MBA I
Semester- I
Quantitative Analysis - I (QA - I)

1. Objectives:

- To impart the basic art and science of gathering, analyzing and using data to identify and resolve managerial and decision making problems.
- To develop skills in structuring and analyzing business problems using quantitative analysis.
- To develop aptitude and statistical thinking approach to business problems.
- To understand the effective use of computer software for resolution of statistical problems.

2. Course Duration:

The course duration is of 36 sessions of 75 minutes each, i.e. 45 hours.

Module No:	Module Content	No. of Sessions	70 Marks (External Evaluation)
I	Introduction to Statistics, Statistics in Business, Charts and Graphs. Descriptive Statistics, Measure of central tendency, measure of variability, for Group and ungrouped data, Measures of shape, measures of association. Permutations and Combinations; Introduction to probability, Structure of probability, Results of probability, Revision of probability: BAYES' RULE, and examples Random variable and probability distribution: Discrete and Continuous distribution, Expected value and variance of a distribution.	7	17
II	Discrete Distributions: Uniform distribution, Hyper-Geometric distribution, Binomial distribution, Poisson distribution and their relationship Continuous Distributions: Uniform distribution, Normal distribution, Exponential distribution; Sampling and sampling Distributions	7	18
III	Statistical Inference: Estimation for Single and Two Populations; Hypothesis Testing for Single Populations- Mean, Proportion and Variance; Hypothesis Testing for Two Populations- Mean, Proportion and Variance	7	17
IV	Analysis of Variance (Only one way), Hypothesis Testing for categorical data(chi square test); Simple Linear Regression Analysis –introduction, Determining the equation of a regression line, measure of variation, using the residual analysis to test the assumptions of Regression, measuring Auto correlation – The Durbin Watson statistic, Testing of the Overall Model	8	18
V	Use of any software (EXCEL, Minitab, SPSS etc.) for exposure to the above concepts. Statistical Modeling using SPSS.	7	Internal Evaluation (20 Marks of CEC)

4. Teaching Method: The following pedagogical tools will be used to teach this course:

(1)Lectures and Discussions

(2) Assignments and Presentations

5. Evaluation:

A	Projects/Assignments/Quiz/Class Participation, etc.	Weightage (50%) (Internal Assessment)
B	Mid-Semester Examination	Weightage (30%) (Internal Assessment)
C	End-Semester Examination (Min. 30% Theory and Min. 70% Practical)	Weightage (70%) (External Assessment)

6. Basic Text Books:

Sr. No.	**Author**	**Name of the Book**	**Publisher**	**Year of Publication**
T1	Ken Black	Business Statistics for Contemporary Decision Making	Wiley	Student Edition Fourth or later edition
T2	Richard I. Levin and David S. Rubin	Statistics for Management	Pearson Education	6th Edition or later edition
T3	Anderson, Sweeney, Williams	Statistics for Business and Economics	Ceenage Learning	Latest edition

Note: Wherever the standard books are not available for the topic appropriate print and online resources, journals and books published by different authors may be prescribed.

7. Reference Books:

Sr. No.	**Author**	**Name of the Book**	**Publisher**	**Year of Publication**
R1	D. P. Apte	Statistics for Managers	Excel Books	Latest edition
R2	T N Srivastava and Shailaja Rego	Statistics for Management	TMH	Latest edition
R3	K. B. Akhilesh & S. B. Balasubrahmanyam	Mathematics and Statistics for Management	Vikas Publishing	Latest edition
R4	Naval Bajpai	Business Statistics	Pearson	Latest edition
R5	D. P. Apte	M. S. Excel: Statistical Tools for Managers	Excel Books	Latest edition
R6	Qazi Zameeruds, Vijay K. Khara, S. K. Bhamri	Business Mathematics	Vikas	Latest edition

9. Session Plan:

Session Nos.	Topics to be covered
1 - 2	Introduction to Statistics, Statistics in Business, Charts and Graphs
3 - 4	Descriptive Statistics, Measure of central tendency, measure of variability, for Group and ungrouped data, Measures of shape: Skewness and Kurtosis, measures of association.
5 - 6	Permutations and Combinations; Introduction to probability, Structure of probability, Results of probability, Revision of probability, Baye's Rule and examples
7	Random variable and probability distribution: Discrete and Continuous distribution, Expected value and variance of a distribution
8 - 9	Discrete Distributions: Uniform distribution, Hyper-Geometric distribution, Binomial distribution, Poisson distribution and their relationship
10 - 14	Continuous Distributions: Uniform distribution, Normal distribution, Exponential distribution; Sampling and sampling Distributions
15 - 16	Statistical Inference: Estimation for Single and Two Populations
17 - 18	Hypothesis Testing for Single Populations- Mean, Proportion and Variance
19 - 21	Hypothesis Testing for Two Populations- Mean, Proportion and Variance
22 - 24	Analysis of Variance (Only one way) and Hypothesis Testing for categorical data(chi square test)
25 - 28	Simple Linear Regression Analysis –introduction, Determining the equation of a regression line, measure of variation, using the residual analysis to test the assumptions of Regression, measuring Auto correlation – The Durbin Watson statistic, Testing of the Overall Model
29 - 36	Use of any software (EXCEL, Minitab, SPSS etc.) for exposure to the above concepts

Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.B.A -Ist SEMESTER–EXAMINATION –JUNE- 2012

Subject code: 810007 Date: 14/06/2012

Subject Name: Quantitative Analysis (QA)

Time: 02:30 pm – 05:30 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 sample of 10 adults was asked to report the number of hours they spent on the internet the previous month. The data is given below. 0, 7, 12, 5, 33, 14, 8, 0, 9, 22. Calculate the following. **07**

1) mean number of hours
2) median number of hours
3) standard deviation of the number of hours
4) Pearsons' measure of skewness
5) comment on the nature of the distribution of number of hours spent on the internet.

(b) Suppose the following data represents the average stock prices of two stocks A and B observed for 10 weeks. **07**

Stock A	18	20	15	16	21	20	12	16	19	20
Stock B	28	18	24	32	18	29	23	38	28	18

Compute the coefficient of variation for each stock. Which stock is more risky?

