

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA - SEMESTER- III EXAMINATION – WINTER - 2017

Subject Code: 2630003

Date: 30-12-2017

Subject Name: STATISTICAL METHODS

Time: 10:30 am to 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 the following terms. 07**
1. Sample
 2. Sampling methods.
 3. Mutually exclusive methods.
 4. Point estimator
 5. Margin of error
 6. Population
 7. Hypothesis
- (b) Answer the following questions. 07**
1. Sum of squares of deviations taken from mean is zero (True / False).
 2. Finite population correction factor can be ignored when sampling fraction n/N is 0.5 (True / false).
 3. For a population if $\mu = 200, \sigma = 50, n = 100$ find s.d. of mean.
 4. Find standard deviation for binomial distribution if $n = 10$ & $p = 0.03$.
 5. If $P(A) = a, P(B) = b$, AND $P(A \cap B) = c$ then find the value of $P(A' \cap B')$.
 6. For rightly skewed distribution, mean > median > mode.
 7. If two events A and B are independent, conditional probability $P(A/B) = P(A \cap B)$. (True / False)
- Q.2 (a) 1. A bag contains 8 white balls & 4 red balls. Five balls are selected at random. What is the probability that two of them are red and three white? 03**
- 2. A Binomial distribution has $n = 20$ and $p = 0.3$. find the mean & variance of this distribution. 04**
- (b) 1. A simple random sample of size 100 is selected from a population with $p = 0.40$. 03**
- a. What is the expected value of p' (sample proportion).
 - b. What is the standard error of p' ?
- 2. The following data are from a simple random sample. 04**
- 5, 8, 10, 7, 10, 14
- a. What is the point estimate of the population mean?
 - b. What is the point estimate of the population standard deviation?
- OR**
- (b) 1. The probability that a man fishing at a particular place will catch 1, 2, 3, 4 fish are 0.4, 0.3, 0.2, and 0.1 respectively. What is the expected number of fish caught? 03**
- 2. A simple random sample of 400 individuals provides 100 YES responses. 04**
- a. What is the point estimate of the proportion of the population that would provide YES responses?
 - b. What is your estimate of the standard error of the proportion?
 - c. Compute the 95% confidence interval for the population proportion.
- Q.3 (a) 1. Explain Least Square Method. 03**
- 2. Write the following terms for Binomial Distribution. 04**
- Properties, probability Mass function, mean & variance

- (b) Consider the following data . 07

14	21	23	21	16
19	22	25	16	16
24	24	25	19	16
19	18	19	21	12
16	17	18	23	25
20	23	16	20	19
24	26	15	22	24
20	22	24	22	20

Develop a Dot plot & histogram for the given data.

OR

- Q.3 (a)** Explain the applications of statistics in business & economics. 07

- (b)

X	16	12	18	4	3	10	5	12
Y	87	88	89	68	78	80	75	83

07

Calculate the regression line of y on x. If x = 7 calculate the estimated value of y.

- Q.4 (a)** An aptitude test for selecting officers in a bank was conducted on 1,000 candidates, the average score is 42 and the standard deviation of scores is 24. 07

Assuming Normal distribution for the scores, find:

1. The number of candidates whose score exceeds 58.
2. The number of candidates whose score lies between 30 & 66.

- (b) A coin was tossed 400 times and the head appeared up 216 times. Test the hypothesis that the coin is unbiased. 07

OR

- Q.4 (a)** Is there any inconsistency in the statement, the mean of binomial distribution is 20 and its standard deviation 4? If no inconsistency is found what shall be the values of p, q, n? 07

- (b) In a random sample of 1,000 persons from town A, 400 are found to be consumer of wheat. In a sample of 800 from town B, 400 are found to be consumers of wheat. Do these data reveal a significant difference between town A and town B, so far as the proportion of wheat consumer is concerned? 07

- Q.5 (a)** For a random sample of 10 persons, fed on diet A, the increase weight in pound in a certain period were: 07

10, 6, 16, 17, 13, 12, 8, 14, 15, 9

For another random sample of 12 persons, fed on diet B, the increase in the same period were:

7, 13, 22, 15, 12, 14, 18, 8, 21, 23, 10, 17

Test whether the diet A and B differ significantly as regards their effect on increase in weight.

Given the following:

Degree of freedom	19	20	21	22	23
Value of t @ 5% level	2.09	2.09	2.08	2.07	2.07

- (b) From the given data below about the treatment of 250 patients suffering from a disease, state whether the new treatment is superior to the conventional treatment: 07

	No. of patients		
	Favorable	Not favorable	Total
New	140	30	170
conventional	60	20	80
total	200	50	250

(Given for the d.o.f. = 1, chi square 5% = 3.84)

OR

Q.5 (a) Intelligence test on two group of boys and girls gave the following result:

07

	Mean	S.D.	N
Girls	75	15	150
Boys	70	20	250

Is there a significance difference in the mean scores obtained by boys & girls?

(b) 200 digits are selected at random from a set of tables. The frequencies of the digits are as follows:

07

Digit	0	1	2	3	4	5	6	7	8	9
frequencies	18	19	23	21	16	25	22	20	21	15

Use χ^2 test to assess the correctness of the hypothesis that the digits were distributed in equal numbers in the tables from which they were chosen.
