POLITEKNIK
MALAYSIA

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

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI JUN 2019

DCW3162: INDUSTRIAL STATISTICS

TARIKH : 07 NOVEMBER 2019
MASA : 2.30 PETANG - 4.30 PETANG (2 JAM)

Kertas ini mengandungi **SEPULUH (10)** halaman bercetak.
Bahagian A: Struktur (2 soalan)
Bahagian B: Struktur (4 soalan)

Dokumen sokongan yang disertakan : Kertas Graf dan 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)** structure questions. Answer **ALL** questions.

ARAHAN:
Bahagian ini mengandungi DUA (2) soalan struktur. Jawab SEMUA soalan.

QUESTION 1
SOALAN 1

CLO1
C1

a) In everyday life, people use statistical problem-solving procedures to help them in making wise and effective decisions. List down the basic steps in statistical problem- solving.

Dalam kehidupan seharian, orang menggunakan prosedur penyelesaian masalah statistik untuk membantu mereka membuat keputusan yang bijak dan berkesan. Senaraikan langkah-langkah asas dalam penyelesaian masalah statistik.

[5 marks]
[5 *markah*]

CLO1
C2

b) Sampling techniques are scientific methods of selecting representative samples from populations. Explain briefly the following sampling techniques.

Teknik pensampelan adalah kaedah saintifik untuk memilih sampel wakil daripada populasi. Terangkan secara ringkas teknik persampelan berikut

i.   Convenience sampling

Persampelan mudah

ii. Judgemental sampling

Persampelan penilaian

iii. Simple random sampling

Persampelan rawak mudah

iv. Systematic sampling

Persampelan sistematik

[10 marks]
[10 *markah*]

SULIT

CLO1
C3

c)   Table Q1 shows the enrolment in Diploma of Wood based Technology (DBK) programme in Shah Alam Polytechnic (PSA) and Kota Kinabalu Polytechnic (PKK). Illustrate the data with a component bar chart.

Jadual Q1 menunjukkan enrolmen program Diploma Teknologi Berasaskan Kayu (DBK) di Politeknik Shah Alam (PSA) dan Politeknik Kota Kinabalu (PKK). Ilustrasikan data-data tersebut menggunakan carta bar komponen.

Polytechnic	Year		
	2016	**2017**	**2018**
PKK	410	433	489
PSA	180	210	306

Table Q1 : Enrolment of DBK program in PSA and PKK

Jadual Q1 : Enrolmen program DBK di PSA dan PKK

[10 marks]

[10 *markah*]

QUESTION 2

SOALAN 2

CLO1
C2

a)   Data presentation is an essential step before further statistical analysis is carried out. List down **FIVE (5)** common types of data presentation.

*Persembahan data adalah langkah asas sebelum analisis statistik dijalankan lebih jauh. Senaraikan **LIMA (5)** jenis persembahan data yang biasa digunakan.*

[5 marks]

[5 *markah*]

CLO1
C3

b) A sample of 10 students in DBK showed the following credit hours taken during the second year of their programme.

10 sampel pelajar DBK menunjukkan jam kredit yang telah diambil oleh mereka semasa berada di tahun kedua program.

24, 18, 21, 22, 19, 20, 18, 21, 18, 17

Calculate:

Kira :

    i.   Range / *Julat*

    ii.   Mean / *Purata*

    iii.   Median / *Median*

    iv.   Mode / *Mod*

    v.   First quartile / *Kuartil pertama*

    vi.   Third quartile */ Kuartil ketiga*

[15 marks]

[15 *markah*]

CLO1
C1

c) Identify how many different permutations can be formed from the words.

Nyatakan jumlah pilih atur yang dapat dibentuk dari perkataan berikut.

    i.   OPPO

    ii.   XIAOMI

[5 marks]

[5 *markah*]

SECTION B : 50 MARKS

BAHAGIAN B : 50 MARKAH

INSTRUCTION:
This section consists of **FOUR (4)** structure questions. Answer **TWO (2)** questions only.

ARAHAN:
*Bahagian ini mengandungi **EMPAT (4)** soalan struktur. Jawab **DUA (2)** soalan sahaja*

QUESTION 1

SOALAN 1

CLO1
C2

a)   Identify steps in Statistical Problem Solving.

Tentukan langkah-langkah dalam penyelesaian masalah statistic.

[10 marks]

[10 *markah*]

CLO1
C3

b)   In designing a questionnaire, there are a few things which should be taken into consideration in order to achieve the target of the survey. Interprate **FIVE (5)** things should be taken into consideration to design a good questionnaire.

*Dalam merekebentuk borang soalselidik, terdapat perkara yang perlu diambilkira untuk mencapai tujuan kajian. Tafsirkan **LIMA (5)** perkara yang perlu diambil kira di dalam merekebentuk soalselidik yang baik.*

[15 marks]
[15 *markah*]

QUESTION 2
SOALAN 2

CLO1
C2

a) The Table B2(a) below shows the frequency distribution for the weight 0f 50 female students in DBK 5. Measurement have been recorded to the nearest kilogram (kg).

