[196] SEAT No._____

SARDAR PATEL UNIVERSITY
M.Sc External Examination, Semester - IV.
Thursday Date : 25-10-2018
Time · 2:00 pm to 5.00 pm
Subject/Course Code :PSO4CSTA02.....
Statistical Quality Control Technique

08

Q-1 Attempt following

1 In usual notation of SQC the warning limit is

   a $\mu \pm \sigma$.

   b $\mu \pm 2\sigma$.

   c $\mu \pm 3\sigma$.

   d   None-of-above.

2 In usual notation of SQC the action limit is

   a $\mu \pm \sigma$.

   b $\mu \pm 2\sigma$.

* c $\mu \pm 3\sigma$.

   d   None-of-above.

3 In usual notation # of non conforming in p.p.m. is 2700, then

   a $PCR \geq 1$.

   b $PCR \leq 1$.

   c $PCR = 1$.

   d   Non-of-above.

4 We recommend use of CUSUM control if it is require to detect shift of magnitude

   a $\mu \pm 3\sigma$ or less.

   b $\mu \pm 2\sigma$ or less.

   c $\mu \pm 1.5\sigma$ or less.

   d   Non of above

5 In context of SQC acceptance sampling plan use as tools for

   a   monitor quality.

   b   improve quality.

   c   audit quality..

   d   Non-of-above.

6 In usual notation of residual analysis for factorial design use in SQC, $\hat{\beta}$ in terms of effect is

   a $effect$

   b $effect/2$

   c $effect/2n$

   d   Non-of-above.

7 In context of SQC the SN ratio advocated by

   a   Taguchi.

   b   Shewhart

   c   Fisher.

   d   None-of-above..

8 In context of SQC the term robust mean

   a   good.

   b   batter.

   c   best.

   d   Non-of-above.

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Q-2 Attempt any SEVEN

(1) Consider following data : Specification is 100 ± 15. Estimate $\hat{\sigma}^2_{gage}$ when $\hat{\sigma}^2_{product} = 2.872$ and $\hat{\sigma}^2_{total} = 4.717$.

(2) Consider process with $\bar{S} = 3.6852$ and $\bar{\bar{X}} = 50$ based on sample of size 4. Compute 0.01 probability

(PTO)

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(3) In usual notation of singly replicate 2^4 design, the response of main effect of (b) is 11.13. BC interaction coded by $X_1 X_2$ in regression model $\hat{y} = 20 + (10)X_1 + (5)X_2 + (5)X_1 X_2$. Compute model estimate.

(4) Compute tolerance limits of process such that 95% of burning rate (normally distributed) lie within this limits with probability 0.99. Based on sample of size 25, the mean and s.d are 50 and 1 respectively.

(5) In usual notation write formula for 95% confidence interval of PCR.

(6) Consider ten effective life (order) in minutes of a catalyst in chemical reaction : 1176, 1183, 1185, 1190, 1191, 1192, 1201, 1205, 1214 1nd 1220. In usual notation compute $\hat{\theta}$.

(7) In context of Taguchi philosophy react and justify : Operation on target and conformance are equally important in SQC.

(8) Write full form for CUSUM chart.

(9) Write demerit of singly replicate factorial design and way to overcome of it.

Q-3	A	Consider process with control limit $(69, 71)$ and based on sample of size four, the process mean is 70 with $\bar{S} = 7$. Compute α-risk and interpret.	06

Q-3　B　In context of SQC discuss : Gage and measurement system capability study use in SQC.　　06

OR

Q-3　B　In context of SQC write note on (1) Active method and passive method. (2) Precision and Accuracy　06

Q-4　A　Consider process with control limit $(61.4, 62.6)$ and based on sample of size four process mean is 61 with $\bar{R} = 2$. Compute β-risk and interpret.　06

Q-4　B　In context of SQC explain the terms: (1) Best (2) Noise (3) Quality (4) off- center process (5) Nominal (6) Target　06

OR

Q-4　B　Discuss all important cases of PCR use in SQC.　06

Q-5　A　For two process with $n = 5$, $\hat{\mu}_A = \bar{\bar{X}}_A = 102, \bar{S}_A = 2$ and $\hat{\mu}_B = \bar{\bar{X}}_B = 100, \bar{S}_B = 3$ compute PCR, PCR_K and PCR_{km} and interpret.　06

B　Explain : (1) three aspect o acceptance sampling plan. (2) Chain sampling.

OR

Discuss : connection between control chart and testing of hypotheses.

Q-6　A Discuss CUSUM chart.　06

B　Write note on : (1) normal probability plot use in SQC. (2) Box plot use in SQC.　06

OR

B　In usual notation explain 2^{3-1} design use in SQC.　06

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