SULIT

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

JABATAN MATEMATIK, SAINS DAN KOMPUTER

PENILAIAN ALTERNATIF

SESI DIS 2020

DBM30033 : ENGINEERING MATHEMATICS 3

NAMA PENYELARAS KURSUS : RABIATUL ADAWIYAH BINTI ROSLI

KAEDAH PENILAIAN : PEPERIKSAAN ONLINE

JENIS PENILAIAN : SOALAN ESEI BERSTRUKTUR
  (2 SOALAN)

TARIKH PENILAIAN : 30 JUN 2021

TEMPOH PENILAIAN : 1 JAM

SECTION A : 25 MARKS
BAHAGIAN A : 25 MARKAH

INSTRUCTION:
This section consists of **TWO (2)** subjective questions. Answer ALL.
ARAHAN :
*Bahagian ini mengandungi **DUA (2)** soalan subjektif. Jawab SEMUA.*

QUESTION 1

a)   The scores of students in Quiz are 3, 13, 11, 15, 5, 4, 2, 3, 2. Calculate:

CLO1
C3

Markah pelajar dalam Quiz adalah 3, 13, 11, 15, 5, 4, 2, 3, 2. Kira:

    i.   Mean
            Min

[3 marks]
[3 *markah*]

    ii.   Median
            Median

[3 marks]
[3 *markah*]

    iii.   Mode
            Mod

[3 marks]
[3 *markah*]

CLO1
C3

b)   The data below shows the body weight of 40 football player in a club. The

measurement is to the nearest kilogram (kg).

Data di bawah menunjukkan berat badan 40 pemain bola sepak di sebuah kelab.

Pengukuran adalah ke kilogram terdekat (kg).

55	70	57	73	55	59	64	72
60	48	58	54	69	51	63	78
75	64	65	57	71	78	76	62
49	66	62	76	61	63	63	76
52	76	71	61	53	56	67	71

    (i)   Construct a frequency distribution table for the data.

Bina jadual taburan frekuensi untuk data.

[11 marks]
[11 *markah*]

(ii) Calculate mean.

Kirakan Min

[5 marks]
[5 *markah*]

QUESTION 2

CLO1
C3

(a) Use Doolittle's method to solve the following system.

Menggunakan kaedah Crout, selesaikan sistem berikut:

$$x_1 + 2x_2 + 3x_3 = 10$$

$$-x_1 + x_2 + x_3 = 0$$

$$x_2 - x_3 = 1$$

[14 marks]
14 *markah*]

CLO1
C3

(b) By using the Newton-Raphson iteration method, calculate the real root of $x \sin x - 4 \cos x = 0$ to 5 decimal places. Given $x_0 = 1$.

Menggunakan kaedah Newton-Raphson, kirakan nilai punca sebenar bagi $x \sin x - 4 \cos x = 0$ kepada 5 titik perpuluhan. Diberi $x_0 = 1$

[11 marks]
[11 *markah*]

SOALAN TAMAT

FORMULA DBM30033 (ENGINEERING MATHEMATICS 3)

NUMERICAL METHOD		
Crout Method	$A = \begin{pmatrix} l_{11} & 0 & 0 \\ l_{21} & l_{22} & 0 \\ l_{31} & l_{32} & l_{33} \end{pmatrix} \begin{pmatrix} 1 & u_{12} & u_{13} \\ 0 & 1 & u_{23} \\ 0 & 0 & 1 \end{pmatrix}$	
Doolittle Method	$A = \begin{pmatrix} 1 & 0 & 0 \\ l_{21} & 1 & 0 \\ l_{31} & l_{32} & 1 \end{pmatrix} \begin{pmatrix} u_{11} & u_{12} & u_{13} \\ 0 & u_{22} & u_{23} \\ 0 & 0 & u_{33} \end{pmatrix}$	
Newton Raphson Method	$x_0 = \dfrac{1}{y_2 - y_1} \begin{vmatrix} x_1 & y_1 \\ x_2 & y_2 \end{vmatrix}$	$x_{n+1} = x_n - \dfrac{f(x)}{f'(x)}$

