Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
SEMESTER– 1 EXAMINATION – WINTER 2012

Subject code: 810007   **Date: 07/01/2013**
Subject Name: Quantitative Analysis (QA)
Time:14:30 – 17:30   **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)** The average stock price for companies making S&P500 is $30,   **07**
and the standard deviation is $8.2. Assume that the stock prices
are normally distributed:
   a. What is the probability a company will have a stock
      price no higher than $20?
   b. How high does a stock price to be put to a company in
      the top 10%?

(b) Define Statistics. Explain two business applications of statistics.   **07**

Q.2 **(a)** Small cars get better gas mileage, but they are not as safe as   **07**
bigger cars. Small cars accounted for 18% of the vehicles on the
road, but accidents involving small cars led to 11,898 fatalities
during a recent year. Assume the probability a small cars is
involved in an accident is 0.18. The probability of an accident
involving a small car leading to fatality is 0.128 and the
probability of an accident not involving a small car leading to a
fatality is 0.05. Suppose you learn of an accident involving a
fatality. What is the probability a small car was involved.

(b) A MBA student applies for a job in two Firms – Firm I and   **07**
Firm II. The probability of his being selected in Firm I is 0.7
and being rejected in Firm II is 0.5. The probability of atleast
one of his applications being rejected is 0.6. Find the probability
that he would be selected in one of the firms?

OR

(b) A company received 10 tubes packed in a box. The probability   **07**
that a tube is defective is 0.1. Assuming independence, find
   (a) The probability that there are 3 defective tubes
   (b) The expected number of defective tubes.
   (c) The standard deviation of the number of defective tubes.

Q.3 **(a)** Describe briefly random and non random sampling methods   **07**
(b) Suppose the mean idle time of a machine is to be estimated   **07**
within 1.15 hour of the true mean idle time with 98% level of
confidence. It is known from past data, that the idle time of a
machine is normally distributed with a standard deviation of 2
hours. Compute the appropriate sample size.

OR

Q.3 **(a)** Explain the following with reference to testing of hypothesis: **07**
Type I and Type II errors, critical region, power of the test
(b) A cosmetic company launched a new brand of nail polish by   **07**
advertising on different T.V. channels. To find out the
percentage of people who had seen the advertisement a random
sample of 100 people were questioned. Out of these 60

responded in the affirmative. Estimate a 90% confidence interval for the true proportion of people who had seen the advertisement.

Q.4 (a) In 16 half hour evening programs, the mean time devoted to commercials was 6.4 minutes with $s_1=2$ mins. In 16 half hour morning programs the mean time was 5.8 minutes with $s_2=1.5$ minutes. Test, at 10% level of significance, if the data indicates that the mean time devoted to commercials is significantly less in the morning? (Assume that the populations are normally distributed with same but unknown variances) **07**

(b) A certain drug is claimed to be effective in curing cold. In an experiment on 500 persons with cold, half of them were given the drug and half of them were given sugar pills. The patient's reactions to the treatment are recorded in the following table: **07**

Treatment	Consequence			
	Helped	Reaction	No Effect	Total
Drug	150	30	70	250
Sugar Pills	130	40	80	250
Total	280	70	150	500

On the basis of the data, can it be concluded that there is a significant difference in the effect of the drug and sugar pills?

OR

Q.4 (a) Two business schools want to determine if the mean scores of CAT for the students in their institutes are similar. A simple random sample of 20 students is taken from the first business school (A) and a simple random sample of 25 students is taken from the second business school (B). The survey yields the following results: **07**

	A	B
Average score	750	650
Sample Standard Deviation	80	90

Test if there is significant difference in the mean CAT scores of the students of school A & school B (use 0.01 level of significance)

Q.4 (b) What do you mean by regression? Point out the usefulness of regression in business analysis **07**

Q.5 (a) The marketing manager of a company is contemplating the price of a new product and has three prices worked out, Rs. 105,110 and 115. In order to decide what price he should fix, he carries out an experiment of sales in an upcoming market. He selects 3 samples in 4 geographical location markets and sales of the new product are recorded at the end of the week. These are given in the table below. **07**

Sales in location	Price Levels		
	Rs. 105	Rs. 110	Rs. 115
A	8	7	4
B	12	10	8
C	10	6	7
D	9	8	9
E	11	9	7

Please advice the marketing manager, whether the price levels have significant influence over the sales levels or not.

(b) The following results were obtained in the analysis of data on **07** dry bark in ounces (Y) and age in year (X) of 200 plants:

	X	Y
Average	9.2	16.5
Standard Deviation	2.1	4.2

Correlation coefficient = 0.84

Construct the two lines of regression and estimate the yield of dry bark of a plant of age 8 years.

OR

Q.5 (a) Suppose that you are given a decision situation with three **07** possible states of nature are P (s1) = 0.2, P (s2) = 0.5, and P (s3) = 0.3. With sample information I, P (I/s1) = 0.1, P (I/s2) = 0.05 and P (I/s3) = 0.2. Compute the revised or posterior probabilities: P (s1/I), P (s2/I), and P (s3/I).

(b) What are the four components of a time series? Explain with an **07** example

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