Q.2 **(a)** Consider a newspaper circulation department where it is known that 84% of the household in a particular neighborhood subscribe to the daily edition of the paper. In addition, it is known that the probability that a household who already holds a daily subscription also subscribes to the Sunday edition is 0.75. By clearly defining the events, what is the probability that a household subscribes to both Sunday and daily editions of the newspaper? **07**

(b) What is the probability of getting 53 Sundays in a leap year? **07**

OR

(b) Define a binomial distribution. What are the assumptions used in binomial distribution. Suppose the random variable X is binomially distributed with n = 15 and p = 0.4. Find E(x), V(x) and $P(X \geq 3)$. **07**

Q.3 **(a)** Given a binomial distribution with n = 30 and p = 0.04, use the Poisson approximation to the binomial to find **07**

1) P(X=25)
2) P(X=3)
3) P(X=5)
4) P(X>1)

(b) The Asian currency crisis of late 1997 and early 1998 was expected to lead to substantial job losses in US. The Economic Policy Institute estimated that the mean number of job losses would be 126,681. Assume that the number of jobs lost is normally distributed with a standard deviation of 30,000. Find the following probabilities. **07**

1) the number of lost jobs between 80,000 and 150,000
2) the number of lost jobs will be greater than 150,000
3) the number of lost jobs will be exactly 126,681
4) the number of lost jobs will be greater than 130,000
5) the number of lost jobs between 130,000 and 140,000

OR

Q.3 **(a)** State Central Limit Theorem. Suppose a random sample of 660 items is taken. Let the sample population proportion is 0.58. What is the probability that the sample proportion is greater than 0.6? **07**

(b) Explain systematic random sampling **07**

Q.4 **(a)** An urban planning group is interested in estimating the difference between the mean household incomes for two localities in a large metropolitan area. Independent random samples of households in the localities provided the following results. **07**

Locality 1	Locality 2
$n_1 = 8$	$n_2 = 12$
$\bar{x}_1 = \$15{,}700$	$\bar{x}_2 = \$14{,}500$
$s_1 = \$700$	$s_2 = \$850$

Construct a 95% confidence interval for the difference between the mean incomes in the two localities.

(b) For the above data in Q.4 (a), test the following hypothesis: $H_0 : \mu_1 - \mu_2 = 0$ against $H_1 : \mu_1 - \mu_2 \neq 0$ at $\alpha = 0.05$. **07**

OR

Q.4 **(a)** List the assumptions used in a linear regression model. Data on advertising expenditures (AE) and revenue (R) for the Four Seasons Restaurant is given below. Figures are in $ 1000s. **07**

AE	1	2	4	6	10	14	20
R	19	32	44	40	52	53	54

1) Develop an estimated regression equation on revenue on advertising expenditure.
2) What is the estimated revenue when the advertising expenditure is 7?
3) Suppose SSR = 691 and SST = 1002. Find the value of R^2 and interpret the same in the context of the problem.

Q.4 **(b)** A lending institution supplied the data on loan approvals by four loan officers (LO). Using 5% level of significance, test whether the loan approval decision (LAD) is independent of the loan officer reviewing the loan application. The data is given below. **07**

LO/LAD	Approved	Rejected
Vijay	24	16
Shweta	17	13
Raju	35	15
Tony	11	9

Q.5 **(a)** An ANOVA is carried out using 15 observations collected from 3 populations. The following ANOVA table is observed (some entries are deliberately omitted). Write down the complete ANOVA table and test the hypothesis that the three population means are equal at $\alpha = 0.05$. **07**

Source of Variation	Degrees of freedom	Sum of Squares	Mean Sum of Squares	F
Treatment		520		
Error				
Total	14	860		

(b) Write a note on index numbers. Briefly explain Laspeyres and Paasche price indices. **07**

OR

Q.5 **(a)** Explain briefly the Moving Average Method and the Exponential Smoothing technique. **07**

(b) A man has the choice of running a hot-snack stall or an ice cream stall at a seaside resort during the summer season. If it is a fairly cool summer, he should make Rs. 5000 by running the hot-snack stall, but if the summer is quiet hot he can only expect to make Rs. 1000. On the other hand, if he operates the ice cream stall, his profit is estimated at Rs. 6500 if the summer is hot, but only Rs. 1000 if it is cool. There is 40% chance of the summer is being hot. Should he opt for running the hot snacks stall or the ice cream stall? What is the expected value of perfect information? **07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.B.A -Ist SEMESTER–EXAMINATION –JUNE- 2012

Subject code: 2810007 Date: 14/06/2012

Subject Name: Quantitative Analysis-I (QA-1)

Time: 02:30 pm – 05:30 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) Discuss the four level of data measurement. 07

(b) A research agency administers a demographic survey of 100 telemarketing companies to determine their size of operations. During the survey each of them asked to report how many employees now work in their telemarketing operation. Following is the frequency distribution. 07

No. of Employees working in Telemarketing	No. of companies
0-20	32
20-40	16
40-60	13
60-80	10
80-100	19

Calculate the mean, mode and variance for the data.

Q.2 (a) The recent census study derives that 0.6 of all Indian household have ceiling fans. 29 % of all households have an exhaust fans. Suppose 0.13 of all Indian households have both a ceiling fan and an exhaust fan. If a household is randomly selected, what is probability that the household has a ceiling fan or an exhaust fan? What is the probability that the household has neither a ceiling fan nor an exhaust fan? What is the probability that the household does have a ceiling fan and does not have an exhaust fan? 07

(b) A movement of Food and Health department found approximately 0.27 of all ready to eat food products did not carry nutritional labeling, whereas 83 % of bakery products did not carry nutritional labeling. If these two categories combined, 60% would be ready to eat food and 40% would be bakery products. A researcher is blindly given a product from these two categories and is told that the product does not have nutritional labeling, revise the probability that the product is a ready to eat product. 07

OR

(b) A leading journal on economics publishes some statistics on the job market. 40% of all workers say they would change their job for higher pay. 88% companies say that there is a shortage of qualified candidates. Suppose 16 workers are randomly contacted and asked if they would change jobs for higher pay, what is the probability that nine or more say yes? If 13 companies selected, what is the probability that all of the companies say there is a shortage of qualified candidates? 07

Q.3 (a) Differentiate Random and Non Random Sampling. 03

(b) The Poisson distribution of annual trips per family to amusement parks gives average of 0.6 trips per year. What is the probability of randomly selected family did not make a trip to an amusement park last year? What is the probability of randomly selected family took three or fewer trips to amusement parks over a three years period? 04

(c) Mukta arts., a bolywood casting company, is selecting a group of extras for a movie. The ages of the first 20 men to be interviewed are 07

50	56	55	49	52	57	56	57
56	59	54	55	61	60	51	59
62	52	54	49				

The director of the movie wants men whose ages are fairly tightly grouped around 55 years. Being a statistics buff of sorts, the director suggests that a standard deviation of 3 years would be acceptable. Does this group of extras qualify?

