

GUJARAT TECHNOLOGICAL UNIVERSITY**MCA Integrated- SEMESTER– III EXAMINATION – WINTER 2019****Subject Code: 2638602****Date: 28/11/2019****Subject Name: Basic Statistics****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)** Define the following **07**
- 1) Mutually exclusive events
 - 2) Random sampling
 - 3) Probability distribution
 - 4) Kurtosis
 - 5) Binomial distribution
 - 6) Coefficient of determination
 - 7) Hypothesis
- (b) (I)** Answer the following objective question. **03**
- 1) Consider a sample with data values of 27, 25, 20, 15, 30, 34, 28 and 25 then what is 65th percentile?
 - 2) If $sd=9.65$ and error is 2 then at 95% confidence level, then what will be the sample size?
 - 3) Following are the wages of 8 workers in rupees 50, 62, 40, 70, 45, 56, 32 and 45 then If one of the workers is selected at random, what is the probability that his wage would be lower than the average wages?
- (II)** Explain Central Limit Theorem with Example. **04**
- Q.2 (a)** Following data shows marks of 10 students in two subjects SM and OS. Using coefficient of variance, determine the subject in which students have consistence performance. **07**
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|----|----|----|----|----|----|----|----|----|----|----|
| SM | 15 | 20 | 18 | 30 | 25 | 12 | 22 | 24 | 20 | 10 |
| OS | 12 | 18 | 20 | 25 | 20 | 15 | 25 | 20 | 15 | 15 |
- (b)**
1. Compute the standard deviation and co-efficient of variance for $x_i : 46, 54, 42, 46, 32$. **03**
 2. The result of a national survey of 3000 adults showed that adults sleep for 6.9 hours a day on an average with a standard deviation 1.2 hours. Mention Chebyshev's theorem. Using it find the percentage of adults who sleep between 4.5 and 9.3 hours per day. **04**
- OR**
- (b)**
1. If ${}^n p_r = 336$ and ${}^n c_r = 56$ then find the value of n and r . **04**
 2. What is the chance of getting at least one defective item if 3 items are drawn randomly from a lot containing 6 items of which 2 are defective items? **03**
- Q.3 (a)** Airline passengers arrive randomly and independently at the passenger screening facility at a major international airport. The mean arrival rate is 10 passengers per minute.
- a) Compute the probability of no arrivals in one minute period. **03**
 - b) Compute the probability that three or fewer passengers arrive in one minute period. **02**
 - c) Compute the probability of no arrivals in a 15 second period. **02**
- (b)** A machinery company has received a big order to produce electric motors for a manufacturing company. In order to fit in its bearing, the drive shifted the makes **07**

must have a diameter of 5.1 ± 0.05 (inches). The company's purchasing agent realizes that there is a large stock of steel rods in inventory with a mean diameter of 5.07 ", and a standard deviation of 0.07 ". What is the probability of a steel rod from inventory fitting the bearing?

OR

- Q.3 (a)**
1. If the prices of new cars increase an average of four times every 3 years, find the probability of five or more hikes in a randomly selected period of 3 years. **04**
 2. In a production process the diameter of items is distributed normally with mean 4.3 cm and variance 0.09 . 200 items are having less than 4 cm. diameter. Estimate the total number of items in the production. **03**
- (b)**
1. Define Confidence Interval. If $n = 50$, $sd = 6$ and sample mean is 32 then what is confidence interval for the population mean at 90% confidence level? **04**
 2. Write any three differences between Cluster and stratified sampling method. **03**

- Q.4 (a)** In a partially destroyed laboratory records on the analysis of correlation data, only the following are legible. Variance of $X = 9$, Regression equations $8X - 10Y + 66 = 0$, $40X - 18Y = 214$ **07**
Find
(1) Mean of X and Y (4)
(2) Standard Deviation of Y (3)

- (b)** A manufacture supplies the rear axis for trucks. These axes must be able to withstand 80000 pounds per square inch in stress tests but, an excessively strong axis raiser production cost significantly. Experience indicates that the standard deviation of strength of its axis is 4000 pounds per sq. inch. The manufacturer selects a sample of 100 axes from production tests than and finds that the mean stress capacity of sample is 79600 pounds per sq. inch. Test the hypothesis at 5% level that the sample has come from the same production. **07**

OR

- Q.4 (a)** The following data are from matched samples taken from two populations. **07**

Population		
Element	1	2
1	11	8
2	7	8
3	9	6
4	12	7
5	13	10
6	15	15
7	15	14

1. What is the point estimate of the difference between two population means?
 2. Provide a 95% confidence interval for the difference between two population means?
- (b)** 24 Heads and 12 tails were obtain in tossing a coin. Does this appear to be unbiased coin. (a) at 5% level of significance (b) at 1% level of significance **07**
- Q.5 (a)** Given are the five observations for two variables x and y . **07**

x_1	1	2	3	4	5
y_1	3	7	5	11	14

The estimated regression equation for these data is $Y = 0.20 + 2.60x$. Estimate the standard deviation of when $x = 4$. Develop a regression line for the expected value of y when $x = 4$.

- (b) A factory is producing 50000 pairs of shoes daily. From a sample of 500 pairs, 2% were found to be of sub-standard quality. Estimate the number of pairs that can be reasonably expected to be spoiled in the daily production and assign limits at 95% level of confidence. **07**

OR

- Q.5 (a)** Sale of major appliances vary with the new housing market. A trade association compiled the following data on major appliance sale and housing market.

Housing Market	2	3	5	1	8
Appliance sales	25	25	20	30	16

1. Develop an equation for relationship between appliance sale (in thousands) and housing market (in thousands) . Fit a suitable regression line. **03**
 2. Computer Coefficient of Determination. **04**
- (b) A simple random sample of 50 items from a population with $\sigma = 6$ resulted in a sample mean of 32. Provide a 90%, 95% and 99% confidence intervals for the population mean. **07**