SOLUTION FOR 1st ORDER DIFFERENTIAL EQUATION	
Homogeneous Equation $$y = vx \quad \text{and} \quad \frac{dy}{dx} = v + x\frac{dv}{dx}$$	Linear Factors (Integrating Factors) $$y \bullet IF = \int Q \bullet IF \, dx$$ Where $IF = e^{\int P dx}$
	Logarithmic $$a = e^{\ln a}$$ $$a^x = e^{x \ln a}$$ $$\int a^x \, dx = \frac{a^x}{\ln a} + c$$
GENERAL SOLUTION FOR 2nd ORDER DIFFERENTIAL EQUATION	
Equation of the form $a\dfrac{d^2 y}{dx^2} + b\dfrac{dy}{dx} + cy = 0$	
1. Real & different roots:	$y = Ae^{m_1 x} + Be^{m_2 x}$
2. Real & equal roots:	$y = e^{mx}(A + Bx)$
3. Complex roots:	$y = e^{\alpha x}(A\cos\beta x + B\sin\beta x)$

DIFFERENTIATION			
1.	$\frac{d}{dx}(k) = 0, k \text{ is constant}$	2.	$\frac{d}{dx}(x^n) = nx^{n-1}$ [Power Rule]
3.	$\frac{d}{dx}(ax^n) = anx^{n-1}$	4.	$\frac{d}{dx}(f(x) \pm g(x)) = f'(x) \pm g'(x)$
5.	$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$ [Product Rule]	6.	$\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$ [Quotient Rule]
7.	$\frac{dy}{dx} = \frac{du}{dx} \times \frac{dy}{du}$ [Chain Rule]	8.	$\frac{d}{dx}(e^x) = e^x$
9.	$\frac{d}{dx}\left(e^{ax+b}\right) = e^{ax+b} \times \frac{d}{dx}(ax+b)$	10.	$\frac{d}{dx}(\ln x) = \frac{1}{x}$
11.	$\frac{d}{dx}[\ln(ax+b)] = \frac{1}{ax+b} \times \frac{d}{dx}(ax+b)$	12.	$\frac{d}{dx}(\sin x) = \cos x$
13.	$\frac{d}{dx}(\cos x) = -\sin x$	14.	$\frac{d}{dx}(\tan x) = \sec^2 x$
15.	$\frac{d}{dx}[\sin(ax+b)] = \cos(ax+b) \times \frac{d}{dx}(ax+b)$	16.	$\frac{d}{dx}[\cos(ax+b)] = -\sin(ax+b) \times \frac{d}{dx}(ax+b)$
17.	$\frac{d}{dx}[\tan(ax+b)] = \sec^2(ax+b) \times \frac{d}{dx}(ax+b)$	18.	$\frac{d}{dx}[\sin^n u] = n\sin^{n-1} u \times \cos u \times \frac{du}{dx}$
19.	$\frac{d}{dx}[\cos^n u] = n\cos^{n-1} u \times -\sin u \times \frac{du}{dx}$	20.	$\frac{d}{dx}[\tan^n u] = n\tan^{n-1} u \times \sec^2 u \times \frac{du}{dx}$

INTEGRATION			
1.	$\int ax^n dx = \frac{ax^{n+1}}{n+1} + c \;;\{n \neq -1\}$	2.	$\int (ax+b)^n dx = \frac{(ax+b)^{n+1}}{(a)(n+1)} + c \;;\{n \neq -1\}$
3.	$\int k\,dx = kx + c, k \text{ is constant}$	4.	$\int_a^b f(x)dx = F(b) - F(a)$
5.	$\int \frac{1}{x}\,dx = \ln x + c$	6.	$\int \frac{1}{ax+b}\,dx = \frac{1}{a} \times \ln(ax+b) + c$
7.	$\int e^x\,dx = e^x + c$	8.	$\int e^{ax+b}\,dx = \frac{1}{a} \times e^{ax+b} + c$
9.	$\int \sin x\,dx = -\cos x + c$	10.	$\int \cos x\,dx = \sin x + c$
11.	$\int \sec^2 x\,dx = \tan x + c$		
12.	$\int \sin(ax+b)\,dx = -\frac{1}{\frac{d}{dx}(ax+b)} \times \cos(ax+b) + c$		
13.	$\int \cos(ax+b)\,dx = \frac{1}{\frac{d}{dx}(ax+b)} \times \sin(ax+b) + c$		
14.	$\int \sec^2(ax+b)\,dx = \frac{1}{\frac{d}{dx}(ax+b)} \times \tan(ax+b) + c$		