RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Applied Sciences
Third Year - Semester I Examination – June / July 2018

MAT 3214 – APPLIED STATISTICS

Statistical tables and Calculators will be provided **Time allowed: Two (2) hours**

Answer **ALL** questions

1.

a)

(i) Write the differences between Census and Sample survey and discuss the advantages of sample survey over to census survey.

(ii) Explain briefly about Simple Random Sampling and Quota Sampling methods.

[40 marks]

b) Most graduate schools of business require applicants for admission to take the Graduate Management Admission Test (GMAT). In general, scores on the GMAT are assumed to be normally distributed with a mean of 527 and standard deviation of 112.

(i) What is the probability of an individual scoring above 500 on the GMAT?

(ii) How high must an individual score on the GMAT in order to be in the top 5%?

[60 marks]

2.

a) Accidents occur with a Poisson distribution at an average of 4 accidents per week.

(i) Calculate the probability of more than 5 accidents in any one week.

(ii) What is the probability at least two weeks will elapse between two consecutive accidents? [60 marks]

b) Suppose cars arrive at a parking lot at an average rate of 50 per hour and it is assumed that the cars arrive to the parking lot in a Poisson process. Compute the probability that in the next hour the number of cars that arrive at this parking lot will be between 54 and 62. [40 marks]

[Turn over

3.

a) A professor wants to know if her introductory statistics class has a good grasp of basic mathematics. Six students are chosen at random from the class and given a mathematics proficiency test. The professor expects the students to be able to score above 70 on the test. The six students scored 62, 92, 75, 68, 83, and 95 in the test. Can the professor have 90 percent confidence so that the mean score for the class on the test would be above 70? [40 marks]

b) A marketing research firm tests the effectiveness of a new flavoring for a leading beverage using a sample of 20 people. Half of the people taste the beverage with the old flavoring and the other half taste the beverage with the new flavoring. The people in the study are then given a questionnaire which evaluates how enjoyable the beverage was. The scores are given in the following table. Determine with a 95% confidence that there is a significant difference between the perceptions of the two flavorings.

New	13	17	19	11	20	15	18	9	12	16
Old	12	8	6	16	12	14	10	18	4	11

(Hint: Perform F test to check whether the population variances are equal or not)

[60 marks]

4.

a) Poisson distribution was used to model the number of arrivals per minute at a bank located in the central business district of a city. Suppose that the actual arrivals per minute were observed in 200 minute period over the course of a week. The results are summarized in the following table. Do these data follow a Poisson distribution? (Take α=0.05).

Arrivals	0	1	2	3	4	5	6	7	8
Freq.	14	31	47	41	29	21	10	5	2

[50 marks]

b) Fit the normal distribution to the following data using Kolmogorov-Smirnov goodness of fit test:

0.58 0.42 0.52 0.33 0.43 0.23 0.58 0.76 0.53 0.64

(Assume $D_{10,\,(0.05)} = 0.410$).

[50 marks]

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