OR

Q.3 (a) Eklavya pvt. Ltd. is developing a compact kidney dialysis machine, but its chief manager, is having trouble controlling the variability of the rate at which fluid moves through the device. Medical standards require that hourly flow be 4 liters, plus or minus 0.1 liter, 80 percent of the time. Manager in testing the prototype has found that 68 percent of the time, the hourly flow is within 0.08 liter of 4.02 liters. Does the prototype satisfy the medical standards? 05

(b) According to a study by agency, 0.21 of the credit card users are very close to their limit of credit card. Suppose a random sample of 600 card users is taken. What is the probability that more than 150 credit card users are very close to the total limit on their cards? 05

(c) A company has developed a new CFL bulb that seems to burn longer than most residential bulbs. To determine how long these bulb burn, the company randomly selects a sample of these CFLs and burn them in the laboratory. The output shown here is a portion of the analysis from this effort. 04

Mean: 2198 hrs
Standard deviation: 153 hrs
Sample size: 84
Confidence level (90%): 27.77
Discuss the output.

Q.4 (a) Write a short note on Type I error and Type II error 07

(b) Fun Republic knows that a certain hit movie ran an average of 84 days in each city, and the corresponding standard deviation was 10 days. The manager of the Mumbai region was interested in comparing the movie's popularity in his region with that all of India's other theaters. He randomly chose 75 theaters in his region and found that they ran the movie an average of 81.5 days. State appropriate hypothesis for testing whether there was a significant difference in the length of the picture's run between Fun republic in the Mumbai district and all of India's other theaters. At a 1 percent significance level, test these hypotheses. 07

OR

Q.4 (a) According to a study conducted in India, 59% of men and 70% of women say that Value for money is very important factor in purchasing Apparels. Suppose this survey was conducted using 374 men and 481 women, do these data show enough evidence to declare that a significantly higher proportion of women than men believe that Value for money is very important factor in purchasing Apparels? Use a 5% significance level. 07

(b) National Economics and Statistics agency claimed that the average retail onion price was Rs. 2.51/kg. Suppose a survey of 27 retailers is conducted this year to determine whether the price of onion has increased. The average price found after the study was Rs. 2.55/kg and variance was 0.022. Use alpha of 0.05 to test the assumption. 07

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

(b) Is the Brand preference of Laptop is independent of the Social class category? Suppose respondents randomly selected from respective class categories and classified in the following table. Use a chi-square test using significance level of 0.05. 07

Brand	Social Class-1	Social Class-2	Social Class-3
A	25	178	31
B	49	141	12
C	31	54	8
D	22	14	6

OR

Q.5 (a) Discuss the relationship between r and r^2 04

(b) The starting salaries of new MBA graduate would differ according to city of Gujarat. A random selection of five MBA graduates is taken from each city (Ahmedabad, Surat and Baroda). The data obtained follow. Use a One Way Anova to analyse these data at 0.05 level of significance. Salaries mentioned are in multiple of Rs. 10,000. 10

Ahmedabad	Surat	Baroda
3.05	4.1	3.55
3.15	3.95	3.35
3.00	3.9	3.5
3.1	3.8	3.65
3.15	3.95	3.6

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Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

MBA Semester –I Examination Dec'11- Jan'12

Subject code: 810007 **Date: 10/01/2012**

Subject Name: Quantitative Analysis (QA)

Time: 10.30 am – 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)** The radio music listener market is diverse .Listener for mats might include adult contemporary, album rock, top 40, oldies, rap, country and western, classic, and jazz. In targeting audience, market researchers need to be concerned about the ages of the listener attracted to particular formats. Suppose a marketer researcher surveyed a sample of 170 listener of oldies stations and obtained the following age distribution. **07**

Age	Frequency
15-under 20	9
20-under 25	16
25-under 30	27
30-under 35	44
35-under 40	42
40-under 45	23
45-under 50	7
50-under 55	2

I. What are the mean and modal ages of oldies listeners?

II. What are the variance and standard deviation of the age's oldies listeners?

(b) A doctor has decided to prescribe two new drugs to 200 heart patients as follows: 50 get drug A, 50 get drug B , and 100 get both. The 200 patients were chosen so that each had an 80 percent chance of having a heart attack if given neither drug. Drug A reduces the probability of a heart attack by 35 percent, drug B reduces the probability by 20 percent and the two drugs, when taken together, work independently .if a randomly selected patient in the program has a heart attack, What is the probability that the patient was given both drugs? **07**

Q.2 **(a)** (1) State chebyshev's theorem **04**

(2) Characteristics of good estimator. **03**

(b) The average number of annual trips per family to amusement parks in the India is Poisson distributed, with a mean of 0.6 trips per year. What is the probability of randomly selecting an Indian family and finding the following: **07**

I. The family did not make a trip to an amusement park last year?

II. The family took exactly one trip to an amusement park last year?

III. The family took two or more trips to amusement parks last year?

IV. The family took three or fewer trips to amusement parks over a three – year period?

V. The family took exactly four trips to amusement parks during a six – year period?

OR

(b) Suppose you are sampling from a population with population standard deviation =1000. You want the standard deviation of the sample mean to be at most 25. what is the minimum sample size you should use? **07**

Q.3 **(a)** Two different areas of a large eastern city are being considered as sites for day–care centers. Of 200 households surveyed in one station, the proportion in which the mother worked full-time was 0.52. In another section, 40 % of the 150 households surveyed had mothers working at full-time jobs. At the 0.04 level of significance, is there a significant difference in the proportion of working mothers in the two areas of the city? **07**

(b) A research company has designed three different systems to clean up oil spills. The following table contains the results, measured by how much surface area (in square meters) is cleaned in 1 hour. The data were found by testing each method in several trials. Are the three systems equally effective? Use the 0.05 level of significance **07**

System A 55 60 63 56 59 55
System B 57 53 64 49 62
System C 66 52 61 57

OR

Q.3 **(a)** Suppose that in past years the average price per square foot for warehouses in the India has been Rs 32.28. A national real estate investor wants to determine whether that figure has changed now. The investor hires a researcher who randomly samples 19 warehouses that are for sale across the India and finds that the mean price per square foot is Rs 31.67, with a standard deviation of Rs 1.29. If the researcher uses a 5% level of significance, what statistical conclusion can be reached? What are the hypotheses? **07**

(b) 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 midlevel managers, and sometimes to low-level managers. The seminar facilities believe evaluations of the seminar may vary with the audience. 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 from 1 to 10, with 10 being the highest. Use a one-way ANOVA to determine whether there is a significant difference in the evaluations according to manager level. Assume $\alpha = 0.05$. Discuss the business implications of your findings. **07**

