SULIT

POLITEKNIK
Jabatan Pengajian Politeknik

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENGAJIAN POLITEKNIK
KEMENTERIAN PENGAJIAN TINGGI

JABATAN KEJURUTERAAN ELEKTRIK

PEPERIKSAAN AKHIR

SESI JUN 2013

EU 701: ADVANCED ENGINEERING MATHEMATICS

TARIKH : 21 OKTOBER 2013
TEMPOH : 2 JAM (8.30 AM - 10.30 AM)

Kertas ini mengandungi **SEMBILAN (9)** halaman bercetak.
Bahagian A: Struktur (10 soalan)
Bahagian B: Esei (3 soalan)
Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

SECTION A : 40 MARKS
BAHAGIAN A : 40 MARKAH

INSTRUCTION:
This section consists of **TEN (10)** structured questions. Answer **ALL** questions.

ARAHAN:
*Bahagian ini mengandungi **SEPULUH (10)** soalan berstruktur. Jawab **semua soalan**.*

CLO1
C4

QUESTION 1

Described the definition of linear Laplace Transform is a

SOALAN 1

Terangkan maksud bagi Penjelmaan Laplace linear.

[4 marks]
[*4 markah*]

CLO1
C4

QUESTION 2

Prove that $L\{Cosh\ t\} = \dfrac{S}{S^2 - a^2}$

SOALAN 2

Buktikan $L\{Cosh\ t\} = \dfrac{S}{S^2 - a^2}$

[4 marks]
[*4 markah*]

CLO4
C3

QUESTION 3

Determine the Laplace transforms of the following expressions

a. $\dfrac{e^{3t} - 1}{t}$

b. $t^2 \sin t$

SOALAN 3

Tentukan penjelmaan Laplace berikut

a. $\frac{e^{3t}-1}{t}$

b. $t^2 \sin t$

[4 marks]
[*4 markah*]

CLO2
C4

QUESTION 4
Described the definition of Fourier Series on Trigonometric functions

SOALAN 4
*Terangkan maksud bagi penjelmaan Fourier*dalam fungsi Trigonometri

[4 marks]
[*4 markah*]

CLO1
C4

QUESTION 5
Draw the graph of the following unit function

$$f(t)= u(t).t - u(t-2).(t-2) + u(t-4).(t-4) - u(t-6).(t-6)$$

SOALAN 5
Lukiskan graf bagi fungsi unit tersebut

$$f(t)= u(t).t - u(t-2).(t-2) + u(t-4).(t-4) - u(t-6).(t-6)$$

[4 marks]
[*4 markah*]

CLO4
A4

QUESTION 6
State four properties of Z- transform.

SOALAN 6
Nyatakan Empat ciri penjelmaan Z

[4 marks]
[*4 markah*]

CLO1
C4

QUESTION 7
Define the meaning of Z-Transform.

SOALAN 7
Nyatakan maksud bagi penjelmaan Z

[4 marks]
[*4 markah*]

CLO1
C4

QUESTION 8
Prove the following Z transform

$$f(n) = u(n) = z/(z-a) \quad \text{, all values of z, } |z|>1$$

SOALAN 8
Buktikan penjelmaan Z adalah

$$f(n) = u(n) = z/(z-1) \quad \text{, bagi semua nilai z, } |z|>1$$

[4 marks]
[*4 markah*]

CLO3
C3

QUESTION 9

12 , 5, 6, 7, 13, 4, 5, 6, 8, 2, 3, 4, 15, 6, 7, -1
Based on the above raw data find the:

i. Min
ii. Mode
iii. Median
iv. Extreme value

SOALAN 9

12 , 5, 6, 7, 13, 4, 5, 6, 8, 2, 3, 4, 15, 6, 7, -1
Berdasarkan data mentah di atas, kirakan:

i. Min
ii. Mod
iii. Median
iv. Nilai terpencil

[4 marks]
[*4 markah*]

CLO3
C3

QUESTION 10

Explain the meaning of

i. Frequency distribution
ii. Quantitative data
iii. Histogram
v. Percentile rank

SOALAN 10

Terangkan maksud bagi

i. *Taburan frekuensi*
ii. *Data kuantitatif*
iii. *Histrogram*
iv. *Julat percentil*

[4 marks]
[*4 markah*]

SECTION B : 60 MARKS
BAHAGIAN B : 60 MARKAH

INSTRUCTION:
This section consists of **THREE (3)** essay questions. Answer **ALL** questions
ARAHAN:
*Bahagian ini mengandungi **TIGA (3)** soalan esei. Jawab **semua soalan.***

