Menoufiya University
Faculty of Engineering
Shebin El-Kom
First Semester Examination
Academic Year: 2014-2015

Minufiya University

Department: Production Eng. & Mech. Design
Year: 3rd production
Subject/Code: Production Quality Control 315B
Time Allowed: 3 hours
Date: 15/1/2015

Allowed Tables and Charts: *(Statistical Tables and Graphs)*
This exam measures ILOS nos.: (a1, a15, a19, b1, b16, b17, c1, c13, and c14)

Total Mark [40 Marks]

Answer all the following Questions

Question (1) [12 Marks = 5 + 4 + 3]

In the manufacturing of carpet, the number of nonconformities per 100 running feet should be controlled. From 20 randomly selected 100-foot lengths, the following data are:

Sample No. :	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Nonconformities:	13	1	2	10	15	10	2	12	10	4	7	7	8	8	9	3	16	9	8	6

a- Use an appropriate control chart to determine whether the process is in control.
b- Draw the OC curve for your control chart.
c- What is the probability of a type I error.

Question (2) [13 Marks = 6 +4 +3]

The following data were collected from a process manufacturing power supplies. The variable of interest is output voltage, and n = 5.

Sample:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
X-bar :	103	102	104	105	104	106	102	105	106	104	105	103	102	105	104	105	106	102	105	103
R :	4	5	2	11	4	3	7	2	4	3	4	2	3	4	5	3	5	2	4	2

a- Construct X-bar and R control charts. Does the process seem to be in statistical control? If necessary, revise the trial control limits.
b- What would be your estimate of the process fraction nonconforming if the specifications on the characteristic were 103 ± 4?
c- What is the process capability? Comment.

Question (3) [10 Marks = 2+8]

(a) What are the different situations that acceptance sampling can be performed?
(b) Design a single sampling plan with p_1=0.02, p_2=0.08, α =0.05, and ß =0.10. Draw OC curve - what are the equivalent double sampling plan; at p=0.06, compute P_a and ASN values for this double plan.

P.T.O.

Question (4) [5 Marks]

Twenty successive bales of cotton are weighed (in pounds), with the following results. Set up control charts for the moving range and individual observations.

Bale	Weight	Bale	Weight
1	987.2	11	1002.9
2	956.7	12	947.2
3	969.5	13	990.1
4	952.2	14	976.5
5	970.1	15	1012.9
6	1008.2	16	985.3
7	950.7	17	972.6
8	1012.4	18	997.8
9	975.3	19	934.8

GOOD LUCK,

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