

Roll No



**PRESIDENCY UNIVERSITY
BENGALURU**

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JUN 2023**

Semester : Semester VI - 2020

Course Code : MEC3016

Course Name : Sem IV - MEC3016 - Statistics and Quality Control

Program : MEC

Date : 21-JUN-2023

Time : 9.30AM - 12.30PM

Max Marks : 100

Weightage : 50%

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and non-programmable calculator are permitted.
- (iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS

(10 X 2 = 20M)

1. How will you define the term 'Fraction defective'? (CO2) [Knowledge]
2. What is Six Sigma? (CO4) [Knowledge]
3. When the measurement system is said to be 'accurate' as well as 'precise'? (CO3) [Knowledge]
4. What is meant by a variable data? Give example. (CO2) [Knowledge]
5. What is Defects per Unit (DPU)? (CO3) [Knowledge]
6. What is difference between specification limit and control limit? (CO3) [Knowledge]
7. When you have to go for data sampling in quality inspection? (CO2) [Knowledge]
8. Write any four quality control tools that you know. (CO1) [Knowledge]
9. Give any four tools normally used in Analyze phase of DMAIC process? (CO4) [Knowledge]
10. What are all the three important dimensions of quality characteristics used in general for any product? (CO1) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

(5 X 10 = 50M)

11. i) What is sampling error?
ii) Why or under what conditions, data Sampling is used?
iii) In a production environment, there is a decision on number of samples to be used for estimating mean weight 800 products, assuming 98% of confidence level and acceptable error of 0.7 kg. Standard deviation of the population is 1.2. (CO2) [Comprehension]
12. Explain the five Phases of DMAIC process in detail with the suitable tools that can be used in each and every phase. (CO4) [Comprehension]
13. How will you measure the quality of a product? Explain the eight dimensions commonly used to evaluate the quality of any product? (CO1) [Comprehension]
14. In a company manufacturing cricket ball, the quality controller inspects the balls and classifies them as defective or non-defective on the basis of certain defects. The company manager wants to maintain the process so that an average of not more than 5 percent of the output is defective. Suggest a suitable control chart for this purpose. If the company can work with a sample of size 500, calculate the centre line and control limits for this chart. (CO3) [Comprehension]
15. The following data gives the readings for 6 samples of size 6 each in the production of a certain product. Find the control limits using mean chart and range chart. (CO3) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

(2 X 15 = 30M)

16. A quality manager at a certain factory claims that the product quality in his plant are above average. A random sample of thirty products quality dimension have a mean score of 112.5. Is there sufficient evidence to support the p quality manager's claim? The mean population quality is 100 with a standard deviation of 15. (CO2) [Application]
17. In charge of quality in a shift has taken 8 samples of size four each from a fastener company. The observations recorded by the quality person recorded are given below. Calculate the control limits for mean and range chart. Also check the process is in control or not by plotting the control charts

Sample	Observation 1	Observation 2	Observation 3	Observation 4
1.	41	40	38	39
2.	37	42	43	38
3.	43	42	38	40
4.	45	42	40	41
5.	47	44	39	37
6.	39	36	45	42
7.	43	42	45	39
8.	40	42	36	38

(CO3) [Application]