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EXAMINATION

Aalto University

School of Science

Department of Industrial Engineering and Management

TU-C2020 Operations Management

Dear participant!

This examination has 4 parts

- I. (a-f) Explanation of terminology (7 parts 1 points each = 7 points)
- II. (a-c) Short answer question (4 parts 2 points each = 7 points)
- III. Essay (6 points)
- IV. (a-g) Practical part combining the different topics of the course (7 parts 1-2 points 9 points)

Instructions

- Question I should be answered to this paper; questions II-IV each on separate paper
- You may answer in English, Finnish and/or Swedish.
- If you write better text in Finnish than in English then preferably answer in Finnish
- Please turn in all the question and answer sheets.
- Please be concise: the length of an answer does not compensate for quality.

E x a m P a r t i c i p a n t f i l l s i n	Name:	Student number:
	Study Program:	Year of studies:
	Year when course assignment was / will be made:	

I. *Define the following concepts.* Answer in the space provided. (7 p.)

- a) What is utilization?

- b) What is the input-transformation-output process?

- c) What is work in process?

- d) What is product life cycle?

- e) What is end-of-life of the products?

- f) What is multi-sourcing?

- g) What is supplier selection?

Write your answer to question 2 (and nothing else) on a separate paper!

Short questions (total 8 p.)

- II. Describe briefly, what are the four key reasons (decision areas) to consider when discussing supply networks (2 p)
- III. Discuss briefly, performance objectives in supply networks. (2 p)
- IV. What is total quality management (2 p)
- V. What are the four costs of quality for management to consider? (2 p)

Write your essay (and nothing else) on a second separate paper!

- VI. **Essay: Process Types.** What are the different manufacturing and service process types? (6 pts)

Write your answer to question 4 (and nothing else) on third separate paper!

- VII. **Designing production system for a new product - practical assignment** (10 pts.)

Matti's Metal Works is a workshop specialized in working stainless steel and it has all main work methods for stainless steel working in its workshop. Until recently, it has been concentrating on business-to-business, but now intends to expand to consumer sector. The company plans to

introduce a high-quality, design product family, made of stainless steel. The first product is a bicycle, which is shown next page.

The estimates for the first year's sales are 80 000 pieces, and a 30% annual growth is estimated. During the first year, the volume would use only about 20% of workshop's capacity, but since the B2B-sales is rather stable, the share of capacity needed for the bicycle is expected to increase in the future. To increase the sales of the bicycle, different variants of the bicycle are planned.

The bicycle is produced of stainless steel and plastic parts as follows: first a frame is constructed from a stainless-steel tube. The decorative ornaments are assembled to the frame. Additional pieces of steel are cut, and it is welded to the frame to form a bicycle (1st subassembly). The second subassembly is the shock absorber(s): the stainless-steel part is cut from a steel profile. Two identical pieces of shock absorbers are cut, painted and assembled to the metal frame with bolts and nuts. Furthermore, a saddle is assembled to the frame as a purchased part. Moreover, in the final assembly the steering handle and wheels are integrated to the bicycle. Finally, the bicycle is cleaned and packed.

You have been assigned to design the production system, and your initial job is to discuss following questions.

Please limit the total length of your answers in section IV to preferably two, max three pages – include everything that is essential!

Discuss briefly what is meant by order qualifying and order winning factors. Give examples on such factors with this product. (1 p)

Draw a component structure -diagram for the bicycle (graphical presentation of Bill of Materials). (1 p)

What basic process type would your manufacturing process be? Why? (2 p)

What kind of OPP location would you have? Why? (1 p)

Your main raw materials are steel and plastics. Discuss briefly, how you would source them: supplier selection and whether you would use single, dual, parallel or multi-sourcing. Why? (1p)

How could the Mass customization approach be used for this product? Give examples on how it could be used for this product and discuss shortly how this would benefit the operations and the customer. (1 p)

How would you expect the demand for the bicycle to behave? Why? Describe briefly means to cope with fluctuating demand in your bicycle production. (2 p)

