(36)

SULIT

POLITEKNIK MALAYSIA

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI JUN 2017

DCC3132: STATISTICS

TARIKH : 02 NOVEMBER 2017
MASA : 8.30 PAGI – 10.30 PAGI (2 JAM)

Kertas ini mengandungi **DUA BELAS (12)** 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 consists of **TWO (2)** structured questions. Answer **ALL** questions.

ARAHAN:

*Bahagian ini mengandungi **DUA (2)** soalan berstruktur. Jawab **SEMUA** soalan.*

QUESTION 1

SOALAN 1

CLO1
C1

(a) List **FIVE (5)** scientific methods of statistics.

*Senaraikan **LIMA (5)** kaedah saintifik bagi statistik.*

[5 marks]

[*5 markah*]

i. Differentiate between descriptive and inferential statistics.

Bezakan diantara statistik deskriptif dan statistik inferensi.

CLO1
C2

[4 marks]

[*4 markah*]

ii. Explain **THREE (3)** disadvantages of secondary data.

*Terangkan **TIGA (3)** keburukan data sekunder.*

[6 marks]

[*6 markah*]

(b) Choose either the following statement is nominal data or ordinal scale.

Pilih sama ada pernyataan berikut adalah data nominal atau skala ordinal.

i. Position of students in a class

CLO1
C3

Kedudukan pelajar dalam kelas

ii. Income level of respondents
Tahap pendapatan responden

iii. Marital status of respondents
Status perkahwinan responden

iv. Ethnic group of respondents
Kumpulan etnik responden

v. Social class of residents
Kelas sosial penduduk

[10 marks]
[*10 markah*]

QUESTION 2
SOALAN 2

CLO2
C1

(a) i. Define data presentation.
Takrifkan persembahan data.

[2 marks]
[*2 markah*]

ii. List **THREE (3)** examples of data presentation.
*Senaraikan **TIGA (3)** contoh persembahan data.*

[3 marks]
[*3 markah*]

CLO2
C2

(b) Table 2.1 shows the operating cost of a minimart in Kelantan for year 2012. Calculate the percentage for each item based on Table 2.1.

Jadual 2.1 menunjukkan kos operasi minimart di Kelantan untuk tahun 2012. Kirakan peratus bagi setiap item berdasarkan Jadual 2.1.

Table 2.1: Operating cost of a minimart in Kelantan /
Jadual 2.1 : Kos operasi minimart di Kelantan

Item/ *Perkara*	**Expense (RM)/ *Perbelanjaan***
Rent/ *Sewa*	2500
Electricity/ *Elektrik*	1800
Administration/ *Pentadbiran*	2200
Wages/ *Gaji*	3000
Others/ *Lain-lain*	500

[10 marks]
[*10 markah*]

CLO2
C3

(b) Table 2.2 shows the enrolment in a private college. Draw a bar chart based on Table 2.2.

Jadual 2.2 menunjukkan enrolmen bagi sebuah kolej swasta. Lukis carta bar berdasarkan Jadual 2.2.

Table 2.2: Enrolment in a private college/
Jadual 2.2 : Enrolmen bagi kolej swasta

Year/ *Tahun*	2011	2012	2013	2014
Enrolment/ *Enrolmen*	2000	2250	3050	2500

[10 marks]
[*10 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

CLO1
C1

(a) i. Define sampling

Definisikan pensampelan.

[2 marks]

[*2 markah*]

ii. List **THREE (3)** types of non-probability sampling technique.

*Senaraikan **TIGA (3)** jenis teknik pensampelan bukan kebarangkalian.*

[3 marks]

[*3 markah*]

CLO1
C3

(b) In designing questionnaire, there are few things which should be taken into consideration to achieve the target of the survey. Explain the procedures to develop a good questionnaire.

Dalam rekabentuk penghasilan soal-selidik, beberapa prosedur perlu diambil kira dalam mencapai sasaran kajian yang diuji. Terangkan prosedur untuk membangunkan borang soal-selidik yang baik.

[10 marks]

[*10 markah*]

CLO1
C4

(c) Identify **ONE (1)** strength and **TWO (2)** weaknesses for the following sampling techniques:

*Kenalpasti **SATU (1)** kekuatan dan **DUA (2)** kelemahan teknik pensampelan berikut:*

i. Simple random sampling
Pensampelan mudah rawak

ii. Systematic sampling
Pensampelan sistematik

iii. Stratified sampling
Pensampelan berstrata

iv. Cluster sampling
Pensampelan kluster

[10 marks]
[*10 markah*]

QUESTION 2

SOALAN 2

CLO2
C3

(a) A randomly selected sample consisting 200 respondents were interviewed on their preferred mobile phone brands. The result of the survey is shown in Table 2A.
Satu sampel yang terdiri daripada 200 responden telah dipilih secara rawak dan ditemuduga tentang kecenderungan mereka terhadap jenama telefon mudah alih. Keputusan kajian seperti yang ditunjukkan dalam Jadual 2A.

Table 2A / *Jadual 2A*

Results of preferred mobile phone

28	24	17	45
47	22	21	65
43	15	12	25
39	30	18	30
17	40	35	26
26	18	40	31
22	30	16	13
25	44	28	39
22	20	24	21
16	33	29	40

i. Illustrate the data using frequency distribution table.
Terangkan data menggunakan jadual kekerapan.

