Mathematics: MCM 109 Final Exam Date: 27 – 5 – 2010 Duration Time: 1 Hour	Modern University For Technology & Information Faculty of Pharmacy	Academic Year: 2009 – 2010 Semester: Spring Examiner: Dr. Mohamed Husein Eid

Answer 4 Questions Only:

[1](a) Find y` where: (i) $y = 2x^3 + 3^x$ (ii) $y = \sin x + \ln(x^2 + 4)$ (iii) $y = x^{-3}.e^x$

(b) Show that the function $f(x) = \begin{cases} 2(1-x), & 0 \le x \le 1 \\ 0, & \text{otherwise} \end{cases}$

is probability density function (p.d.f) and find its probability function (p.f) F(x).

[2](a) Find the integrals: (i) $\int (x^4 + 2^x)dx$ (ii) $\int (x\cos x)\,dx$ (iii) $\int_1^2 [x^2+2]^2\,dx$

(b)If $A = \begin{bmatrix} 2 & 3 & 1 \\ 0 & 1 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 4 & 2 \\ -3 & 0 & 5 \end{bmatrix}$. Find, if possible, A + B, A.B

[3] If $A = \begin{bmatrix} 1 & 2 \\ 3 & 1 \\ 1 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 4 & 2 \\ -3 & 0 & 5 \end{bmatrix}$. Find, if possible, A + B, A.B, |A.B|

[4]Solve the system of equations:

$x + y + z = 6$, $x - y + 2z = 3$, $2x - y - 3z = 1$

[5] If a medicine is available in 3 dosage forms :

First type of concentration: 1 mg /tablet

Second type of concentration: 3 mg /tablet

Third type of concentration: 4 mg /tablet

If the pharmacist wanted to prepare 10 tablets containing 2 mg / tablet

by mixing whole tablets of each type. Find all possible solutions.

Good luck *Dr. Mohamed Eid*

Mathematics: MCM 109 Mid-Term Exam	Modern University For Technology & Information Faculty of Pharmacy	Date: 14 – 4 – 2010 Examiner: Dr. Mohamed Husein Eid

Answer the following questions:

[1] Find y` where: (a) $y = 2x^3 + \sin x$ (b) $y = 3^x + \cos x$ (c) $y = \sqrt{x} + \ln(x^3 + 3x)$

[2] Find the integrals: (a) $\int (x^3 + 3^x)dx$ (b) $\int (x+1)e^x \, dx$

(c) $\int \frac{x+1}{x^2 - 5x + 4} \, dx$ (d) $\int_0^1 [2 + x^2]^2 \, dx$

[3] Show that the function $f(x) = \begin{cases} \frac{3}{26}x^2, & 1 \le x \le 3 \\ 0, & \text{otherwise} \end{cases}$

is probability density function (p.d.f) and find its probability function (p.f) F(x).

[4]A medicine in the blood decreases according to equation $y_0 - y = ct$.

If c = 10 units / hour and the initial quantity $y_0 = 200$ units. Find

(a)The time at which 25 % of medicine exists in the blood.
(b)The time at which 50 % of medicine exists in the blood.
(c)The time at which there is no medicine in the blood.

Good luck *Dr. Mohamed Eid*