


Academic Year: 2015 – 2016 Semester: Spring Date: May 5, 2016	 Modern University for Technology & Information مستقبل الصفوة 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 $A = \begin{bmatrix} 1 & 2 & -2 \\ 0 & 3 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 0 & 1 \\ 1 & 2 & 1 \end{bmatrix}$ Find, if possible, $A + B$, $A.A$, $A.B$, $A.B^t$, $ A $, $ A^t.B $.		10																
(b) Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 2 & 4 \\ 1 & 2 \end{bmatrix}$.		6																
Question 2																		
(a) Find y' where:		12																
(i) $y = x^3 + 3^x + 3x$	(ii) $y = x^2.2^x + 4$	(iii) $y = \cos x . \log x$																
(iv) $y = [x^3 - \sin x]^6$	(v) $y = 3 + \sin^5 x$	(vi) $y = \frac{2}{x^2} + \frac{\ln x}{2x+1}$																
(b) Find the integrals:		12																
(i) $\int (x^4 + 2^x)dx$	(ii) $\int (\frac{2}{3} + \frac{1}{x^3}) dx$	(iii) $\int (2 \cos x - \sin x) dx$																
(iv) $\int (\sqrt{x} + e^x) dx$	(v) $\int x \cos x dx$	(vi) $\int_0^1 (x^2 + 2)^2 dx$																
Question 3																		
(a) Find the extrema of the function : $f(x) = x^3 - 6x^2 + 2$		5																
(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 4 mg /tablet. If the pharmacist wanted to produce 8 tablets of concentration 2.5 mg / tablet by mixing whole tablets. Find two possible solutions.		5																
Question 4																		
(a) If y is the quantity of drug decreases according to the equation $\frac{dy}{dt} = -y^{\frac{1}{2}}$. Find y as function of the time t where the initial quantity is 16 units. Also, find (i) The value of y after 2 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>2</td><td>4</td><td>6</td><td>8</td><td>10</td><td>Hours</td></tr><tr><td>Quantity: y</td><td>20</td><td>19</td><td>16</td><td>11</td><td>5</td><td>1</td><td>Units</td></tr></table>		Time: t	0	2	4	6	8	10	Hours	Quantity: y	20	19	16	11	5	1	Units	
Time: t	0	2	4	6	8	10	Hours											
Quantity: y	20	19	16	11	5	1	Units											
From these data, find the relation $y = a + bt$.																		