

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VI • EXAMINATION – WINTER 2013

Subject Code: 162501**Date: 27-11-2013****Subject Name: Statistical Methods and Quality Control****Time: 02:30 pm to 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Determine the control limits for X and R charts if $\bar{X}=357.5$, $\bar{R}=9.90$. Number of subgroups=20. It is given that $A_2=0.18$, $D_3=0.41$, $D_4=1.59$, and $d_2=3.735$. Also find process capability. **07**
- (b) A random sample of 4 is to be selected from lot of 10 articles, 3 of which are defective. What is probability that the sample will contain exactly 1 defective.? **07**

- Q.2** (a) Explain procedure of taking chi square test. **07**
- (b) A lot of 25 articles contains 3 defective. A sample of 5 is selected at random from the lot inspection. What are the respective probabilities of 0 and 1 defective occurring in the sample of 5? **07**

OR

- (b) Explain C chart with suitable example. **07**
- Q.3** (a) A machine shop produces crank pins. The width of 100 pins are recorded as under. **07**

Width in mm	frequency	Width in mm	frequency
9.50-9.51	6	9.58-9.59	22
9.52-9.53	2	9.60-9.61	8
9.54-9.55	20	9.62-9.63	6
9.56-9.57	32	9.64-9.65	4

Find mean, mode, standard deviation, variance. Also find what % of pins has width 9.52 to 9.63

- (b) Discuss concept of variations also explain various types and reasons of variations. **07**

OR

- Q.3** (a) Explain normal, exponential and binomial probability distribution. **07**
- (b) Explain Bayes's theorem with a case problem. **07**

- Q.4** (a) Explain various methods of vendor rating **07**
- (b) Sketch OC curve for the following scheme: A single item is taken at random from the lot and inspected. If it is defective, the lot is rejected otherwise lot is accepted. **07**

OR

- Q.4** (a) Explain p and np charts with neat sketch. **07**
- (b) Explain skewness and kurtosis with suitable example. **07**

- Q.5** (a) Explain SPC. **07**
- (b) Explain student's t-distribution with suitable example. **07**

OR

- Q.5** (a) Explain double sampling plans with neat sketch. **07**
- (b) Explain 4 risks of OC curve with neat sketch. **07**
