Total Pages—4

(Set-1)

B.Tech-8th

Quality Assurance & Reliability

Full Marks : 70

Time : 3 hours

Q. No. 8 is compulsory and answer any **five** questions from the rest

The figures in the right-hand margin indicate marks

Use of statistics tables and SQC tables is permitted

1. (*a*) Explain in detail the construction of $\overline{P}$ chart with example. 5

(*b*) Control chart for $\overline{X}$ and σ are maintained on the weight in kg of the contents of a certain container. The subgroup size is 10. The values of $\overline{X}$ and σ are cometed for each subgroup. After 18 subgroups, $\Sigma \overline{X} = 595{\cdot}8$ and $\Sigma\sigma = 8{\cdot}24$. Compute the values of σ' on the assumption the process is in statistical control. It is given that $A_1 = 1{\cdot}03$, $B_4 = 1{\cdot}72$, $B_3 = 0{\cdot}28$, $C_2 = 0{\cdot}9227$. 5

(*Turn Over*)

2. (*a*) Explain the various types of sampling plans which are in practice in industry with their respective acceptance criteria. 5

(*b*) A single sampling plan uses a sample size of 15, and an acceptance number 1. Using hypergeometric probabilities, compute the probability of acceptance of lot of 50 articles 2% defective. 5

3. (*a*) State the scope of quality control function in an engineering industries. Give details of various aspects and necessary steps to achieve quality control. 5

(*b*) What is quality cost ? Describe different quality cost system. 5

4. (*a*) Describe the philosophical basis for quality circles. In what way quality circle method are different from traditional management approach ? 5

(*b*) What do you mean by quality of design ? Explain the factors controlling quality of design. 5

5. (*a*) What is P-D-C-A cycle. State why is this method so poplar ? 5

(*b*) Explain the detail the seven basic quality control tools. 5

6. (*a*) What are the basic elements of reliability ? Discuss the failure pattern for complex product. 5

(*b*) An element has a probability of successful operation over a given period of 60 per cent. If four such elements are connected in parallel estimate the improvement factor. 5

7. (*a*) Explain the CUSUM control charts for variable. 5

(*b*) Describe OC curve in details and explain what do you mean by producer's risk and consumer's risk. 5

8. Answer the following questions : 2 × 10

(*a*) What do you mean Process Capability Analysis ?

(*b*) Define 'tolerance' and 'limits'.