WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 4th Semester Examination, 2020

STSACOR10T-STATISTICS (CC10)

Time Allotted: 2 Hours   Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

Answer any *four* questions from Question Nos. 1-6 and any *two* questions from Question Nos. 7-9

1. What are the bases of formation of rational subgroups? — Discuss. 5

2. Describe Shewhart's control chart and its components. 5

3. Discuss the differences between probability limits and k-σ limits. 5

4. Discuss the statistical basis of 3-σ limits. 5

5. Briefly describe the following: 1+1+1+
    1+1 = 5
    (a) Producer's value

    (b) Producer's risk

    (c) Consumer's value

    (d) Consumer's risk

    (e) Average outgoing quality limit (AOQL).

6. Write down the layout (flowchart) of single sampling plan for attributes and give the expressions for Consumer's risk, Producer's risk and ATI when it is given that N = Lot size, p_t = Consumer's value and $\bar{p}$ = Producer's value. How do you choose the value of the sample size and the cutoff value for LTPD plan? 1+1+1+
    1+1=5

7. (a) Discuss with examples chance causes and assignable causes in the context of statistical quality control. 3

   (b) Differentiate with examples between defect and defective. Discuss control chart for fraction of defective when the subgroup sizes are same. How would you modify the chart if the value of the lower control limit comes out to be negative? 2+4+1=7

8. (a) Write a note on modified control chart.

    $2\frac{1}{2}$

   (b) Briefly describe the following with examples:

    $1\frac{1}{2} \times 5 = 7\frac{1}{2}$

      (i) Specification limit

      (ii) Statistical tolerance limit

      (iii) Natural tolerance limit

      (iv) Average run length (ARL)

      (v) Process capability ratio (PCR).

9. Write down the layout (flowchart) of double sampling plan for attributes and give the expressions for OC, AOQL, ASN and ATI when it is given that $N = $ Lot size, n_1 and n_2 are the sample sizes, c_1 and c_2 are the respective cutoffs and $p = $ proportion of defective items in a lot.

   2+2+2+
   2+2=10

   N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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