

05.03.2012 Exam for TU-22.1321 Industrial Service Operations

The exam is in three parts. Select 4 (out of 5) questions from Parts I and II. Answer one of the questions in Part III. The maximum of points from Part I to III is 27

In addition there are two short bonus questions for an additional 2 points based on the case sessions. These points are added to the exam score.

PART I

You have read a collection of 22 articles and participated/ read the material from the lectures. Next follows questions on three topics you should be familiar with based on the articles and lectures. A good answer brings together ideas from both the articles and lectures with your own analysis.

1. *Arizona Pavement Management System (6p)*

Answer based on lecture materials, guest lecture and article by Golabi, K., Kulkarni, R. B., and Way, G. B. 1982. "A Statewide Pavement Management System," INTERFACES (12:6), pp. 5-21

- *Describe the principles for how the Arizona Pavement Management Systems works*
- *Why is it easier to develop an effective asset management system that improves asset performance and reduces costs for a road network than for a power network?*
- *Based on the guest lecture on Fingrid's asset management identify the key elements of Fingrid's systematic approach*

2. *Reliability Based Maintenance/RCM (6p)*

Answer based on lecture materials, guest lecture and article by David Sherwin, (2000) "A review of overall models for maintenance management", Journal of Quality in Maintenance Engineering, Vol. 6 Iss: 3, pp.138-164

- *Describe what problem is Reliability Based Maintenance (RCM) designed to solve.*
- *According to the article, why is it difficult to get the intended results with RCM?*
- *Based on the guest lecture on Konecrane's use of installed base information, how does the company try to combine installed base information and RCM to improve maintenance operations?*

3. Performance Contracts (6p)

Answer based on the lectures and article by Ivory, C.J, Thwaites, A.T. and Vaughan, R. (2003) "Shifting the goal posts for design management in capital goods projects: 'design for maintainability'". R&D Management 2003, 33(5), 527-538

- Describe how a manufacturer can re-organize its business to deliver value in use for a large customer, based on a performance contract
- How was design for maintainability financed in the example described in the paper?
- How can sub-system suppliers effectively be involved in improving performance?
- What do the case examples illustrate regarding the length of contract for delivering value in use?

PART II

You have worked on three cases and participated in the debriefing sessions. Next follows two questions where you are asked to apply a concept in the different case settings (6p).

Please answer the following questions:

4. Rapid manufacturing/ additive manufacturing (6p)

Answer based on the lectures and article by Holmström, J., Partanen, J., Tuomi, J., and Walter, M. 2010. "Rapid manufacturing in the spare parts supply chain: Alternative approaches to capacity deployment," Journal of Manufacturing Technology Management (21:6), pp. 687-697

Consider the case setting described in Hau Lee, Barchi Peleg and Seungjin Whang (2005), TOYOTA: SERVICE CHAIN MANAGEMENT, Stanford Graduate School of Business, Case S GS-41

Assume that there are some car parts (but not all) that can be produced using additive manufacturing technology.

- In the setting of Toyota's American service chain what would be the key issues that Toyota would need to investigate in order to determine the potential value of introducing additive manufacturing technology for spare parts?
- Where in the service chain would you locate additive manufacturing capacity and why?
- What potential benefits would the introduction bring to the service chain?

Based on the debriefing session there is an additional bonus point

BONUS QUESTION 1 (Additional point)

- Eero Eloranta compared in his debrief Toyota's and Saturn's service chains. The strength according to Eero of the Toyota service chain in Japan was the vertical integrations. What was the innovation in terms of the service supply chain design of Saturn in Brazil?

5. Demand-supply chain management (6p)

Answer based on the lectures and article by Holmström, J., Brax, S., and Ala-Risku, T. 2010. "Comparing provider-customer constellations of visibility-based service", Journal of Service Management, Vol. 21, No 5, pp. 675-692

In the last sub-question make use of the value offering described in the case "Reconfiguring the demand-supply chain – Case Würth" by Jan Holmström and Eero Eloranta

- *What is the potential advantage to the customer and service provider of a collaborative service supply chain constellation?*
- *Describe what information a supplier needs from the customer in a collaborative service supply chain constellation. How is the information to be used by the service provider?*
- *How could an Original Equipment Manufacturer (OEM) make use of Würth's value offering described in the case to support collaborative service supply chain management?*

Based on the debriefing session there are additional bonus points

BONUS QUESTION 2 (Additional point)

- *Jan Holmström in the debriefing session pointed out a factor that has contributed to make it difficult for Würth to apply its VMI model in construction projects. Describe the factor differentiating construction projects from assembly lines?*

PART III Guest lectures

You have attended 5 guest lectures. Based on the guest lectures answer one of the questions below.

6. *Based on the guest lecture of Ilkka Töyrylä (Midagon) on Warranty Chain Management answer the following short questions (3p)*

- *Describe the slippery slope that can lead a service shop to start systematic warranty fraud*
- *What effective actions can a manufacture take to reduce warranty fraud?*

7. *Based on the guest lecture of Timo Ala-Risku on Performance Management answer the following short questions (3p)*

- *What factors complicate the comparison of performance between different service units in a company providing field services?*
- *Why do these factors you have identified make comparison difficult?*