Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – SUMMER • 2014

Subject Code: 162501 **Date: 19-05-2014**

Subject Name: Statistical Methods and Quality Control

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)** Explain with the help of neat diagram, the following statistical data presentation devices. **07**

(i) Bar chart (ii) Component bar chart (iii) Pictogram (iv) Pie chart (v) Scatter diagram

(b) A person interested to invest in three different stocks X, Y, and Z Rs 25000, Rs 30000, and Rs 120000 respectively, and at the end of the year received dividends of Rs 1500, Rs 1500, and Rs 840. Calculate the weighted average of return he has earned. **07**

Q.2 **(a)** A security analyst studied hundred companies and obtained the following distribution for the dividend declared by these companies during the year 2010. Calculate the average dividend. **07**

Dividend Declared, %	0-8	8-16	16-24	24-32	32-40
Number of Companies,(f)	15	30	40	10	5

(b) Find the average rate of increase in price which in the first year has increased by 20%, in the next year by 25%, and in the third year by 44%. **07**

OR

(b) Calculate the mode for the following distribution. **07**

Gross profit as % of sales:	0-7	7-14	14-21	21-28	28-35	35- 42	42-49
Number of companies,(f):	19	25	36	72	51	43	28

Q.3 **(a)** Calculate the first and third quartiles for the following distribution. **0 7**

Percentage of Dividend declared	Number of companies	Percentage of Dividend declared	Number of companies
5-10	5	25-30	5
10-15	6	30-35	4
15-20	15	35-40	2
20-25	10	40-45	2

(b) In a survey of 50 Chemical industries the following data was collected. **07**

Level of profit (xi)	10	15	20	25	30
No. of companies(fi)	15	10	15	6	4

Calculate the variance for the distribution.

OR

Q.3 **(a)** Calculate the second, third, and the fourth moments for the following distribution of service time at registration counter of a local post office. **07**

Service time In minutes)	2.0	2.5	3.0	3.5	4.0	4.5
Frequencies	5	30	40	15	5	5

(b) An item is manufactured by three machines M1, M2, and M3. Out of the total manufactured during a specified production period, 50% are manufactured on M1, 30% on M2, and 20% on M3. It is also known that 2% of the item produced by M1 and M2 are defective, while 3% of those manufactured by M3 are defective. All the items are put into one bin. From the bin, one item is drawn at random and is found to be defective. What is the probability that it was made on M1, M2 or M3. **07**

Q.4 **(a)** If 5% of the items produced turn out to be defective, then find out the probability that out of 20 items selected at random there are: **07**

(i) exactly three defectives
(ii) at least two defectives
(iii) exactly four defectives

(b) Past experience indicates that in a box of 25 bulbs, five bulbs are defectives. If a random sample of 5 bulbs are examined, what is the probability of having (i) no defectives, and (ii) less than 2 defectives. **07**

OR

Q.4 **(a)** A normal curve has an average of 140.6 and a standard deviation of 3.70. What percentage of the area under the curve will fall between limits of 135.5 and 142.5. **07**

(b) A large number of tests on line voltages to various residences shows a mean of 118.5 V and standard deviation of 1.2 V. Determine the percentage of data between 116 V and 120 V. **07**

Q.5 **(a)** At one of the largest restaurant in the city of Amdavad, it takes 10 minutes to receive the order after placing. If the service time is exponentially distributed, find the probability that the customer waiting time is (i) more than 10 minutes, (ii) 10 minutes or less, and (iii) 3 minutes or less. **07**

(b) A machine produces following units per hour. The data is randomly collected for 10 hours. The production is: **07**

63, 64, 69, 71, 70, 69, 63, 70, 65, 66.

If the mean production is 65 units, calculate the value of t.

OR

Q.5 **(a)** Following gives the number of units produced by two workers: **07**

Worker A: 33, 27, 32, 35, 42, 34, 38, 28, 43, 41, 37, 30

Worker B: 16, 20, 27, 26, 22, 23, 24, 18, 19, 25

Calculate the value of F distribution.

(b) Explain the OC curves with reference to sampling inspection and the meaning of the following terms: **07**

(i) AQL (II)LTPD (iii) IQL (iv) Producer's risk (v) Consumer's risk

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