

Academic Year: 2014 – 2015 Semester: Autumn Date: January 18, 2015	 Modern University For Technology & Information Faculty of Pharmacy	Mathematics: OCM 103 Final Exam Duration Time: 2 Hours																
Answer All Questions		No. of questions: 4 Total Mark: 60																
Question 1																		
(a) If $A = \begin{bmatrix} 1 & 1 & -2 \\ 2 & 3 & 2 \\ 2 & 0 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ 0 & 3 \\ 1 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 1 \\ 2 & -3 \\ 3 & 0 \end{bmatrix}$ Find, if possible, $A + B$, $B + C$, $A.B$, $B.C$, $ A $ and $ B $.		10																
(b) Find the eigenvalues and the eigenvectors of : $A = \begin{bmatrix} 2 & 4 \\ 1 & -1 \end{bmatrix}$		8																
Question 2																		
(a) If $A = \begin{bmatrix} 2 & 1 \\ 1 & 0 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 4 \end{bmatrix}$. Find $A.B$ and $(A.B)^t$.		4																
(b) Determine the type of solution of the linear system : $3x - 2y - z = -1$, $x - y + z = 3$, $-2x + y + 2z = 4$.		4																
Question 3																		
(a) Find y' where: (i) $y = x^3 + 3^x + 3x$ (ii) $y = x^3 \cdot 3^x + \sqrt{3}$ (iii) $y = \sin 2x \cdot \log x$ (iv) $y = [\ln x + \cos x]^5$ (v) $y = 3^{x^2} - \cos x^3$ (vi) $y = \frac{x}{\sqrt{2}} + \ln \frac{\sin \ln x}{2 + \cos x}$		12																
(b) Find the integrals: (i) $\int (x^4 + 4^x) dx$ (ii) $\int 2x(3 + x^2)^8 dx$ (iii) $\int (\cos 2x + 2 \sin x) dx$ (iv) $\int (3^x + 2^x)^2 dx$ (v) $\int \frac{1}{x} \cdot \ln x dx$ (vi) $\int_0^1 (3x^2 + e^x) dx$		12																
Question 4																		
(a) If y is the quantity of drug decreases according to the equation $\frac{dy}{dt} = -4y^{\frac{1}{2}}$. Find y as function of the time t where the initial quantity is 64 units. Also, find (i) The value of y after 3 hours. (ii) The time at which there is no drug in the blood.		5																
(b) If the quantity of a drug in the blood decreases according to the data:		5																
<table><tr><td>Time: t</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>Hours</td></tr><tr><td>Quantity: y</td><td>40</td><td>36</td><td>28</td><td>18</td><td>7</td><td>1</td><td>Units</td></tr></table>		Time: t	0	1	2	3	4	5	Hours	Quantity: y	40	36	28	18	7	1	Units	
Time: t	0	1	2	3	4	5	Hours											
Quantity: y	40	36	28	18	7	1	Units											
From these data, find the relation $y = a + bt$. Also, find the value of y at $t = 2.5$																		

Good Luck

Dr. Mohamed Eid

Mathematics: OCM 103	Mid-Term Exam	Name:	
November 20, 2014	Time: 1 Hour		
Answer Four Questions	Total mark: 20	ID:	Sec:

[1] If $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 1 & -1 \\ 2 & 3 & 2 \\ 2 & 0 & -1 \end{bmatrix}$. Find, if possible, $A + B$, $A.B$, $|A|$, $|B|$.

[2] Find the eigenvalues and the eigenvectors of : $A = \begin{bmatrix} 1 & 1 \\ 2 & 0 \end{bmatrix}$

[3] Write the linear system in matrix form and determine the type of solution:

$$x + y + 3z = 1, \quad -x + y + z = 2, \quad 2x + 2z = 1.$$

[4] If a drug exists in three dosage forms : The first type of concentration 1 mg / tablet , The second of concentration 2 mg / tablet , The third of concentration 4 mg / tablet. If the pharmacist wanted to produce 10 tablets of concentration 3 mg / tablet by mixing whole tablets. Find two possible solutions.

Academic Year: 2013 – 2014 Semester: Autumn Date: November, 2013 Duration Time: 1 Hour	 Modern University For Technology & Information	Mathematics: OCM 103 Mid-Term Exam Examiner: Dr. Mohamed Eid
Answer All Questions	Faculty of Pharmacy	Total Mark: 20
[1] Find y' where:		9
(a) $y = 3x^3 - 2^x + 4x$ (b) $y = \frac{3}{4} + \cos x \cdot \ln x$ (c) $y = (\cos x + \log x)^{-4}$ (d) $y = \frac{1}{x^3} + \frac{1}{(x+\sin x)^4}$ (e) $y = \frac{x^4}{4} + 2 \cos x$ (f) $y = \ln^5 x + \ln x^5$		
[2] Determine the maximum and minimum points of : $f(x) = x - e^x$		2
[3] Find the following integrals:		10
(a) $\int (x^3 + \frac{1}{x} + \cos x) dx$ (b) $\int (2^x + \frac{3^x}{4^x} + \cos x) dx$ (c) $\int \cos x \cdot \sin^5 x dx$ (d) $\int x \cos x dx$ (e) $\int_0^1 (1 - x^2)^2 dx$		

Good Luck

Dr. Mohamed Eid

*Group1	Sec:	ID:	Name:
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[1] If $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 & 2 \\ 1 & 0 & 3 \end{bmatrix}$. Find, if possible: $A + B$, $A.B$, $|A^t.B|$

