Registration Number:

Date & Session:

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU -27
M. Sc STATISTICS – III SEMESTER
SEMESTER EXAMINATION: OCTOBER 2022
(Examination conducted in December 2022)

ST 9320: QUALITY ASSURANCE AND RELIABILITY THEORY

Time: 2 ½ Hours **Max Marks: 70**

This paper contains TWO printed pages and TWO parts

PART-A

Answer any SIX questions. $6 \times 3 = 18$

1. What is quality assurance?
2. Explain the cause-and-effect diagram.
3. What are the different dimensions of quality?
4. What is process capability analysis?
5. Explain Deming's philosophy to improve quality.
6. Define Reliability with an example.
7. Define structure function of a system. Write down the structure of function of parallel system with n components.
8. Distinguish between positive and negative ageing of life distribution.

PART-B

Answer FOUR questions. $13 \times 4 = 52$

9. a) Describe the procedure of constructing control limits for $\bar{X}$ and R charts.
   b) Describe specification limits and tolerance limits.
   c) How do you improve the sensitivity of a control chart? (5+4+4)

10. a) Discuss EWMA control chart for process mean. What are the advantages of this chart over Shewhart control chart?
    b) Distinguish between prevention cost and appraisal cost of quality
    c) Explain tabular CUSUM chart. (5+5+3)

11. a) Describe Hotelling's T^2-control chart.
    b) Write a note on six sigma programmes.
    c) What is ISO certification? (6+5+2)

12. a) Describe single and double lot-by-lot acceptance sampling plan. Obtain an expression for OC and AOQ of double sampling plan.

    b) Explain MIL-STD systems. (10+3)

13. a) Define hazard function and mean time to failure.

    b) Check whether Weibull and Pareto distributions belongs to IFR or not? (5+8)

14. a) Define AOQ and ASN in sampling plans.

    b) Describe minimal path and minimal cut sets.

    c) Define Increasing Failure Rate (IFR), New Better Than Used (NBU), Decreasing Mean Residual Life (DMRL).

(3+6+4)