SECTION A

BAHAGIAN A

STRUCTURED : 2 Questions (25 marks each)

STRUKTUR : 2 soalan (25 markah setiap soalan)

INSTRUCTION: This section consists of **TWO (2)** structured questions. Answer **ONE (1)** question only.

*Arahan : Bahagian ini mengandungi **DUA (2)** soalan struktur. Jawab **SATU (1)** soalan sahaja.*

QUESTION 1
SOALAN 1

CLO1
C1

a) Table 1(a) shows the grade scored by 120 students in a mathematic test.
Jadual 1(a) menunjukkan gred markah bagi 120 pelajar dalam ujian matematik.

Table 1(a)/ Jadual 1(a)

GRED	NUMBER OF STUDENT	PERCENTAGE (%)
A	12	10
B	27	22
C	33	28
D	30	25
E	18	15

SULIT

POLITEKNIK
Jabatan Pengajian Politeknik

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENGAJIAN POLITEKNIK
KEMENTERIAN PENDIDIKAN MALAYSIA

JABATAN MATEMATIK, SAINS DAN KOMPUTER

PEPERIKSAAN AKHIR

SESI JUN 2013

BA301: ENGINEERING MATHEMATICS 3

TARIKH : 22 OKTOBER 2013
TEMPOH : 2 JAM (8.30 AM - 10.30 AM)

Kertas ini mengandungi **SEPULUH (10)** halaman bercetak.
Bahagian A: Struktur (2 soalan)
Bahagian B: Struktur (4 soalan)
Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

QUESTION 2

SOALAN 2

CLO1
C1

a) Based on the given data, calculate……

Berdasarkan data yang diberi, kirakan……

2.2, 2.3, 2.1, 2.4, 2.1, 2.2, 2.6

i. the mean (2 marks)
min *(2 markah)*

ii. the median (1 mark)
median *(1 markah)*

iii. the mode (2 marks)
mod *(2 markah)*

From the table, construct……

Dari jadual, binakan…..

i. the bar chart (5 marks)
Carta palang *(5 markah)*

ii. the pie chart (8 marks)
Carta pie *(8 markah)*

CLO1
C1

b) The data below shows the amount of money collected in RM from 30 students for a charity fund.

Data di bawah menunjukkan kutipan wang dalam ringgit bagi 30 pelajar untuk tabung kebajikan.

122	130	120	28	217	86	90	80	120	140
40	145	70	113	187	68	174	90	170	194
104	75	100	75	123	97	100	82	120	109

i. Complete the frequency distribution Table1 (b) below. (6 marks)
Lengkapkan jadual 1(b) taburan frekuensi di bawah. (6 markah)

Table 1(b) / *Jadual 1(b)*

Class	Frequency
28 - 59	
60 - 91	
92 - 123	
124 - 155	
156 - 187	
188 - 219	

ii. Find the mean of the money contributed by the students based on the frequency distribution. (6 marks)
Cari purata wang di sumbangkan oleh pelajat berdasarkan taburan frekuensi. *(6 markah)*

SECTION B

BAHAGIAN B

STRUCTURED : 4 Questions (25 marks each)

Struktur : 4 Soalan (25 markah setiap soalan)

INSTRUCTION: This section consists of **FOUR (4)** structured questions. Answer **THREE (3)** questions only.

*Arahan : Bahagian ini mengandungi **EMPAT (4)** soalan struktur. Jawab **TIGA (3)** soalan sahaja.*

QUESTION 3

SOALAN 3

CLO2 C1

(a) Complete table 3(a) . Give your answer in 3 decimal places. (6 marks)

Lengkapkan jadual 3(a). Beri jawapan anda sehingga 3 tempat perpuluhan.

(6 markah)

Table 3(a)/*Jadual 3(a)*

x	0	0.2	0.4	0.6	0.8	1.0
$f(x) = \sqrt{x^2 + 3}$						

CLO2 C2

(b) Refer to table 3(a) above. Using the Trapezoidal Rule, approximate

$\int_0^1 \sqrt{x^2 + 3}\, dx$. (7 marks)

Rujuk jadual 3(a) di atas. Dengan menggunakan Petua Trapezium, anggarkan

$\int_0^1 \sqrt{x^2 + 3}\, dx$. *(7 markah)*

CLO2 C3

(c) Evaluate $\int_2^3 x^3 + 5\, dx$, by using the Simpson's Rule with $n = 4$.

(12 marks)

Nilaikan $\int_2^3 x^3 + 5\, dx$, *dengan menggunakan Petua Simpson dengan* $n = 4$. *(12 markah)*

CLO1 C1

b) Table 2(a) shows a data being recorded.

Data telah direkodkan seperti jadual 2(a).

Table 2(a) / Jadual 2(a)

Class Interval	Frequency
4 – 5	3
6 –7	5
8– 9	14
10 – 11	31
12 - 13	30
14-15	7

i. Determine the variance and standard deviation. (10 marks)

Tentukan varians dan sisihan piawai. *(10 markah)*

ii. Construct a an ogive to represent the data. From the ogive, find the value of the interquartile range and the 8^{th} decile. (10 marks)

Bina satu ogif bagi mewakili data tersebut. Daripada ogif, cari nilai selang antara kuartil dan desil ke-8. *(10 markah)*

QUESTION 4

SOALAN 4

CLO 2
C3

(a) Given that the first term of Arithmetic Progression is -2, and the sum for the first ten terms is 115. Calculate.

