UNIVERSITY OF COLOMBO – SRI LANKA

FACULTY OF ARTS

SPECIAL DEGREE EXAMINATION IN ARTS (GEOGRAPHY) – PART I

SECOND SEMESTER FINAL EXAMINATION (2019/2020)

GYG 2217 – Statistics

Time: Two (02) Hours

Answer any 10 questions in part 1, answer any 6 questions in part 2, and answer any 2 questions in part 3.

Graph papers will be provided. Use of calculator is allowed

Part I

1. Answer any 10 questions. Each question carries 2 marks.

   i. What is Statistics?

   ii. Write down the names of levels of measurement.

   iii. Define Variable.

   iv. Write down the names of any four measures of variability

   v. What is meant by normal distribution?

   vi. Define quartiles.

   vii. What do you mean by central tendency?

   viii. Define data.

   ix. Define coefficient of variation

   x. What is meant by ogive?

   xi. What is meant by kurtosis?

   xii. What is meant by skewness?

(Marks 10×2=20)

Part II

2. Answer any 6 questions. Each question carries 5 marks.

i.. Explain differences between grouped and ungrouped frequency distributions.

ii.. Briefly explain any two methods of collecting primary data

iii. How do you create a box plot?

iv. Explain differences between primary and secondary data

v. Explain differences between census and sample.

vi. Explain differences between critical value and critical region.

vii. Briefly explain discrete and continuous variable.

viii. Briefly explain any two methods of measuring coefficient of correlation.

(Marks 6×5=30)

Part III

3. (i) With the help of the data given in **Table No. 1**, construct the histogram, frequency polygon, and ogive.

Table No. 1

Marks	Number of students
0-9	3
10-19	13
20-29	30
30-39	25
40-49	14
50-59	8
60-69	4
70-79	2
80-89	1

(09 marks)

(ii) Calculate the mean deviation and standard deviation for the following data.

2, 3, 6, 8, 10, and 11.

(04 marks)

(iii) Calculate the mean, mode and median for the data given in **Table No.2**.

Table No. 2

Class Interval	Frequency
130-134	5
135-140	12
140-144	28
145-149	24
150-154	17
155-159	10
160-164	1

(12 marks)

(Total 25 marks)

4. (i) A doctor believes that the proportions of births in his 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 are given in **Table No. 3**. At a significance level of 0.01, is there enough evidence to support the doctor's claim?

Table No.3

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

(10 marks)

(ii) A survey of 200 workers was conducted regarding their education (primary, secondary, and tertiary) and the level of their job satisfaction (low, medium, and high). The results are given in the **Table No. 4**.

Table No. 4

	Low	Medium	High
Primary	20	35	25
Secondary	17	33	20
Tertiary	11	18	21

At 5% level of significance, examine whether the level of job satisfaction depends on the level of education.

(15 marks)

(Total 25 marks)

5. The blood pressure (mmHg) and ages (years) of 10 patients are shown in **Table No. 5.**

Table No. 5

Patient	Age	Blood Pressure
A	42	98
B	74	130
C	48	120
D	35	88
E	56	182
F	26	80
G	60	135
H	50	120
I	43	110
J	65	140

(i) Draw the scatter diagram of blood pressure and age for 10 patients.

(03 marks)

(ii) Find the equation of the regression line.

(12 marks)

(iii) Plot the regreession line on the scatter diagram.

(02 marks)

(iv) Estimate the blood pressure of a 40 years old patient.

(02 marks)

(v) Test the hypothesis: ***H1; $\beta > 0$, using $\alpha = 0.05$***

(06 marks)

(Total 25 marks)

6. (i) A local telephone company claims that the average length of a phone call is 8 minutes. In a random sample of 58 phone calls, the sample mean was 7.8 minutes and the standard deviation was 0.5 minutes. Is there enough evidence to support this claim at $\alpha = 0.05$?

