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0404N69

Candidate's Seat No :_____

M.Sc Semester-4 Examination

509

Statistics

April-2024

Time : 2-30 Hours] **[Max. Marks : 70**

Note: Attempt all questions.

Q.1

(i) Describe Performance, Reliability, Durability and Serviceability as dimensions of quality. [7]

(ii) Explain: (a) Prevention costs (b) Appraisal costs. [7]

OR

(i) Explain: (a) Internal failure costs (b) External failure costs. [7]

(ii) Explain natural tolerance limits and specification limits. [7]

Q.2

(i) Explain the tabular cusum for monitoring the process mean. [7]

(ii) Explain the moving average control chart and compare it with other control charts. [7]

OR

(i) Explain the exponentially weighted moving-average control chart. [7]

(ii) Describe process capability ratio for an off-center process. [7]

Q.3

(i) Explain ChSP-1 plan. Discuss OC curve related to this plan. [7]

(ii) Explain CSP-2 and CSP-3 plans. [7]

OR

(i) Expain CSP-1 plan. [7]

(ii) Describe the conditions required for proper use of chain sampling. [7]

Q.4

(i) Discuss how Taguchi's philosophy is helpful in the quality improvement process of any organization. [7]

(ii) Explain how statistical process control methods and experimental design are interrelated for the improvement and optimization of process. [7]

OR

(i) Explain 2^{k-p} fractional factorial design with an example. [7]

(ii) Explain with an example how design of experiment is helpful in product design process. [7]

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Q. 5 Answer any seven: [14]

(i) Define Quality.

(ii) Quality characteristics are classified into variables and _____.

(a) constants (b) attributes (c) standard (d) specifications

(iii) Which one of these is not a component of quality?

(a) Aesthetics (b) Features (c) Acceptance sampling (d) Conformance to standards

(iv) Give one advantage of cusum chart.

(v) V-mask procedure is used to detect small process shifts.

(a)True (b) False

(vi) Give one disadvantage of V-mask procedure.

(vii) PCR_{km} is given by

(a) $\frac{LSL - USL}{6}$ (b) $\frac{USL - LSL}{\tau}$ (c) $\frac{USL - LSL}{6\tau}$ (d) none of the above

(viii) Skip-lot sampling plans should be used only when the quality of the submitted product is good as demonstrated by the vendor's quality history.

(a)True (b) False

(ix) In usual notations, for SKSP-2 plan f lies in the interval

(a) $0 < f < 1$ (b) $0 < f < 2$ (c) $1 < f < 2$ (d) $1 < f < 5$

(x) What do you mean by 'interaction' in factorial design?

(xi) When there are several factors of interest in an experiment, a --------design should be used.

(xii) Experimental design is a passive statistical method.

(a)True (b) False

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