MÄLARDALENS HÖGSKOLA
Institutionen för Innovation,
Design och Teknik

EXAM

Production, Maintenance and Quality development (PPU404)

Date: 2016-06-03 Time: 08.10-13.30

Exam: TEN 1 Utilities: Calculator, dictionary

Responsible teacher: Antti Salonen, tel (016-163606), mobile 0709-378469

Max score: 35 p
Pass (Swedish, 3 – ECTS, E): 18p
ECTS, D: 21
Swedish, 4: 25
ECTS, C: 25
ECTS, B: 28
Swedish, 5: 30
ECTS, A: 32

Good Luck!

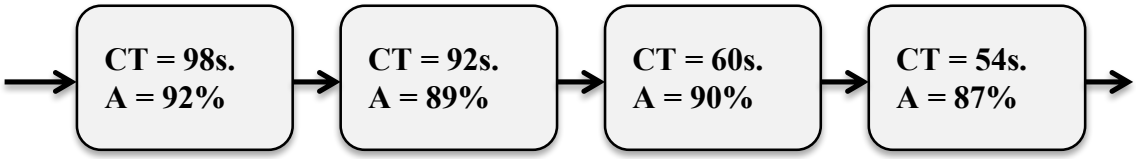
Q 1:

Chen, et.al (2008) present a case study, in which one of their improvements was to implement a “Rabbit chasing system”. Which were the main purposes of the introduction of this Rabbit chasing system?

(3 P.)

Q 2:

What’s the average capacity (components per hour) of the production line below?



CT = Cycle time, A = Availability

(5 P.)

Q 3:

According to Stålberg and Fundin, seven challenges could be observed in the process of reaching a holistic perspective on production system improvement. Which are they?

(5 P.)

Q 4:

According to Bruch, why should you apply a process perspective on system development?

(3 P.)

Q 5:

Name three “triggers of inefficiency”, associated with “improvements in vain”?

(3 P.)

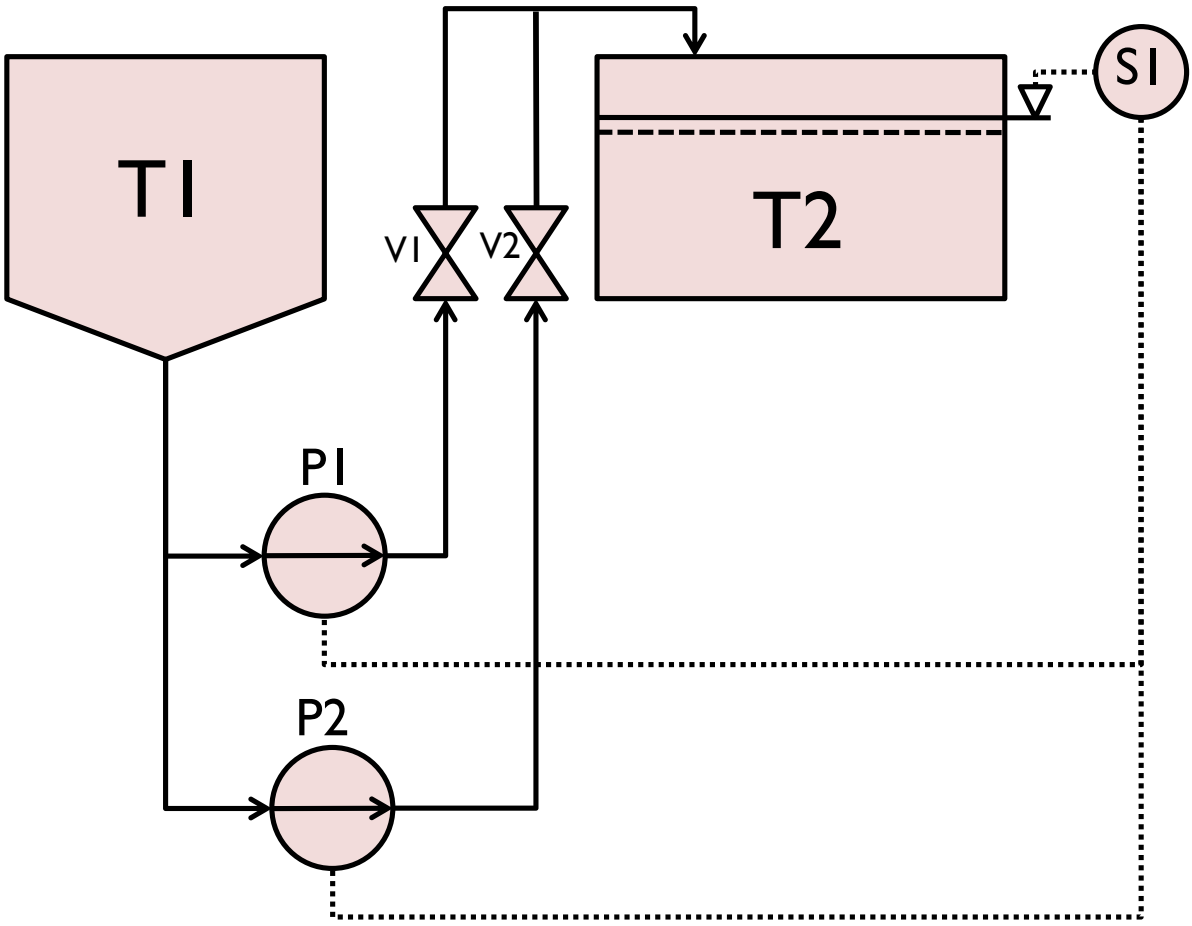
Q 6:

The system that is shown below keep the fluid level in tank T2 at a certain level. I order to function the system need to fulfill the following conditions:

1. The level sensor S1 has to be functional
2. Either P1 has to be working and V1 open, and V2 closed **or:**
3. P2 has to be working and V2 open and V1 closed.
4. Also, there has to be fluid in tank T1

Draw a Fault tree for the top event: ”Low level in T2”.
Base the Fault tree only on the above mentioned circumstances.

(5 P.)



Q 7:

A Lathe have an aquisition cost of 9,800,000 SEK. The machine has a calculated capacity of 12000 products per year and the products have a selling price of 350 SEK per item. The machine will work at weekdays in two shifts per day, so the yearly salary cost is estimated to 1,000,000 SEK. The material cost for the products is 130 SEK per item. Further, the operating costs e.g. energy, and maintenance are about 180,000 SEK per year. The machine have a calculated life length of 10 years and an estimated rest value of 75,000 SEK. The company use a 5% interest rate. Calculate the Net Present Value of the proposed investment.

$$NPV = -C_A + r\frac{(1+i)^n - 1}{i(1+i)^n} + \frac{s}{(1+i)^n}$$

C_A = Acquisition cost
r = yearly profit
i = interest rate
s = rest value
n = calculated, economic life time

(5 P.)

Q 8:

Wisner and Fawcett (1991) presents a 9 step process for developing an effective performance measurement system. What is the first step?

(3 P.)

Q 9:

According to MacDuffie process standardization should be understood as marking the beginning of further improvement efforts. Why is that?

(3 P.)