University of Colombo, Sri Lanka

Faculty of Arts

Second Year Examination in Arts, Part I – 2018/19

Second Semester, Final Examination

GYG 2217 – Statistics

(Time : 2 Hours)

Answer three questions only

Graph papers will be provided. Use of calculator is allowed

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1. Thirty AA batteries were tested to determine how long they would last. The results, to the nearest minute were recorded as follows:

   423, 369, 387, 411, 393, 394, 371, 377, 389, 409, 392, 408, 431, 401, 363,

   391, 405, 382, 400, 381, 399, 415, 428, 422, 396, 372, 410, 419, 386, 390

   (i) Construct a frequency distribution table, using 360-369, 370-379 class intervals.

   (10 marks)

   (ii) Use the frequency distribution table, compute the mean, median and mode.

   (10 marks)

   (Total 20 marks)

2. (i) The researcher wants the average wait time for incoming calls on Mondays (during normal business hours, 8:00 a.m. to 5:00 p.m.) to be less than 25 seconds. A random sample of 40 calls yielded the results shown below.

15	16	12	17	12	25	18	30	11	19
12	20	20	25	10	21	26	16	22	16
26	23	29	21	24	22	23	25	12	32
26	12	34	27	12	17	28	30	16	29

   (10 marks)

(ii)   Test the following hypotheses.

(a) H_0: $\mu = 100$, H_1: $\mu \neq 100$, $n = 30$, $\bar{x} = 114$, $\sigma = 15$, $\alpha = 0.05$

(b) H_0: $\mu = 300$, H_1: $\mu < 300$, $n = 28$, $\bar{x} = 290$, $\sigma = 20$, $\alpha = 0.05$

(c) H_0: $\mu = 15$, H_1: $\mu \neq 15$, $n = 25$, $\bar{x} = 16.1$, $s = 3.0$, $\alpha = 0.05$

(d) H_0: $\mu = 25$, H_1: $\mu > 25$, $n = 40$, $\bar{x} = 26.5$, $s = 3.5$, $\alpha = 0.01$

(e) H_0: $\mu = 50$, H_1: $\mu \neq 50$, $n = 60$, $\bar{x} = 48.9$, $s = 4.0$, $\alpha = 0.01$

(10 marks)

(Total 20 marks)

3.   Hypothetical data is given Table No. 1.

X = pH of well water

Y = Bicarbonate (parts per million) of well water.

Table No. 1

Sample	X	Y
1	7.6	200
2	7.1	274
3	8.2	115
4	7.5	233
5	7.4	243
6	7.8	215
7	7.3	217
8	8	190
9	7.1	242
10	7.5	225
11	8.1	175
12	7	275
13	7.3	262
14	7.8	205
15	7.3	245
16	8	180
17	8.5	82
18	7.1	210
19	8.2	90
20	7.9	195

(i)   Construct a scatter diagram.

(05 marks)

(ii)   Find the regression equation.

(10 marks)

(iii)   Compute the total variation, unexplained variation and explained variation.

(03 marks)

(iv)   Estimate the Bicarbonate of well water when a pH of well water is 6.8.

(02 marks)

(Total 20 marks)

4. (i)   A doctor claims that the proportions of births in this country on each day of the week are equal. A simple random sample of 700 births from a recent year is selected, and the results in Table No. 2. At a significance level of 0.01, test that is there enough evidence to support the doctor's claim?

Table No. 2

Day	Frequency
Sunday	65
Monday	103
Tuesday	114
Wednesday	116
Thursday	115
Friday	112
Saturday	75

(08 marks)

(ii)   A two-way table for age groups and types of drinks appears in Table No.3

Test the independent of age groups and types of drinks, assume a significance level of $\alpha = 0.05$.

Table No. 3

Age groups	Types of drinks				Total
	Soda	Coffee	Tea	Water	
20-29	10	8	5	2	25
30-39	11	9	2	3	25
40-49	8	9	1	7	25
50-59	9	8	3	5	25
Total	38	34	11	17	100

(12 marks)

(Total 20 marks)

5. The heights (in centimeters) and weight (in kilograms) of 10 basketball players on a team in Table No. 4.

Table No. 4

Height (X)	186	189	190	192	193	193	198	201	203	205
Weight (Y)	85	85	86	90	87	91	93	103	100	101

(i) Find the relationship between height and weight.

(10 marks)

(ii) Test the hypothesis: H_1: $B_1 > 0$, using $\alpha = 0.05$.

(06 arks)

(iii) Interpret your results.

(04 marks)

(Total 20 marks)