MÄLARDALENS HÖGSKOLA
Institutionen för Innovation,
Design och Teknik

EXAM

Production, Maintenance and Quality development (PPU404)

Date: 2016-01-05 Time: 14.10-19.30

Exam: TEN 1 Utilities: Calculator, dictionary

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

Max score: 30 p
Pass (Swedish, 3 – ECTS, E): 15p
ECTS, D: 18p
Swedish, 4: 20p
ECTS, C: 21p
ECTS, B: 24p
Swedish, 5: 25p
ECTS, A: 27p

Good Luck!

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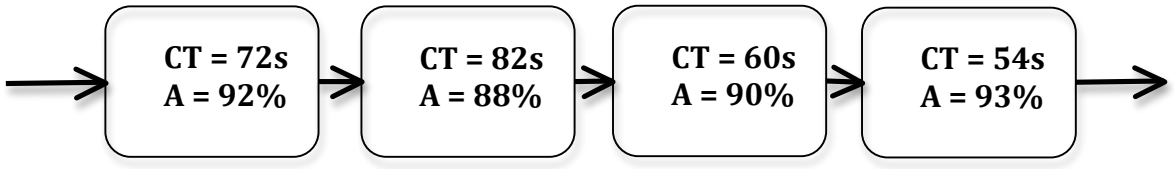
Q 1:

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

(4 P.)



CT = Cycle time, A = Availability

Q 2:

Name three examples of system loss

(3 P.)

Q 3:

Name three of the four guidelines that Yamamoto and Bellgran (2010) give for finding problems, when working with Kaizen

(6 P.)

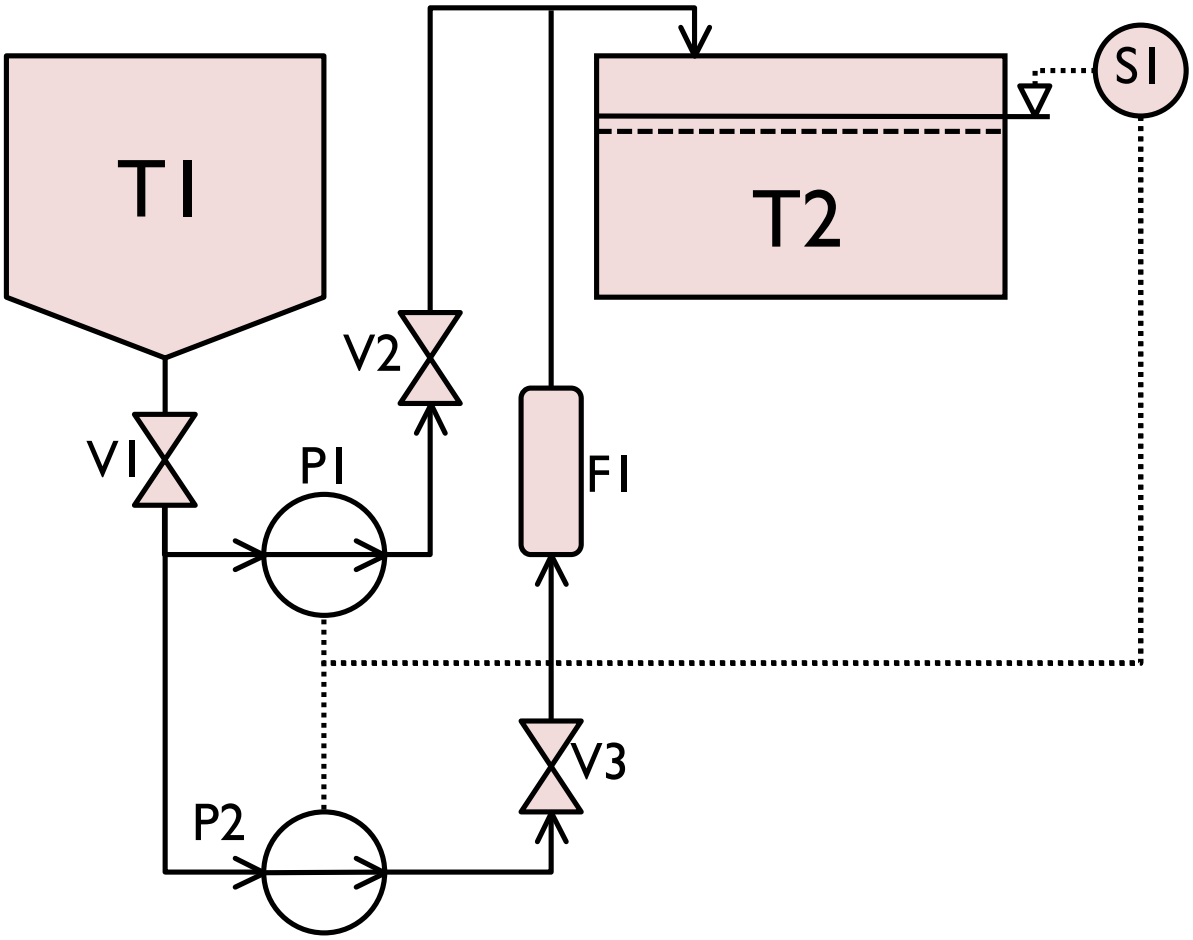
Q 4:

The system that is shown below keep the fluid level in tank T2 at a certain level. I order to secure that the fluid in tank T2 is clean, the following conditions have to apply:

1. The fluid in tank T1 has to be clean
2. Otherwise, the filter F1 has to be functional, and
3. The valve V2 have to be closed

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

(5 P.)



Q 5:

Acme engineering is about to start producing a new product with an estimated life cycle of 25 years. In order to produce it, the company needs to buy a new machine and two alternatives have been selected. Both alternatives are expected to run 7300 h/y. The data of the two alternatives is found below:

Data	Machine X	Machine Y
Acquisition cost	1350000 €	930000 €
Maintenance cost	11500 €/y	???
Life length	30 y	35 y
MTBF	350 h	300 h
MTTR	2 h	3 h
Cost of downtime	500 €/h	500 €/h
Operations cost	45000 €/y	48000 €/y

Calculate what yearly maintenance cost Machine Y could have and still be an interesting alternative to Machine X.

(5 P.)

$LCC = C_A + t_C(C_O + C_M + C_{DT})$

C_A : Acquisition cost
t_C : time of comparison
C_O : Operations cost
C_M : Maintenance cost
C_{DT} : Downtime cost

Q 6:

Describe the seven steps of SIPOC performance

(7 P.)