



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**M.Sc.DEGREE EXAMINATION – STATISTICS**

THIRD SEMESTER – APRIL 2018

**16PST3MC03- STATISTICAL QUALITY CONTROL**

Date: 03-05-2018  
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

**Part-A**

Answer **ALL** the questions:

(10 X 2 = 20)

1. Define Quality.
2. What is the difference between specification limits and control limits?
3. Define warning limits.
4. What is average run length?
5. When do you prefer S chart.
6. Define Process capability analysis.
7. Write the control limits for np chart.
8. Define multivariate quality control.
9. What do you understand by average outgoing quality level?
10. Write any two advantages of acceptance sampling.

**Part-B**

Answer any **FIVE** questions only:

(5 X 8 = 40)

11. Explain the reasons for popularity of control charts
12. Elucidate on the Eight Dimensions of Quality
13. What are the major statistical methods for quality improvement?
14. Derive the control limits for  $\bar{x}$  and R chart.
15. Write short notes on the following pattern interpretation on control charts
  - a) Cyclic pattern
  - b) A shift in process level
  - c) Trend in process level
  - d) Mixture pattern
16. Explain the control charts for fraction non conforming with illustration.
17. Explain the multivariate control charts by using Hotelling  $T^2$  and chi-square.
18. Describe single sampling plan with illustration.

**Part-C**

Answer any **TWO** questions:

(2 x 20 = 40)

19. a) State and explain Deming's 14 points in total quality management.
- b) A fraction non conforming control chart with  $n = 400$  has the following parameters:

$$UCL = 0.0962,$$

$$CL = 0.0500,$$

$$LCL = 0.0038$$

- a) Find the width of the control limits in the standard units
- b) Suppose the process non conforming shifts to 0.15. What is the probability of detecting the shift on the first sub sequent sample? (10 +10)

20. Explain the following:

a) Process Capability Analysis using histogram

b) Process capability ratio.

( 10 +10)

21. a) Derive the control limits for EWMA chart.

- b) Set up an EWMA control chart for the process mean with the target value  $\mu_0 = 12$ ,  $\sigma = 1$ ,  $\lambda = 0.10$  and  $L = 3$  to the data given below and interpret the result.

i	1	2	3	4	5	6	7	8	9	10
$x_i$	11.50	12.25	11.20	11.55	12.46	10.34	12.94	11.96	10.98	11.14

(8 + 12)

22. Explain the DMAIC procedure in detail.

(4+4+4+4+4)