PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination : Semester II **Academic Year :** 2008

Date : February 18, 2009. **Time :** 09.00 - 12.00

Subject : 225-345 Quality Control **Room :** วิศวกรรมยนต์

ทุจริตในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้น
และพักการเรียน 1 ภาคการศึกษา

Instructions :

1. **There are 5 questions, 100 points.**
2. **Attempt all questions.**
3. **Books and notes, calculator and dictionary are allowed.**
4. **Borrowing things from other students is prohibited.**

Problem no.	Full Score	Score
1	15	
2	15	
3	15	
4	15	
5	40	
Total	100	

Assoc. Prof. Dr. Sunchai Klinpikul

Instructor

1. A process produces rubber belts in lots of size 2500. Inspection records on the last 20 lots reveal the following data :

Lot no.	NC Belts	Lot no.	NC belts
1	230	11	456
2	435	12	394
3	221	13	285
4	346	14	331
5	230	15	198
6	327	16	414
7	285	17	131
8	311	18	269
9	342	19	221
10	308	20	407

NC = nonconforming

a. Compute trial control limit for a fraction nonconforming control chart.

(5 points)

b. If you want to set up a control chart for controlling future production, can you use the trial control chart from (a) ? If not, how can you do ?

(10 points)

2. (a) Design a double sampling plan given α = 0.05, β = 0.10, AQL = 0.8%, LTPD = 6.5 % and use the second sample size at twice of the first sample size.

(5 points)

(b) From the double sampling plan designed in (a), calculate the average sampling number if the process average is 1% .

(10 points)

3. The density of a plastic part used in a pocket calculator is required to be at least 0.70 g/cm^3. The parts are supplied in large lots, and a variable sampling plan is to be used to sentence the lots.

The desired AQL lot has 0.02 fraction defective with the probability of acceptance of 90% whereas the RQL lot has 0.10 fraction defective with the probability of acceptance of 5%. The variability of the manufacturing process is unknown but will be estimated by the sample standard deviation.

(a) Find an appropriate variable sampling plan of this product.
(10 points)

(b) Suppose that a sample of the appropriate size was taken and $\overline{X}$ = 0.73, sample standard deviation = 0.0105. Should the lot be accepted or rejected ?
(5 points)

4. A new customer of the Wiseman Company is going to design a proper plan to test the operation life of alkaline batteries produced by the company. The customer decides to buy batteries having life time of 2,500 hours with the probability of acceptance of 99 % and reject batteries having average life of 1,800 hours with the probability of 90%

What should be the proper test plan of the customer? What are the sample size and testing period ?

(15 points)

5. Answer the following questions : (40 points)

(5.1) Explain the difference of principle between Statistical Quality Control and Company Wide Quality Control.

(5 points)

(5.2) Explain the reasons why ISO 9000:1994 had not been successfully implemented ?

(5 points)

(5.3) Explain why business process of the organization is considered to be an important process for the QMS implementation ?

(5 points)

(5.4) How do you overcome the problem of independent kingdom in the organization ?

(5 points)

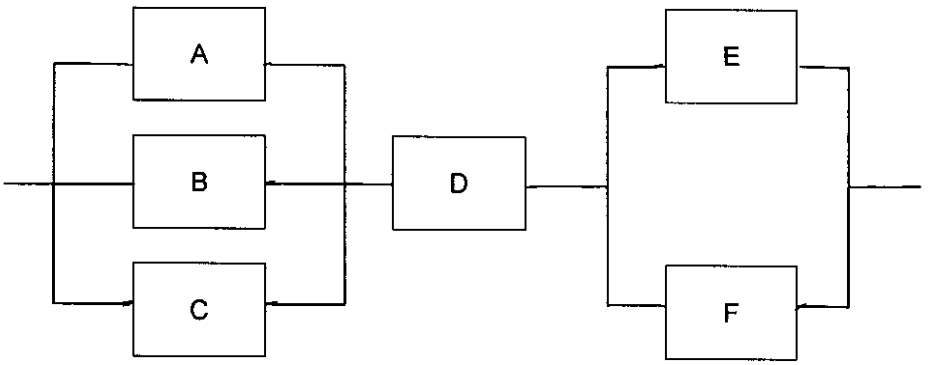
(5.5) What are the alternatives for applying BSC and KQI in an organization ?

(5 points)

(5.6) Explain the format and symbols used in " the process decision program chart "or flowchart in the new 7 QC tools ?

(5 points)

(5.7) Calculate system reliability of the following circuit ? **(5 points)**



R_A = 0.75 R_D = 0.94 R_E = 0.89

R_B = 0.92 R_F = 0.97

R_C = 0.87

(5.8) Internal failure cost consists of : **(5 points)**

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