

GUJARAT TECHNOLOGICAL UNIVERSITY**MBA(Evening) Sem-II Remedial Examination December 2010****Subject code: 810007****Subject Name: Quantitative Analysis****Date: 21 /12 /2010****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)** The Indian department of the interior release figures on mineral production. **07**
Following are the 10 leading states in nonfuel mineral production in the India.

State	Value (Rs.millions)
Gujarat	3350
Bihar	2800
Madhapradesh	2550
Goa	2050
Maharastra	1920
Assam	1670
Andrapradesh	1660
Sikkim	1570
Rajasthan	1420
UP	1320

- I. Calculate the mean, median & mode.
 - II. Calculate the range, interquartile range, mean absolute deviation, sample variance & sample standard deviation.
- (b)** 1. Suppose that 5 men out of 100 and 25 women out of 1000 are colour blind. A colour blind person is chosen at random. What is the probability of his being male (assuming that males and females are in equal proportion)? **05**
2. Why do we use $n-1$ as the denominator instead of n to calculate sample variance? **02**

- Q.2 (a)** 1. State chebyshev's theorem **03**
2. Characteristics of good estimator. **02**
3. Explain: Descriptive statistics and statistical inferences. **02**
- (b)** 1. Concert pianist Priyank has become quite upset at the number of coughs occurring in the audience just before he begins to play. On his latest tour, Priyank estimates that on average eight coughs occur just before the start of his performance. Mr. Priyank has sworn to her conductor that if he hears more than five coughs at tonight's performance, he will refuse to play. What is the probability that he will play tonight? **05**
2. Differentiate coefficient of correlation & coefficient of determination. **02**

OR

- (b)** 1. Differentiate point estimation & interval estimation. **02**
2. An X-ray technician is taking readings from her machine to ensure that it adheres to federal safety guidelines. She knows that the standard deviation of the amount of radiation emitted by the machine is 150 milligrams, but she wants to take reading until the standard error of sampling distribution is no higher than 25 milligrams. How many reading should she take? **05**

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	

OR

Q.3 (a) Students Against Drunk Driving has targeted seat-belt usage as a positive step to reduce accidents and injuries. Before a major campaign at one high school, 44 percent of 150 drivers entering the school parking lot were using their seat belts. After the seat-belt awareness program, the proportion using seat belts had risen to 52 percent in a sample of 200 vehicles. At a 0.04 significance level, can the students conclude that their campaign was effective? **07**

(b) The following data show the number of claims processed per day for a group of four insurance company employees observed for a number of days. Test the hypothesis that the employees' mean claims per day are all the same. Use the 0.05 level of significance **07**

Employee 1	15	17	14	12		
Employee 2	12	10	13	17		
Employee 3	11	14	13	15	12	
Employee 4	13	12	12	14	10	09

Q.4 (a) Is the transportation mode used to ship goods independent of type of industry? Suppose the following contingency table represents frequency counts of types of transportation used by the publishing and the computer hardware industries. Analyze the data using the chi-square test of independence to determine whether type of industry is independent of transportation mode. Let $\alpha = 0.05$. **07**

		Transportation mode		
		Air	Train	Truck
Industry	Publishing Industry	32	12	41
	Computer Hardware	05	06	24

- (b) Campus Stores 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)	33	38	24	61	52	45
No. of sections	03	07	06	06	10	12
Sales (units)	65	82	29	63	50	79
No. of sections	12	13	12	13	14	15

1. Develop the estimating equation that best fits the data.
2. Calculate the sample coefficient of determination and the sample coefficient of correlation

OR

- Q.4 (a)** 1. 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 04

MINITAB Output

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) = 78.3%

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			

2. Write a short note on Multicollinearity. 03
- (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)** Robin Zill and Stewart Griffiths own a small company that manufactures portable massage tables in Hillsborough, North Carolina. Since they started the company, the number of tables they have sold is represented by this time series: 07

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Table sold	42	50	61	75	92	111	120	127	140	138

- I. Find the linear equation that describes the trend in the number of tables sold by Robin and Stewart.
- II. Estimate their sales of tables in 1998.
- (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

- Use the maximax criterion to determine which decision alternative to select.
- Use the maximin criterion to determine which decision alternative to select.
- 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.
- 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)** Bill Simpson, owner of a California vineyard, has collected the following information describing the prices and quantities of harvested crops for the years 1992-1995 07

Type of Grape	Price (per ton)				Quantity Harvested (tons)			
	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

Construct a Laspeyres index for each of these 4 years using 1992 as the base period.

- (b) Use the following decision table to complete parts (a) through (c). 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

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