(06 marks)

(ii) A manufacturer claims that its batteries have an average life greater than 1,000 hours. A random sample of 10 batteries has a mean life of 1002 hours and a standard deviation of 14 hours. Is there enough evidence to support this claim at $\alpha = 0.01$?

(06 marks)

(iii) The statistics marks from second year students are given in **Table No. 6**. At $\alpha = 0.05$ significance level, test that the mean is equal to 80.

Table No. 6

85	81	83	79	91	86	84	97	89	93
92	82	89	77	92	91	80	92	91	94
90	81	90	86	81	79	83	79	77	81

(13 marks)

(Total 25 marks)

Percentage Points of the Normal Distribution

P	Z
90%	0.1257
80%	0.2533
70%	0.3853
60%	0.5244
50%	0.6745
40%	0.8416
30%	1.0364
20%	1.2816
10%	1.6449
5%	1.96
2%	2.3263
1%	2.5758
0.20%	3.0902
0.10%	3.2905

The Students t Distribution

Distribution of *t* for given probability Levels						
df	*Level of significance for one-tailed test*					
	0.1	**0.05**	**0.025**	**0.01**	**0.005**	**0.0005**
	Level of significance for two-tailed test					
	0.2	**0.1**	**0.05**	**0.02**	**0.01**	**0.001**
1	3.08	6.31	12.71	31.82	63.66	636.62
2	1.89	2.92	4.30	6.97	9.93	31.60
3	1.64	2.35	3.18	4.54	5.84	12.94
4	1.53	2.13	2.78	3.75	4.60	8.61
5	1.48	2.02	2.57	3.37	4.03	6.86
6	1.44	1.94	2.45	3.14	3.71	5.96
7	1.42	1.90	2.37	3.00	3.50	5.41
8	1.40	1.86	2.31	2.90	3.36	5.04
9	1.38	1.83	2.26	2.82	3.25	4.78
10	1.37	1.81	2.23	2.76	3.17	4.59
11	1.36	1.80	2.20	2.72	3.11	4.44
12	1.36	1.78	2.18	2.68	3.06	4.32
13	1.35	1.77	2.16	2.65	3.01	4.22
14	1.35	1.76	2.15	2.62	2.98	4.14
15	1.34	1.75	2.13	2.60	2.95	4.07
16	1.34	1.75	2.12	2.58	2.92	4.02
17	1.33	1.74	2.11	2.57	2.90	3.97
18	1.33	1.73	2.10	2.55	2.88	3.99
19	1.33	1.73	2.09	2.54	2.86	3.88
20	1.33	1.73	2.09	2.53	2.85	3.85
21	1.32	1.72	2.08	2.52	2.83	3.82
22	1.32	1.72	2.07	2.51	2.82	3.79
23	1.32	1.71	2.07	2.50	2.81	3.77
24	1.32	1.71	2.06	2.49	2.80	3.75
25	1.32	1.71	2.06	2.49	2.79	3.73
26	1.32	1.71	2.06	2.48	2.78	3.71
27	1.31	1.70	2.05	2.47	2.77	3.69
28	1.31	1.70	2.05	2.47	2.76	3.67
29	1.31	1.70	2.05	2.46	2.76	3.66
30	1.31	1.70	2.04	2.46	2.75	3.65
40	1.30	1.68	2.02	2.42	2.70	3.55
60	1.30	1.67	2.00	2.39	2.66	3.46
120	1.29	1.66	1.98	2.36	2.62	3.37
∞	1.28	1.65	1.96	2.33	2.58	3.29

