

GUJARAT TECHNOLOGICAL UNIVERSITY**M.B.A. Sem-II (Evening) Examination May 2011****Subject code: 810007****Subject Name: Quantitative Analysis****Date: 30/05/2011****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 number of checks cashed each day at the five branches of The Bank of Baroda during the past month had the following frequency distribution: **07**

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

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

- (b)** Satyam department store has been the target of many shoplifters during the past month, but owing to increased security precautions, 250 shoplifters have been caught. **07**

Each shoplifter's sex is noted; also noted is whether the shoplifter was a first time or repeat offender. The data are summarized in the table.

Sex	First time offender	Repeat offender
Male	60	70
Female	<u>44</u>	<u>76</u>
	104	146

Assuming that a shoplifter is chosen at random, find

- (a) The probability that the shoplifter is male.
 - (b) The probability that the shoplifter is first time offender, given that the shoplifter is male.
 - (c) The probability that the shoplifter is female, given that the shoplifter is a repeat offender.
 - (d) The probability that the shoplifter is female, given that the shoplifter is a first time offender.
 - (e) The probability that the shoplifter is both male and a repeat offender.
- Q.2 (a)** Explain the various reasons for taking sample. Also explain different techniques of random sampling. **07**

- (b) Suppose that, for every lot of 100 computer chips a company produces, an average of 1.4 are defective. Another company buys many lots of these chips at a time, from which one lot is selected randomly and tested for defects. If the tested lot contains more than three defects, the buyer will reject all the lots sent in that batch. What is the probability that the buyer will accept the lots? **07**

OR

- (b) Mr. Tejas Shah is the supervisor for the Narmada Dam. Mr. Shah knows that the dam's turbines generate electricity at the peak rate only when at least 10,00,000 gallons of water pass through the dam each day. He also knows, from past experience, that the daily flow is normally distributed, with the mean equal to 8,50,000 gallons and standard deviation of 2,00,000 gallons. What is the probability that the turbines will generate at peak rate today? **07**

- Q.3** (a) The average commission charged by full-service brokerage firms on a sale of common stock is Rs. 144, and standard deviation is Rs. 52. Mr. Shah has taken a random sample of 121 trades by his clients and determined that they paid an average commission of Rs. 151. At a 0.10 significance level, can Mr. Shah conclude that his clients' commissions are higher than the industry average? **07**

- (b) A consumer-research organization routinely selects several car models each year and evaluates their fuel efficiency. In this year's study of two similar subcompact models from two different automakers, the average gas mileage for 12 cars of brand A was 27.2 miles per gallon, and the standard deviation was 3.8 mpg. The nine brand B cars that were tested average 32.1 mpg, and the standard deviation was 4.3 mpg. At $\alpha = 0.01$, should it conclude that brand A cars have lower average gas mileage than do brand B cars? **07**

OR

- Q.3** (a) An innovator in the motor-drive industry felt that its new electric motor drive would capture 48 percent of the regional market within 1 year, because of the product's low price and superior performance. There are 5000 users of motor drives in the region. After sampling 10 percent of these users a year later, the company found that 43 percent of them were using the new drives. At significance level of 1 percent, should we conclude that the company failed to reach its market-share goal? **07**

- (b) Compute a one-way ANOVA on the following data. **07**

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

Determine the observed F value. Compare the observed F value with the critical table F value and decide whether to reject the null hypothesis. Use a 1% level of significance.

- Q.4 (a)** Use the following data and $\alpha=.01$ to determine whether the observed frequencies represent a uniform distribution. **07**

Category	f_0
1	19
2	17
3	14
4	18
5	19
6	21
7	18
8	18

- (b)** Explain coefficient of determination. **07**

OR

- Q.4 (a)** A corporation owns several companies. The strategic planner for the corporation believes dollars spent on advertising can to some extent be predictor of total sales dollars. As an aid in long-term planning, she gathers the following sales and advertising information from several of the companies for 2002. (\$ millions). Develop the equation of the simple regression line to predict sales from advertising expenditures using these data. **07**

Advertising	Sales
12.5	148
3.7	55
21.6	338
60.0	994
37.6	541
6.1	89
16.8	126
41.2	379

- (b)** Write a short note on Multicollinearity. **07**

- Q.5 (a)** Explain Laspeyres price index and Paasche price index. **07**
(b) Using following statistical data, compute the aggregate index numbers for the four items. Let 1987 be the base year for this market basket of goods. **07**

	Year		
Items	1987	1992	1997
1.	1.31	1.53	1.40
2.	1.99	2.21	2.15
3.	2.14	1.92	2.68
4.	2.89	3.38	3.10

OR

- Q.5 (a)** Explain expected value of perfect information in decision making. **07**

- (b) As a fund-raiser for a student organization, some students have decided to sell individual pizzas outside the Union on Friday. Each pizza will sell for Rs. 1.75 and costs the organization Rs. 0.77. Historical sales indicated that between 55 and 60 dozen pizzas will be sold with the probability distribution given below: **07**

Dozens of pizzas	55	56	57	58	59	60
Probability	0.15	0.20	0.10	0.35	0.15	0.05

To maximize the profit contribution, how many pizzas should be ordered? Assume pizzas must be ordered by the dozen. What is the expected value of perfect information in this problem? What is the maximum amount the organization would be willing to pay for perfect information?
