Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER– III EXAMINATION – WINTER 2019

Subject Code: 2630003 Date: 19/12/2019

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) Do as directed : **07**

(i) Full form : SST

(ii) If A and B are mutually exclusive events then what is the value of $P(A \cap B)$?

(iii) List out applications of statistics in business and economics.

(iv) Arithmetic operators are appropriate for_____data. (Quantitative/ Qualitative)

(v) Define : Type-I error and Type-II error

(vi) What is ogive ?

(vii) Write full form of : MAD

(b) Construct Stem & Leaf Display for following data. **07**

86,77,91,60,55,76,92,47,88,67,23,59,72,75,83,77,68,82,97,89,81,75,74,39,67,79,83, 70,78,91,68,49,56,94,81

Q.2 (a) Meclia Matrix Collected data showing most popular website browsing at home and work. **07**

Websites	Unique Visitors (X)
About.com	5538
Alvita.com	7391
Amazon.com	7986
Ag.com	8917
Aol.com	23863
Ebay.com	6786
Excite.com	8296
Mountan.com	10479

(i) Compute Mean and Median

(ii) Compute First Quartile and Third Quartile

(iii) Compute 85th Percentile

(b) A bowler's score for six games were X **:** 182, 168, 184, 190, 170 and 174. Using these data as a sample. Compute the following data. **07**

(i) Variance

(ii) Standard Deviation

(iii) Coefficient of Variance

OR

(b) Explain properties of binomial distribution. **07**

Q.3 **(a)** Define : Mutual exclusive events. If P(A) = 0.10 , P(B) = 0.12 , P(C) = 0.21 P(A ∩ C) = 0.05 & P(B ∩ C)=0.03 then solve the following : **07**

- **(i)** P(A ∪ C)
- **(ii)** P(B ∪ C)
- **(iii)** If A and B are mutually exclusive events then find P(A ∪ B)

(b) Bank customers arrive randomly on weekday afternoon at average rate(lamda) of 3.2 customers in every 4 minute. **07**

- **(i)** What is the probability of having exactly 8 customers in 4 minute?
- **(ii)** What is the probability of having greater than 7 but less than 10 customers in 4 minutes ?
- **(iii)** What is the probability of having exactly 10 customers in 8 minutes?

OR

Q.3 **(a)** What is sampling ? Differentiate cluster sampling and stratified sampling. **07**

(b) The Average (mean) stock price for companies making up is 494 and Standard deviation is 100 then Assume the stock prices are normally distributed. **07**

- **(i)** What is the probability a company will have a stock price greater than 700 ?
- **(ii)** What is the probability a company will have a stock price is 550 or less?
- **(iii)** What is the probability a company will have a stock price between 300 and 600 ?

Q.4 **(a)** A random sample of 112 item is taken, resulting in a sample mean 78695 and population standard deviation is 14530.Consider 5 % significance level . Check following hypothesis : **07**

Null hypothesis : $\mu = 74914$

Alternative hypothesis : $\mu \neq 74914$

(b) Fourteen different rentals of ditchdiggers are selected randomly from the files, yielding the following data. She uses these data to construct a 99% confidence interval to estimate the average(mean)number of days that a ditchdigger is rented and assumes that the number of days per rental is normally distributed in the population. **07**

3, 1, 3, 2, 5, 1, 2, 1, 4, 2, 1, 3, 1, 1

OR

Q.4 **(a)** Find karl's pearson co-efficient of correlation of following data: **07**

X	30	50	40	55	30	25	60	25	50	55
Y	28	25	25	23	33	32	21	35	26	25

(b) According to the U.S. Bureau of Labor Statistics, the average weekly earnings of a production worker were 424.20. Suppose a labor researcher wants to test to determine whether this figure is still accurate today. The researcher randomly selects 54 production workers from across the United States and obtains a representative earnings statement for one week from each. The resulting sample average is 432.69. Assuming a population standard deviation of 33.90, and a 5% level of significance, determine whether the mean weekly earnings of a production worker have changed. **07**

Q.5 (a) Given are Five observation for two variable X and Y. **07**

X	1	2	3	4	5
Y	3	7	5	11	14

(i) Calculate Regression Equation by using b0 and b1
(ii) Use estimated Regression to predict value of Y when X = 4

(b) The U.S. Energy Department states that 60% of all U.S. households have ceiling fans. In addition, 29% of all U.S. households have an AC(Airconditionar). Suppose 13% of all U.S. households have both a ceiling fan and an AC .Suppose a U.S. household is randomly selected. **07**

(i) What is the probability that the household has a ceiling fan or an AC?

(ii) What is the probability that the household has neither a ceiling fan nor an AC?

OR

Q.5 (a) Consider following data. **07**

X	2	4	5	7	8
Y	2	3	2	6	4

Assume regression equation of these data is : $\hat{\mathbf{Y}} = 2.65 + (0.25)\ X$

(i) Compute the SSE, SST & SSR
(ii) Compute the Coefficient of Determination (r^2)

(b) A survey of the morning beverage market shows that population proportion is 17% of Americans is milk. A milk producer in Wisconsin, where milk is plentiful,Chech hypotheses that the figure is higher. To test this idea, she contacts a random sample of 550 Wisconsin residents and asks which primary beverage they consumed for breakfast that day. Sample proportion is 0.209. Using a level of significance of 5% , Test the hypothesis that the milk proportion figure is higher for Wisconsin. **07**

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