

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**MCA Integrated - SEMESTER-III • EXAMINATION – WINTER • 2014**

**Subject Code: 4430603****Date: 03-12-2014****Subject Name: Statistical Methods****Time: 02:30 pm - 05:00 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)** What is the application of statistics in Business and Economics and hence in computer? **07**

**(b)** (i) What are the mean, median, and mode for the following data: **07**  
 21,21,21,22,23,25,28,29,33,35,38,56,61  
 (ii) Compute the standard deviation and co-efficient of variance for  
 $X_i$  : 46,54,42,46,32

**Q.2 (a)** In a study of job satisfaction, a series of tests was administered to 50 subjects. **07**  
 The following data were obtained: higher scores represent greater dissatisfaction. Construct a stem-and-leaf display for the data.

|    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|
| 87 | 67 | 92 | 41 | 90 | 76 | 58 | 59 | 50 | 75 |
| 80 | 70 | 69 | 88 | 85 | 81 | 73 | 61 | 46 | 97 |
| 50 | 81 | 75 | 65 | 77 | 47 | 87 | 60 | 92 | 71 |
| 70 | 53 | 61 | 84 | 70 | 74 | 43 | 89 | 83 | 46 |
| 84 | 78 | 69 | 78 | 74 | 76 | 64 | 76 | 67 | 64 |

**(b)** Find the correlation coefficient between the sales and expenses of the following 10 firms. (Figure in '000 Rs.) **07**

|          |    |    |    |    |    |    |    |    |    |    |
|----------|----|----|----|----|----|----|----|----|----|----|
| Firms    | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 |
| Sales    | 50 | 50 | 55 | 60 | 65 | 65 | 65 | 60 | 60 | 50 |
| Expenses | 11 | 13 | 14 | 16 | 16 | 15 | 15 | 14 | 13 | 13 |

**OR**

**(b)** Automobiles traveling on a road with a posted speed limit of 55 miles per hour are checked for speed by a state police radar system. Following is a frequency distribution of speeds. **07**

|                    |           |
|--------------------|-----------|
| Speed (miles/hour) | Frequency |
| 45-49              | 10        |
| 50-54              | 40        |
| 55-59              | 150       |
| 60-64              | 175       |
| 65-69              | 75        |
| 70-74              | 15        |
| 75-79              | 10        |

- 1) What is the mean speed of the automobiles traveling on this road?
- 2) Compute the variance and standard deviation.

**Q.3 (a)** Assuming that half of the Indian population is vegetarian. Estimate how many investigators out of 100 will report that 3 or less are vegetarian in the sample of 10 individuals. **07**

- (b) State the Baye's rule. A producer purchases parts of machine from two suppliers B1 and B2 And he stores the purchased parts in big urn. The producer knows that his past experience That 9 % of the parts purchased from B1 and 5 % of the parts purchased from B2 are defective. The supplier supply parts to the producer in proportion 4 : 1. A part is chosen at random From the urn and found to be non-defective what is the probability that the part has been Supplied by B1 ? **07**

**OR**

- Q.3 (a)** Define the normal distribution. **07**

Marks of large number of students are distribution normally with mean 50 and standard Deviation 12. If a student is selected at random what is the probability that his marks will be Between (1) 38 and 62 (2) 26 and 74 (Given area between  $z = 0$  and  $z = 1$  is 0.34135 &  $z = 0$  and  $z = 2$  is 0.47725 )

- (b) Phone calls arrive at the rate of 48 per hour at the reservation desk for Regional airways. **07**

(1) Compute the probability of receiving three calls in a five minute interval of time.

(2) Compute the probability of receiving exactly ten calls in fifteen minutes.

(3) If no calls are being processed, what is the probability that the agent can take three minutes for personal time without being interrupted by a call?

- Q.4 (a)** Explain the Other Sampling Methods. **07**

- (b) A simple random sample of 50 items from a population with population s.d. 6 and sample mean of 32. Provide a 90%, 95% and 99% confidence intervals for the population mean. **07**

**OR**

- Q.4 (a)** A man buys 50 electric bulbs of 'Philips' and 50 electric bulbs of 'HMT' Brand. He fined that 'Philips' bulbs give an average life of 1500 hrs. With standard deviation of 60 hrs. and 'HMT' bulbs gave an average life of 1512 hours with standard deviation of 80 hrs. is there a significant difference in the mean life of two brands of bulbs ? (At 1 % level significance = 2.58 ) **07**

- (b) The following data shows sales made by salespeople from two different cities. **07**

City A: 59,68,44,71,63,46,69,54,48

City B : 50,36,62,52,70,41

Assuming the populations sampled to be approximately normal having the same variance, test whether there is any significant difference between the means of these samples.

- Q.5 (a)** Explain designs of experiments. **07**

- (b) Compute one way ANOVA on the following data. **07**

| Plant-1 | Plant-2 | Plant-3 |
|---------|---------|---------|
| 29      | 32      | 25      |
| 27      | 33      | 24      |
| 30      | 31      | 24      |
| 27      | 34      | 25      |
| 28      | 30      | 26      |

**OR**

**Q.5 (a)** For the Following Data

**07**

|   |    |    |    |    |    |
|---|----|----|----|----|----|
| X | 2  | 3  | 5  | 1  | 8  |
| Y | 25 | 25 | 20 | 30 | 16 |

Calculate

- (1) Compute the estimated regression equation.
- (2) Compute SSE, SST & SSR.
- (3) Compute the coefficient of determination  $r^2$  and comment on the goodness of fit.

**(b)** Explain Type I and Type II error with example.

**07**

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