LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **STATISTICS**

SIXTH SEMESTER – **APRIL 2024**

UST 6503 – STATISTICAL QUALITY CONTROL

Date: 05-04-2024   Dept. No.   Max. : 100 Marks
Time: 09:00 AM - 12:00 NOON

SECTION A

Answer ALL the questions.   **(10 x 2 = 10)**

1   Define total quality management.
2   What is frequency distribution?
3   Define quality assurance.
4   What do you mean by quality of a product?
5   Define histogram
6   Define Process Capability.
7   What is Double Sampling Plan?
8   When a process is said to be an out-of-control process?
9   Define Operative Characteristic (OC) curve.
10   What are the different types of acceptance sampling plans for attributes?

SECTION B

Answer any FOUR of the following questions.   **(4 x 10 = 40)**

11   Explain any five key dimensions of quality introduced by Garvin.

12   Discuss the major applications of statistical process control

13   Explain the procedure of constructing Box Plot with an example.

14   Explain the following: (a) QQ Plot,   and   (b) Xbar and R chart.

15   A machine is set to deliver the packets of a given following weight. Ten samples of size five each were examined and the following results were obtained:

Sample No.	1	2	3	4	5
Mean	44	50	38	44	45
Range	5	7	4	7	6

Sample No.	6	7	8	9	10
Mean	37	50	45	42	46
Range	4	9	5	5	6

Calculate the values for the central line and the control limits for the mean chart and range chart. Comment on the state of control.
Given that: For n=5, D3 = 0, D4 = 2.114, and A2 = 0.577.

16   The number of nonconforming switches in 20 samples each of size 150 are as follows: 7, 4, 1, 3, 6, 8, 10, 5, 2, 7, 6, 15, 0, 9, 5, 1, 4, 5, 7, 12

Construct a fraction nonconforming control chart for these data.

17   (b) What are the advantages of sampling plan?

      (b) Explain AQL and LTPD with an example for each.   (5 + 5)

18   Discuss the item-by-item sequential sampling plan.

SECTION C

Answer any TWO of the following questions.   **(2 x 20 = 40)**

19   (a) Explain any eight key principals from Deming's 14 points that are helpful for implementing quality and productivity improvement in an organizational setting.

      (b) Discuss the construction of np-chart.

                                                          (12 + 8)

20   (a) Draw a suitable control chart for the following data pertaining to the number of coloured threads (considered as defects) in 15 pieces of cloth in a certain number of synthetic fibre and state your conclusions:

8, 11, 4, 20, 23, 6, 5, 4, 12, 7, 1, 0, 7, 9, 19.

      (b) Explain Consumer's and producers' risks with an example for each.

                                                        (10 + 10)

21   Explain the following:
        (i) Average Sample Number (ASN)
        (ii) Average Total Inspection (ATI)
        (iii) Double Sampling Plan.

                                                          (5+10+5)

22.   (a) Explain the Single Sampling Plan in detail.
      (b) Distinguish between Shewhart control charts and CUSUM control charts.

                                                         (12 + 8)

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