POLITEKNIK MALAYSIA

SULTAN SALAHUDDIN ABDUL AZIZ SHAH

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENGAJIAN TINGGI

JABATAN MATEMATIK, SAINS & KOMPUTER

PENILAIAN ALTERNATIF BERIKUTAN
PELAKSANAAN PERINTAH KAWALAN BERSYARAT

SESI JUN 2020

DBM20023 : ENGINEERING MATHEMATICS 2

NAMA PENYELARAS KURSUS : NORAZILA BINTI MAD

KAEDAH PENILAIAN   : PEPERIKSAAN ONLINE

JENIS PENILAIAN   : SOALAN ESEI BERSTRUKTUR
                              (2 SOALAN)

TARIKH PENILAIAN   : 21 DISEMBER 2020

TEMPOH PENILAIAN   : 1 JAM

INSTRUCTION:
This section consists of TWO (**2**) subjective questions. Answer **ALL** questions.

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

QUESTION 1

SOALAN 1

CLO1
C2

(a)   Simplify the following expressions:

  Permudahkan setiap yang berikut:

  i. $\dfrac{m^{2-3n}}{m^{n-6} \times m^{2n+1}}$

[5 marks]
[*5 markah*]

  ii. $\log 7 + 2\log\dfrac{2}{5} - 3\log 4$

[5 marks]
[*5 markah*]

CLO1
C3

(b)   Solve the following equations by applying suitable method:

  Selesaikan setiap persamaan yang berikut dengan menggunakan kaedah yang sesuai:

  i. $5^{x-3} \times 125^{3+2x} = 1$

[5 marks]
[*5 markah*]

  ii. $2\log_x 3 + \log_x 9 = 4$

[5 marks]
[*5 markah*]

CLO1
C3

(c)   Given $\log_2 3 = 1.59$ and $\log_2 5 = 2.32$. Solve the value of $\log_2 75 + \log_3 5$ without using calculator.

  Diberi $\log_2 3 = 1.59$ *dan* $\log_2 5 = 2.32$. *Selesaikan* $\log_2 75 + \log_3 5$ *tanpa menggunakan kalkulator.*

[5 marks]
[*5 markah*]

QUESTION 2
SOALAN 2

CLO 1
C3

(a) Solve the following functions using a suitable method.

Selesaikan fungsi-fungsi berikut mengikut kaedah yang bersesuaian.

    i.   y $= (2x + 3)^2(x - 1)$

[5 marks]
[*5 markah*]

    ii.   y $= \frac{4x-2}{2x^2}$

[5 marks]
[*5 markah*]

CLO 1
C3

(b) i. The parametric equations are given as $x = 6e^{2t-1}$ and $y = 2t^3$. Calculate $\frac{dy}{dx}$.

    Persamaan – persamaan parametrik diberi sebagai $x = 6e^{2t-1}$ *dan* $y = 2t^3$.

    Kirakan $\frac{dy}{dx}$.

[4 marks]
[*4 markah*]

    ii. Use implicit differentiation to find $\frac{dy}{dx}$ if $3x - 2y^2 + 5xy = 4$.

    Gunakan pembezaan implicit untuk mendapatkan $\frac{dy}{dx}$ *sekiranya*

    $3x - 2y^2 + 5xy = 4$.

[5 marks]
[*5 markah*]

CLO 1
C3

(c) Given $z = 4x^3 + 3x^4y^2 - 5y^2$, use partial differential to solve $\frac{\partial z}{\partial x}$, $\frac{\partial z}{\partial y}$, $\frac{\partial^2 z}{\partial x \partial y}$

and $\frac{\partial^2 z}{\partial y \partial x}$.

Diberi bahawa $z = 4x^3 + 3x^4y^2 - 5y^2$, *gunakan pembezaan separa untuk*

selesaikan $\frac{\partial z}{\partial x}$, $\frac{\partial z}{\partial y}$, $\frac{\partial^2 z}{\partial x \partial y}$ *dan* $\frac{\partial^2 z}{\partial y \partial x}$.

[6 marks]
[*6 markah*]

FORMULA SHEET FOR DBM20023

EXPONENTS AND LOGARITHMS

	LAW OF EXPONENTS		LAW OF LOGARITHMS
1.	$a^m \times a^n = a^{m+n}$	**8.**	$\log_a a = 1$
2.	$\dfrac{a^m}{a^n} = a^{m-n}$	**9.**	$\log_a 1 = 0$
3.	$(a^m)^n = a^{m \times n}$	**10.**	$\log_a b = \dfrac{\log_c b}{\log_c a}$
4.	$a^0 = 1$	**11.**	$\log_a MN = \log_a M + \log_a N$
5.	$a^{-n} = \dfrac{1}{a^n} , a \neq 0$	**12.**	$\log_a \dfrac{M}{N} = \log_a M - \log_a N$
6.	$a^{\frac{m}{n}} = (\sqrt[n]{a})^m$	**13.**	$\log_a N^P = P \log_a N$
7.	$(ab)^n = a^n b^n$	**14.**	$N = a^x \Leftrightarrow \log_a N = x$

DIFFERENTIATION

1.	$\dfrac{d}{dx}(k) = 0, k \text{ is constant}$	**2.**	$\frac{d}{dx}(ax^n) = nax^{n-1}$ [Power Rule]
3.	$\dfrac{d}{dx}(f(x) \pm g(x)) = f'(x) \pm g'(x)$	**4.**	$\frac{d}{dx}[a\{u(x)\}^n\}] = na\{u(x)\}^{n-1} \cdot u'(x)$ [Composite]
5.	$\dfrac{d}{dx}(uv) = u\dfrac{dv}{dx} + v\dfrac{du}{dx}$ [Product Rule]	**6.**	$\dfrac{d}{dx}\left(\dfrac{u}{v}\right) = \dfrac{v\dfrac{du}{dx} - u\dfrac{dv}{dx}}{v^2}$ [Quotient Rule]
7.	$\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}$ [Chain Rule]	**8.**	$\frac{d}{dx}(ae^{u(x)}) = ae^{ux} \cdot u'(x)$
9.	$\frac{d}{dx}[a \ln u(x)] = \frac{a}{u(x)} \cdot u'(x)$	**10.**	$\dfrac{d}{dx}[a \sin u(x)] = a \cos u(x) \cdot u'(x)$
11.	$\dfrac{d}{dx}[a \sin^n u(x)] = an \cos u(x) \cdot \sin^{n-1} u(x) \cdot u'(x)$	**12.**	$\dfrac{d}{dx}[a \cos u(x)] = -a \sin u(x) \cdot u'(x)$
13.	$\dfrac{d}{dx}[a \cos^n u(x)] = -an \sin u(x) \cdot \cos^{n-1} u(x) \cdot u'(x)$	**14.**	$\dfrac{d}{dx}[a \tan u(x)] = a \sec^2 u(x) \cdot u'(x)$
15.	$\dfrac{d}{dx}[a \tan^n u(x)] = an \tan^{n-1} u(x) \cdot \sec^2 u(x) \cdot u'(x)$	**16.**	$\frac{dy(t)}{dx(t)} = \frac{dy(t)}{dt} \times \frac{dt}{dx(t)}$ [Parametric Rule]