

BT-7/D11 : 7854
ME-405E : STATISTICAL QUALITY
CONTROL AND RELIABILITY

Time : Three Hours

Maximum Marks : 100

Note:- Attempt any five question. Select at least one question from each unit.

UNIT - I

- Q.1 a) Define term quality control and explain its objectives. 8
- b) Differentiate between:
- Cost of quality and value of quality
 - Inspection and quality control
 - Quality of design and quality of conformance.
 - Quality of conformance and quality of performance. 3, 3, 3, 3
- Q.2 a) State the guiding principles of TQM. 10
- b) What is Juran Trilogy? Explain its components in brief. 10

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Contd.

UNIT - II

- Q.3. a) Compare \bar{x} chart with R chart - Discuss the circumstances in which either of the two or a combination of these will be used for purpose of control.
- b) control charts for \bar{X} and σ are maintained on the weight in kg of content of a certain container. The subgroup size is 10. The values of \bar{X} and σ are computed for each group. After 18 subgroups; $\Sigma \bar{X} = 595.8$ and $\Sigma \sigma = 8.24$. compute the values of σ on the assumptions the process is in statistical control. 12
- Q.4 a) What do you mean by warning limits and action limits. Explain the use of warning limits 10
- b) What is cusum chart. What are its advantages over conventional stewart chart. 10

UNIT - III

- Q.5 a) State and explain the advantages and limitations of acceptance sampling over 100% inspection. 12
- b) Compare Random sampling and stratified sampling. 8
- Q.6 a) Explain the various types of sampling plans which are in practice in industry with their respective acceptance criteria. 12

- b) Explain the characteristics of OC curve. 8

UNIT - IV

- Q.7 a) State and explain the factors to be considered in designing for reliability. 10
- b) Explain the reliability tests. 5
- c) A certain type of electric components has a uniform failure rate of 0.00001 per hour what is reliability for a specified period of service of 10,000 hours. 5
- Q.8 a) What is Redundancy? Discuss the effect of placing redundancy in a system. 8
- b) Write the short notes on:
- i) Reliability control during manufacturing
 - ii) Maintainability and availability
 - iii) MTBF and MTTR 4, 4, 4