

POLITEKNIK
Jabatan Pengajian Politeknik

EXAMINATION AND EVALUATION DIVISION
DEPARTMENT OF POLYTECHNIC EDUCATION

(MINISTRY OF HIGHER EDUCATION)

CIVIL ENGINEERING DEPARTMENT

FINAL EXAMINATION
JUN 2012 SESSION

CN303: STATISTICS

DATE: 22 NOVEMBER 2012

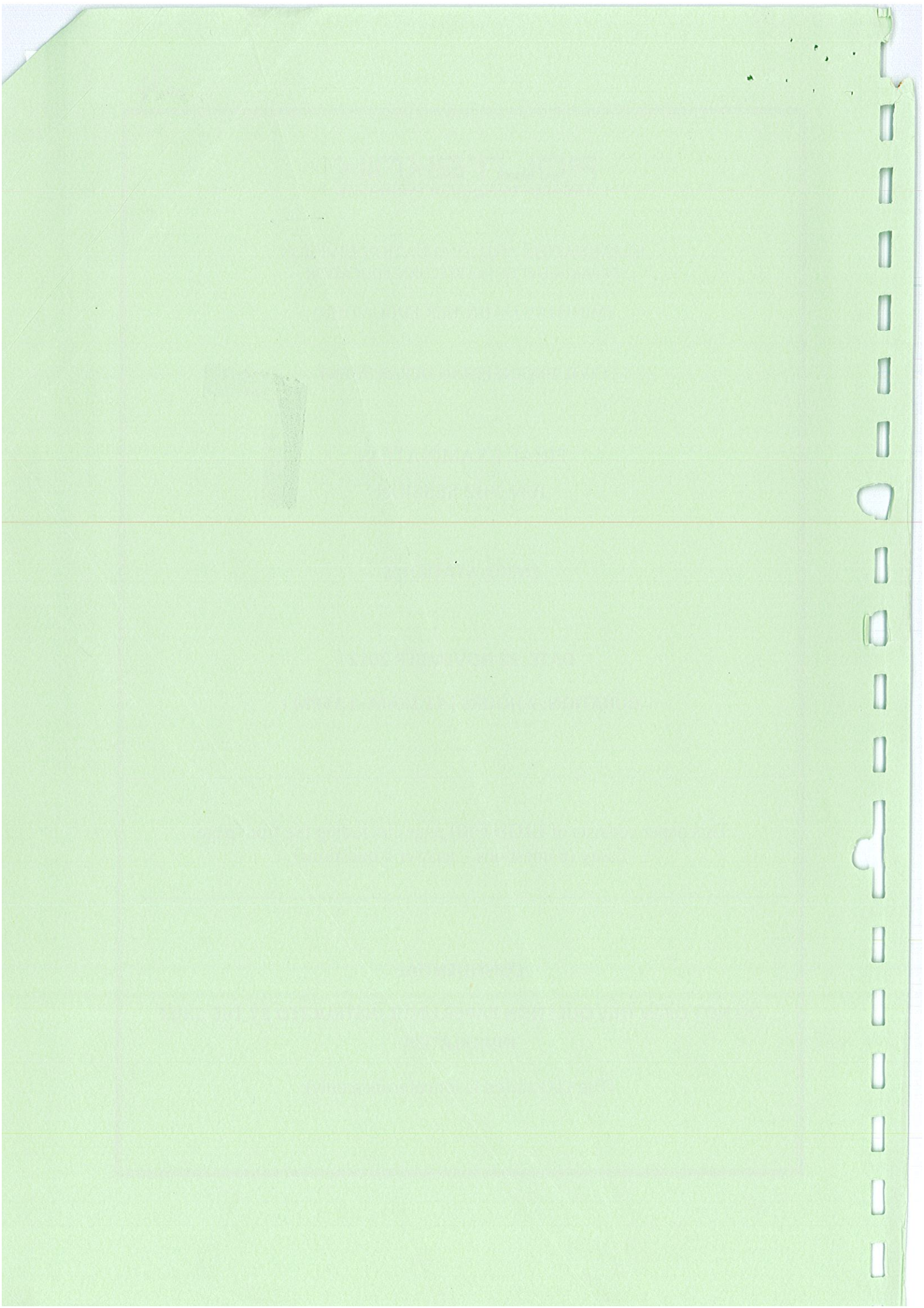
DURATION: 2 HOURS (11.15AM -1.15PM)

This paper consists of **EIGHT (8)** pages including the front page.
Essay (6 questions – answer 4 questions)

CONFIDENTIAL

**DO NOT OPEN THIS QUESTION PAPER UNTIL INSTRUCTED BY THE CHIEF
INVIGILATOR**

(The CLO stated is for reference only)



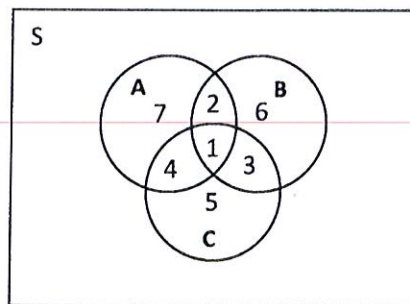
Essay (100 marks)

Instruction: This section consists of **SIX (6)** essay questions. Answer **FOUR (4)** questions only.

