RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Applied Sciences
FirstYear - Semester IIExamination – April/May 2015

BIO 1208 - STATISTICAL METHODS IN BIOLOGY I

Time: 2 (two) hours

Answer <u>ALL</u> questions

1) (a) A social scientist claims that the average salary of a farm employee in the Anuradhapura district is less than Rs.60 per hour. A random sample of eight farms in the Anuradhapura district is selected, and the hourly salaries (in rupees) are shown. Is there enough evidence to support the scientist's claim at α= 0.10?

   60   56   60   55   70   55   60   55

   (b) It has been reported that 40% of the adult population engages in computer hobbies during their leisure time. A random sample of 180 adults found that 65 engaged in computer hobbies. At α =0.01, is there sufficient evidence to conclude that the proportion differs from 40%?

   (c) A representative of Mobitel estimates that 40% of its customers have call-waiting service. To test this hypothesis, she selected a sample of 100 customers and found that 37% had call waiting. At α= 0.01, is there enough evidence to reject the claim?

2) (a) Listed below is the moisture content (by percent) for random samples of different fruits and vegetables. At the 0.05 level of significance, can it be concluded that fruits differ from vegetables in average moisture content?

Fruits		Vegetables	
Apricot	86	Artichoke	85
Banana	75	Bamboo shoots	91
Avocado	72	Beets	88
Blackberry	88	Broccoli	89
Clementine	87	Cucumber	95
Pink grapefruit	92	Iceberg lettuce	96
Mango	84	Mushroom	92
Fig	79	Radish	95
		Tomato	94

(b) In a study of nursing homes, researchers found that 12 out of 34 small nursing homes had a resident vaccination rate of less than 80%, while 17 out of 24 large nursing homes had a vaccination rate of less than 80%. At $\alpha = 0.05$, test the claim that there is no difference in the proportions of the small and large nursing homes with a resident vaccination rate of less than 80%.

3) (a) A researcher read that firearm-related deaths for people aged 1 to 18 were distributed as follows: 74% were accidental, 16% were homicides, and 10% were suicides. In her district, there were 68 accidental deaths, 27 homicides, and 5 suicides during the past year. At $\alpha = 0.10$, test the claim that the percentages are equal.

(b) A sociologist wishes to see whether the number of years of college a person has completed is related to her or his place of residence. A sample of 88 people is selected and classified as shown. At 0.05, can the sociologist conclude that a person's location is dependent on the number of years of college?

Location	No college	Four-year degree	Advanced degree	Total
Urban	15	12	8	35
Suburban	8	15	9	32
Rural	6	8	7	21
Total	29	35	24	88

4) The table below is a summary of the attendance and the final grades of seven students enrolled in a statistics class.

Student	Number of absences x	Final grade y (%)
A	6	82
B	2	86
C	15	43
D	9	74
E	12	58
F	5	90
G	8	78

a. Construct a scatter plot for the data set given above.

b. Compute the value of the correlation coefficient for the data and test the significance of the coefficient.

c. Find the equation of the regression line for the data and graph the line on a scatter plot.