

Indian Statistical Institute, Bangalore  
MS (QMS) First Year  
Second Semester - Advanced Statistical Process Control

Final Exam  
Maximum marks: 50

Date: May 07, 2018  
Duration: 3 hours

1. Write short notes on the following:- [3 x 4 = 12]

- a) SPC v/s EPC.
- b) Taguchi's concept of Loss Function.
- c) Process Capability analysis when data does not follow Normal distribution.
- d) Continuous Sampling Plan.

2. [3 + 2 + 5 = 10]

- a) Explain chain sampling procedure.
- b) State the conditions for implementing chain sampling plan.
- c) Compare the two chain sampling plan by calculating the probability of acceptance at

$$p = 0.01, 0.05, 0.10$$

$$n = 5, i = 3 \mid n = 10, i = 2.$$

3. [4 + 8 = 12]

- a) Define sequential sampling procedure.
- b) Identify a sequential sampling procedure satisfying  $p_1 = 0.05, \alpha = 0.05$  and  
 $p_2 = 0.15, \beta = 0.10$

4. [3 + 10 + 2 = 15]

- a) State Taguchi's  $\beta$ -correction procedure.
- b) Derive the  $\beta$ -correction factor.
- c) Define the control system.

5. Data has been collected from a process with the specification of  $100 \pm 5 \mu$ , is shown below 85, 90, 95, 95, 100, 98, 102, 105, 108, 102, 110, 106, 110, 112, 108, 109.

- a) Compute the  $\beta$ -correction factor from the above data by using ANOVA method.
- b) Calculate the limit when correction is not necessary. Prepare a correction table for few observation. [10 + 5 = 15]