(Pages: 2)   Name……………………..

Reg. No…………………..

THIRD SEMESTER M.A. DEGREE EXAMINATION, NOVEMBER 2022
(CBCSS-PG)

(Regular/Supplementary/Improvement)

CC19P ST3 E10 - STATISTICAL QUALITY CONTROL

(Statistics)

(2019 Admission onwards)

Time: Three Hours   Maximum: 30 Weightage

PART A

Answer any *four* questions. Each question carries 2 weightage.

1. What is mean by curtailment? How does it is applicable in double sampling plan?

2. Discuss about various approaches for lot sentencing.

3. Compare acceptance sampling plans for attributes and variables.

4. A process is controlled with a fraction nonconforming control chart with three-sigma limits, n = 20, UCL = 0.25, center line = 0.080, and LCL = 0. Compute the probability of acceptance if the process fraction nonconforming is 0.2.

5. Illustrate the construction of c chart.

6. What is meant by process centering. How it is examined using process capability ratios?

7. Discuss about V mask procedure.

(2 × 4 = 8 Weightage)

PART B

Answer any *four* questions. Each question carries 3 weightage.

8. Define quality. Explain various dimensions of quality.

9. Compare double sampling and multiple sampling plans. Derive the OC function of double sampling plan.

10. Explain CSP-I and CSP – II.

11. A process produces rubber belts in lots of size 2500. Inspection records on the last 12 lots are given below. Construct a suitable control chart for number of non-conforming items using these data. Does the process appear to be in control?

Lot no.	1	2	3	4	5	6	7	8	9	10	11	12
No. of non-conforming belts	230	435	221	346	230	327	285	456	394	285	331	198

12. Explain any three methods of constructing control chart for fraction of non-conforming items for varying sample size.

13. Suppose that a quality characteristic has a normal distribution with specification limits at USL = 100 and LSL = 90. A random sample of 30 parts results in and s = 1.6.

(a) Calculate a point estimate of Cpk. (b) Find a 95% confidence interval on Cpk.

14. Explain the significance and construction of EWMA control chart.

(4 × 3 = 12 Weightage)

PART C
Answer any *two* questions. Each question carries 5 weightage.

15. Explain single sampling plan for attributes. Drive its performance measures.

16. Explain the derivation of a sampling plan for variables with double specification limit and unknown variance when AQL and LTPD along with the consumers and producers risk are given.

17. (a) Construct control chart of mean and standard deviation for the following data and comment on the state of control.

(b) Derive ARL of mean chart.

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12
Sample values	42	46	66	36	57	77	87	45	45	66	87	66
	64	53	81	87	99	89	56	78	78	55	57	120
	44	75	34	60	46	56	39	34	98	48	77	33
	75	89	4	79	77	48	121	98	39	88	55	55
	86	44	75	66	44	40	56	65	65	64	97	66

18. Individual observations on molecular weight taken hourly from a chemical process is given below. The target value of molecular weight is 1050 and the process standard deviation is $\sigma = 25$. Set up a tabular CUSUM chart with parameters of h = 5 and k = 0.5.

Sample no.	1	2	3	4	5	6	7	8	9	10
Weight	1045	1055	1037	1064	1095	1008	1050	1087	1125	1146
Sample no.	11	12	13	14	15	16	17	18	19	20
Weight	1139	1169	1151	1128	1238	1125	1163	1188	1146	1167

(2 × 5 = 10 Weightage)

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