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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E., - Industrial and production Engineering

Semester End Examination; May/June - 2019

Quality Assurance and Reliability

Time: 3 hrs *Max. Marks: 100*

***Note**: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.*
ii) Use of SQC table is permitted.

UNIT - I

1 a. Describe the eight dimensions of Quality in briefly. 10

b. Explain the Prevention Cost and Appraisal Cost with example. 10

2 a. Define Quality Assurance. Explain Quality Assurance activities. 10

b. Explain the following : 10

i) Audit reporting ii) Quality audit concept.

UNIT - II

3 a. With a neat sketch, explain basic principles of control charts. 10

b. Write a short note on the following : 10

i) Causes for variation ii) Sample size and Sampling frequency

4 a. With a neat sketch, explain R-chart. 5

b. The following are the $\bar{x}$ and R values for 20 sub-groups and five readings. The specifications for this product are 37 ± 10. The values given are the last two figures of the dimension. 15

Subgroup	$\bar{x}$	R	Subgroup	$\bar{x}$	R
1	34.0	4	11	35.8	4
2	31.6	4	12	38.4	4
3	30.8	2	13	34.0	14
4	33.0	3	14	35.0	4
5	35.0	5	15	33.8	7
6	32.2	2	16	31.6	5
7	33.0	5	17	33.0	5
8	32.6	13	18	28.2	3
9	33.8	19	19	31.8	9
10	37.8	6	20	35.6	6

i) Determine the control limits for $\bar{x}$ and R chart for future use, evaluate all the out of control points

ii) Will the process be able to meet the specification?

UNIT - III

5 a. With a neat diagram, explain P-chart. 8

b. Using each day's production as the days sample, draw a control chart for friction defectives on the basis of the proportion and defectives castings produced in 10 days tabulated below : 12

Contd…2

Day	No. of castings produced	No. of castings forms defective
1	154	4
2	152	2
3	148	2
4	150	4
5	154	3
6	145	4
7	151	2
8	154	2
9	150	1
10	153	4

6 a. A set of chair are subjected for inspection. A set consist of five chairs and there are twenty subgroups. The inspection data obtained is an follows:

Group No.	1	2	3	4	5	6	7	8	9	10
No. of Defects	77	54	75	93	45	61	49	65	45	77
Group No.	11	12	13	14	15	16	17	18	19	20
No. of Defects	59	54	41	87	40	22	92	89	55	25

15

i) Draw suitable chart ii) Find revised control limits, if the process is out of control charts

b. Write a note on guidelines for implementing control charts. 5

UNIT - IV

7 a. Describe the following: i) Producer risk ii) LTPD iii) AOQL. 6

b. With a neat sketch, explain OC curve. 5

c. Draw OC curve for the given SSP, n = 110, c =1 for p values 1%, 2%, 3%, 4% and 5%. 9

8 a. Explain seven sequential sampling plans with a neat sketch. 10

b. A double sampling plan as follows : $N = 5000$ $n_1=100$ $c_1= 0$ $n_2 = 100$ $c_2 = 1$

Compute the following :

i) P_a for 1% defectives

ii) If the rejected lot is 100% inspected, what is AOQ? When lot has 1% defectives? 10

iii) What is ATI?

UNIT - V

9 a. Describe the following : i) Relaibility ii) MTBF iii) MTTF. 6

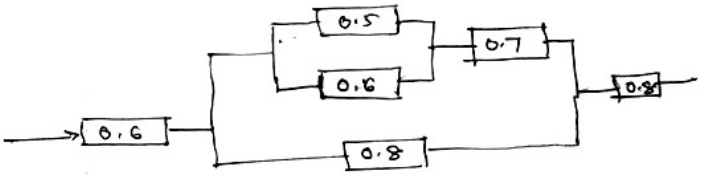
b. Explain various types of failures with a neat curve. 7

c. In the life testing of ten specimens of a device, time to failure for each specimen is recored. Find the MTTF for all ten specimens and the mean failure rate for T = 900 hrs. 7

Specimen	1	2	3	4	5	6	7	8	9	10
Time to failure (a)	805	810	815	820	825	832	842	856	875	900

10 a. What are the techniques of incresing reliabilty? Explain briefly. 10

b. Determine the system reliabilty of the given diagram,



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