FACULTY OF ENGINEERING
B.E. 4/4 (AE) II-Semester (Main) Examination, April / May 2013

Subject : Quality Control and Reliability Engineering

Time : 3 Hours   **Max. Marks: 75**

Note: Answer all questions of Part - A and answer any five questions from Part-B.

PART – A (10x2.5=25 Marks)

1. Explain briefly basic concepts of quality.
2. Explain process capability.
3. Explain 'p' and 'c' chart.
4. Define SQC
5. Explain Quality costs
6. Define AQL, LTPD
7. Define Reliability, Mean time to failure
8. Sketches the product development process.
9. Differentiate between variables and attributes
10. Describe O-C curve

PART – B (5x10=50 Marks)

11.(a) Explain benefits and limitations of SQC.   (4)

(b) Plot the control charts for $\bar{X}$ and R. Using the following sample data and a sample size of '5'(five) from the chart find out whether the process is in control.   (6)

Sample	1	2	3	4	5	6	7	8	9	10
$\bar{X}$	166	165	168	166	167	169	168	168	167	166
R	23	8	22	12	7	8	15	6	7	12

12.(a) What are the sources of assignable causes of variation on in quality control?   (4)
(b) Explain 'comments concerning Cp and C$_{PK}$' with neat sketches.   (6)

13.(a) The Piston rings are produced in batches of 100. The inspection results of the 15 batches is as follows. Using 'np' chart analysis the manufacturing process.   (5)

Batch	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Defects	15	20	35	18	27	10	12	18	15	25	30	16	19	20	25

(b) Explain product life cycle.   (5)

14.(a) Explain double sampling plan.   (4)
(b) For n=20 and c=2 construct O-C curve and find the producers risk at AQL of 5 percent.   (6)

15.(a) Explain briefly the Reliability improvement techniques.   (5)
(b) Explain Information flow during product cycle.   (5)

16.(a) Explain 'Maintainability' and 'Availability'.   (4)
(b) The components are arranged as follows in the system.   (6)

Supplier Reliability of components / Components	1	2	3
A	0.95	0.92	0.94
B	0.80	0.86	0.9
C	0.90	0.93	0.85

Based on the above data, which one of the supplier should be choosen? Consideration is the maximum possible reliability.

17. Write short notes on of the following:
(a) Product Life Cycle   (3)
(b) Dexating   (3)
(c) System reliability in series and parallel system   (4)

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