4 SEM TDC STSH (CBCS) C 10

2022

(June/July)

STATISTICS

(Core)

Paper : C–10

(Statistical Quality Control)

Full Marks : 50
Pass Marks : 20

Time : 2 hours

The figures in the margin indicate full marks for the questions

1. Choose the correct answer from the following alternatives : 1×5=5

(a) Quality

(i) is inversely proportional to variability

(ii) means fitness for use

(iii) is the reduction of variability in process and product

(iv) All of the above

(b) The trial control limits for R-chart with usual constant factors are

(i) UCL = D_4R, CL = R, LCL = D_3R

(ii) UCL = $D_4\overline{R}$, CL = $\overline{R}$, LCL = $D_3\overline{R}$

(iii) UCL = $D_4\overline{R}$, CL = $\overline{R}$, LCL = $D_4\overline{R}$

(iv) All of the above

(c) Control chart for number of defects is also known as

(i) np-chart

(ii) p-chart

(iii) c-chart

(iv) None of the above

(d) A curve showing the probability of accepting a lot of quality p is known as

(i) OC curve

(ii) ASN curve

(iii) Gompertz curve

(iv) None of the above

(e) The starting point for statistical six-sigma analysis is

(i) Juran's 80/20 rule

(ii) standard deviation

(iii) defects per million opportunities

(iv) None of the above

(Continued)

2. Answer the following questions in brief : 2×5=10

(a) Write the important components of quality standards set by ISO.

(b) Write the eight dimensions of components of quality.

(c) Distinguish between variable and attribute control charts.

(d) Explain the meaning of average outgoing quality.

(e) What do you mean by CTQ (critical to quality) characteristic?

3. Answer any *one* from the following : 10

(a) What are the seven major SPC problem-solving tools? Explain any two of them. 3+(3½+3½)=10

(b) What are chance and assignable causes of variability? What part do they play in the operation and interpretation of a Shewhart control chart? 5+5=10

(c) Discuss the rational sub-group concept. What part does it play in control chart analysis? What are the warning limits on a control chart? How can they be used? 3+3+2+2=10

4. *(a)* Explain clearly the basis and working of control charts for mean and range. Compare *R*-chart vs. Sigma (σ) chart. 8+3=11

Or

(b) Distinguish between defect and defective. Discuss the construction of *p*-chart when all the samples are of same size. Give some applications of *c*-chart. 2+7+2=11

5. *(a)* What are average sample number (ASN) and average total inspection (ATI)? Explain the method of their calculation for single sampling plan. Why are ASN and ATI calculated? 2+4+1=7

Or

(b) Distinguish between single and double sampling inspection plans in quality control. Explicate Dodge and Romig double sampling inspection plans. 2+5=7

6. Answer any *one* from the following : 7

(a) What do you mean by VOC? Write about the necessities of voice of customers as a basic concept of six-sigma methodology. Mention some different ways of capturing VOC. What is the best measuring scale used for collecting feedback as VOC? 2+2+2+1=7

(Continued)

(b) What is lean six-sigma? What are the benefits of lean six-sigma in the industrial world? What are 5S's in lean approach to organize a workspace? Explain any one of them. 1+2+2+2=7

(c) What do you mean by DMAIC methodology? Discuss each phase of DMAIC methodology in brief. 2+5=7

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