High level	Mid level	Low level
7	8	5
7	9	6
8	8	5
7	10	7
9	9	4
	10	8
	8	

Q.4 **(a)** Study the MINITAB regression output that follows. How many predictors are there? What is the equation of the regression model? Find out the strength of the model and the predictors. **07**

Regression Analysis: Y versus X1, X2, X3, X4

The regression equation is

Y = -55.9 + 0.0105 X1 – 0.107 X2 + 0.579 X3 – 0.870 X4

Predictor	coef	SE coef	T	P
Constant	-55.93	24.22	-2.31	0.025
X1	0.01049	0.02100	0.50	0.619
X2	-0.10720	0.3503	-3.06	0.003
X3	0.57922	0.07633	7.59	0.000
X4	-0.8695	0.1498	-5.81	0.000

S = 9.025 R-sq = 80.2% R-sq(adj) = 783.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	4	18088.5	4522.1	55.52	0.000
Residual Error	55	4479.7	81.4		
Total	59	22568.2			

(b) Use the following contingency table and the chi-square test of independence to determine whether social class is independent of number of children in a family. Let $\alpha=0.05$. **07**

		Social Class		
Number of children		Lower	Middle	Upper
	0	7	18	6
	1	9	38	23
	2 or 3	34	97	58
	More than 3	47	31	30

OR

Q.4 **(a)** campus store has been selling the *believe it or not : wonders of statistics study guide* for 12 semesters and would like to estimate the relationship between sales and number of sections of elementary statistics taught in each semester. The following data have been collected: **07**

Sales(units)	Number of sections
33	3
38	7
24	6
61	6
52	10
45	12
65	12
82	13
29	12
63	13
50	14
79	15

(1) Develop the estimating equation that best fits the data

(2) Calculate the sample coefficient of determination and the sample coefficient of correlation

(b) The following information has been gathered from a random sample of apartment renters in a city. We are trying to predict rent (in dollars per month) based on the size of the apartment (number of rooms) and the distance from downtown (in miles.) **07**

Rent ($)	No. of Rooms	Distance from Downtown
360	2	1
1000	6	1
450	3	2
525	4	3
350	3	10
300	1	4

(1) Calculate the least-squares equation that best relates these three variables.
(2) If someone is looking for a two-bedroom apartment 2 miles from downtown, what rent should he expect to pay

Q.5 **(a)** Janak Bhai, owner of a California vineyard, has collected the following information describing the prices and quantities of harvested crops for the years 1992-1995. **07**

	Price (per ton)				Quantity Harvested (tons)			
Type of Grape	1992	1993	1994	1995	1992	1993	1994	1995
Ruby cabernet	$108	$109	$113	$111	1280	1150	1330	1360
Barbera	93	96	96	101	830	860	850	890
Chenin Blanc	97	99	106	107	1640	1760	1630	1660

Calculate a fixed – weight index for each year using 1992 prices as the base and the 1995 quantities as the fixed weight.

(b) Use the decision table given here to complete parts (a) through (d). **07**

		State of Nature		
		S1	S2	S3
Decision Alternative	d1	250	175	-25
	d2	110	100	70
	d3	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.
3. Use the Hurwicz criterion to determine which decision alternative to select. Let $\alpha = 0.3$ and then let $\alpha = 0.8$ and compare the results.
4. Compute an opportunity loss table from the data. Use this table and a minimax regret criterion to determine which decision alternative to select.

OR

Q.5 **(a)** Use the following decision table to complete parts (a) through **07**

		State of Nature		
		s1(0.40)	s2 (0.35)	s3 (0.25)
Decision Alternative	d1	150	250	500
	d2	100	200	400
	d3	75	150	700
	d4	125	450	650

1. Draw a decision tree to represent this payoff table.
2. Compute the expected monetary values for each decision and label the decision tree to indicate what the final decision would be.
3. Compute the expected payoff of perfect information. Compare this answer to the answer determined in part (2) and compute the value of perfect information.

(b) The number of faculty-owned personal computers at the University of Ohio increased dramatically between 1990 and 1995: **07**

Year	1990	1991	1992	1993	1994	1995
Number of PCs	50	110	350	1020	1950	3710

Develop a linear estimating equation that best describes these data.

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Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

MBA Semester –I Examination Dec'11- Jan'12

Subject code: 2810007 **Date: 10/01/2012**

Subject Name: Quantitative Analysis-I (QA-I)

Time: 10.30 am – 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) In a society there are two clubs. 60% members of the society are members of club A and 29% members of the society are member of club B while 13% members of the society are member of both clubs. Suppose if one society member is selected at random, 07

(i) What is the probability that he is member of club A or club B?

(ii) What is the probability that he is neither member of club a nor club B?

(iii) What is the probability that he is not the member of club A but member of club B?

(b) A company is producing the personal computers have shipped 16 computers, knowing that four of them have defective wiring. The purchaser wants to inspect three the computers for its wiring. What is the probability that the purchaser finds following 07

(i)No defective computers.

(ii)Exactly three defective computers.

Q.2 (a) Suppose that for years the mean of population I has accepted to be the same as the mean of population II, but that now population I is believed to have a greater mean than population II. Letting $\alpha = 0.05$ and assuming the populations have equal variances and x is approximately normally distributed, use the following data to test this belief. 07

Sample I : 43.6 45.7 44.0 49.1 45.2 45.6 40.8 46.5
48.3 45.0

Sample II :40.1 36.4 42.2 42.3 43.1 38.8 37.5 43.3
41.0 40.2

(b) Determine interquartile range for the following data. 07

44 18 39 40 59 46 59 37 15 73
23 19 90 58 35 82 14 38 27 24
71 25 39 84 70

OR

(b) The following data are the result of a historical study of the number of flows found in a porcelain cup produced by manufacturing firm. Use these data and the associated probabilities to compute the expected number of flaws and the standard deviation of flaws. 07

Flaws	Probability
0	0.461
1	0.285
2	0.129
3	0.087
4	0.038

Q.3 (a) From the following table check if the Variable 1 is independent of Variable 2. Take $\alpha = 0.01$. 07

	Variable 2			
Variable 1	24	13	47	58
	93	59	187	244

(b) A pen company averages 1.2 defective pens per carton produced. The number of defects per carton is Poisson distributed. If the each carton is of 200 pens, find following probabilities. 07
(i)Randomly selected carton do not have any defective pen
(ii)Randomly selected carton is having 8 or more defective pens.

