

Academic Year: 2016 – 2017 Somostor: Summar		Mathematics: OCM 103	
Date: July 31, 2017	Modern University for Technology & Information	Duration Time: 2 Hours	
Answer All Questions	مستقبل الصفوة Faculty of Pharmacy	No. of questions: 4 Total Mark	x: 60
Question 1			
(a)If $A = \begin{bmatrix} 1 & -2 & 1 \\ 0 & 3 & 2 \\ 2 & -1 & 1 \end{bmatrix}$, $B =$	$\begin{bmatrix} 2 & 1 & 2 \\ 3 & 1 & 0 \end{bmatrix} \text{ and } \mathbf{C} = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$	$\begin{bmatrix} 2 & -1 & 3 \\ 1 & -3 & 1 \end{bmatrix}$	10
Find, if possible, $A + B$, $B + C$, $A \cdot B$, $B \cdot A$, $B \cdot C$, $B' \cdot C$, $ A $, $ C $.			
(b)Find the eigenvalues and eig	genvectors of the matrix	$: A = \begin{bmatrix} -1 & 1 \\ 4 & 2 \end{bmatrix}.$	6
Question 2			_
(a)Solve the linear systems : (i) $x - y = 2$, $x + 2y = 0$, $-2x + y = 3$. (ii) $x - y + z = 2$, $2x + z = 7$, $x + y + 2z = 1$			5
(h) $x - y + 2 - 2$, $2x + 2 - 7$, $-x + y + 22 - 1$. (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 3 mg / tablet by mining whole tablets. Find two possible colutions			5
mixing whole tablets. Find two possible solutions.			
Question 3			12
(a)Find y where: (i) $v = 2x^{-3} - x^3 - 3$ (ii) $\mathbf{v} = \mathbf{x} + \mathbf{e}^{\mathbf{x}} \cdot \log \mathbf{x}$	(iii) $v = 2 + \cos x \cdot 3^x$	
(iv) $y = [x - \cos x]^8$ (v)	v) $y = \sqrt{x} + \frac{\ln x}{5} + \frac{3}{4}$	(vi) $y = \sin x + \sin^4 x$	10
(b)Find the integrals:	x ³ 4		12
(i) $\int (x^2 + \frac{1}{x^2} + \frac{1}{x}) dx$ (ii)	ii) $\int (\cos 2x + \sin x) dx$	(iii) $\int (1+x-3^x) \mathrm{d}x$	
(iv) $\int (x^2 - 3)^2 dx$ ($(v)\int x.\sin xdx$	$(vi)\int \frac{x}{x^2 - 2x - 3} dx$	
Question 4			
(a) If y is the quantity of a drug decreases according to the equation : $\frac{dy}{dt} = -\frac{1}{2}\sqrt{y}$.			
Find y as function of the time t where the initial quantity is 16 units. Find (i)The value of y after 4 hours. (ii)The time at which there exists 25 % of drug in the blood.			6
(b)If the quantity of a drug in the blood decreases according to the data :			
Time: t Quantity: y	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	8 Hours	4
Quantity. y			
From these data, find the relation : $y = a e^{bt}$. Also, find the value of y at $t = 2$.			
Good Luck		Dr. Mohamed Eid	