

Seat No. : _____

AE-115

April-2015

B.Sc., Sem.-VI

Statistics

STA-309 : Statistical Quality Control

Time : 3 Hours]

[Max. Marks : 70

Instruction : All questions carry equal marks.

1. (a) What is statistical quality control ? Give the meaning of quality in SQC. Also explain importance of SQC in industry. 7

OR

How will you determine whether the process is under control or not ? Also explain the responsibility of various quality control department.

- (b) Discuss causes of variation in a production process. 7

OR

Explain in detail : "Theory of Runs".

2. (a) Discuss the importance of rational sub-grouping in the construction of control charts. 7

OR

Describe \bar{X} & R – chart with reference to the following :

- (i) Possible objective of control charts
- (ii) Choice of variable
- (iii) Control limits for mean and range
- (iv) Preliminary conclusions from charts

- (b) Explain construction, control limits and conclusions drawn from p and np–charts. 7

OR

Distinguish between charts for variables and charts for attributes.

3. (a) Discuss single sampling plan for attributes. Also explain the following terms : 7

- (i) AQL
- (ii) LTPD
- (iii) Producer's risk
- (iv) Consumer's risk

OR

What is ideal OC-curve for SSP ? Explain the properties of OC-curve.

- (b) A lot of 20,000 units contains 800 defectives. Find the value of Average Outgoing Quality under the plan (20000, 100, 3). 7

OR

Discuss the basic theory for constructing Double Sampling Plan.

4. (a) Derive the procedure for sampling inspection plan for variables when the lower limit is specified and standard deviation σ is known. 7

OR

For Double Sampling Plan $N = 2000$, $n_1 = 40$, $C_1 = 0$, $n_2 = 100$, $C_2 = 3$. Find out the probability of accepting the lot when $p = 0.005$.

- (b) Give the assumptions, procedure and derivation for Single Sampling Plan for variables when upper limit is specified and standard deviation σ is known. 7

OR

Give the advantages and disadvantages of Sampling Inspection Plans for variables compare to Sampling Inspection Plans for attributes.

5. Write answers in brief : 14

- (i) Define High Spots and Low Spots.
- (ii) Give any two applications of C-chart.
- (iii) In 15 samples, each having 200 items, there are 304 defective items. Find LCL and UCL of np-chart.
- (iv) Give the reason : Why \bar{X} & R – chart are drawn simultaneously ?
- (v) Define : ASN and AOI.
- (vi) Which distribution will be used for calculating probabilities of accepting the lots for the following plans :
(80, 10, 1) and (1200, 150, 2)
- (vii) For a particular Single Sampling Plan, if for fraction defective 0.02 value of ASN = 100, AOQ = 0.002708, ATI = 878, find the value of N.