OR

Q.3 (a) Perform one way analysis of variance for following data. 07

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

(b) According to Cellular Telecommunication Industry Association, the average local monthly cell phone bill is \$42.78. Suppose local monthly cell phone bills are normally distributed, with a standard deviation of \$11.35. 07
(i)What is the probability that a randomly selected cell phone bill is more than \$67.75.
(ii)What is the probability that a randomly selected cell phone bill is between \$30 and \$50.
(iii)What is the probability that a randomly selected cell phone bill is not more than \$25.

Q.4 (a) What is hypothesis? Describe types of hypothesis and process of hypothesis testing. 07
(b) For the following data estimate the regression equation of Y on X. 07

X	61	63	67	69	70	74	76	81	86	91	95	97
Y	4.28	4.08	4.42	4.17	4.48	4.30	4.82	4.70	5.11	5.13	5.64	5.56

OR

Q.4 (a) Use the following data to test the hypothesis : Ho : $\mu1-\mu2=0$ Ha : $\mu1-\mu2 \neq 0$ 07
($\alpha = 0.05$)

Sample 1		
90	88	80
88	87	91
81	84	84
88	90	91
89	95	97
88	83	94
81	83	88
87	87	93
88	84	83
95	93	97

Sample 2		
78	85	82
90	80	76
77	75	79
82	83	88
80	90	74
81	75	76
83	88	77
86	90	75
80	80	74
89	84	79

(b) Estimate the regression line and find residual of y. 07

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

Q.5 (a) (1) Compute Q1 and P24 for following observations. 03
16 28 29 13 17 20 11 34 32 27 25 30 19 18 33
(2) Write short note on Systematic Random Sampling. 04

(b) (1) Explain one tailed and two tailed test. 03
(2) Write short note autocorrelation. 04

OR

Q.5 (a) (1) Calculate the value of ${}^5C_3$ and ${}^6P_3$. 03
(2) Write short note on snowball sampling and quota sampling. 04

(b) (1) Using given information obtain confidence interval to estimate p_1-p_2. 03
$n_1 = 430$, $n_2 = 399$, $x_1 = 275$, $x_2 = 275$, level of confidence = 85%.
(2) Write short note on chi square test of goodness of fit. 04

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Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

MBA. Sem-I Regular Examination January/ February 2011

Subject code: 810007 **Subject Name: Quantitative Analysis**

Date: 05 /02 /2011 **Time: 10.30 am – 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)** What are the essential differences among nominal, ordinal, interval and ration scales? **07**

(b) Assume that the daily demand for unleaded gasoline at a service station is normally distributed with a mean of 25000 gallons and a standard deviation of 5000 gallons. **07**

a. What are the chances that daily demand will exceed 30000 gallons?
b. What are the chances that the daily demand will be less than 15000 gallons?
c. Between what two amounts would you expect 95% of the daily demands to lie?

Q.2 **(a)** What is random and non random sampling? Explain? **07**

(b) Mr. Patel applies for a housing loan of Rs. 15, 00,000 from a bank for new house. The bank informed him that over the years, the bank has received about 2920 loan applications per year and that the probability of approval was on was 0.92. **07**

a) Mr. Patel wants to know the average and standard deviation of the number of loans approved per year
b) Suppose bank actually received 2850 loan applications per year with an approval probability of 0.92. What are the mean and standard deviation now?

OR

(b) A company is in a process of appointing a new CEO. The president (production), president (marketing), and president (personnel) are in a race, and the probability that any one among the three gets appointed is in the proportion of 5:3:2 respectively. The probability that president (production) if selected will introduce the voluntary retirement scheme (VRS) is 0.4.The probabilities that the two if selected will introduce the VRS scheme are 0.6 and 0.8 respectively. What is the probability that VRS will be implemented? **07**

Q.3 **(a)** Suppose that a toy manufacturer offers a rebate in order to determine what customers are actually paying (after discounts) for a product. The manufacturer receives 1600 sales receipts back from customers in connection with rebate offer. Assume that the mean purchase price is Rs.25.00 with a standard deviation of Rs.3.00. **07**

a. Construct a 95% confidence interval for the purchase price.
b. Construct a 90% confidence interval for the purchase price.

(b) In future, the New York Times decides its survey must have a margin or error no greater than 1.2%, with confidence level 95%. What sample size do they need to achieve this? **07**

OR

Q.3 **(a)** A real estate agent claims that the average price of a Flat in Ahmedabad is at most Rs.50, 000. The standard deviation is s = Rs.8, 500. A sample of 81 condominiums has an average selling price of Rs.51, 500. Use $\alpha = 0.10$ level of significance to test the claim. **07**

(b) A team of eye surgeons has developed a new technique for a risky eye operation to restore the sight of people blinded from certain disease. Under the old method, it is known that only 30 % of the patients who undergo this operation recover their eyesight. Suppose that surgeons in various hospitals have performed a total of 225 operations using the new method and that 88 have been successful (the patients fully recovered their sight). Can we justify the claim that the new method is better than the old one? (Use a 1% level of significance). **07**

Q.4 **(a)** A regular *Times New* poll includes the question, "Do you approve or disapprove of the way Mr. Prime Minister is handling foreign policy?" In a recent poll, there were 1,131 respondents, of whom 37% answered "approve" and 56% answered "disapprove"(the other 7% either didn't answer or said they had no opinion). **07**

a. Construct a 90% confidence interval of the true proportion of the population who approve of Mr. Prime Minister's foreign policy.
b. Does this poll contain convincing evidence that more people disapprove than approve? Explain.

(b) Suppose we want to perform an ANOVA test to determine if I = 4 types of sleep inducers have the same mean time-till-sleep. We time how long (in minutes) it takes each sleep inducer to put J = 5 people to sleep, and our observed data is summarized in the table below: **07**

Inducer	Sleeping Pills	Sloths	Statistics Faculty	Statistics Text Books
Sample Mean	5.08	5.14	5.71	5.47
Sample SD	0.463	0.405	0.372	0.399

Use this data to test the null hypothesis "all sleep inducers are equally effective" at level of significance of 0.05.

OR

Q.4 **(a)** Describe in your own words the purpose of Simple Linear Regression. **07**

(b) In Consumer marketing, common problem the marketing manager encounter is selection of the appropriate package design. Assume that, a marketer wishes to compare five different package designs; he is interested in knowing which the most preferred one is so that the same can be introduced in the market. Random sample of 200 customers gives the following picture. **07**

Package design	Preference by the consumer
A	36
B	52
C	40
D	35
E	37
TOTAL	200

Do the consumer preferences for the designs show any significance differences?