QUESTION 1

- a. Based on the Venn diagram below, A, B and C are three events in the sample space S. The total of sample space is the sum of all the outcomes in sample space. Find:

CLO1 : C2



- i) $P(A' \cap B')$
- ii) $P(B' \cap C')$
- iii) $P(A \cup C)$
- iv) $P((A \cup B) \cap C')$
- v) $P((A \cap B) \cup C')$

(10 marks)

- b. Students are divided into two groups according to their genders carrying out experiments of Total Suspended Solid (TSS), Total Solid (TS) and Total Volatile Suspended Solid (TVSS). The distribution of the quantity of experiments according to the groups as shown here: CLO1 : C3

Experiment	TSS	TS	TVSS
Female	8	12	3
Male	5	15	2

If an experiment is selected at random, determine these probabilities,

- i) The experiment is carried out by female group or male group (2marks)
- ii) The students carried out TS experiment or female group. (2marks)
- iii) The student is male or carried out TSS experiment. (2marks)
- c. A couple has three children. Determine each probability by using tree diagram: CLO1 : C3
- i) Tree diagram (1marks)
- ii) of all boys (2marks)
- iii) of all girls or all boys. (2marks)
- iv) of exactly two boys or two girls. (2marks)
- v) of at least one child of each gender. (2marks)

QUESTION 2

- a. If 20% of the people in a community uses 100 kg plastic bags per one year, determine these probabilities for a sample of 10 people. CLO2 : C3
- i) Exactly **THREE (3)** of the people in a community used 100kg of plastic bags per year. (2marks)
 - ii) At most **THREE (3)** of the people in a community used 100 kg plastic bags per year. (6marks)
- b. The average time a student takes to complete the task based on water sampling experiment is 24.6 minutes. The standard deviation is 5.8 minutes. determine these probabilities. Assume the variable is normally distributed. CLO2 : C2
- i) It will take a student between 15 to 30 minutes to complete the task. (5marks)
 - ii) It will take a student less than 18 minutes or more than 28 minutes to complete the task. (5 marks)
- c. The average money from selling recycled items is RM 792. Suppose the distribution is normal distribution with a standard deviation is RM 103. Determine the limits of the money for the middle 50 %. CLO2 : C3 (7 marks)

QUESTION 3

- a. A sample of 12 students were given an arithmetic test, and the durations (in minutes) to complete it were;

10, 9, 12, 11, 8, 15, 9, 7, 8, 6, 12, 10

Calculate the range, mean, variance and standard deviation of the sample. CLO3 : C3
(12marks)

- b. The costs per load (in cents) of selling reused items by Love Green Organization are shown here. Calculate the variance and standard deviation. CLO3 : C3
(13 marks)

Class limits	Frequency
13-19	2
20-26	7
27-33	12
34-40	5
41-47	6
48-54	1
55-61	0
62-68	2

QUESTION 4

- a. Noise level in various areas at urban hospitals was measured in decibels. The mean of the noise levels in 84 corridors was 61.2 decibels, and the standard deviation was 7.9. Determine the 95% confidence interval of the true mean. CLO2 : C2
(3 marks)
- b. How many cities growing seasons would have to be sampled in order to estimate the true mean growing season with 95% confidence within 2 days? The standard deviation is 54.2 days. CLO2 : C2
(3 marks)
- c. The number of unhealthy days based on the AQI (Air Quality Index) for a random sample of metropolitan areas is shown below. Construct a 98% confidence interval based on the data. CLO2 : C4
- 61 12 6 40 27 38 93 5 13 40
- (13 marks)
- d. From a pressure test that has been conducted, the average pressure is 115 (Pa). The standard deviation of the sample was 6 (Pa). Determine what degree of confidence it can be if the mean of pressure is 115 ± 6.501 . CLO2 : C3
(6 marks)

QUESTION 5

- a. The average price (in RM) for biodegradable plastic items per kg for 8 suppliers shown below. Calculate the true mean price for biodegradable plastic bag with 95 % confidence.

CLO2 : C3

3.56 1.90 7.83 2.83 1.91 5.88 2.91 6.08

(10 marks)

- b. The following gives the results of hydrocarbon emissions (in ppm) at idling speed for 15 randomly selected buses.

CLO3 : C3

169 103 497 276 441 220 397 403
313 182 159 412 357 287 167

- Determine the 99% confidence interval for the true mean hydrocarbon emissions for buses.

(15 marks)

QUESTION 6

- a. A researcher wishes to determine if a person's age is related to the number of hours he or she exercises per week. The data for the sample is shown below.

CLO3 : C3

Age, x	18	26	32	38	52	59
Hours, y	10	5	2	3	1.5	1

Determine the value of correlation, the equation of the regression line and the y value when $x = 35$ years.

(13 marks)

- b. The director of Green Technology Association wants to determine whether there is any relationship between the contribution obtained from selling reused items (in ringgit) and the years of selling the items. The data is as follows.

CLO3 : C3

Years, x	1	5	3	10	7	6
Contribution, y	500	100	300	50	75	80

Determine the value of correlation, the equation of the regression line and the y value when $x = 4$ years.

(12 marks)