[10 marks]
[*10 markah*]

ii. Sketch the polygon frequency.
Lakarkan frekuensi polygon.

[5 marks]
[*5 markah*]

CLO2
C4

(b) Table 2B shows hectarage of leafy vegetables by types in Peninsular Malaysia in year 2000. Draw a horizontal bar graph based on Table 2B.

Jadual 2B menunjukkan keluasan (Hektar) tanaman sayur-sayuran daun mengikut jenis di Semenanjung Malaysia pada tahun 2000. Lukis carta bar mendatar berdasarkan Jadual 2B.

Table 2B / *Jadual 2B*

Types of Leafy Vegetables ***Jenis Sayur Daun***	**Area/ *Keluasan* (Hectarage)**
Asparagus *Asparagus*	30
Chinese Spinach *Bayam*	55
Broccoli *Brokoli*	18
Sweet Shoot *Cekur Manis*	40
Spring Onion *Daun Bawang*	76
Chinese parsley *Daun Ketumbar*	44
Chinese Kale *Kailan*	90
Water Spinach *Kangkung*	60
Cabbage *Kobis*	25

[10 marks]

[*10 markah*]

QUESTION 3

SOALAN 3

CLO2
C3

(a) There are 10 lecturers in the Environmental Engineering Division (7 males and 3 females), 20 lecturers in Civil Engineering Division (8 males and 12 females), and 12 lecturers in Architecture Division (7 males and 5 females). If one lecturer is selected randomly, calculate the probability of :-

Terdapat 10 orang pensyarah di Bahagian Kejuruteraan Alam Sekitar (7 lelaki dan 3 wanita), 20 pensyarah di Bahagian Kejuruteraan Awam (8 lelaki dan 12 perempuan), dan 12 pensyarah di Bahagian Seni Bina (7 lelaki dan 5 perempuan). Jika salah seorang pensyarah dipilih secara rawak, kirakan kebarangkalian :-

i. Environmental Engineering Division or Female.
Bahagian Kejuruteraan Alam Sekitar atau Wanita.

[3 marks]
[*3 markah*]

ii. Civil Engineering Division or Male.
Bahagian Kejuruteraan Awam atau Lelaki.

[3 marks]
[*3 markah*]

iii. Not from the Architecture Division.
Bukan dari Bahagian Seni Bina.

[3 marks]
[*3 markah*]

iv. Environmental Engineering Division or Architecture Division.
Bahagian Kejuruteraan Alam Sekitar atau Bahagian Arkitek.

[3 marks]
[*3 markah*]

CLO2
C4

(b) A director reported that 25% of Malaysian citizens reused their household items each year. If a random sample of 50 Malaysian citizens is selected, solve these probability using binomial distribution.

Pengarah melaporkan bahawa terdapat 25% rakyat Malaysia mengguna semula barangan rumah mereka setiap tahun. Jika satu sampel rawak 50 orang rakyat Malaysia dipilih, selesaikan kebarangkalian menggunakan kaedah taburan binomial.

i. There are exactly 8 people in the sample that reused their household items each year.

Terdapat tepat 8 orang daripada sampel menggunakan semula barangan rumah setiap tahun.

[3 marks]

[*3 markah*]

ii. There are at most 3 people in the sample that reused their household items.

Terdapat paling banyak 3 orang menggunakan semula barangan rumah.

[10 marks]

[*10 markah*]

QUESTION 4

SOALAN 4

CLO2
C3

(a) The manager of a water treatment plant is interested in comparing the performance of two production lines. The results are given in Table 4A.

Pengurus loji rawatan air berminat untuk membandingkan prestasi dua barisan pengeluaran. Keputusan adalah seperti dalam Jadual 4A.

Table 4A / *Jadual 4A*

Production line / *Bahagian pengeluaran*	Number of completed per hour /*Bilangan yang disiapkan per jam*						
Line 1, x / *Barisan 1, x*	782	486	451	529	618	520	845
Line 2,y / *Barisan 2, y*	1223	902	739	954	1055	875	1455

i. Calculate the equation of the regression line.
Kirakan persamaan bagi garis regresi.

ii. Calculate the value of y, when x = RM 500.
Kirakan nilai y apabila x= RM 500.

[15 marks]
[*15 markah*]

(b) An engineer reported that two machines in operations are performing with equal efficiency. Six random samples from each of the machines were obtained. Determine the value of correlation coefficient for the data obtained in the study of two machine as shown in Table 4B.

CLO2
C4

Seorang jurutera melaporkan bahawa kedua-dua mesin beroperasi dengan kecekapan yang sama. Enam sampel rawak daripada setiap mesin telah disediakan. Tentukan nilai pekali korelasi bagi data yang diperolehi dalam kajian dua mesin seperti ditunjukkan di dalam Jadual 4B.

Table 4B / *Jadual 4B*

Machine / *Mesin* A, X	Machine /*Mesin* B, Y
43	128
48	120
56	135
61	143
67	141
70	152

[10 marks]
[*10 markah*]

SOALAN TAMAT

FORMULAS –DCC3132 STATISTICS

NUMERICAL DESCRIPTIVE MEASURES

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

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

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

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

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

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)

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

Correlation coefficient, r:

(Spearman's rank correlation coefficient)

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

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

where :

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

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