Q.5 **(a)** Multiple regression often provides a more adequate way of modeling complex business situation than simple linear regression. Explain this statement. **07**

(b) The mean number of patients admitted per day to the emergency room of a small hospital is 3.5. If on a given day, there are only five beds available for new patients, what is the probability the hospital will not have enough beds to accommodate its newly admitted patients? **07**

OR

Q.5 **(a)** Explain the components of Time Series Analysis? **07**

(b) A small group of investors is considering planting a tree farm. Their choices are (1) don't plant trees, (2) plant a small number of trees, or (3) plant a large number of trees. The investors are concerned about the demand for trees. If demand for trees declines, planting a large tree farm would probably result in a loss. However, if a large increase in the demand for trees occurs, not planting a tree farm could mean a large loss in revenue opportunity. They determine that three states of demand are possible: (1) demand declines, (2) demand remains the same as it is, and (3) demand increases. Use the following decision table to compute an expected monetary value for this decision opportunity. **07**

	State of Demand($)		
Decision Alternatives	Decline(0.20)	Same(0.30)	Increase(0.50)
Don't Plant	20	0	-40
Small Tree Plant	90	10	175
Large Tree Plant	600	150	800

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Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. B. A. 1ST Semester Remedial Examination –July- 2011

Subject code: 810007

Subject Name: Quantitative Analysis

Date:15/07/2011 **Time: 02:30 pm – 05:30 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)** Three machines producing 40%, 35% & 25% of the total output are known to produce with defective proportion of items as 0.04, 0.06 and 0.03 respectively. On a particular day, a unit of output is selected at random and is found to be defective. What is the probability that it was produced by the second machine? **07**

(b) Explain the following: **07**
(i) Baye's Theorem
(ii) Chebyshev's Theorem
(iii) Theory of Central tendency

Q.2 **(a)** A company which produces cheese slices and other cheese related products, has to decide about the production of sliced cheese as to how much to produce per week. The probability of sales, in kgs., is **07**

Demand in Kgs	Probability
200	0.1
210	0.2
220	0.3
230	0.2
240	0.1
250	0.1

A kg of slice cheese sells for Rs. 100 in the market and has a cost of Rs. 75. Any unsold cheese is sold to a local restaurant for Rs. 60. How much company should produce for deriving maximum profit?

(b) Write 'Exponential Distribution' probability density function. and explain its entire notation. Explain the various characteristics of Exponential Distribution. **07**

(b) The marks obtained in statistical Method paper in MBA first semester examination of a management institute has mean as 75 and standard deviation 10. If 250 students appeared at the examination, estimate the number of students, scoring: **07**
(i) Less that 70 marks
(ii) More than 90 marks

Q.3 **(a)** A tree nursery has been experimenting with fertilizer to increase the growth of seedlings. Samples of 35 two year-old pine trees are grown with a fertilizer. A second sample of 35 two-year old pine trees are grown for three more years under identical conditions but no with fertilizer. Tree growth is measured over the three-year period with the following results: **07**

Trees with Fertilizers	Trees without Fertilizers
$\underline{n}1 = 35$	$\underline{n}2 = 35$
$\bar{X}1 = 38.4$ inches	$\bar{X}2 = 23.1$ inches
$\sigma 1 = 9.8$ inches	$\sigma 2 = 7.4$ inches

Does the data support the theory that the population of trees with the fertilizer grew significantly larger during the period in which they were fertilized than the non fertilized trees? Use $\alpha = .01$

(b) A business convention holds its registration from 9:00 a.m. until 12:00. Past history has shown that registrant average arrival rate is 1.8 every 15 seconds. **07**

1. What is the probability that 25 seconds or more would pass between registration arrivals?
2. Suppose the registration computers went down for 1 – minute period. Would this condition pose a problem? What is the probability that at least 1 minute will elapse between arrivals.

Q.3 **(a)** A behavioral scientist is conducting a survey to determine if the financial benefits, in terms of a salary, influence the level of satisfaction of employees, or whether there are other factors such as work environment which are more important that salary in influencing employee satisfaction. A random sample of 300 employees is given a test to determine their level of satisfaction. Their salary levels are also recorded. The information is tabulated below: **03**

Level of satisfaction	Annual Salary (Rs. Lakhs)			
	Up to 5	5 – 10	More than 10	Total
High	10	10	10	30
Medium	50	45	15	110
Low	40	15	5	60
	100	70	30	200

At 5% level of significance, determine whether the level of employee satisfaction is influenced by salary level?

(b) The number of cheques cashed each day at the five branches of a bank during the past five months had the following frequency distribution: **07**

Class	Frequency
0-199	10
200-399	13
400-599	17
600-799	42
800-999	18

The director of operations for the bank knows that a standard deviation in checking cashing of more than 200 cheques per day creates staffing and organizational problems at the branches because of the uneven workload. Should the director worry about the staffing next month?

Q.4 **(a)** Five students of an Engineering program at certain Institute were selected at random. Their intelligent Quotient (I.Q.) and the marks obtained by them in one paper were as given below **07**

I.Q.	Marks (Out of 100)
120	85
110	80
130	90
115	88
125	92
120	87

Calculate coefficient of correlation.

(b) Differentiate between the following: **07**
(i) Correlation & regression
(ii) Type I error & Type II error

Q.4 **(a)** A marketing firm expects a sale of 500 units of a product per week. An advertisement campaign was undertaken to increase the sale. To test the effectiveness of the advertisement campaign, a sample of 20 shops was randomly selected. The mean sales were observed a s 515 units with a standard deviation of 9 units. Is it true that the sales have increased after the advertisement campaign? Test at 5% significant level. **07**

(b) What is random and non random sampling? Explain. **07**

Q.5 **(a)** Three groups of five salesmen each were imparted training to marketing of consumer products by three Management Institutes. The amount of sales made by each of the salesmen during the first month after training were recorded and are give as: **07**

		Salesmen				
Institutes		1	2	3	4	5
	1	67	70	65	71	72
	2	73	68	73	70	66
	3	61	64	64	67	69

Check whether the three institutes training program are equally effective.

(b) Define hypothesis. What is Null hypothesis & Alternate hypothesis? Explain with an example. **07**

Q.5 **(a)** Determine the sample size under the following condition: **07**

1. To estimate μ with $\sigma = 44$, $E = 3$, and 95% confidence
2. To estimate p with p unknown, $E = 0.04$ and 98% confidence.

