5E6204

B.Tech. V Sem. (Main/Back) Exam., 2014
Mechanical Engineering
5ME4A Quality Assurance and Reliability

Time : 3 Hours

Total Marks : 80
Min. Passing Marks : 24

Instructions to Candidates :
Attempt any five questions selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

UNIT–I

1. (a) Discuss the importance of Quality Control in the success of any organization. (8)
   (b) Discuss the major aspects of effective management of Quality. (8)

OR

1. (a) What do you understand by "Quality of conformance" and "Quality of Design"? Explain. (8)
   (b) A process is known to produce about 6% non-conforming items. If a random sample of 200 items is chosen, what is the probability of finding between 6 and 8 non-conforming items? (8)

UNIT–II

2. What do you understand by Control Charts for variables ? Classify and explain them. (16)

OR

2. (a) Explain the concept of Statistical Quality Control. Explain Type –I and Type –II errors. (8)
   (b) Five different types of defects are classified in a telephone assembly industry; weightage of each defect is as shown below. A sample of 20 units is inspected and no. of defects of each class is recorded as follows. Establish the central line, upper and lower C.L. for demerit C.C.

Class of defect	1	2	3	4	5
Weightage	0.80	0.65	0.25	0.15	0.05
No. of defects	4	12	60	75	50

(8)

UNIT–III

3. (a) Explain the concept of process capability. When should it be estimated? Discuss its impact. (8)
   (b) Distinguish between a non-conformity activity and a non conformity item. Give example of each. (8)

OR

3. Data for the number of dissatisfied customers in a department store observed for 20 samples of size 300 is shown in table. Construct an np chart for the number of dissatisfied customers. (16)

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

UNIT – IV

4. (a) Draw the Acceptance and Rejection lines for sequential sampling plans from the following data :

AQL = 2%

LTPD = 8%

Producer risk = 5%

Consumer risk = 10%

Also compute various constants used in plotting the lines. (8)

(b) Discuss relative advantages and disadvantages of single, double and multiple sampling plans. (8)

OR

4. What is ISO-9000 and why it is needed in industries? How does ISO-9000 : 2000 quality system work? (16)

UNIT – V

5. (a) Sketch "Bath Tub Curve" and discuss what informations does it reveal. (8)

(b) Explain what is the use of reliability data and how calculation of failure rate is done? (8)

OR

5. Derive an expression of reliability on terms of failure rate and life of product, along with all assumptions. (16)