Academic Year: 2015 – 2016 Semester: Summer Date: August 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 $A = \begin{bmatrix} 0 & 3 & -2 \\ 2 & 1 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 & 0 \\ 0 & 3 & 4 \end{bmatrix}$ 6

Find, if possible, A + B, A.A , A.B , $A.A^t$, |A| , $|A^t.B|$.

(b)Find the eigenvalues and eigenvectors of : $A = \begin{bmatrix} 0 & 1 \\ 3 & 2 \end{bmatrix}$. 5

(c)Solve the linear system : x + y = 3, 2x – 3y = 1, 3x – 2y = 4 5

Question 2

(a)Find **y`** where: 12

(i) $y = 2x^4 + 4^x + x$ (ii) $y = 3 + x^3 . \ln x$ (iii) $y = \cos 4x . \log x$

(iv) $y = [2x - \sin x]^4$ (v) $y = \cos x + \cos^4 x$ (vi) $y = \frac{2}{x^2} + \frac{\ln x}{x}$

(b)Find the integrals: 12

(i) $\int (x^{-4} + 4^x) dx$ (ii) $\int (\frac{2}{3x} + \frac{1}{x^3})\, dx$ (iii) $\int (\cos x - \sin x)\, dx$

(iv) $\int (\sqrt{x} + e^x)\, dx$ (v) $\int x \cos x\, dx$ (vi) $\int_0^1 (3 + x^2)^2\, dx$

Question 3

(a)Find the extrema of the function : $f(x) = x^4 - 2x^2 + 1$ 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 $\frac{dy}{dt} = -\frac{1}{y}$. 5

Find y as function of the time t where the initial quantity is 4 units.

Also, find (i)The value of y after 2 hours.

(ii)The time at which there is no drug in the blood.

(b)If the quantity of a drug in the blood decreases according to the data: 5

Time: t	0	2	4	6	8	10	Hours
Quantity: y	12	11	9	6	2	1	Units

From these data, find the relation y = a + bt.

Good Luck *Dr. Mohamed Eid*