

Seat No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA – SEMESTER 1 – EXAMINATION – WINTER 2018**Subject Code: 2810007****Date: 01/01/2019****Subject Name: Quantitative Analysis - I****Time: 10.30 am to 01.30 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) Choose the correct option.**6**

1. Which of the following is a locational measure
 - a) Mean
 - b) Median
 - c) Mode
 - d) Geometric Mean
2. According to empirical rule 95% observations falls within
 - a) $\mu \pm 1\sigma$ limits
 - b) $\mu \pm 2\sigma$ limits
 - c) $\mu \pm 3\sigma$ limits
 - d) $\mu \pm 4\sigma$ limits
3. For independent events X & Y which one is true
 - a) $P(X|Y) = P(X)$ and $P(Y|X) = P(Y)$
 - b) $P(X) = P(Y)$
 - c) $P(X \cup Y) = \phi$
 - d) None of the above
4. The mean of a distribution is 14 and standard deviation is 5. What is the value of Coefficient of Variation?
 - a) 60.4%
 - b) 48.3%
 - c) 35.7%
 - d) 27.8%
5. The mean of a distribution is 23, the Median is 24 and the mode is 25.5. It is most likely that this distribution is
 - a) Positively Skewed
 - b) Symmetrical
 - c) Asymptotic
 - d) Negatively skewed
6. A parameter is a measure which is computed from
 - a) Population data
 - b) Sample data
 - c) Test statistics
 - d) None of the above.

Q.1 (b) Answer in short.**4**

- a) Define Mode.
- b) List four types of measurement scales.
- c) Type I error in hypothesis testing
- d) Discrete and continuous data.

Q.1 (c) Describe in brief assumptions of simple linear regression model. 4

Q.2 (a) Explain characteristics of Poisson distribution. 7

(b) 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%. 7

In addition,

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

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

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

A part produced by this company is randomly sampled and was found to be part X. Find the probability that it came from

a) Machine A.

b) Machine B.

c) Machine C.

OR

(b) The following data pertains to two distributions A and B. 7

Measure	Distribution A	Distribution B
Mean	29	32
Median	26	29
Standard Deviation	12.3	12.3

Check whether the following statements are TRUE or not.

a) The variation of distribution A and B are same.

b) The skewness of distribution A and B are same.

Q.3 (a) Suppose that the average tariff per day of hotel in a small town is Rs. 951 and the standard deviation of the tariff is Rs. 96 and that the tariffs are normally distributed. 7

If a hotel is selected at random, what is the probability that the tariff is :

a) Rs. 1000 or more?

b) Between Rs. 900 and Rs. 1100?

c) Between Rsd. 825 and Rs. 925?

d) Less than Rs 700?

(b) According to market information, the market share of Oreo is 10% of the market for cookies brand. Suppose 20 purchasers of cookies are selected randomly from the population. What is the probability that 7

a) More than 2 purchasers choose Oreo?

b) Fewer than 4 purchasers choose Oreo?

OR

Q.3 (a) A company produces and ships 16 personal computers knowing that 4 of them have defective wiring. The buyer that purchased the computers is going to check thoroughly 3 of these computers. The buyer can detect the defective wiring. What is the probability that the buyer will find the following? 7

a) Exactly three defective computers.

b) Two or more defective computers.

(b) The retail price of 250 g box of corn flake ranges from Rs. 92 to Rs. 96. Assume that this prices are uniformly distributed. 7

a) What is the average price and standard deviation of the price?

b) If a box is selected at random, what is the probability that the price will be between Rs. 93 to Rs. 95.

c) If a box is selected at random, what is the probability that the price is Rs. 100 or more?

- Q.4 (a)** 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 on this figure is 25. Company officials want to know whether the variance of overtime hours has changed. Given here is 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 $\alpha = 0.1$ 7

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

- (b)** Use the following data to test the following hypothesis. 7
 $H_0: \mu_1 - \mu_2 = 0$ $H_a: \mu_1 - \mu_2 < 0$

Sample 1	Sample 2
$n_1 = 8$	$n_2 = 11$
$\bar{x}_1 = 24.56$	$\bar{x}_2 = 26.42$
$s_1^2 = 12.4$	$s_2^2 = 15.8$

Use 1% level of significance.

OR

- Q.4 (a)** A random sample of 81 items is taken, producing a sample mean of 47. The population standard deviation is 5.89. Construct a 90% confidence interval to estimate the population mean. Also determine point estimate for population mean. 7
- (b)** According to US Bureau of Labor Statistics, the average weekly earnings of a production worker in 1997 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 and obtains a representative earnings statement for one week from each. The resulting sample average is \$432.69. Assuming population standard deviation of \$33.90 and a 5% level of significance, determine whether the mean weekly earnings of production worker have changed or not. 7

- Q.5** A chemical engineering is studying the effect of temperature on the yield of a certain product in chemical process. The process is run 10 times and the following data is observed for the temperature of each process X and the corresponding yield Y. 14

Temperature X (in ° C)	95	110	118	124	145	140	185	190	205	222
Yield Y (In Kg)	108	126	102	121	118	155	158	178	159	184

- a) Obtain Regression Equation of Y on X.
 b) Find Sum Square of Error (SSE) and Standard error of estimate (Se).

Q.5

A management consulting company presents a three-day seminar on project management to various clients. The seminar is basically the same each time it is given. However sometimes it is presented to high-level managers, sometimes to mid-level managers, and sometimes to low level managers. The seminar facilitators believe evaluation of the seminar may vary with the audience.

14

Suppose the following data are some randomly selected evaluation scores from different levels of managers who attended the seminar. The ratings are on a scale of 1 to 10, with 10 being the highest.

High Level	Middle Level	Low Level
7	8	5
7	9	6
8	8	5
7	10	7
9	9	4
	10	8
	8	

Use one way ANOVA to determine whether there is a significant difference in the evaluations according to manager level. Assume $\alpha = 0.05$.

Also discuss the business implications of your findings.

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