POLITEKNIK
MALAYSIA

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN MALAYSIA

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI JUN 2019

DCC3132: STATISTICS

TARIKH   : 31 OKTOBER 2019
MASA   : 8.30 PAGI - 10.30 PAGI (2 JAM)

Kertas ini mengandungi **SEBELAS (11)** halaman bercetak.
Bahagian A : Struktur (2 soalan)
Bahagian B : Struktur (4 soalan)

Dokumen sokongan yang disertakan : Kertas Graf/Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SECTION A : 50 MARKS
BAHAGIAN A : 50 MARKAH

INSTRUCTION:
This section consist of **TWO (2)** essay structured question. Answer **ALL** questions.
ARAHAN :
*Bahagian ini mengandungi **DUA (2)** soalan esei berstruktur. Jawab **SEMUA** soalan.*

QUESTION 1
SOALAN 1

CLO1
C1

(a) List **FIVE (5)** steps involved in statistical problem solving.

*Senaraikan **LIMA (5)** langkah yang terlibat dalam penyelesaian masalah statistik.*

[5 marks]
[5 markah]

CLO1
C2

(b) Explain the terms of statistics: descriptive statistics, inferential statistics, qualitative variable and quantitative variable.

Terangkan terma berikut: statistik, statistik desktiptif, statistik inferens, pembolehubah kualitatif dan pembolehubah kuantitatif.

[10 marks]
[*10 markah*]

CLO1
C3

(c) There are **TWO (2)** types of variables in statistics which are qualitative variable and quantitative variable. Choose whether the following variables are qualitative or quantitative.

*Terdapat **DUA (2)** jenis pembolehubah dalam statistics iaitu pembolehubah kualitatif dan pembolehubah kuantitatif. Pilih yang berikut sama ada pembolehubah kualitatif atau kuantitatif.*

i.   The color of the car in the showroom.

        Warna kereta di dalam bilik pameran.

                                                                                    [2 marks]
                                                                                    [*2 markah*]

ii.   The population of a city.

        Populasi penduduk di sebuah bandar.

                                                                                    [2 marks]
                                                                                    [*2 markah*]

iii.   The blood type of some patients in the hospital.

        Jenis darah pesakit di hospital.

                                                                                    [2 marks]
                                                                                    [*2 markah*]

iv.   Brand of cars used by the lecturers in the university.

        Jenama kereta yang dipakai oleh pensyarah di university.

                                                                                    [2 marks]
                                                                                    [*2 markah*]

v.   The distance between hospital to the house.

        Jarak di antara hospital dan rumah.

                                                                                    [2 marks]
                                                                                    [*2 markah*]

QUESTION 2
SOALAN 2

CLO1
C1

(a)   List **FIVE (5)** probability sampling methods.

*Senaraikan **LIMA (5)** jenis kaedah pensampelan kebarangkalian.*

[5 marks]
[*5 markah*]

CLO1
C2

(b)   There are several methods of collecting data and each has its own advantages and disadvantages.

Terdapat beberapa kaedah untuk mengumpulkan data dan setiap kaedah mempunyai kebaikan dan keburukan tersendiri.

i.   Explain mail (or postal) questionnaire method.

Terangkan kaedah soal selidik secara pos.

[4 marks]
[*4 markah*]

ii.   Explain **THREE (3)** advantages and disadvantages of the above methods.

Terangkan TIGA (3)kebaikan dan keburukan bagi kaedah di atas.

[6 marks]
[*6 markah*]

CLO1
C3

(c)   Choose whether the following quantitative variable is discrete or continuous.

Pilih samada pembolehubah kuantitatif berikut diskrit atau bersambung.

i.   The number of calls received by Telekom operator each day for a month.

Bilangan panggilan yang diterima oleh operator Telekom setiap hari dalam sebulan.

[2 marks]
[2 markah]

ii.   The length of time required for DKA3 students to solve Mathematics question.

Masa yang diperlukan oleh pelajar-pelajar DKA3 untuk menyelesaikan soalan Matematik.

[2 marks]
[*2 markah*]

iii.   Number of cookies sold in a bakery each day.

Bilangan biskut yang dijual di bakeri setiap hari.

[2 marks]
[*2 markah*]

iv.   The size of leaves on a tree

Saiz daun pada sebatang pokok.

[2 marks]
[*2 markah*]

v.   Blood pressure of runners in a marathon.

Tekanan darah pelari didalam satu marathon.

