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**Total No. of Questions : 07**

**B.Tech. (Ind. Engg. & Mgt.) (Spl. in TQM) (Sem.-4)**

## STATISTICAL QUALITY CONTROL

**Subject Code : IEM-403**

**M.Code : 61018**

**Time : 3 Hrs.**

**Max. Marks : 40**

**INSTRUCTIONS TO CANDIDATES :**

1. Attempt EIGHT out of TEN questions from SECTION-A carrying TWO marks each.
2. Attempt any FOUR out of SIX questions from SECTION-B carrying SIX marks each.

## SECTION-A

**1. Answer briefly :**

- a) Define the term Quality control and its objectives.
- b) Differentiate variable charts and attribute charts.
- c) Describe JIT manufacturing.
- d) Differentiate between single sampling and double sampling plan.
- e) Draw various regions of OC curve.
- f) What is bulk sampling? Describe its objectives.
- g) Tensile strength of a sample is  $1790 \text{ kg/cm}^2$  with a standard deviation of  $220 \text{ kg/cm}^2$ . If the distribution is normal, what percentage of the casting will have :
  - (i) tensile strength less than  $1400 \text{ kg/cm}^2$
  - (ii) more than  $1500 \text{ kg/cm}^2$ ?
- h) How it is confirmed whether the process is in control?
- i) Explain the factors to be considered in determining the sample size, frequency of sub grouping and basis of sub grouping.
- j) Differentiate clearly between accuracy and precision.

**SECTION-B**

2. Explain various Inspection procedures and write their applications.
3. Construct an OC curve for a sampling plan where the lot size is 2000, sample size is 55 and acceptance number is 4.
4. State the conditions for instituting :
  - a) Reduced inspection
  - b) Normal inspection
  - c) Tightened inspection
5. Explain **any four** tools of statistical quality control.
6. The subgroup size of a manufactured lot is 5. The values for  $\bar{X}$  and  $R$  are calculated for each subgroup. After 15 subgroups it was found that  $\Sigma\bar{X} = 415$  and  $\Sigma R = 3.5$ . Calculate the values of  $3\sigma$  limits for the  $\bar{X}$  and  $R$  charts and estimate the value of population standard deviation on the assumption that the process is in statistical control.
7. Explain the following in connection with Dodge-Romig sampling plan :
  - a) Single sampling lot tolerance tables
  - b) Double sampling lot tolerance tables
  - c) Single sampling AOQL tables

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**