

SULIT



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

JABATAN MATEMATIK, SAINS & KOMPUTER

PENILAIAN ALTERNATIF

SESI DISEMBER 2020

DBM20023 : ENGINEERING MATHEMATICS 2

NAMA PENYELARAS KURSUS : NORAZILA BINTI MAD

KAEDAH PENILAIAN : PEPERIKSAAN ONLINE

**JENIS PENILAIAN : SOALAN ESEI BERSTRUKTUR
(2 SOALAN)**

TARIKH PENILAIAN : 29 JUN 2021

TEMPOH PENILAIAN : 1 JAM

LARANGAN TERHADAP PLAGIARISM (AKTA 174)

**PELAJAR TIDAK BOLEH MEMPLAGIAT APA-APA IDEA, PENULISAN, DATA
ATAU CIPTAAN ORANG LAIN. PLAGIAT ADALAH SALAH SATU
PENYELEWENGAN AKADEMIK. SEKIRANYA PELAJAR DIBUKTIKAN
MELAKUKAN PLAGIARISM, PENILAIAN BAGI KURSUS BERKENAAN AKAN
DIMANSUHKAN DAN DIBERI GRED F DENGAN NILAI MATA 0.**

**(RUJUK BUKU ARAHAN-ARAHAN PEPERIKSAAN DAN KAEDAH PENILAIAN (Diploma) EDISI 6, JUN 2019,
KLAUSA 17.3)**

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**

- (a) Change the following expressions in the simplest form:

Tukarkan setiap yang berikut kepada bentuk termudah:

CLO1
C3

i.
$$\frac{h^{3+2k} \times (6h)^2}{2h^{k-4}}$$

[5 marks]
[5 markah]

ii.
$$5 \log 2 + \log \frac{1}{2} - 2 \log 5$$

[5 marks]
[5 markah]

CLO1
C3

- (b) Solve the following equations by applying suitable logarithm rules and index rules:

Selesaikan setiap persamaan yang berikut dengan menggunakan hukum logarithm dan hukum indeks yang sesuai:

i.
$$7^{1-x} \times 49^{2x-3} = 7^{2x}$$

[5 marks]
[5 markah]

ii.
$$2 \log_m 6 - 3 \log_m 4 + 2 = 0$$

[5 marks]
[5 markah]

CLO1
C3

- (c) Given $\log_3 4 = 1.2619$ and $\log_3 7 = 1.7712$. Calculate the value of $\log_3 16 - \log_4 7$ without using calculator.

Diberi $\log_3 4 = 1.2619$ dan $\log_3 7 = 1.7712$. Kirakan $\log_3 16 - \log_4 7$ tanpa menggunakan kalkulator.

[5 marks]
[5 markah]

QUESTION 2
SOALAN 2

CLO 1
C3

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

Selesaikan fungsi-fungsi berikut menggunakan kaedah pembezaan yang bersesuaian.

i. $y = x(2 - 7x)^3$

[5 marks]

[5 markah]

ii. $y = \frac{5x+4}{3x^2-2}$

[5 marks]

[5 markah]

CLO 1
C3

(b) i. The parametric equations are given as $x = 4 \sin 2t$ and $y = \ln t^3$. Calculate $\frac{dy}{dx}$.

Persamaan – persamaan parametrik diberi sebagai $x = 4 \sin 2t$ dan $y = \ln t^3$.

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

[4 marks]

[4 markah]

ii. Apply implicit differentiation to find $\frac{dy}{dx}$ if $3e^{-2x} - 2y^5 + 7 = xy^2$.

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

$3e^{-2x} - 2y^5 + 7 = xy^2$.

[5 marks]

[5 markah]

CLO 1
C3

(c) Given $z = \sqrt{y} + \cos(xy) - 2x^2$, apply partial differentiation to solve $\frac{\partial z}{\partial x}$, $\frac{\partial z}{\partial y}$ and

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

Diberi bahawa $z = \sqrt{y} + \cos(xy) - 2x^2$, gunakan pembezaan separa untuk

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

[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.	$\frac{a^m}{a^n} = a^{m-n}$	9.	$\log_a 1 = 0$
3.	$(a^m)^n = a^{m \times n}$	10.	$\log_a b = \frac{\log_c b}{\log_c a}$
4.	$a^0 = 1$	11.	$\log_a MN = \log_a M + \log_a N$
5.	$a^{-n} = \frac{1}{a^n}, a \neq 0$	12.	$\log_a \frac{M}{N} = \log_a M - \log_a N$
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.	$\frac{d}{dx}(k) = 0, k \text{ is constant}$	2.	$\frac{d}{dx}(ax^n) = nax^{n-1}$ [Power Rule]
3.	$\frac{d}{dx}(f(x) \pm g(x)) = f'(x) \pm g'(x)$	4.	$\frac{d}{dx}[a\{u(x)\}^n] = na\{u(x)\}^{n-1} \cdot u'(x)$ [Composite]
5.	$\frac{d}{dx}(uv) = u \frac{dv}{dx} + v \frac{du}{dx}$ [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.	$\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$ [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.	$\frac{d}{dx}[a \sin u(x)] = a \cos u(x) \cdot u'(x)$
11.	$\frac{d}{dx}[a \sin^n u(x)] = an \cos u(x) \cdot \sin^{n-1} u(x) \cdot u'(x)$	12.	$\frac{d}{dx}[a \cos u(x)] = -a \sin u(x) \cdot u'(x)$
13.	$\frac{d}{dx}[a \cos^n u(x)] = -an \sin u(x) \cdot \cos^{n-1} u(x) \cdot u'(x)$	14.	$\frac{d}{dx}[a \tan u(x)] = a \sec^2 u(x) \cdot u'(x)$
15.	$\frac{d}{dx}[a \tan^n u(x)] = an \tan^{n-1} u(x) \cdot \sec^2 u(x) \cdot u'(x)$	16.	$\frac{dy(t)}{dx(t)} = \frac{dy(t)}{dt} \times \frac{dt}{dx(t)}$ [Parametric Rule]