



UNIVERSITY
OF SKÖVDE

School of Engineering

WRITTEN EXAMINATION

Course Fundamentals of Production Engineering

Sub-course

Course code PRO33G

Credits for written examination 3hp

Date 2025-09-26

Examination time 0830-1230

Examination responsible Victor Hedén

Teachers concerned

Aid at the exam/appendices

Other

Instructions

- ☐ Take a new sheet of paper for each teacher.
- ☒ Take a new sheet of paper when starting a new question (part questions on the same paper).
- ☒ Write only on one side of the paper.
- ☒ Write your name and personal ID No. on all pages you hand in.
- ☒ Use page numbering.
- ☒ Don't use a red pen.
- ☒ Mark answered questions with a cross on the cover sheet.



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Grade points

Grading results U, G, VG	Grading results: A-F
U = less than 6p/Part	A = 4*VG
G = 6-10p/Part	B = 3*VG + 1G
VG=11-15p/Part	C = 2*VG + 2*G
	D = 1 VG + 3*G
	E = 4*G
	F = Less than G on any Part

Grading limits to get the least pass are required G on each part A, B, C and D. If any part is judged as U, all parts must be re-examined.

Examination results should be made public within 18 working days

Good luck!

Total number of pages 7

Part A (questions 1, 2, 3) General questions Total 15p

Question 1 (9p)

Waste and problems in production sometimes occur. In the course we have talked about 7 + 1 waste based on Lean production

- Most people understand that waste (Muda) is not good. How does a waste turn out if we think in economic terms? We have talked about **2 different ways, which ones?** (2p)
- Name 3 of 7+1 wastes and explain how can we **detect** each of them? (3p)
- In Lean production, people talk about waste. Explain with an **example** how the words Problem, Cause, Symptom and Waste are connected. (4p)

Question 2 (3p)

A common way to categorize time is to divide the time into Value-adding time (VA), Non-value-adding time (IVA) and Non-value-adding but necessary time (NIVA). **Give 2 production-related examples** for each of these three categories of time. (1p / time category)

Question 3 Takt time and cycle time (3p)

- What is the purpose of Takt-time? (1p)
- How do you set the TAKT-time? (1p)
- Explain what cycle time is. (1p)

Part B (question 4,5,6) Production preparation Total 15p

Question 4 Process planning 6p

Process planning could be described as follows:

Process planning or production preparation means the function that prepare, adjust and modifies product structures, as well as documentations for manufacturing, in terms of operational sequences and operating hours.

Discuss possible obstacles or limitations in the current manufacturing processes that could affect the process planning. (6p)

Question 5 Plant layout 6p

In the course we have discussed 4 Layout types. Explain thoroughly and discuss **2 of the 4 different plant layouts**

The explanations should include which process types are suitable for those 2 different layouts. (6p)

Question 6 Automation 3p

Automation in a really wide sense could regard both automatic machining as well as automatic identification and data capture.

Where in a manufacturing process it could be useful to atomize manual work? Give 3 examples and a short motivation why it would be beneficial. (3p)

Part C (questions 7, 8) Production and problem solving Total 15p

Question 7 Leveling (9p)

Right now, your company can produce 1000 items per day and you produce 5 days per week. When producing 1000 items per day the company have time to change products 3 times per month in the machine.

For 1 month, you produce a total of 20,000 items (20 working days per month).

The demand during this month can be seen in the table below:

Article	Demand right now per months
A	10 000
B	8000
C	2000

The person responsible for the planning has chosen to produce first 10000 A then 8000 B and then 2000 C, after that the person starts with A again and so on.

a) **Give a motivation about the** good things about this planning. (2p)

Your customer now wants to go from having a to plan for 1 months, to 1 week and maybe further down to only plan for 1 day ahead. This probably means that you need to change the production plan and how you level out your production.

b) **Describe** how you should plan to cope with 1 week plan and 1 day-plan respectively. (Leveling the production correctly regarding to lower the waiting time) (2p)

c) **Describe and justify a clear requirement** for the process. (2p)

d) **Describe shortly a tool / method** that can help you more easily meet the requirement in 6C above. (3p)



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Question 8 Problem solving 6p

In the course we have talked about PDCA and DMAIC as a good way to organize continuous improvement.

The first phase in PDCA is Plan, where problems are define investigated and solutions to the problem are suggested.

Describe shortly three (3) different tools, how they work and what they help you with, which could be used in purpose of problem solving. (2p/tool) (6p)

Part D (questions 9, 10) Production logistics Total 15p

Question 9 Production planning 7p

The MRP II model separates planning activities in 4 different levels, where the Master production schedule is the actual starting point for planning production.

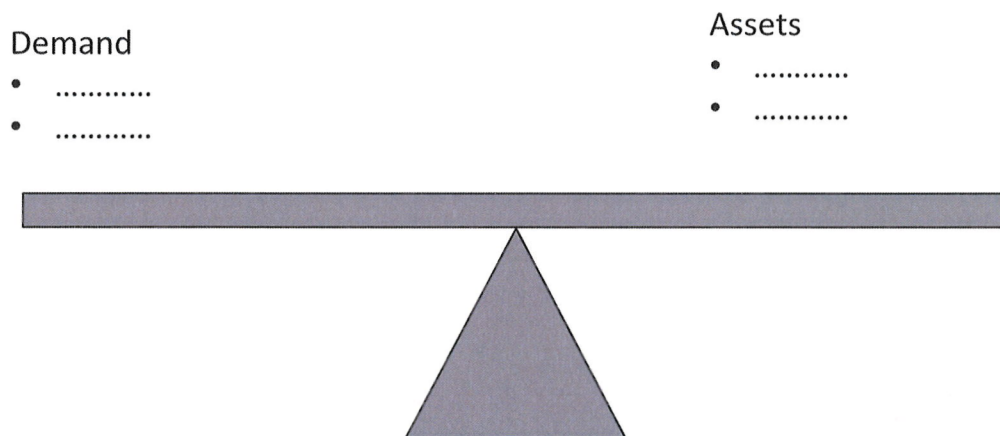
- a) This schedule/plan should answer to 4 specific questions. The first is which product we should produce. Which are the following 3 questions? (3p)

The picture below describes the balance between assets and demand which has to be accomplished by the master production planning.

- b) Which are the 2 “thing” that should be under Demand respectively Assets? (2p)

- c) Explain 2 possible consequences in case of an unbalanced situation. (2p)

Balance between assets and demand



Question 10 Material ordering 8p

- a) Describe thoroughly an “Ordering point”-system. (4p)
- b) Describe a supermarket solution. (4p)