

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 than 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
$n_1 = 35$	$n_2 = 35$
$\bar{x}_1 = 38.4$ 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 than 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)			Total
	Up to 5	5 – 10	More than 10	
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 as 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 given 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