[2 marks]
[*2 markah*]

SECTION B : 50 MARKS
BAHAGIAN B : 50 MARKAH

INSTRUCTION :
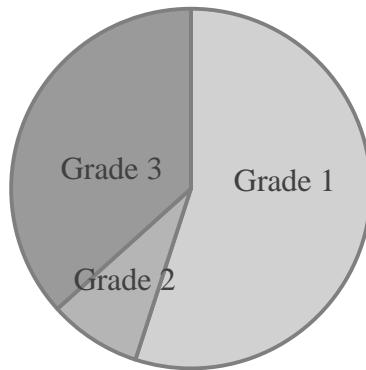This section consists of **FOUR (4)** structured questions. Answer **TWO (2)** questions only.
ARAHAN :
*Bahagian ini mengandungi **EMPAT (4)** soalan berstruktur. Jawab **DUA (2)** soalan sahaja.*

QUESTION 1
SOALAN 1

CLO2
C1

(a) **Figure B1(a)** shows the pie chart of 300 students who obtained Grade 1, Grade 2 and Grade 3 in the SPM examination respectively. The angles of the sector representing Grade 1 and Grade 2 are 198° and 30° respectively.

Gambarajah B1(a) di bawah menunjukkan carta pai 300 orang pelajar yang mendapat Gred 1, Gred 2 dan Gred 3 dalam peperiksaan SPM. Sudut bagi sektor Gred 1 dan Gred 2 adalah 198° and 30°.

Figure B1(a) / *Gambarajah B1(a)*

Identify how many students obtained Grade 1 and Grade 3.

Kenalpasti berapa bilangan pelajar yang memperolehi Gred 1 dan Gred 3.

[5 marks]
[*5 markah*]

CLO2
C2

(b) A study was done on the growth rate of cultured prawns in a farm. The data below indicates the mass of 30 prawns after the period of three months.

Satu kajian berkaitan dengan kadar tumbesaran udang di dalam sebuah kolam telah dilakukan. Taburan data di bawah menunjukkan berat bagi 30 ekor udang dalam tempoh 3 bulan.

25	55	46	50	38	30	20	30	59	75
28	65	66	43	57	25	33	57	23	22
45	20	25	20	35	22	40	70	28	61

Classify the data to a stem and leaf method (using digit 10 as the stem) and frequency table.

Kelaskan data di atas kepada Kaedah Stem and Leaf (menggunakan digit 10 sebagai stem) dan jadual kekerapan.

[10 marks]
[*10 markah*]

CLO2
C3

(c) 542 cars are parked in the parking lots of a shopping complex. The parking duration of each car (to the nearest minute) is shown in the **Table B1(c)** below. Draw a histogram to represent this information.

*Terdapat 542 buah kereta di tempat letak kenderaan di sebuah pusat membeli belah. Tempoh meletak kenderaan (kepada minit terhampir) ditunjukkan dalam **Jadual B1(c)** di bawah. Bina sebuah histogram untuk mewakili maklumat tersebut.*

Table B1(c) / *Jadual B1(c)*

Time / *Masa* (minutes)	Frequency / *Kekerapan*
6 – 25	62
26 – 61	72
62 – 81	90
82 – 105	120
106 – 113	45
114 - 149	108
150 – 197	30
198 – 297	15

[10 marks]
[*10 markah*]

SULIT

QUESTION 2
SOALAN 2

CLO2
C3

(a) Calculate the mean, mode and median for the following data.

Kira min, mod dan median bagi data di bawah.

    i.   0.18   0.12   0.12

[5 marks]
[*5 markah*]

    ii.

14.25	19.00	11.00	28.00	24.00
23.00	43.20	14.00	27.00	25.00
15.00	7.00	34.00	15.50	15.00
22.00	19.00	19.00	27.00	21.00

[10 marks]
[*10 markah*]

CLO2
C4

(b) **Table B2(b)** shows the years of working experience for 120 employees of Jannah's Company.

Jadual B2(b) menunjukkan pengalaman bekerja bagi 120 orang pekerja di Syarikat Jannah.

Table B2(b) / *Jadual B2(b)*

Years of Experience / *Pengalaman Bekerja (Tahun)*	Number of Employees / *Jumlah Pekerja*
1 – 4	16
5 – 8	20
9 – 12	28
13 – 16	24
17 – 20	16
21 – 24	11
25 – 28	5
Total / *Jumlah*	120

Calculate the mean, mode and median for the years of working experience.

Kira min, mod dan median bagi tahun pengalaman bekerja.

[10 marks]
[*10 markah*]

QUESTION 3
SOALAN 3

CLO2
C3

(a)   A box contains 4 black marbles and 6 white marbles, 3 marbles are selected randomly from the bag. Calculate the probability of selecting 2 white marbles and 1 black marble by using the tree diagram.

