


Academic Year: 2016 – 2017 Semester: Spring Date: May , 2017	 <b>Modern University</b> for Technology & Information مستقبل الصفوة <b>Faculty of Pharmacy</b>	Mathematics: OCM 103 Final Exam Duration Time: 2 Hours														
<b>Answer All Questions</b>		No. of questions: 4      Total Mark: 60														
<b>Question 1</b>																
(a)If $A = \begin{bmatrix} 3 & 2 & -2 \\ 1 & 0 & -1 \end{bmatrix}$ , $B = \begin{bmatrix} 2 & 0 & 1 \\ 3 & 1 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} 3 & -3 \\ 2 & -1 \end{bmatrix}$ Find, if possible, $A + B$ , $A + C$ , $A.B$ , $A.C$ , $C.A$ , $ A $ , $ C $ , $ A.B^t $ .		10														
(b)Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 2 & 2 \\ 3 & 1 \end{bmatrix}$ .		10														
<b>Question 2</b>																
(a)Write the linear system in matrix form and state the types of solutions : $x - 2y + z = 3$ , $x + 2z = 0$ , $y - 2x + 3z = 5$ .		4														
(b)If a drug exists in three dosage forms : The first of concentration 1 mg / tablet , The second of concentration 2 mg / tablet , The third of concentration 3 mg /tablet. If the pharmacist wanted to produce 12 tablets of concentration 2.5 mg / tablet by mixing whole tablets. Find two possible solutions.		6														
<b>Question 3</b>																
(a)Find $y'$ where:		12														
(i) $y = 3^x - 2x^3 - 3x$	(ii) $y = 3 + x^4 \cdot \sin x$	(iii) $y = x + \cos x \cdot \log x$														
(iv) $y = \frac{3}{4} + \frac{1}{[x+\sin x]^8}$	(v) $y = \frac{3x}{4} + \frac{\ln x}{x^5}$	(vi) $y = [x + \ln x]^5$														
(b)Find the integrals:		12														
(i) $\int (x^3 + \frac{1}{x^3} + \frac{3}{x})dx$	(ii) $\int (3^x - e^x) dx$	(iii) $\int (2 \cos x - 3 \sin x) dx$														
(iv) $\int (x^2 - 3)^2 dx$	(v) $\int x \cdot \sin x dx$	(vi) $\int \frac{x}{x^2-2x-3} dx$														
<b>Question 4</b>																
If the quantity of a drug in the blood decreases according to the data:		6														
<table><tr><td>Time: t</td><td>0</td><td>2</td><td>4</td><td>6</td><td>8</td><td>Hours</td></tr><tr><td>Quantity: y</td><td>20</td><td>17</td><td>12</td><td>6</td><td>1</td><td>Units</td></tr></table>		Time: t	0	2	4	6	8	Hours	Quantity: y	20	17	12	6	1	Units	
Time: t	0	2	4	6	8	Hours										
Quantity: y	20	17	12	6	1	Units										
From these data, find the relations : $y = a + bt$ and $y = a e^{bt}$ .																

Good Luck

Dr. Mohamed Eid