

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA - SEMESTER– IV EXAMINATION – WINTER - 2018

Subject Code:3640001**Date:16/11/2018****Subject Name: Basic Statistics****Time:10.30 am to 1.00 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 different level of data measurement with examples? **07**
 (b) For each class interval of the frequency distribution given, determine the class midpoint , the relative frequency , and the cumulative frequency **07**

Class interval	Frequency
20 -25	8
25 -30	6
30-35	5
35-40	12
40-45	15
45-50	7

- Q.2** (a) A data set contains the following eight values **07**
 4 3 0 5 2 9 4 5.
 1) Find the range.
 2) Find the mean absolute deviation.
 3) Find the sample variance.
 4) Find the sample standard deviation.
 5) Find the interquartile range.

- (b) Following data represent the cost of sample of 30 postal mailing by a company **07**

3.67	2.75	9.15	5.11	3.32	2.09
1.83	10.94	1.93	3.89	7.20	2.78
6.72	7.80	5.47	4.15	3.55	3.53
3.34	4.95	5.42	8.64	4.84	4.10
5.10	6.45	4.65	1.97	2.84	3.21

Using dollars as a stem and cents as a leaf, construct a stem – and – leaf plot of the data.

OR

- (b) According to the U.S . Bureau of Labor Statistics, 75% of the women 25 through 49 years of age participate in the labor force. Suppose 78% of the women in that age group are married. Suppose also that 61% of women 25 through 49 years of age are married and are participating in the labor force. **07**
- a. What is the probability that a randomly selected woman in that age group is married or is participating in the labor force?
 - b. What is the probability that a randomly selected woman in that age group is married or is participating in the labor force but not both?
 - c. What is the probability that a randomly selected woman in that age group is neither married nor participating in the labor force ?

- Q.3** (a) Machines A, B and C all produce the same two parts , X and Y of all the parts produced , Machine A Produces 60% , Machine B produces 30% , and Machine C produces 10% . In addition , **07**

40% of the parts made by machine A are part X.

50% of the parts made by machine B are part X.

70% of the parts made by machine C are part X.

A part produced by this company is randomly sampled and is determined to be an X part. With the knowledge that it is an X part, revise the probabilities that the part came from machine A, B or C.

- (b) Explain different sampling Methods ? **07**

OR

- Q.3 (a)** W.Edwards Deming in his red bead experiment had a box of 4000 beads, of which 800 were red and 3200 were white. Suppose a researcher were to conduct a modified version of the red bead experiment. In her experiment, she has a bag of 20 beads, of which 4 are red and 16 are white. This experiment requires a participant to reach into the bag and randomly select five beads without replacement. **07**
- a. What is the probability that the participant will select exactly four white beads?
b. What is the probability that the participant will select exactly four red beads?
c. What is the probability that the participant will select all red beads?

- (b) Suppose you are working with a data set that is normally distributed, with a mean of 200 and a standard deviation of 47. Determine the value of x from the following information. **07**
- a. Sixty percent of the values are greater than x.
b. x is less than 17% of the value.
c. Twenty – two percent of the values are less than x.
d. X is greater than 55% of the values.

- Q.4 (a)** Suppose a subdivision on the southwest side of Denver, Colorado, contains 1500 houses. The subdivision was built in 1983. A sample of 100 houses is selected randomly and evaluated by an appraiser. If the mean appraised value of a house in this subdivision for all houses is \$177,000, with a standard deviation of \$8,500, what is the probability that the sample average is greater than \$185,000? **07**

- (b) A random sample of size 70 is taken from a population that has a variance of 49. The sample mean is 90.4. What is the point estimate of μ ? Construct a 94% confidence interval for μ . **07**

OR

- Q.4 (a)** According to a survey by Accountemps, 48% of executives believe that employees are most productive on Tuesdays; Suppose 200 executives are randomly surveyed. **07**
- a. What is the probability that fewer than 90 of the executives believe employees are most productive on Tuesdays?
b. What is the probability that more than 100 of the executives believe employees are most productive on Tuesdays?
c. What is the probability that more than 80 of the executives believe employees are most productive on Tuesdays?

- (b) Suppose you want to estimate the average age of all Boeing 737-300 airplanes now in active domestic U.S. service. You want to be 95% confident, and you want your estimate to be within one year of the actual figure. The 737-300 was first placed in service about 24 years ago, but you believe that no active 737-300s in the US domestic fleet are more than 20 years old. How large of a sample should you take? **07**

- Q.5 (a)** A random sample of size 20 is taken, resulting in a sample mean of 16.45 and a sample standard deviation of 3.59. Assume x is normally distributed and use this information and $\alpha=0.05$ to test the following hypothesis. **07**
- $H_0: \mu = 16$ $H_a: \mu \neq 16$

- (b) Compute the sum of squares of error and the standard error of the estimate data, in which regression model was developed to predict the number of FTes at a hospital by number of beds. **07**

X	23	29	29	35	42	46	50	54	64	66	76	78
Y	69	95	102	118	126	125	138	178	156	184	176	225

OR

- Q.5** (a) List properties of Point Estimator. Explain any one in detail **07**
- (b) A small business has 37 employees. Because of the uncertain demand for its product the company usually pays overtime on any given week. The company assumed that about 50 total hours of overtime per week is required and that the variance is about 25. Company officials want to know whether the variance of overtime hours has changed. Given here is a sample of 16 weeks of overtime data (in hours per week). Assume hours of overtime are normally distributed .Use these data to test the null hypothesis that the variance of overtime data is 25. Let $\alpha=.10$ **07**

57	56	52	44
46	53	44	44
48	51	55	48
63	53	51	50
