SULIT

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

JABATAN MATEMATIK, SAINS & KOMPUTER

PENILAIAN ALTERNATIF

SESI 1 2021/2022

DBM20023 : ENGINEERING MATHEMATICS 2

NAMA PENYELARAS KURSUS : NORAZILA BINTI MAD

KAEDAH PENILAIAN	**: PEPERIKSAAN ONLINE**
JENIS PENILAIAN	**: SOALAN ESEI BERSTRUKTUR (2 SOALAN)**
TARIKH PENILAIAN	**: 24 JANUARI 2022**
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.Write your answers in the Alternative Exam answer sheet.

ARAHAN :
*Bahagian ini mengandungi **DUA (2)** soalan subjektif. Jawab semua soalan. Tulis jawapan anda di dalam kertas jawapan Penilaian Alternatif. .*

QUESTION 1

SOALAN 1

CLO1 C3

a) Solve the following equations

Selesaikan persamaan yang berikut

i. $\frac{1}{3^{5x}} + 3^3 = 36$ [3 marks]
[*3 markah*]

ii. $log_5 x^2 = 1 + log_5(25 - 4x)$ [4 marks]
[*4 markah*]

CLO2 C3

b) Use suitable method to find $\frac{dy}{dx}$ for the following functions :

Gunakan kaedah yang sesuai untuk mendapatkan $\frac{dy}{dx}$ persamaan yang berikut:

i. $y = 2\ln(cos4x^2)$ [3 marks]
[3 *markah*]

ii. $y = \frac{(1+e^x)^5}{x^3}$ [5 marks]
[5 *markah*]

CLO2 C3

c) Given a curve $y = 2x^3 - 2x^2 + 1$. Solve the equation to find stationary points and their natures. Then, sketch the graph.

Diberi lengkung $y = 2x^3 - 2x^2 + 1$. Selesaikan persamaan lengkung tersebut bagi mendapatkan titik pusingan dan sifat-sifatnya. Kemudian, lakarkan graf.

[10 marks]
[10 markah]

QUESTION 2

SOALAN 2

CLO1
C3

a) Use integration of partial fraction for $\int \frac{x-1}{(x^2-1)(x-3)}\,dx$

Gunakan kamiran pecahan separa bagi $\int \frac{x-1}{(x^2-1)(x-3)}\,dx$

[7 marks]

[7 *markah*]

CLO2
C3

b) Use suitable method to find integration of $\int tan^3 x\ dx$

Gunakan kaedah yang sesuai bagi kamiran $\int tan^3 x\ dx$

[8 marks]

[8 *markah*]

CLO2
C3

c) Use integration by parts for the following functions:

Gunakan kamiran bahagian demi bahagian bagi fungsi yang berikut:

i. $\int \ln x\ dx$

[4 marks]

[4 *markah*]

ii. $\int \frac{x^3 e^{2x}}{5}\,dx$

[6 marks]
[6 markah]

SOALAN TAMAT

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 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.	$\frac{d}{dx}[ae^{u(x)}] = ae^{u(x)} \cdot u'(x)$	6.	$\frac{d}{dx}[a\ln u(x)] = \frac{a}{u(x)} \cdot u'(x)$
7.	$\frac{d}{dx}[a \sin u(x)] = a \cos u(x) \cdot u'(x)$	8.	$\frac{d}{dx}[a \sin^n u(x)] = an \cos u(x) \cdot \sin^{n-1} u(x) \cdot u'(x)$
9.	$\frac{d}{dx}[a \cos u(x)] = -a \sin u(x) \cdot u'(x)$	10.	$\frac{d}{dx}[a \cos^n u(x)] = -an \sin u(x) \cdot \cos^{n-1} u(x) \cdot u'(x)$
11.	$\frac{d}{dx}[a \tan u(x)] = a\, sec^2 u(x) \cdot u'(x)$	12.	$\frac{d}{dx}[a \tan^n u(x)] = an \tan^{n-1} u(x) \cdot sec^2 u(x) \cdot u'(x)$
13.	$\frac{d}{dx}[y\{u(x)\}] = \frac{dy}{du} \times \frac{du}{dx}$ [Chain Rule]	14.	$\frac{d}{dx}[u(x) \cdot v(x)] = u\frac{dv}{dx} + v\frac{du}{dx}$ [Product Rule]
15.	$\frac{d}{dx}\left[\frac{u(x)}{v(x)}\right] = \frac{\left(v\frac{du}{dx} - u\frac{dv}{dx}\right)}{(v)^2}$ [Quotient Rule]	16.	$\frac{dy(t)}{dx(t)} = \frac{dy(t)}{dt} \times \frac{dt}{dx(t)}$ [Parametric Equation]

INTEGRATION			
1.	$\int k\ dx = kx + c$, k is constant	2.	$\int ax^n dx = \frac{ax^{n+1}}{(n+1)} + c \quad ;\{n \neq -1\}$
3.	$\int [f(x) \pm g(x)]\ dx = \int f(x)\,dx \pm \int g(x)\,dx$	4.	$\int a[u(x)]^n dx = \frac{a[u(x)]^{n+1}}{(n+1)\cdot u'(x)} + c \quad ;\{n \neq -1\}$
5.	$\int_a^b f(x)dx = F(b) - F(a)$	6.	$\int \frac{a}{[u(x)]^n}\ dx = \frac{a\ln[u(x)]}{u'(x)} \quad ;\{n = 1\}$
7.	$\int e^{u(x)}\ dx = \frac{e^{u(x)}}{u'(x)} + c$	8.	$\int a\sin u(x)\ dx = -\frac{a\cos u(x)}{u'(x)} + c$
9.	$\int a\cos u(x)dx = \frac{a\sin\ u(x)}{u'(x)} + c$	10.	$\int a\sec^2 u(x)\ dx = \frac{a\tan u(x)}{u'(x)} + c$
IDENTITY TRIGONOMETRY			
1.	$\cos^2\theta + \sin^2\theta = 1$	2.	$1 + \tan^2\theta = \sec^2\theta$
3.	$1 + \cot^2\theta = \operatorname{cosec}^2\theta$	4.	$\sin 2\theta = 2\sin\theta\cos\theta$
5.	$\cos 2\theta = 2\cos^2\theta - 1$ $= 1 - 2\sin^2\theta$ $= \cos^2\theta - \sin^2\theta$	6.	$\tan 2\theta = \frac{2\tan\theta}{1 - \tan^2\theta}$
7.	$\tan\theta = \frac{\sin\theta}{\cos\theta}$	8.	$\cot\theta = \frac{\cos\theta}{\sin\theta} = \frac{1}{\tan\theta}$
9.	$\sec\theta = \frac{1}{\cos\theta}$	10.	$\operatorname{cosec}\theta = \frac{1}{\sin\theta}$
AREA UNDER CURVE			
1.	$A_x = \int_a^b y\ dx$	2.	$A_y = \int_a^b x\ dy$
VOLUME UNDER CURVE			
1.	$V_x = \pi\int_a^b y^2\ dx$	2.	$V_y = \pi\int_a^b x^2\ dy$
INTEGRATION BY PARTS			
$\int u\,dv = uv - \int v\,du$			