Diberi sebutan pertama bagi Janjang Aritmetik adalah -2, dan hasil tambah sepuluh sebutan pertama adalah 115. Kirakan.

i. the common difference. (4 marks)
beza sepunya . *(4 markah)*

ii. the 4^{th} term. (2 marks)
sebutan ke-4. *(2 markah)*

iii. the value of n for the sum of the first n terms of the arithmetic progression is 285. (5 marks)
nilai n apabila hasil tambah n sebutan pertama Janjang Aritmetik ialah 285.
(5 markah)

CLO 2
C3

(b) $2p + 2$, $2p - 4$, *and* $2p - 7$ are the first three terms for Geometric Progression. Find.

$2p + 2$, $2p - 4$, *dan* $2p - 7$ *adalah tiga sebutan pertama bagi suatu Janjang Geometri. Cari.*

i. the value of p. (5 marks)
nilai p. *(5 markah)*

ii. the 7^{th} terms. (5 marks)
sebutan ke-7. *(5 markah)*

iii. the sum for the first 5 terms. (4 marks)
hasil tambah lima sebutan pertama. *(4 markah)*

QUESTION 5

SOALAN 5

CLO3
C3

a. Given.
Diberi.

$$A = \begin{pmatrix} -1 & 3 & 3 \\ 2 & -2 & 0 \\ 0 & 1 & 2 \end{pmatrix} \quad \text{and} \quad B = \begin{pmatrix} -2 & -1 & 3 \\ 2 & 0 & 4 \\ 2 & 5 & 0 \end{pmatrix}$$

Calculate.
Kirakan.

i. *Determinant* $|B|$ (2 marks)
Penentu $|B|$ *(2 markah)*

ii. $B^T - A^T$ (3 marks)
$B^T - A^T$ *(3 markah)*

CLO3
C3

b. Given.
Diberi.

$$A = \begin{pmatrix} 3 & 0 & 4 \\ 2 & 4 & 3 \\ 1 & -1 & 3 \end{pmatrix}$$

Find the cofactor of A. (8 marks)
Dapatkan kofaktor bagi A. *(8 markah)*

CLO3
C3

c. Solve the following simultaneous equations by using the Cramer's Rule.

(12 marks)

Selesaikan persamaan serentak berikut dengan menggunakan Petua Cramer.

(12 markah)

$$2x - 5y + z = 3$$
$$x - 2y - 2z = 5$$
$$3x - y + 3z = 2$$

QUESTION 6

SOALAN 6

a)

$$6x - 12y + 10z = 12$$
$$-8y + 6z = 4$$
$$4x + 8y - 8z = 10$$

i) Rewrite the equation into the matrix form of AX=B. (1 mark)

Tuliskan persamaan dalam bentuk matrik, AX=B *(1 markah)*

CLO3
C2

ii) Solve x, y and z by using Crout's Method if given.

(10 marks)

CLO3
C3

Selesaikan untuk x, y dan z dengan menggunakan kaedah Crout jika diberi.

(10 markah)

A = LU

$$\begin{pmatrix} 6 & -12 & 10 \\ 0 & -8 & 6 \\ 4 & 8 & -8 \end{pmatrix} = \begin{pmatrix} 6 & 0 & 0 \\ 0 & -8 & 0 \\ 4 & 16 & \frac{-8}{3} \end{pmatrix} \begin{pmatrix} 1 & -2 & \frac{5}{3} \\ 0 & 1 & -\frac{3}{4} \\ 0 & 0 & 1 \end{pmatrix}$$

b. Show that the equation $3x + \sin x - e^x = 0$ have one root between $x = 0$ and $x = 1$ by using Newton Raphson's method. Give your answer correct to 4 decimal places. (14 marks)

CLO3
C3

Tunjukkan bahawa persamaan $3x + \sin x - e^x = 0$ *mempunyai satu punca antara* $x = 0$ *dan* $x = 1$ *menggunakan kaedah Newton Raphson. Berikan jawapan anda betul kepada 4 titik perpuluhan.*

(14 markah)

QUESTION ENDS

SOALAN TAMAT

FORMULA OF ENGINEERING MATHEMATICS 3 (BA301)

Descriptive Statistics		
Mean	$\bar{x} = \frac{\sum x}{n}$	$\bar{x} = \frac{\sum (fx)}{\sum f}$
Median	$\text{Median} = L + \left[\frac{\frac{N}{2} - F}{f_m}\right] C$	
Mode	$\text{Mode} = L_{Mo} + \left[\frac{d_1}{d_1 + d_2}\right] C$	
First Quartile	$Q_1 = L + \left[\frac{\frac{N}{4} - F}{f_m}\right] C$	
Third Quartile	$Q_3 = L + \left[\frac{\frac{3N}{4} - F}{f_m}\right] C$	
Decil	$D_k = L + \left[\frac{\frac{k}{10} N - F}{f_{DK}}\right] C$	
Percentile	$P_K = L + \left[\frac{\frac{k}{100} N - F}{f_{PK}}\right] C$	
Mean Deviation	$E = \frac{\sum \lvert x - \bar{x} \rvert}{n}$	$E = \frac{\sum (\lvert x - \bar{x} \rvert f)}{\sum f}$
Variance	$s^2 = \frac{\sum (x - \bar{x})^2}{n}$	$s^2 = \frac{\sum_{i=1}^{n} x_i^2 - n\bar{x}^2}{n}$
	$s^2 = \frac{\sum [(x - \bar{x})^2 f]}{\sum f}$	$s^2 = \frac{\sum fx^2}{\sum f} - \left[\frac{\sum fx}{\sum f}\right]^2$
Standard Deviation	$s = \sqrt{\text{var}\,iance}$	