POLITEKNIK
MALAYSIA

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI JUN 2016

DCW3162 : INDUSTRIAL STATISTICS

TARIKH : 25 OKTOBER 2015
MASA   : 2.30 PM – 4.30 PM (2 JAM)

Kertas ini mengandungi **DUA BELAS (12)** halaman bercetak.
Bahagian A : Struktur (2 soalan)
Bahagian B : Struktur (4 soalan)
Dokumen sokongan yang disertakan : Formula & Kertas Graf

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 struktur. Jawab SEMUA soalan.

QUESTION 1
SOALAN 1

CLO1
C1

(a)   Define each of the following terms:

Berikan definisi bagi perkara-perkara berikut:

    i.   Sample Survey */Tinjauan sampel*

    ii.   Discrete Variable / *Pembolehubah diskrit*

    iii.   Continuous Variable / *Pembolehubah sambungan*

    iv.   Sample */Sampel*

    v.   Variable/ *Pembolehubah*

[10 marks]
[10 *markah*]

CLO1
C2

(b)   Determine if the following statements are categorical data or numerical data:

Nyatakan kenyataan berikut sama ada data kategori atau berangka :

    i.   Types of mobile phone used by students in Polytechnic

        Jenis telefon bimbit yang digunakan oleh pelajar dalam Politeknik.

    ii.   Count the number of cars in a parking site

        Mengira bilangan kereta di tempat letak kereta.

    iii.   Measuring in litres the water consumption for a housing area

        Mengukur penggunaan air dalam liter bagi kawasan perumahan.

    iv.   T-shirts classified into large, medium and small

        Pengkelasan t-shirt sama ada besar, sederhana dan kecil.

    v.   Count the number of black cars and white cars which pass through a toll booth

        Mengira bilangan kereta hitam dan kereta putih yang melalui plaza tol.

[5 Marks]
[5 *markah*]

CLO1
C3

(c) The data below are the marks scored by 30 students in Industrial Statistics Test 2016.

Data di bawah menunjukkan markah skor bagi 30 pelajar dalam Ujian Statistik

Industri.

95	70	83	80	93	65	44	38	64	50
80	86	71	78	81	53	68	18	54	69
73	79	62	61	79	67	33	27	52	48

Calculate the mean, median and mode

Kira purata, median dan mod

[10 marks]
[10 *markah*]

QUESTION 2
SOALAN 2

CLO 1
C2

(a) A survey on television watching habits among villagers in Hilir Perak provided the following data on viewing time (in hours) per week.

Satu kajian tabiat menonton televisyen di kalangan penduduk kampung Hilir Perak memberikan data masa (dalam jam) setiap minggu.

12, 14, 8, 20, 26, 25, 13, 14, 16, 5, 8, 20, 14, 13, 10

Calculate the mean and mode.
Kirakan min dan mod.

[5 marks]
[5 *markah*]

CLO 1
C3

(b) The following data indicates the number of durians sold by sellers near Lawang Industrial Area.

Data berikut menunjukkan bilangan durian yang telah dijual oleh penjual berhampiran Kawasan Perindustrian Lawang.

No of durians	Number of sellers, f
1 – 10	3
11-20	5
21 – 30	7
31 – 40	19
41 – 50	15
51 – 60	13
61 - 70	3

Calculate

    i.   Decile 3 (D_3)

         Desil 3 (D_3)

    ii.   Decile 7 (D_7)

         Desil 7 (D_7)

    iii.   Percentile 39 (P_{39})

         Persentil 39 (P_{39})

[15 marks]
[15 *markah*]

CLO 1
C1

(c)   Zainal took an orange from a bag which contains two oranges marked with "M" and three oranges marked with "K".

Zainal memilih sebiji oren dari sebuah beg yang mengandungi dua biji oren yang di tandakan M dan tiga biji oren yang ditandakan K.

    i.   List all the possible outcomes

         Senaraikan semua hasil kemungkinan.

    ii.   Write the sample space for the experiment using a notation set.

         Tuliskan ruang sampel bagi ujikaji itu dengan menggunakan tatatanda set.

[5 marks]
[5 markah]

SECTION B : 100 MARKS
BAHAGIAN B : 100 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
C2

(a)   Describe the advantages and disadvantages of primary and secondary data

Terangkan kelebihan dan kekurangan data utama dan data kedua

[10 marks]
[*10 markah*]

CLO1
C1

(b)   List down the data collection methods

Senaraikan kaedah pemgumpulan data.

[5 marks]
[*5 markah*]

CLO1
C3

(c)   A researcher intends to determine the monthly expenses of the students in Shah Alam Polytechnic. The breakdown of the students according to their ethnicity is shown in the table below. The researcher plans to randomly select 20% of the students from each ethnic group. Using a stratified sampling technique, calculate the number of students needed for each group in the study.

Seorang penyelidik bercadang untuk menentukan belanjawan bulanan pelajar di Politeknik Shah Alam. Analisis seisi rumah ini mengikut kaum seperti jadual Q2. Penyelidik memilih secara rawak 20% daripada pelajar bagi setiap kaum. Dengan mnggunakan teknik persampelan berstrata Kira bilangan pelajar yang diperlukan bagi setiap kumpulan dalam kajian ini.

Ethnic Group	Number of students
Malay	220
Indian	200
Chinese	160
Others	20

[10 marks]
[*10 markah*]

QUESTION 2
SOALAN 2

CLO 1
C2

(a) Data can be classified into categories or classes. They can be presented in form of Frequency Distribution, Bar Charts, Pie Chart and Contingency Table. Explain about Bar Charts.

Data boleh diklasifikasikan kepada kategori atau kelas. Ianya dapat dipersembahkan dalam bentuk Taburan Kekerapan, Carta palang, Carta Pie dan Jadual Kontingensi. Terangkan mengenai Carta palang.