(b) Calculate Laspeyre's, Paasche's Price Index using the following data: **07**

Commodities	Base Year		Current Year	
	Price (Rs.)	Quantity (Kg.)	Price (Rs.)	Quantity (Kg.)
A	2	7	6	6
B	3	6	2	3
C	4	5	8	5
D	5	4	2	4

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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 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: **07**

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 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? **07**

Q.2 **(a)** A small fruit merchant has got a problem on hand. He has to decide how many 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. **07**

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 than they did beforehand. Suppose we asked 90 women with children, and found. **07**

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?

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**

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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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MBA Second Semester-II (Evening) Examination May 2010

Subject code: 810007

Subject Name: Quantitative Analysis

Date: 28 / 05 / 2010 **Time: 11.00 am – 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)** For a given set of observations assumed to be normally distributed, mean=μ=40 units and standard deviation = σ =5 units. What does the empirical rule indicate for the interval [μ-2 σ , μ+2 σ] ? Explain the meaning of what you state in this connection State Chebyshev's rule.in this context and compare your results with that of empirical rules. **07**

(b) Explain the following terms giving salient features. **07**

(1) Uniform Distribution

(2) Standard Error

(3) Goodness -of – Fit test

Q.2 **(a)** Explain the following concepts in context to 'Testing of Hypothesis' **07**

(1) Null Hypothesis and Alternative Hypothesis.

(2) Level of Significance and types of error.

(3) Rejection and non-rejection regions.

(b) Solve the following case. **07**

In order to find the importance of customer service, a survey was made on a 5 point scale.[1 being low and 5 being high.]The mean was found to be 4.30. Another team of researchers feel that the figure [mean] obtained was high and just to establish that they made another survey. The results are as follows.

3 4 5 5 4 5 5 4 4 4 4
4 4 4 4 5 4 4 4 3 4 4
4 3 5 4 4 5 4 4 4 5

Give your view about the survey results of research team's decision taking $\alpha = 0.05$

OR

(b) The following data (in K.G.) related to weights of machine parts follow normal distribution. The production manager claims that the machine part, on an average is 8.3 K.G. A sample from the production was taken and the weights of each one of the part is as given below. **07**

8.1 8.4 8.3 8.2 8.5 8.6 8.4 8.3
8.4 8.2 8.8 8.2 8.2 8.2 8.1 8.3
8.4 8.5 8.5 8.7

Take $\alpha = 0.01$ and verify production manager's claim

Q.3 **(a)** Two different samples are taken from two different normally distributed populations. test the following hypothesis of the difference in population means by using the following data. [Take level of significance = 0.10] **07**

$H_0 : \mu_1 - \mu_2 = 0$ $H_1: \mu_1 - \mu_2 < 0$

sample 1	sample 2
$\bar{x}_1 = 51.3$	$\bar{x}_2 = 53.2$
$S_1^2 = 52$	$S_2^2 = 60$
$n_1 = 31$	$n_2 = 32$

(b) To study the effects of inflation on stock market a researcher takes the P/E ratios of 9 companies for the year 2004 and the same 9 companies for the year 2005. **07**

Company	P/E ratio 2004	P/E ratio 2005
1	8.9	12.7
2	38.1	45.4
3	43	10
4	34	27.2
5	34.5	22.8
6	15.2	24.1
7	20.3	32.3
8	19.9	40.1
9	61.9	106.5

Using the above records you are required to give your opinion regarding effect of inflation on the P/E ratio based on testing of hypothesis

OR

Q.3 **(a)** A study of female entrepreneurs was conducted to determine their definition of success. The women were offered optional choices such as happiness/ self-fulfillment, sales/profit, and achievement/ challenge. The women were divided into groups according to the gross sales of their businesses. A significantly higher proportion of them in the Rs. 100,000 to 500,000 category than in the less than Rs. 100,000 category seemed to rate sales/profit as a definition of success. **07**

Suppose you decide to test this result by taking a survey of your own and identify female entrepreneurs by gross sales. You interview 100 female entrepreneurs with gross sales of less than 100,000 and 24 of them define sales/profit as success. You then interview 95 females from the group with the gross sales of Rs. 100,000 to Rs. 500,000 and 39 cite sales/profit as a definition of success. Use this information to test with level of significance 0.01 to determine whether there is a significant difference in their participation of the two groups that define success as sales /profit.

(b) Explain usefulness of C.V. (coefficient of variation) Compare the following two sets of data for consistency. **07**

Data set I	Data set II
49	159
82	121
77	138
54	152

Q.4 **(a)** Give the salient features of the following concepts.[Draw necessary figures and highlight the features.] **07**

(1) Skewness. (2) Kurtosis (3) Positive and negative correlation

(b) Explain the following terms in context of probability. **07**

(1) Conditional probability

(2) Independent Events

(3) Solve the following problem.

Machines A, B, and C produce the same two parts X and Y with the estimated contribution percentages 60% , 30% , and 10%.In addition to this we know that 40% of the parts produced by machine A are parts X ,while 50% and 70% produced by machines B and C respectively are parts X. A part is randomly taken from the total production and found it to be part X. What is the probability that the part is produced by machine C ?

OR

Q.4 **(a)** The manager of a leading publication, using the results of a survey, expects that rating given by the readers should be as given below. **07**

(1) excellent 8% (2) pretty good 47% (3) only fair 34% (4) poor 11%

In order to verify the truth value of the % given above, a researcher conducts a survey and the corresponding results are as follows.

Rating	Frequency
(1) Excellent	21
(2) Pretty good	109
(3) Only Fair	62
(4) poor	15

Does this observed reading agree with the manager's expectations?
[Take level of significance = 0.05]

(b) Using the following data obtain the equation of regression line. **07**

x	Y
22	17
21	15
28	22
8	19
20	24

Q.5 **(a)** Explain the term 'Time series'. What are the basic components of a time series? Draw the diagram and explain each one. Using the following data compute a 4-month moving average for all available months. **07**

Month	Production	Month	Production
1	1056	7	1110
2	1345	8	1334
3	1381	9	1416
4	1191	10	1282
5	1259	11	1341
6	1361	12	1382

(b) Calculate Laspeyre's and Passche's price index using the following data **07**

Item	Price -2006	Quantity	Price-2007	Quantity
1	6.70	150	6.95	135
2	1.35	60	1.45	65
3	5.10	8	6.25	12
4	4.50	25	4.95	30
5	11.95	6	13.20	7
6	7.90	4	9.00	2

OR

Q.5 **(a)** Assuming that the trend is absent, determine, if any, seasonality in the given data. **07**

YEAR	1	2	3	4
2000	3.7	4.1	3.3	3.5
2001	3.7	3.9	3.6	3.6
2002	4.3	4.1	3.3	3.1
2003	3.3	4.4.	4.0	4.0

(b) A news-paper boy keeps a record of number of newspaper demanded by certain group of people. A record of 100 days is show n below. **07**

Copies-demanded	days
10	20
11	30
12	40
13	10

The cost of a copy to him is Rs. 1.00 while he sells each for Rs. 2/00.

