

9. (a) Explain Sequential Sampling plan when specific values of producer's risk  $\alpha$ , consumer's risk  $\beta$ , AQL and LTPD are given. How to draw its O.C curve ?
- (b) What is the principle underlying the variable sampling plan ? Give the variable plan when standard deviation is known. **8,7**

Roll No. ....

Total Pages : 04

**CMDE/D-23**

**6019**

INDUSTRIAL STATISTICS

ST-104

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. The weightage of all the questions is same.

**1. Compulsory Question.**

- (i) Give the equation of logistic curve along with its parameters. Also give its shape.
- (ii) Define Serial correlation of order k. Give suitable example as well.
- (iii) Distinguish between three sigma limits and natural tolerance limits in the context of control charts.
- (iv) What is the shape of an ideal O.C curve ? How to achieve this shape ?
- (v) What is the purpose of CUSUM chart ? How is it different from Shewhart Control Chart ?
- (vi) What do you understand by ARL curve ? Give its expression in case of Shewhart control Chart.
- (vii) What is a stationary Time Series ? Explain giving its model. **7×2=14**

- (viii) Distinguish between Chance and Assignable variations. 1

### Unit I

2. What is secular trend in time series ? Explain giving suitable example. Explain the method of estimating exponential trend and modified exponential trend in time series. Discuss the merits and demerits of the method. How will you decide about the type of the trend to be fitted to a given time series. 15
3. (a) What is meant by seasonal fluctuations in time series ? Discuss the method of ratio to moving average to estimate seasonal variations. What are its merits and demerits
- (b) What do you mean by the random component of the Time Series ? Explain in brief the Variate Difference method to estimate the variance of the random component in a series. 7,8

### Unit II

4. Explain the nature of cyclic variations in Time Series, giving suitable examples. What is periodogram ? Describe the method of periodogram analysis for measuring cyclic component. 15

5. Describe the different schemes for explaining the oscillations in a stationary time series. Explain the use of correlograms for discriminating between the above schemes. For the first order auto regressive series, obtain the correlogram. 15

### Unit III

6. (a) What is meant by the statement that a process is in a state of statistical control ? Explain with the help of Shewart Control chart.
- (b) Distinguish between defect and defective. Give suitable example. Discuss the control chart for fraction defective when :
- (i) Sample size is fixed
- (ii) Sample size varies. 6,9
7. (a) Define the Modified Control limits and give its expression for  $\bar{X}$  chart.
- (b) What is single Sampling plan ? Explain giving flow diagram. and obtain the expression for its O.C function .How to obtain the consumer's and Producer's Risk from O.C curve. 7,8

### Unit IV

8. What is the purpose of CUSUM Control Chart ? Explain in brief the procedure of Tabular Cusum. How the corresponding chart is drawn ? How is it different from the V-mask concept of Cusum chart. ? Discuss in brief.