

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-VII Examination-Nov/Dec.-2011

Subject code: 171504**Date: 29/11/2011****Subject Name: Industrial Statistics & Quality Management****Time: 10.30 am-01.00 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) Define Statistics. Explain the role of industrial statistics in field of quality management. **07**
- (b) Discuss various causes of variation in the quality of manufactured product. **07**

- Q.2** (a) What do you mean by quality control ? State difference between inspection and quality control. Also explain 'Cost of quality'. **07**
- (b) Explain the construction of histogram with suitable example. How would you proceed in case of unequal width class interval ? **07**

OR

- (b) Discuss Binomial V/s Poison distribution. **07**
- Q.3** (a) What do you understand by skewness and kurtosis ? Point out their role in analyzing a frequency distribution. **07**
- (b) Calculate the arithmetic mean and the median of the frequency distribution given below. Hence calculate the mode using the empirical relation between the three : **07**

Class - Limits	Frequency
120 – 124	5
125 – 129	15
130 – 134	28
135 – 139	24
140 – 144	17
145 – 149	10
150 - 154	1

OR

- Q.3** (a) What is scatter diagram ? How does it help in studying the correlation between two variables in respect of both its nature and extent ? **07**
- (b) A dealer has purchased C.F.Lamps from two manufacturers X and Y. His observations during testing are as under : **07**

Life of C.F.L. (In hrs.)	No. of C.F.L.s	
	Mfr. X	Mfr. Y
800-1000	3	10
1000-1200	42	16
1200-1400	12	26
1400-1600	3	8

Assuming the price for both the types of bulbs is same, find whose bulbs are more reliable ?

- Q.4 (a)** Write short note on : Test of Hypothesis. **07**
- (b)** The Probability that a T. V. manufactured by the company will be defective is $1/20$. If T. V.s are manufactured in lot of 10. Find the probability that : **07**
- (i) At least two will be defective,
 - (ii) Exactly two will be defective, and
 - (iii) None will be defective.

OR

- Q.4 (a)** What is process capability ? Discuss the elements of a process capability analysis. **07**
- (b)** The following are the sample means and ranges for 10 samples each of size 5. Calculate the control limits for mean chart and range chart and state whether the process is in control or not. **07**

Sample No.	1	2	3	4	5
Mean	5.10	4.98	5.02	4.96	5.04
Range	0.3	0.4	0.2	0.4	0.1
Sample No.	6	7	8	9	10
Mean	4.94	4.92	4.92	4.92	4.98
Range	0.1	0.8	0.5	0.3	0.5

- Q.5 (a)** Discuss the concept of Total Quality Management (TQM). **07**
- (b)** Samples of 50 'clocks' are drawn randomly from the output of a process that produces several thousand units daily. Sampled items are inspected for quality, and faulty clocks are rejected. **07**
- Sample results of 10 lots of 50 clocks are as under :

Lot No.	1	2	3	4	5	6	7	8	9	10
No. of defectives	5	7	4	8	10	3	6	2	9	3

Draw a control chart for fraction defective and give an interpretation of the results.

OR

- Q.5 (a)** What are the important criteria for selecting the sampling plan ? **07**
- (b)** Mention the following on a typical O.C. curve for single sampling plan (rough sketch) : **07**
- AQL = 4.0%, $\alpha = 0.02$, $\beta = 0.10$, LQ = 14.2%
- Also Explain the meaning of each term.