Assuming that loss of sale not to be criteria for decision making, you are requested

to guide him to purchase number of copies for sale on each day.

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MBA. Sem-I Remedial Examination April 2010

Subject code: 810007 Subject Name: Quantitative Analysis

Date:10 / 04 / 2010 Time: 12.00 noon – 02.30 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) Calculate Mean, Median, Mode and Standard Deviation of the date given below: **07**

X	24-34	34-44	44-54	54-64	64-74	74-84	TOTAL
f	10	16	40	24	8	2	100

Is it symmetrical? Why?

(b) 1. Three families have respectively 3 boys and 4 girls, 2 boys and 3 girls, 4 boys and 2 girls. One child is selected at random from each family. Find the probability that the selected group of 3 children will have all girls. **03**

2. Give definitions of Leptokurtic Distribution and Inter Quartile Range. **04**

Q.2 (a) A merchant buys ice-creams at Rs. 5 per cup and sells at Rs. 8 per cup. The stock of the unsold cup/s at the end of the day he has to clear at Rs. 2 per cup. On the basis of past experience, the probability distribution is prepared as under: **07**

Daily sales (cups)	15	16	17	18
Probability	0.1	0.2	0.4	0.3

1. Find 'Expected Monetary Values' (EMVs) of all alternatives and suggest the most profitable alternative on the basis of EMVs.
2. Prepare 'Expected Opportunity Loss' (EOL) matrix and suggest the most profitable alternative on the basis of EOLs.

(b) 1. Write an explanatory note on the tool 'Data Analysis' of Excel. **03**

2. In an industry a managing director is to be appointed from three persons X, Y, and Z. The chance of selection of X is twice than that of Y, while the chance of selection of Y is twice than that of Z. The probabilities that these persons, if selected as managing director will increase the bonus of the workers are respectively 0.2, 0.3 and 0.4. **04**

   If the bonus has increased in the industry, find probability that X is selected as managing director.

OR

(b) 1. Calculate 3 years weighted averages using weight 2:1:3 for the given data: **03**

Year	1	2	3	4	5	6	7
Y	10	13	14	12	16	15	18

2. For the undermentioned data, calculate the indices of (1) Laspeyre, (2) Paasche **04**

COMMODITY	BASE YEAR		CURRENT YEAR	
	Price	Total Cost	Quantity	Total Cost
A	5	30	8	80
B	10	50	12	96

Q.3 (a) The following figures relate to the production in K.G. of three varieties A, B and C of capsicum sown in 12 plots. **07**

A	15	17	19	-	-
B	15	14	16	23	-
C	19	17	20	20	21

At 5% level, is there any significant difference in the production of the three varieties?

(b) The mean of a certain production process is known to be 51 with a standard deviation of 2.5. The production manager may welcome any change in mean value towards higher side but would like to safeguard against decreasing value of mean. He takes a sample of 12 items that gives a mean value of 49.5. What inference should the manager take for the production process on the basis of sample results? Use 5% level of significance for the purpose. **07**

OR

Q.3 (a) The mean of a random sample of 1000 units is 17.6 and the mean of another random sample of 800 units is 18. Can it be concluded that both the samples come from the same population with standard deviation (S.D.) = 2.6? **07**

(b) Two independent samples provided the following results: **07**

Sample	Size	Mean	Sum of squares of deviations from their respective means
I	10	12	120
II	12	13	144

Can the two samples be regarded as drawn from the same normal population?

Q.4 (a) 1. In about 70 words, write a note on 'Use of Expected Value in Decision Making'. **03**

2. Write 'Hypergeometirc Distribution' formula and explain its all notations. Write its 5 characteristics. **04**

(b) 1. Give Mean and Standard Deviation of Uniform, Binomial and Poisson distributions. **03**

2. The expenditure on breakfast of customers of a restaurant follow normal distribution with mean Rs. 200 and S.D. Rs. 50. On a particular day 40 customers spent more than Rs. 275, find the expected number of customers visited the restaurant on that day. **04**

OR

Q.4 (a) According to the Association of Insurance Commissioners, the average annual cost for automobile insurance in a state is Rs. 691. Suppose automobile insurance costs are uniformly distributed in the state with a range of from Rs. 200 to Rs. 1,182. What is the standard deviation of the uniform distribution? What is the height of the distribution? What is the probability that a person's annual cost for automobile insurance in the state is between Rs. 410 and Rs. 825? **07**

(b) 1. State advantages of taking a sample instead of conducting a census. **02**

2. The probability that a blade manufactured by a factory is defective is 1/500. Blades are packed in packets of 10 blades. Find the expected number of packets containing (i) no defective blade (ii) one defective blade. **05**

Q.5 (a) 1. State Utility of study of Regression. **02**

2. A departmental store gives in-service training to its salesmen which is followed by a test. It is considering weather it should terminate the services of any salesman who does not do well in the test. The following data gives test scores and sales made by nine salesmen during a certain period: **05**

3.

Test scores (X)	14	19	24	21	26	22	15	20	19
Sales ('00 Rs.) (Y)	31	36	48	37	50	45	33	41	39

If, Mean of X = 20, Mean of Y = 40, S.D. of X = 3.65, S.D. of Y = 6.2 and r = 0.9476,

Does it indicate that the termination of service of low test score is justified?

If the firm wants a minimum sales volume of Rs. 3,000, what is the minimum test score that will ensure continuation of service?

(b) The units produced by a plant are classified into four grades. The past performance of the plant shows that the respective proportions are 8:4:2:1. To check the run of the plant, 600 units were examined and classified as follows. **07**

Grade	First	Second	Third	Fourth	Total
Units	340	130	100	30	600

Is there any evidence of a change in production standards? Use 5% level of significance for the purpose.

OR

Q.5 (a) 1. What is 'Test of Independence'? **02**

2. Write note on: Using the computer for Multiple Regression. **05**

(b) Prove that the undermentioned data is fit for $Y = 3x^2 - 4x + 5$. **07**

X	1	2	3	4	5
Y	4	9	20	37	60

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