Academic Year: 2014 – 2015 Semester: Spring Date: May 7, 2015	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 12

If $A = \begin{bmatrix} 2 & 2 & 1 \\ 0 & 1 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 3 & 1 \end{bmatrix}$

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

Question 2

(a)Write the matrix of the chemical compound and find its eigenvalues: 6

CH_3 —— C≡≡≡ CH

(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 10 tablets of concentration 3 mg / tablet by mixing whole tablets. Find two possible solutions. 10

Question 3 18

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

(i) $y = x^{-3} + 2^x + 3x$ (ii) $y = x^3 . 3^x + 4$ (iii) $y = \sin x . \log x$

(iv) $y = [\ln x + \cos x]^5$ (v) $y = 4^{x^2} + \sin x^3$ (vi) $y = x + \ln(1 + x)$

(b)Find the integrals:

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

(iv) $\int (\frac{1}{x} + \frac{1}{x+2})\, dx$ (v) $\int \ln x \, dx$ (vi) $\int_0^1 (3x^2 + x)\, dx$

Question 4

(a)If y is the quantity of drug decreases according to the equation $\frac{dy}{dt} = -2y^{\frac{1}{2}}$. 6

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.

(b)If the quantity of a drug in the blood decreases according to the data: 8

Time: t	0	1	2	3	4	5	Hours
Quantity: y	30	26	20	12	4	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*