[10 marks]
[10 markah]

CLO 1
C3

(b) A sample of 25 mangoes was collected from a tree. The masses of the mangoes are given in the table below (data to one decimal place).

Satu sampel 25 mangga dikumpulkan daripada pokok. Berat daripada mangga diberikan dalam jadual di bawah (data kepada satu tempat perpuluhan).

20.4   12.6   5.3   17.0   28.5   19.4   15.5   24.0   9.8   15.3   16.8   7.7
23.3   11.6   18.3   13.5   14.2   19.1   16.7   9.1   22.2   8.7   20.7
12.5   15.8

From the data given, determine :

Dari data yang diberikan, tentukan :

i.   The number of classes, k / *Bilangan kelas, k*

ii. The data range / *Julat data*

iii. The class width /*lebar kelas*

iv. The frequency distribution table / *Jadual taburan kekerapan*

[15 marks]
[15 markah]

QUESTION 3
SOALAN 3

CLO1
C2

(a) The table below shows the age of students who took grade 5 piano examination.

Jadual dibawah menunjukkan umur pelajar yang mengambil gred 5 ujian piano.

Age, x (months)	Number of computers, f
21 – 25	10
26 – 30	15
31 – 35	16
36 – 40	5
41 – 45	8
46 – 50	10
51 – 55	3
56 – 60	12
61- 65	4

Calculate :

Kira :

i.   Inter quartile range

Julat antara kuartil

[5 marks]
[5 markah]

ii. 6nd Deciles

6nd *Desil*

[2.5marks]
[2.5 markah]

iii. 60th Percentiles

60th *Pecentile*

[2.5 marks]
[2.5 markah]

CLO1
C3

(b)   Below are the marks obtained from a group of students sitting for a particular Wood of Mechanics Structure Test:

Markah yang diperolehi dari sekumpulan pelajar yang menduduki ujian Mekanik Struktur Kayu diberikan seperti dibawah:

Marks	Number of Student, f
20 and less than 30	4
30 and less than 40	18
40 and less than 50	25
50 and less than 60	43
60 and less than 70	20

i.   Calculate the range.

Kira julat.

[3 marks]
[*3 markah*]

ii.   Find the variance and standard deviation for the above data.

Cari varian dan sisihan piawai bagi data di atas.

[12 marks]
[*12 markah*]

QUESTION 4
SOALAN 4

CLO1
C1

(a)   A bag has 20 cards. The cards are numbered from 1 to 20 respectively. If a card is chosen randomly, find the probability of obtaining an odd number.

Beg A mempunyai 20 kad. Kad tersebut masing-masing bernombor dari 1 hingga 20. Jika kad dipilih secara rawak, cari kebarangkalian mendapat nombor ganjil

[5 marks]
[*5 markah*]

CLO 1
C2

(b)   A mathematics exam paper consists of 9 questions. Determine the number of combinations to answer 5 questions if a student is required to answer 3 questions from Section A which consists of 5 questions and 2 questions from Section B which consists of 4 questions.

Kertas peperiksaan matematik ini mengandungi 9 soalan. Tentukan jumlah kombinasi untuk menjawab 5 soalan jika seseorang pelajar dikehendaki menjawab 3 soalan dari Bahagian A yang terdiri daripada 5 soalan dan 2 soalan daripada Bahagian B yang mengandungi 4 soalan.

[5 marks]
[*5 markah*]

CLO 1
C3

(c)   Hostel residents comprising of 30% of first semester students, 20% of semester 2 students and 50% of semester 3 students. 2%, 4% and 5% of semester 1, 2 and 3 students have their own transportation respectively. A student has been chosen randomly.

Pelajar-pelajar Kamsis terdiri daripada 30% pelajar semester 1, 20% pelajar semester 2 dan 50% pelajar semester 3, 2%, 4% dan 5% pelajar semester 1, 2 dan 3 mempunyai kenderaan sendiri. Seorang pelajar telah dipilih secara rawak.

i.   Draw a tree diagram

Lukiskan gambarajah pokok

ii.   Find the probability of semester 1 students who does not have their own transportation.

   Apakah kebarangkalian pelajar semester 1 tidak mempunyai kenderaan sendiri.

iii. Find the probability of the students who do not have their own transportation?

   Apakah kebarangkalian pelajar tidak mempunyai kenderaan sendiri

[15 marks]
[*15 markah*]

SOALAN TAMAT

FORMULA

i. $K = 1 + \log_{10}(n)$

ii. $x = \frac{\sum_{i=1}^{n} x_i}{n}$

iii. $x = L_m + \left[\frac{\frac{n}{2} - \sum f_{fm-1}}{f_m}\right] \times c$

iv. $x = L_m \left(\frac{\Delta_1}{\Delta_1 + \Delta_2}\right) \times c$

v. $x = \frac{n+1}{4}$

vi. $x = L_1 + \left[\frac{\frac{n}{4} - \sum f_{bq-1}}{f_1}\right] \times c$

vii. $D_k = L_m + \left[\frac{k\frac{n}{10} - \sum f_{BD1}}{f_{D1}}\right] \times c$

viii. $P_k = L_{BK} + \left[\frac{k\frac{n}{100} - \sum f_{Bk1}}{f_{BK1}}\right] \times c$

ix. $s^2 = \frac{1}{n-1} \sum [x - \bar{x}]^2$

x. $s^2 = \frac{1}{\sum f - 1} \left[\sum f x^2 - \frac{(\sum fx)^2}{\sum f}\right]$

xi. $s = \sqrt{s^2}$

xii. mean deviation $= \frac{\sum |x - mean|}{n}$, $\frac{1}{\sum f} [\sum f |x - \bar{x}|]$

12