Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – SUMMER • 2015

Subject Code:162501 **Date: 01/05/2015**

Subject Name: Statistical Methods and Quality Control

Time:10.30am-01.00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use of Statistical table is permitted**

Q.1 The following matrix is given for the income level and preferred refrigerator. One sample of 500 customer is taken **14**

Income level	LG	Samsung	Whirlpool
Low	160	35	50
Medium	60	40	80
High	30	80	60

On the basis of above information, will you conclude that preference pattern is independent of income level? Setup ANOVA table and make the decision.

Q.2 (a) In the following table the weights of 40 male students at State University are recorded to the nearest pound. Construct frequency distribution and a histogram for a weight distribution. **07**

138	164	150	132	144	125
149	157	146	158	140	147
136	148	152	144	168	126
138	176	163	119	154	165
146	173	142	147	135	153
140	135	161	145	135	142
150	156	145	128		

(b) Explain joint probability distribution and its use with suitable example **07**

OR

(b) In a class of 20 students 12 are boys and remaining are girls, find the probability that **07**

1. selected one student is boy
2. selected one student is girl
3. selected two students are boy and a girl

Q.3 (a) In a certain factory turning razor blades, there is a small probability of 1/500 for any blade to be defective. The blades are supplied in packets of 10. Use poisson distribution to calculate the approximate number of packets containing (i) no defective (ii) one defective (iii) two defective blades in a consignment of 10,000 packets. **07**

(b) What do you mean by goodness of fit? Which probability distribution is suitable for testing of goodness of fit? Justify. **07**

OR

Q.3 (a) In a class of 50, the average mark of students in a subject is 48 and standard deviation is 24. Find the probable number of students who got (i) above 50 (ii) between 35 and 50 (iii) less than 35 **07**

(b) Explain student's t-test with suitable example **07**

Q.4 **(a)** Obtain the lines of regression and find the coefficient of correlation from the following. **07**

x	1	2	3	4	5	6	7
y	9	8	10	12	11	13	14

(b) The two regression lines are 4x-5y+33 = 0 and 20x - 9y =107. **07**
Find (i) correlation coefficient (ii) mean values of x and y.

OR

Q.4 **(a)** Find the correlation coefficient for the following data. **07**

X	78	89	97	69	59	79	61	61
Y	125	137	156	112	107	136	123	108

(b) Find the Mean and standard deviation for the following data **07**

x	30	35	40	45	50	55	60	65
f	4	5	8	10	9	6	4	3

Q.5 **(a)** Distinguish between multiple sampling plans and sequential sampling plans. **07**

(b) Define the terms: AQL, LTPD, Producers risk, Consumers risk. **07**

OR

Q.5 **(a)** **07**

Control chart of $\bar{x}$ and R in use with the following measures.

$\bar{x}$ chart : CL = 420 , LCL = 390, UCL = 450.

R chart : CL = 67.05 , LCL = 54.15, UCL = 61.16, d2 = 2.326

The sample size is 5. Both charts exhibit control. The quality characteristic is normally distributed.

(a) What is the α – risk associated with the $\bar{x}$ chart

(b) Specification of the quality characteristic is 415 ± 20. What are your conclusions regarding the ability of the process to produce within specifications?

(b) What is a c – chart. When and where it is used **07**

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