



Register Number:

DATE: 27-11-2020

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27

B.Sc. STATISTICS - V SEMESTER

SEMESTER EXAMINATION - NOVEMBER 2020

ST: 5218 –STATISTICAL METHODS FOR QUALITY MANAGEMENT

Time: 2½hrs

Max: 70 Marks

This question paper has TWO printed pages and THREE parts

SECTION – A

I Answer any FIVE of the following:

5 x 3 = 15

1. Mention any three aims/objectives of statistical quality control
2. What are the different causes of variations?
3. Mention any six quality control tools.
4. Define control charts for attributes with help of an example.
5. What is Process Capability Ratio?
6. Distinguish between 100% Inspection and Sampling Inspection.
7. Give statement of optimal property of SPRT

SECTION – B

II Answer any FIVE of the following:

5 x 7 = 35

8. A) Write a note quality management systems (4)
B) Explain the product control and process control (3)
9. A) Explain statistical basis for construction of 3σ control charts (4)
B) What are warning limits? How are they useful? (3)
10. Derive the 3σ control limits for \bar{X} chart when standards are
(i) known and (ii) unknown (7)
11. A) Define producer's risk with reference to acceptance sampling. (3)
B) Explain double sampling plan and how it is different from single sampling plan (4)
12. A) Differentiate between natural tolerance limits and specification limits (3)
B) 25 Rational samples of size 5 revealed $\sum R_i = 8.8$. The specification limit is 14.40 ± 0.4
Calculate process capability ratio (PCR) and comment on process variability ($d_2 = 2.326$) (4)

13. A) Define average total inspection (ATI). (2)
B) Derive expressions for OC curve for single sampling plan (5)
14. A) Give operational definition for sequential probability ratio test (3)
B) Discuss about operating characteristic (OC) function and average run length (ARL) function. (4)

SECTION – C

III Answer any TWO of the following: 2 x 10 = 20

15. A) Write short notes on concept of rational subgroups. (3)
B) Discuss about various costs involved in quality control (3)
C) Write a note on six-sigma standard (4)
16. A) Explain any five criteria for detection of lack of control in control charts with neat diagrams.
OR
A) Explain any five quality control (7 QC) tools in detail (10)
17. A) Write down 3σ control limits for fraction defective chart (3)
B) Explain the construction of single sampling plan by attributes (7)