[2] Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 3 & 0 \\ 2 & 1 \end{bmatrix}$

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Answer

**Group1	Sec:	ID:	Name:
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[1] If $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 \\ 2 & 0 \\ -2 & 3 \end{bmatrix}$. Find, if possible: $A + B$, $A + B^t$, $|B.A^t|$

[2] Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 0 & 1 \\ 2 & 1 \end{bmatrix}$

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Answer

***Group1	Sec:	ID:	Name:
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[1] If $A = \begin{bmatrix} 1 & 3 \\ 2 & -2 \\ 3 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 & 3 \\ 1 & 4 & 0 \end{bmatrix}$. Find, if possible: $A + B$, $A^t + B$, $|A \cdot B|$

[2] Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 0 & 3 \\ 1 & 2 \end{bmatrix}$

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Answer

*Group2	Sec:	ID:	Name:
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[1] If $A = \begin{bmatrix} 1 & 4 \\ 2 & -2 \\ 3 & 0 \end{bmatrix}$. Find, if possible: $|A|$, $A + A^t$, $|A.A^t|$

[2] Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix}$

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Answer

**Group2	Sec:	ID:	Name:
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[1] If $A = \begin{bmatrix} 3 & -2 \\ 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & 4 \end{bmatrix}$. Find, if possible, $A + B$, $A.B$, $|B^t.B|$

[2] Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$

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Answer

***Group2	Sec:	ID:	Name:
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[1] If $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 2 & 2 \\ -1 & 3 & 1 \end{bmatrix}$. Find $2A$, $A + A^t$, $|A|$

[2] Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$

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Answer

Sec:	ID:	Name:
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[1]Find y' , where

(a) $y = 3^x \cdot x^3 + 3$

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(b) $y = \sin x^3 + \sin^3 x$

.....

(c) $y = \log x + \log(2 + x^3)$

.....

[2]Find the integrals:

(a) $\int (3^x - 2x^3) dx$

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(b) $\int (x^2 - 2)^2 dx$

.....

(c) $\int \cos x \cdot (2 + \sin x)^6 dx$

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[3]Find the maximum and minimum points of the function: $f(x) = x - 2 \ln(x + 1)$

Sec:	ID:	Name:
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[1]Find y' , where

(a) $y = \frac{2}{3} + x^4 \cdot 4^x$

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(b) $y = \tan 2x + 2 \cos 3x$

.....

(c) $y = \ln(x + 1)^4 + \ln^4(x + 1)$

.....

[2]Find the integrals:

(a) $\int (3^{2x} - 2 \sin 3x) dx$

.....

(b) $\int (3^x - 2)^2 dx$

.....

(c) $\int e^x \cdot \sqrt{2 + e^x} dx$

.....

[3]Find the maximum and minimum points of the function: $f(x) = x + e^{-x}$

Sec:	ID:	Name:
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[1]Find y' , where

(a) $y = \frac{x^3}{3} - 3x^2$

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(b) $y = \sin x \cdot \cos 3x$

.....

(c) $y = \log \sin x + \ln(2 + x)$

.....

[2]Find the integrals:

(a) $\int (2^{3x} - \sin \frac{x}{2}) dx$

.....

(b) $\int \frac{1+2^x}{3^x} dx$

.....

(c) $\int \cos x \cdot \sin^3 x dx$

.....

[3]Find the maximum and minimum points of the function: $f(x) = x^2 - 2 \ln x$

Sec:	ID:	Name:
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[1]Find y' , where

(a) $y = \frac{\sin x}{\cos 2x} - \tan^3 x$

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(b) $y = 6^x \cdot x^6 + \sqrt{3}$

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(c) $y = \ln \frac{x + \sin x}{x^2 + \ln x}$

.....

[2]Find the integrals:

(a) $\int (3x - \frac{2}{3^x}) dx$

.....

(b) $\int \frac{1}{x} \cdot \ln^4 x dx$

.....

(c) $\int (\frac{2}{x^2} + \cos 3x) dx$

.....

[3]Find the maximum and minimum points of the function: $f(x) = \frac{x}{2} + \frac{2}{x}$

Sec:	ID:	Name:
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[1]Find y' , where

(a) $y = \tan x \cdot \sin 3x$

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(b) $y = (3x + \ln x)^5$

.....

(c) $y = \cos \ln x + \ln \tan x$

.....

[2]Find the integrals:

(a) $\int \left(\frac{x}{4} - \frac{4}{x^4} \right) dx$

.....

(b) $\int \left(x + \frac{1}{x} \right)^2 dx$

.....

(c) $\int \frac{\cos x}{\sqrt{\sin x}} dx$

.....

[3]Find the maximum and minimum points of the function: $f(x) = 2x + e^{-2x}$

Sec:	ID:	Name:
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[1]Find y' , where

(a) $y = \sin 3x \cdot \log x$

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(b) $y = (3x + 3^x)^5$

.....

(c) $y = \cos 3x + \tan 2x$

.....

[2]Find the integrals:

(a) $\int \frac{2x}{(1+x^2)^3} dx$

.....

(b) $\int (3 - x^2)^2 dx$

.....

(c) $\int \left(\frac{2^x}{3} + \frac{3^x}{4} \right) dx$

.....

[3]Find the maximum and minimum points of the function: $f(x) = x \cdot e^{-x}$

