Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA Sem-I   Examination January 2010

Subject code: 810007   **Subject Name: Quantitative Analysis**
Date: 01 / 02 / 2010   **Time: 12.00 – 2.30 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) A multinational bank issuing Master Card is monitoring the use of credit card **07**
account holders in the context of their spending habits. A market survey shows
that the average monthly spending of its regular card users is normally
distributed with mean Rs.2800 and standard deviation Rs.900. The customers
are classified into four categories according to pattern of spending:
   a) Category 1 spends less than Rs.2000
   b) Category 2 spends Rs.2000 or more but less that Rs.3000
   c) Category 3 spends Rs.3000 or more but less than Rs.4000
   d) Category 4 spends Rs.4000 or more
What proportion of customers would you expect to fall into each category?

(b) A small independent physicians' practice has three doctors. Dr. Shah sees 41% of the **07**
patients, Dr. Patel sees 32%, and Dr. Jadeja sees the rest. Dr. Shah request blood test on
5% of her patients, Dr. Patel request blood test on 8% of his patients, and Dr. Jadeja
request blood test on 6% of her patients An Auditor randomly selects a patient from
past week and discovers that patient had a test as a result of the physician visit.
Knowing this information, what is the probability that the patient saw Dr. Patel? For
what percentage of all patients at this practice are blood tests requested?

Q.2 (a) A small fruit merchant has got a problem on hand. He has to decide how many **07**
dozens of particular type of fruit to stock on a given day. Total demand per
day is uncertain. He has analyzed the past data and found the following
pattern of distribution based on 360 days.

Total demand per day (in dozens)	# of days each demand Level was recorded	Probability of demand
25	72	0.20
30	90	0.25
35	108	0.30
40	90	0.25

Fruits not sold on any day perish and have to be thrown out. Selling price of
the fruit per dozen is 30. Cost of procurement and other incidentals add to
20 per dozen. How many dozens per day should the merchant stock?

(b) It is sometimes maintained that women sleep less soundly after having children **07**
than they did beforehand. Suppose we asked 90 women with children, and
found.

Number of children	Present sleep compared with before having children		
	Worse	Same	Better
1	28	7	5
2	13	6	6
3 or more	8	9	8

What inference can be drawn?

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OR

(b) From the following data, apply one-way ANOVA. **07**

Treatment Level		
1	2	3
22	21	22
21	17	24
18	16	22
19	18	21

Q.3 **(a)** What is the meaning of Standard deviation? Explain why the standard deviation is the most preferred and widely used tool? **07**

(b) The XYZ magazine is studying the sales of the magazines 25 towns in Gujarat. The data has compiled in the following frequency distribution. **07**

Sales(000)	Frequency
0 - 5000	2
5000 – 10000	6
10000 – 15000	10
15000 – 20000	5
20000 – 25000	2

The management wants to know the answers for the following questions:
   i.   What is the overall average sales figure of the magazine?
   ii. How much variability is there in terms of sales in different towns

OR

Q.3 **(a)** What is Baye's theorem? What is its importance in the business. **07**

(b) Two sets of candidates are competing for the positions on the board of directors of a company. The probability that the first set and the second set will win are 0.6 and 0.4 respectively. If the first set wins, the probability of introducing a new product is 0.8 and the second set wins is 0.3. What is the probability that the new product will be introduced? **07**

Q.4 **(a)** What is multiple regression? How multicollinearity problem will arise? **07**

(b) A hair stylist has been in a business one year. Sixty percent of his customers are walk in business. If he randomly samples eight of the people from last week's list of customers, what is the probability that three or fewer were walk ins? If this outcome actually occurred, what would be some of explanations for it? **07**

OR

Q.4 **(a)** Write short notes on Index numbers and Time series analysis **07**

(b) On Monday mornings, The First National Bank only has one teller window open for deposits and withdrawals. Experience has shown that the average number of arriving customers in a 4- minute interval on Monday mornings is 2.8, and each teller can serve more than the number efficiently. The random arrivals at this bank on Monday mornings are Poisson distribute. **07**
   a. What is the probability that on a Monday morning exactly six customers will arrive in 4 – minute interval?
   b. What is the probability that five or more customers will arrive at the bank during 8 – minute period?

Q.5 **(a)** What is Type I and Type II error? Explain with examples **07**

(b) A company is considering two different TV advertisements for promotion of a new product. Management believes that advertisement A is more effective than advertisement B. Two identical test market areas are selected. A random sample of 60 customers who saw advt. A, 18 tried the product. A random sample of **07**

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100 customers who saw advt. B, 22 tried the product. Does this indicate that advertisement A is more effective than advertisement B, if a 5% level of significance is used?

OR

Q.5 **(a)** Suppose the mean idle time of machine is to be estimated within 1.15 hrs of the true mean idle time with 98% level of confidence. It is known from past data that the idle time of a machine standard deviation of 2 hours. Compute the appropriate sample size. **07**

(b) It is required to test whether the test whether the temperature required to damage a computer on an average is less than 110 degrees. Because of the price of testing, a sample of twenty computers was tested to see what temperature would damage the computer. It was observed that the damaging temperature averaged 109 degrees with a standard deviation of 3 degrees. Use $\alpha = 0.01$, to test if the damaging temperature is less than 110 degrees? **07**

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