 100$) and z_2 (with a price of P_2 = 400). Only 60 units of the second input factor can be bought. Cost is now defined by the following program:

$$C(q;P) \equiv \min_{z_1 \geq 0,\, z_2 \geq 0} P_1 * z_1 + P_2 * z_2$$

$$\text{s.t.} \quad q \leq \sqrt[4]{z_1 z_2} \text{ (Rest. 1)}$$

$$z_2 \leq \overline{z_2} \text{ (Rest. 2)}$$

a) Formulate the Lagrange function (for an unknown q). Use λ_1 for Rest.1 and λ_2 for Rest. 2.
b) Now q=10 should be produced.
   i) Calculate the optimal z_1^* and z_2^*. Assume that the second restriction is not binding.
   ii) Calculate the marginal cost.
   iii) Calculate the average cost.

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2) (15 points) Ralph's firm produces two products (A & B). There are three different kinds of cost pools:

1. DL: Direct Labor
2. DM: Direct Material
3. OV: (Total Manufacturing) Overhead

Ralph concludes that OV is best described with a linear model of the following form:

$$OV_t = \alpha + \beta * y_t + \varepsilon_t$$

y_t is the total of direct labor cost plus direct material cost in period t, ε_t is a zero mean random error term in period t and OV_t is total manufacturing overhead in period t. Ralph speculates that $\alpha = 40\,000$ and $\beta = 0{,}8$. Ralph also speculates that manufacturing during the period in question will result in y_t = 100 000. Ralph now wants to implement a normal, full costing procedure. y_t = 100 000 should be used as a normal volume. Overhead is allocated based on total of DL+DM.

Data of the actual period:

	A	B
DL	33 000	4 000
DM	67 000	2 000
Units produced	200	100

The actual overhead in the current period is 130 000.

a) Determine the unit costs of products A and B.
b) Is there an over- or under-allocation of the overhead?
c) Further suppose 3/4 of the current period production of A and B has been sold. Determine ending finished goods inventory and cost of goods sold.

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3) (12 points) Ralph faces a choice problem in which the dollar outcome is uncertain. There are five different possible states. These states are equally possible. Ralph can choose between 3 different kinds of actions. Ralph is risk neutral.

	s_1	s_2	s_3	s_4	s_5
a_1	600	1000	400	600	200
a_2	800	300	400	800	300
a_3	700	700	400	500	400

a) What is Ralph's best choice? Support your argument with calculations.
b) Ralph can now purchase an information system: This information system can deliver one of two signals: $y_L$and y_H. y_L means that s_1 or s_2 can occur. y_H means that s_3, s_4 or s_5 can occur. What is the value of this information system?
c) Assume that the information system of b) is installed. How much would Ralph pay for an information system which delivers three signals: z_L means that $s_1$or s_2 can take place, z_M includes s_3 and z_H means that s_4 or s_5 are possible.
d) Given there is no information system installed yet what is the value of an information system which delivers perfect information?

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4) (18 points) David's firm produces two products. Quantities of the two products are denoted q_1 and q_2. Costs in dollars depend on those quantities and are determined by following LLAs:

direct labor cost	DL= $100q_1 + 110q_2$
direct material cost	DM= $40q_1 + 120q_2$
first overhead pool	$OV_1 = 30\,000 + 4$ DL
second overhead pool	$OV_2 = 60\,000 + 2$DM
selling and adm.	S&A = $50\,000 + 20q_1 + 40q_2$

Total revenue is given by TR = $1040q_1 + 1250q_2$. There are two production departments with limited machine capacity. Each department has a capacity of 1200 machine hours. Machine hour requirements are as follows

	Product 1	Product 2
department one	1	2
department two	3	1

a) What is David's optimal output and associated profit? How many machine hours are left in each department? Use fractions during your calculation (e.g. 1/3).
b) Because of a special request, David has now the opportunity to produce one unit of a third product. It requires 100 direct labor dollars and 70 direct material dollars. It requires 3 machine hours in the first department and 1 machine hour in the second department. There is no additional cost for selling and adm. Write down the maximization problem. At which price $\hat{P}$ is David indifferent between accepting and rejecting this request?