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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 - 2018

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 permitted
iii) Missing data and wrongly printed data if any may be assumed suitably.

UNIT - I

1 a. What is Quality? Briefly explain any four dimensions of Quality. 10

b. What is Quality Cost? Briefly describe appraisal and Internal failure cost. 10

2 a. Define Quality Assurance. Write a note on departmental quality assurance activities. 10

b. Write a note on the following : 10

i) QFD ii) Planning and performing audits on activities briefly.

UNIT - II

3 a. Explain the chance and assignable causes and variations with examples 10

b. Write a note on six sigma concept and process capability. 10

4 a. Describe the objectives and control chart. 5

b. The control limits of $\bar{x}$ and R charts for a certain component with a subgroup size of Five and specification limits 14.4±0.4. It is also given that after 25 subgroups. The values of $\sum \bar{x}$ and $\sum R$ are 357.50 and 8.8 respectively. Assume that all the points are within control limits on both the charts and normally distributed. 15

i) Compute the control limits $\bar{x}$ and R-charts

ii) Find the process capability

iii) Determine the percentag and rejection if any

iv) Suggest the possible ways in which the situation can be improved.

UNIT - III

5 a. Differentiate between; 8

i) P-chart and nP-chart ii) C chart and U-chart

b. A manufacturer purchases small bolts is a cartons that contain several thousands of bolts. As a part of acceptance procedure 400 bolts are selected at random from each carton and subjected to visual inspection for inspection for certain defectives. In a shipment of 10 cartons the respective of defectives in the sample from each carton are 12

0	0	0.5	0.75	0	2.0	0.25	0.25	0	1.25

i) Construct an appropriate chart.

ii) Determine whether the shipment of screws appear to exhibit statistical control.

Contd…2

6 a. Write a note on guidelines for implementing control chart. 7

b. Mention the difference between control chart for variables and Attributes. 6

c. With a neat sketch, explain nP-chart. 7

UNIT - IV

7 a. Describe the following : 6

i) Producer's Risk ii) Consumer's Risk iii) AOQL.

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

c. Draw the OC curve for the given SSP n = 150, C = 1 for P values 1%, 2%, 3%, 4% and 5% 9

8 a. With neat flow diagrams, explain the DSP. 7

b. In a DSP;

$N = 5000$, $n_1 = 100$, $C_1 = 0$, $n_2 = 100$, $C_2 = 1$

i) Compute the Pa for 1% Defectives 10

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

iii) What is ATI?

c. With an example, describe triple sampling plan. 3

UNIT - V

9 a. Explain the following : 6

i) Reliability ii) Failure Density iii) MTBF.

b. With a neat sketch, describe failure rate curve. 6

c. A series system has 3 independent part A, B and C, which have MTBF's of 100, 400 and 800 respectively. Find; 8

i) MTBF of the system

ii) Failure rate of the system is failure per 10^6 hrs

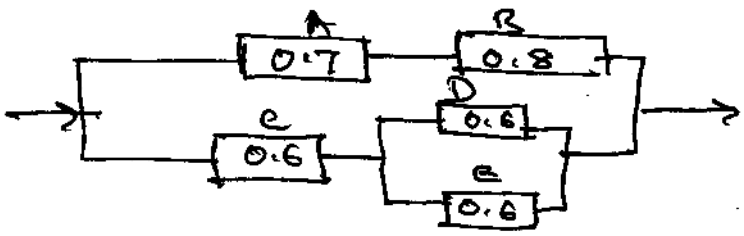
iii) Failure rate of the system is % failures per 1000 hrs

iv) Reliability of the system for a 30 hrs.

10 a. Describe System Reliability. 3

b. Narrate Reliability increasing techniques. 9

c. Find the system reliability. 8



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