Jadual B2(a) dibawah menunjukkan taburan kekerapan untuk berat 50 orang pelajar perempuan DBK 5. Pengukuran direkodkan kepada kilogram (kg) yang hampir.

Table B2(a)
Jadual B2(a)

Weight (kg)	Number of students
40 and less than 45	2
45 and less than 50	5
50 and less than 55	13
55 and less than 60	16
60 and less than 65	7
65 and less than 70	6
70 and less than 75	1

Draw a "less than" ogive on a graph paper.

Lukis ogif "kurang daripada" pada kertas graf.

[10 marks]
[*10 markah*]

b) The data below is the mark obtained by 30 students in Industrial Statistics Test 2012.

Data di bawah ini menunjukkan markah yang diperolehi oleh 30 orang pelajar dalam Ujian Statistik Perindustrian 2012.

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

i. Construct a stem and leaf plot for the above data.

Bina plot batang dan daun bagi data diatas.

ii.   Construct a frequency distribution table with the same class width stating with '10 and less than 20' as the first class limit.

Bina jadual taburan kekerapan dengan lebar kelas yang sama bermula dengan '10 dan kurang daripada 20' sebagai had kelas pertama.

iii.   Based on question 3(b), draw a histogram.

Berdasarkan soalan 3(b), lukis histogram.

[15 marks]
[*15 markah*]

QUESTION 3
SOALAN 3

CLO1
C2

a)   The table B3(a) below shows the age of students taking grade 5 piano examination.

Jadual B3(a) dibawah menunjukkan umur pelajar yang mengambil gred 5 ujian piano.

Table B3(a)
Jadual B3(a)

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.   4th Deciles

            4th Desil

[2.5marks]

[2.5*markah*]

    iii.   75th Percentiles

            75th Pecentile

[2.5 marks]

[2.5 *markah*]

CLO1
C3

b)   Table B3(b) Below are the marks obtained for a group of students sitting for a particular Wood of Mechanics Structure Test:

Jadual B3(b) Markah yang diperolehi dari sekumpulan pelajar yang menduduki ujian Mekanik Struktur Kayu diberikan seperti dibawah:

Table B3(b)
Jadual B3(b)

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.

            Kirakan 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
C2

a)   i)   If you know that successful applicants are degree holder what is the probability that she is a woman?

Jika diketahui bahawa pemohon yang berjaya mempunyai ijazah sarjana, apakah kebarangkalian bahawa ia adalah seorang wanita?

[5 marks]

[5 markah]

ii)   Identify number of different arrangements that can be formed from the words below:

Tentukan bilangan perbezaan susunan yang boleh dibentuk dari perkataan dibawah:

a)   STATISTICS

STATISTIK

[2.5 marks]

[2.5 *markah*]

b)   SYSTEMATIC

SISMETIK

[2.5 marks]

[2.5 *markah*]

CLO1
C3

b) i) A bag contains six red balls and nine yellow balls. If the two balls are drawn without replacement, what is the probability that both of the balls are red?

Sebuah beg mengandungi enam biji bola merah dan sembilan biji bola kuning. Jika kedua-dua bola dikeluarkan tanpa penggantian, apakah kebarangkalian yang kedua-duanya adalah merah?

[7 marks]
[7 *markah*]

ii) In the Wood Based Technology program, 90% of the students passed in OSHA 2, 95% passed in Design course and 88% of students passed both the OSHA 2 and Design. Students are selected at random. Specify:

Dalam program Teknologi Berasaskan Kayu, 90% pelajar lulus dalam OSHA 2, 95% lulus dalam kursus Design dan 88% pelajar lulus kedua-duanya OSHA 2 dan Design. Pelajar dipilih secara rawak. Nyatakan:

a) Probability of students passing OSHA 2 dan Design course.
Kebarangkalian pelajar lulus OSHA 2 dan Rekabentuk.

[4 marks]
[4 *markah*]

b) Probability that the student failed either OSHA 2 dan Design course.
Kebarangkalian pelajar tidak lulus sama ada OSHA 2 dan Rekabentuk.

[4 marks]
[4 *markah*]

SOALAN TAMAT

FORMULA

DCW3162 : INDUSTRIAL STATISTICS

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. $x = L_m \left(\frac{d_1}{d_1 + d_2}\right) \times c$

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

vi. $Q1 = L_1 + \left[\frac{\frac{n}{4} - \sum f_{bq1-1}}{f_1}\right] \times c$

vii. $Q3 = L_3 + \left[\frac{\frac{3n}{4} - \sum f_{bq-1}}{f_1}\right] \times c$

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

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

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

(ungroup data)

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

(group data)

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

xiii. mean deviation =

$\frac{\sum|x - mean|}{n}$ (ungroup data)

$\frac{1}{\sum f}\left[\sum f |x - \bar{x}|\right]$ (group data)