Distribution of Chi-square for Given Probability Levels													
D.F	*Probability*												
	0.995	**0.99**	**0.975**	**0.95**	**0.9**	**0.75**	**0.5**	**0.25**	**0.1**	**0.05**	**0.025**	**0.01**	**0.005**
1	0.00004	0.00016	0.00098	0.00393	0.0158	0.102	0.455	1.32	2.71	3.84	5.02	6.63	7.88
2	0.01	0.0201	0.0506	0.103	0.211	0.575	1.39	2.77	4.61	5.99	7.38	9.21	10.6
3	0.0717	0.115	0.216	0.352	0.584	1.21	2.37	4.11	6.25	7.81	9.35	11.3	12.8
4	0.207	0.297	0.484	0.711	1.06	1.92	3.36	5.39	7.78	9.49	11.1	13.3	14.9
5	0.412	0.554	0.831	1.15	1.61	2.67	4.35	6.63	9.24	11.1	12.8	15.1	16.7
6	0.676	0.872	1.24	1.64	2.2	3.45	5.35	7.84	10.6	12.6	14.4	16.8	18.5
7	0.989	1.24	1.69	2.17	2.83	4.25	6.35	9.04	12	14.1	16	18.5	20.3
8	1.34	1.65	2.18	2.73	3.49	5.07	7.34	10.2	13.4	15.5	17.5	20.1	22
9	1.73	2.09	2.7	3.33	4.17	5.9	8.34	11.4	14.7	16.9	19	21.7	23.6
10	2.16	2.56	3.25	3.94	4.87	6.74	9.34	12.5	16	18.3	20.5	23.2	25.2
11	2.6	3.05	3.82	4.57	5.58	7.58	10.3	13.7	17.3	19.7	21.9	24.7	26.8
12	3.07	3.57	4.4	5.23	6.3	8.44	11.3	14.8	18.5	21	23.3	26.2	28.3
13	3.57	4.11	5.01	5.89	7.04	9.3	12.3	16	19.8	22.4	24.7	27.7	29.8
14	4.07	4.66	5.63	6.57	7.79	10.2	13.3	17.1	21.1	23.7	26.1	29.1	31.3
15	4.6	5.23	6.26	7.26	8.55	11	14.3	18.2	22.3	25	27.5	30.6	32.8
16	5.14	5.81	6.91	7.96	9.31	11.9	15.3	19.4	23.5	26.3	28.8	32	34.3
17	5.7	6.41	7.56	8.67	10.1	12.8	16.3	20.5	24.8	27.6	30.2	33.4	35.7
18	6.26	7.01	8.23	9.39	10.9	13.7	17.3	21.6	26	28.9	31.5	34.8	37.2
19	6.84	7.63	8.91	10.1	11.7	14.6	18.3	22.7	27.2	30.1	32.9	36.2	38.6
20	7.43	8.26	9.59	10.9	12.4	15.5	19.3	23.8	28.4	31.4	34.2	37.6	40
21	8.03	8.9	10.3	11.6	13.2	16.3	20.3	24.9	29.6	32.7	35.5	38.9	41.4
22	8.64	9.54	11	12.3	14	17.2	21.3	26	30.8	33.9	36.8	40.3	42.8
23	9.26	10.2	11.7	13.1	14.8	18.1	22.3	27.1	32	35.2	38.1	41.6	44.2
24	9.89	10.9	12.4	13.8	15.7	19	23.3	28.2	33.2	36.4	39.4	43	45.6
25	10.5	11.5	13.1	14.6	16.5	19.9	24.3	29.3	34.4	37.7	40.6	44.3	46.5
26	11.2	12.2	13.8	15.4	17.3	20.8	25.3	30.4	35.6	38.9	41.9	45.6	48.3
27	11.8	12.9	14.6	16.2	18.1	21.7	26.3	31.5	36.7	40.1	43.2	47	49.6
28	12.5	13.6	15.3	16.9	18.9	22.7	27.3	32.6	37.9	41.3	44.5	48.3	51
29	13.1	14.3	16	17.7	19.8	23.6	28.3	33.7	39.1	42.6	45.7	49.6	52.3
30	13.8	15	16.8	18.5	20.6	24.5	29.3	34.8	40.3	43.8	47	50.9	53.7