

GUJARAT TECHNOLOGICAL UNIVERSITY

MBA - SEMESTER- I EXAMINATIONS – WINTER 2015

Subject Code: 810007
Date: 28/12/2015
Subject Name: Quantitative Analysis
Time: 10:30 AM to 1:30 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) Define Statistics. What is the use of statistics in business? **07**
 (b) Calculate the mean, mode and the variance of the given sample data. **07**

Class Interval	Frequency
10 – 15	6
15 – 20	22
20 – 25	35
25 – 30	29
30 – 35	16
35 – 40	8
40 – 45	4
45 – 50	2

- Q.2** (a) In a manufacturing plant, machine A produces 10% of a certain product, machine B produces 40% of this product, and machine C produces 50% of this product. Five percent of machine A products are defective, 12% of machine B products are defective, and 8% of machine C products are defective. The company inspector has just sampled a product from this plant and has found it to be defective. Determine the revised probabilities that the sampled product was produced by machine A, machine B, or machine C. **07**
- (b) The U.S. Bureau of Economic Statistics reports that the average annual salary in the metropolitan Boston area is \$50,542. Suppose annual salaries in the metropolitan Boston area are normally distributed with a standard deviation of \$4,246. A Boston worker is randomly selected. **07**
1. What is the probability that the worker's annual salary is more than \$60,000?
 2. What is the probability that the worker's annual salary is less than \$45,000?
 3. What is the probability that the worker's annual salary is more than \$40,000?
 4. What is the probability that the worker's annual salary is between \$44,000 and \$52,000?

OR

- (b) The following lists the number of fatal accidents by scheduled commercial airlines over a 17-year period according to the Air Transport Association of America. Using these data, compute the mean, median, and mode. What is the value of the third quartile? Determine P_{11} , P_{35} , P_{58} , and P_{67} . **07**
- 4 4 4 1 4 2 4 3 8 6 4 4 1 4 2 3 3

- Q.3** (a) Define & explain different random sampling techniques. **07**

- (b) What is the first big change that American drivers made due to higher gas prices? According to an Access America survey, 30% said that it was cutting recreational driving. However, 27% said that it was consolidating or reducing errands. If these figures are true for all American drivers and if 20 such drivers are randomly sampled and asked what is the first big change they made due to higher gas prices? 07

1. What is the probability that exactly 8 said that it was consolidating or reducing errands?
2. What is the probability that none of them said that it was cutting recreational driving?
3. What is the probability that more than 7 said that it was cutting recreational driving?

OR

- Q.3 (a)** What is Hypothesis? Explain different types of hypothesis. 07

- (b) Use the data given to test the following hypothesis 07

$$H_0 : \mu = 1200 \quad H_a : \mu > 1200$$

Sample Mean = 1215

Size of Sample = 113

Population standard deviation = 100

Level of significance = 0.10

- Q.4 (a)** Develop a one-way ANOVA on the following data. 07

1	2	3	4
113	120	132	122
121	127	130	118
117	125	129	125
110	129	135	125

Determine the observed F value. Compare it to the critical F value and decide whether to reject the null hypothesis. Use a 5% level of significance.

- (b) Explain the steps of hypothesis testing procedure. 07

OR

- Q.4 (a)** Use a chi-square goodness-of-fit test to determine whether the observed frequencies are distributed the same as the expected frequencies ($\alpha = 0.05$). 07

Category	1	2	3	4	5	6
F_o	53	37	32	28	18	15
F_e	64	42	33	22	10	8

- (b) A sample of 87 professional working women showed that the average amount paid annually into a private pension fund per person was \$3352. The population standard deviation is \$1100. A sample of 76 professional working men showed that the average amount paid annually into a private pension fund per person was \$5727, with a population standard deviation of \$1700. A women's activist group wants to "prove" that women do not pay as much per year as men into private pension funds. If they use $\alpha = 0.01$ and these sample data, will they be able to reject a null hypothesis that women annually pay the same as or more than men into private pension funds? Use the eight-step hypothesis-testing process. 07

- Q.5 (a)** Determine the equation of the regression line for the following data. 07

X	12	21	28	8	20
Y	17	15	22	19	24

- (b) Write a short note on Index numbers. 07

OR

- Q.5 (a)** What is regression analysis? Discuss the application of regression in Business Decisions. 07

- (b) Use the decision table given below to select decision alternative with below mention decision making criteria. 07

Decision Alternatives		State of Nature		
		S ₁	S ₂	S ₃
	D ₁	250	175	-25
	D ₂	110	100	70
	D ₃	390	140	-80

- (1) Use the maximax criterion to determine which decision alternative to select.
- (2) Use the maximin criterion to determine which decision alternative to select.

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