Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – VI • EXAMINATION – WINTER 2012

Subject code: 162501 Date: 02/01/2013

Subject Name: Statistical Methods and Quality Control

Time: 02.30 pm - 05.00 pm Total Marks: 70

Instructions:

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Use of Statistical tables are permitted.(GTU will not provide any tables)**

Q.1 **(a)** Why are statistical methods of quality control so important? **07**

(b) Explain cumulative frequency curve with neat sketch. **07**

Q.2 **(a)** Explain binomial probability distribution with suitable example. **07**

(b) Explain addition theorem of probabilities .also explain theorem of compound probabilities. **07**

OR

(b) Explain mean ,median and mode .derive relations among the three. **07**

Q.3 **(a)** A machine was set to produce a diameter to specification limits of 12.00+-0.05mm.it ran for approximately 7 hours.making 1 piece a minute and then the whole outputwas checked with the following results.Plot histogram and frequency distribution curves.comment upon The shape of the curve. **07**

X	NO OF PIECES
11.97	1
11.98	7
11.99	49
12.00	103
12.01	102
12.02	43
12.03	20
12.04	38
12.05	39
12.06	15
12.07	2
12.08	1

(b) Explain use of X and R charts. **07**

OR

Q.3 **(a)** **07**

10000 rods ,normal length 7 m were measured to the nearest 1 cm. and results are given below.Draw the histograms and ogive curves.

Cell boundaries	Cell mid points	frequency
6.75—6.85	6.8	780
6.85—6.95	6.9	1640
6.95—7.05	7.0	5470
7.05—7.15	7.1	1570
7.15—7.25	7.2	540

(b) What are the objectives of correlation technique? **07**

Q.4 **(a)** A lot of 10 articles contaning 3 nonconforming articles.a random sample of 2 articles is selected from this very lot What are the respective probabilities that this random sample will contain all good, 1 nonconforming,2 nonconforming articles and atleast one non conforming article? **07**

(b) Explain T-test with example. **07**

OR

Q.4 **(a)** Explain analysis of variance (ANOVA). **07**

(b) What double sampling plan should be used for a lot size of 900 and on AOQL of 2% if the process average is estimated as 0.9% defective.What will be the LTPD for this sampling scheme? **07**

Q.5 **(a)** Explain vendor rating. **07**

(b) What single sampling plan should be used for a lot size of 1500 and an LTPD of 50% with a consumer's Risk of 0.10 if the process average is estimated as 0.6% defective? **07**

OR

Q.5 **(a)** Explain p –chart with suitable example. **07**

(b) In 25 samples of 50 pieces each numbers of rejects was : 1,2,5,6,3,5,2,1,1,0,0,1,0,1,0,2,1,0,0,1,1,0,0,0,1 Is this process in control? **07**

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