

UNIVERSITY OF COLOMBO

FACULTY OF ARTS

**SPECIAL DEGREE EXAMINATION IN ARTS (PART II) 2017/18
(SECOND SEMESTER EXAMINATION)**

GYG 3262 - QUANTITATIVE ANALYSIS

(THREE HOURS)

Answer three questions only

Statistical tables are attached to the question paper. Use of calculator is allowed

1. (i) Explain the following pairs with examples and sketch diagram wherever necessary.
 - (a) Critical value and critical region.
 - (b) One sample test and two sample test.
 - (c) One tailed test and two tailed test.
 - (d) Independent samples test and dependent samples test.
 - (e) Population Variance is known and Population Variance is unknown

(10 marks)

- (ii) The arterial blood pressure of a random sample of 10 patients is measured before and after surgery for treatment of the blockage yielded the following data. Conclude that the surgery tends to lower arterial blood pressure?

Patient	Before	After
1	150	90
2	132	102
3	130	80
4	116	82
5	107	90
6	100	94
7	101	84
8	96	93
9	90	90
10	78	80

(10 marks)

(Total 20 marks)

2. (i) Explain briefly the following
- (a) Decision variables
 - (b) Objective function
 - (c) Constraints

(06 marks)

- (ii) What are the difference between graphical solution method and simplex solution method.

(02 marks)

- (iii) Luminous lamps produce three types of lamps namely A, B and C. These Lamps are processed on three machines X, Y and Z. Data are given in the following table.

Find out a suitable production plan to maximize the profit.

Product	Machine			Profit per unit
	X	Y	Z	
A	2	0.5	1	25
B	1	3	2	30
C	2	1	1	40
Available Time	59	25	26	

(12 marks)

(Total 20 marks)

3. (i) What is the ANOVA

(02 marks)

- (ii) What are the difference between one-way ANOVA and two-way ANOVA

(04 marks)

- (iii) 22 bypass-patients are randomly divided into 3 treatment groups (different respiration). Differ the values of folic acid in red blood cells after 24 hours?

Group 1	Group 2	Group 3
243	206	241
251	210	258
275	226	270
291	249	293
347	255	328
354	273	
380	285	
392	295	
	309	

(08 marks)

(iv) Interpret your results using Scheffe test.

(06 marks)

(Total 20 marks)

4. A matrix of correlation coefficients for 10 variables is given below.

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
V1	1.00	0.46	0.31	0.42	0.79	0.66	0.52	0.51	0.72	0.82
V2	0.46	1.00	-0.10	-0.09	0.71	0.59	0.16	0.44	0.67	0.52
V3	0.31	-0.10	1.00	0.75	0.12	0.27	0.36	0.16	0.06	0.25
V4	0.42	-0.09	0.75	1.00	0.18	0.44	0.50	0.31	0.17	0.39
V5	0.79	0.71	0.12	0.18	1.00	0.76	0.54	0.63	0.78	0.89
V6	0.66	0.59	0.27	0.44	0.76	1.00	0.68	0.83	0.61	0.80
V7	0.52	0.16	0.36	0.50	0.54	0.68	1.00	0.62	0.40	0.73
V8	0.51	0.44	0.16	0.31	0.63	0.83	0.62	1.00	0.56	0.69
V9	0.72	0.67	0.06	0.17	0.78	0.61	0.40	0.56	1.00	0.72
V10	0.82	0.52	0.25	0.39	0.89	0.80	0.73	0.69	0.72	1.00

V1 – Percentage of urban population

V2 – Median age of population

V3 – Population change

V4 – Migration index

V5 – Telephone per 1000 persons

V6 – Income per capita

V7 – School years completed

V8 – Expenditure on education

V9 – Physicians per 100,000 persons

V10 – Housing of good quality

(i) Obtain one principal component from this matrix.

(08 marks)

(ii) Calculate Eigen value and explained variation.

(04 marks)

(iii) Classify these variables into three (3) groups.

(04 marks)

(iv) Comment on your classification.

(04 marks)

(Total 20 marks)

5. In an effort to relate the literacy rate of a country to various mass communication outlets, a demographer has proposed to relate literacy rate to the following variables: number of daily newspaper copies (per 1000 population), and number of radios (per 1000 population). Below given the data for a sample of 10 countries.

Newspaper (X1)	Radios (X2)	Literacy rate (Y)
280	266	0.98
142	230	0.93
10	114	0.25
390	313	0.99
86	329	0.79
17	42	0.72
21	49	0.32
314	1695	0.99
333	430	0.99
91	182	0.82

- i. Construct a multiple regression equation.

(12 marks)

- ii. Test the hypothesis that whether there is a significant relationship between mass communication and literacy rate.

(06 marks)

- iii. Comment on the results of your analysis.

(02 marks)

(Total 20 marks)