Satu beg mengandungi 4 biji guli hitam dan 6 biji guli putih, 3 biji guli dipilih secara rawak dari beg tersebut. Kirakan kebarangkalain memilih 2 biji guli putih dan 1 biji guli hitam dengan menggunakan gambarajah pokok.

  i. With replacement
      Dengan pemulangan

[5 marks]
[*5 markah*]

  ii. Without replacement
       Tanpa pemulangan

[10 marks]
[*10 markah*]

CLO2
C4

(b)   A delegation of 6 students is to be chosen from a group of 9 males and 10 females. Identify how many ways can the students be selected if there is no restriction and there are more females than males.

Satu delegasi 6 orang pelajar akan dipilih dari sekumpulan pelajar yang terdiri daripada 9 orang lelaki dan 10 orang perempuan. Kenalpasti berapa cara pelajar boleh dipilih jika tiada sekatan dan lebih ramai perempuan berbanding lelaki.

[10 marks]
[*10 markah*]

QUESTION 4
SOALAN 4

CLO2
C3

(a)   A study is conducted on the price of a particular spare part for motor vehicles and the distances of the spare part shops from the central distributor center. The data is summarized in the **Table B4(a).**

*Satu kajian dijalankan terhadap harga alat gantian kenderaan bermotor dan jarak kedai dari pusat jualan. Data yang diperolehi diringkaskan dalam **Jadual B4(a).***

Table B4(a) / *Jadual B4(a)*

Distance / *Jarak* (km)	Price / *Harga* (RM)
20	10
25	18
32	40
33	25
43	50
45	60
50	65
55	80
65	70
80	75

  i.   Calculate the regression line equation.

        Kirakan persamaan garis lurus.

[10 marks]
[*10 markah*]

  ii.   Calculate the price of spare part sold by a shop at a distance of 30 km from the central distribution centre.

        Kirakan harga alat gantian yang dijual oleh kedai tersebut pada jarak 30 km dari pusat jualan.

[5 marks]
[*5 markah*]

CLO2
C4

(b) In a certain exam the time in which candidates took to hand in their papers and their marks obtained were record in the **Table B4(b).** Calculate the Spearman's rank correlation coefficient.

Dalam satu peperiksaan tertentu, masa di mana calon-calon yang mengambil bahagian dalam kertas kerja dan markah yang diperolehi dicatatkan dalam Jadual B4(b). Kirakan nilai pekali korelasi Spearman.

Table B4(b)/ *Jadual B4(b)*

Time / *Masa*	66	74	90	73	58	70	81	86	60	77	84	79
Marks / *Markah*	76	80	60	68	88	60	78	72	74	88	70	60

[10 marks]
[*10 markah*]

SOALAN TAMAT

FORMULA

NUMERICAL DESCRIPTIVE MEASURES

Mean for individual data, $\bar{x} = \frac{\sum x}{n}$

Mean for group data, $\bar{x} = \frac{\sum fx}{n}$

Median position $= \left(\frac{n+1}{2}\right)$

Location of median class in group data $= \left(\frac{\sum f}{2}\right)$

Median $= L_m + \left[\frac{\frac{n}{2} - \sum f_{m-1}}{f_m}\right] \times C$

Mode $= L_m + \left[\frac{f_0 - f_1}{(f_0 - f_1) + (f_0 - f_2)}\right] \times C$

PROBABILITY

Additional rule 1 (mutually exclusive events :

P (A or B) = P (A) + P (B)

Additional rule 2 (events not mutually exclusive):

P(A or B) = P(A) + P(B) – P (A and B)

Multiplication rule 1 (independent events):

P(A and B) = P(A)●P(B)

Multiplication rule 2 (dependent events):

P(A and B) = P(A)●P(B/A)

Conditional probability:

$P(B/A) = \frac{P\ (A\ and\ B)}{P\ (A)}$

Complementary events:

$P(\bar{E}) = 1 - P(E)$

Permutation rule: Number of permutations of n objects taking r at a time is

$nP_r = \frac{n!}{(n-r)!}$

Combination rule: Number of combination of r objects selected from n objects is

$nC_r = \frac{n!}{(n-r)!\,r\,!}$

CORRELATION AND REGRESSION

Correlation coefficient, r:

(Pearson's correlation coefficient)

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{[n(\sum x^2) - (\sum x)^2][n(\sum y^2) - (\sum y)^2]}}$$

Correlation coefficient, r:

(Spearman's rank correlation coefficient)

$$\rho = 1 - \frac{6\sum d_i^{\ 2}}{n(n^2 - 1)}$$

The regression line equation: $y = a + bx$

where:

$$a = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2}$$

$$b = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}$$