CLO2
C3

QUESTION 1
SOALAN 1

(a) Determine the Laplace Transform for the following function

Tentukan penjelmaan Laplace bagi fungsi tersebut,

(i) $\mathcal{L}^{-1}\, 3\, e^{-2t} \cos 3t$

(ii) $\mathcal{L}^{-1} \dfrac{s+2}{s^2+4s+7}$

(iii) $\mathcal{L}^{-1} \dfrac{s+4}{s^2+4s+9}$

[9 marks]

[*9 markah*]

(b) Solve the following initial condition using Laplace transform,

Selesaikan penjelmaan Laplace tersebut

$\dfrac{d^2x}{dt^2} + 2\dfrac{dx}{dt} + x = e^{-2t}$ where $\dot{x} = 0$ and $x = 1$ at $t = 0$

[11 marks]

[*11 markah*]

CLO4
C4

QUESTION 2

SOALAN 2

(a) If $f(t) = \mathrm{L}^{-1}\left\{\frac{\left(1+3e^{-2s}\right)\left(1-e^{-3s}\right)}{s^2}\right\}$, determine *f(t)* and sketch the graph of the function

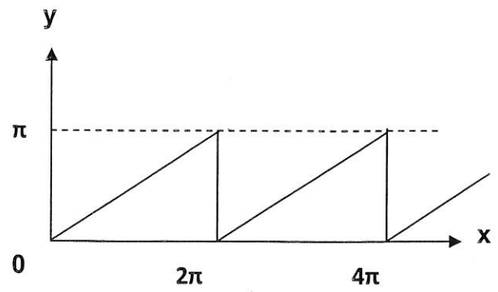
Jika $f(t) = \mathrm{L}^{-1}\left\{\frac{\left(1+3e^{-2s}\right)\left(1-e^{-3s}\right)}{s^2}\right\}$, Tentukan *f(t)* dan lakarkan graf bagi fungsi berikut

[10 marks]

[*10 markah*]

(b) Determine the Fourier series to represent the periodic function shown

Tentukan Fourier series bagi mewakili fungsi berkala di bawah



[10 marks]

[*10 markah*]

CLO1
C4

QUESTION 3

SOALAN 3

(a) The sequence *f(n)* has Z transform, find the Z^{-1}

Berikut adalah fungsi f(n) bagi penjelmaan Z, *Dapatkan* Z^{-1}

$$F(z) = \frac{5z}{\left(z^2 - 4z + 4\right)\left(z + 2\right)}$$

[4 marks]

[*4 markah*]

CLO3
C3

(b) Here are the ages, arranged in order for 25 highest- paid CEOs on the Fortune 500 list of top companies in the United States (data source: http://ww.forbes.com/lists/2012/12/best-boss-12_CEO-Compesention_CompTotDisp.html).

Berikut adalah peringkat umur, disusun dalam usaha untuk 25 pegawai eksekutif tertinggi dengan bayaran tertinggi dalam senarai Fortune 500 syarikat-syarikat terkemuka di Amerika Syarikat (sumber data: HTP :/ / ww.forbes.com/lists/2012/12/best-boss- 12_CEO-Compesention_CompTotDisp.html).

42	47	48	49	49	49	50	51
54	54	56	57	59	60	61	61
63	64	64	65	65	67	67	70
70							

a. Construct a frequency distribution table. Take 42 as the lower limit of the first class.
Binakan Jadual Taburan kekerapan dengan mengambil kira 42 adalah had terkecil bagi kelas

[3 marks]
[3 *markah*]

b. Calculate the relative frequencies and percentages for all the classes.
Kirakan kekerapan relatif dan peratuan bagi semua kelas

[2 marks]
[*2 markah*]

c. Construct a plot box and whiskers on this data set? Describe the shape
Binakan 'Plot Box and Whiskers' bagi data set berikut? Nyatakan coraknya?

[6 marks]
[*6 markah*]

d. Find the value of the 75th percentile. Give the brief interpretation of the 75th percentile.
Dapatkan nilai pada percentil ke-75. Nyatakan dengan ringkas interperitasi mengenai percentil tersebut.

[4 marks]
[*4 markah*]

e. Where does the ages of 59 years fall in the data?
Dimanakah umur 59 berada dalam data ini?

[1 mark]
[*1 markah*]

END OF QUESTIONS

SOALAN TAMAT