

**GUJARAT TECHNOLOGICAL UNIVERSITY****M.B.A -I<sup>st</sup> 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. **07**  
 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  $\alpha = 0.05$ .

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 **07**  
 indices.

**OR**

- Q.5 (a)** Explain briefly the Moving Average Method and the Exponential Smoothing **07**  
 technique.
- (b)** A man has the choice of running a hot-snack stall or an ice cream stall at a **07**  
 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?

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