Academic Year: 2011 – 2012 Semester: Spring Duration Time: 1 Hour	Modern University For Technology & Information Faculty of Pharmacy	Mathematics: MCM 109 Final Exam Date: May, 5, 2012 Examiner: Dr. Mohamed Eid
Answer All Questions		Marks

[1](a) Find y` where:

(i) $y = 3\cos x + 2^{-x}$ (ii) $y = x^3 \ln x + 3$ (iii) $y = \frac{3^x}{x+\sin x}$ 6

(b)Find maximum and minimum points of the function $f(x) = x^4 - 2x^2 + 1$ 2

(c) Find the integrals: (i)$\int (x^2 + 3^x + 1)dx$ (ii) $\int (2x + 1)\ln x\, dx$ 8

(iii) $\int \frac{1}{x^2 - x} dx$ (iv) $\int_2^3 \frac{2x-1}{x^2-x} dx$

[2](a)If $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 0 \end{bmatrix}$. Find, if possible, A + B, A.B, A^t.B 5

(b) Determine the type of solution of the linear system: $\begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 3 & 3 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$ 4

[3](a) If a medicine exists in 3 dosage forms : 5

First type of concentration: 1 mg / tablet
Second type of concentration: 2 mg / tablet
Third type of concentration: 4 mg / tablet
If the pharmacist wanted to produce 11 tablets containing 3 mg / tablet by mixing whole tablets of each type. Find all possible solutions.

(b)A drug in the blood decreases according to equation $y_0 - y = 10t$, where y is the quantity at a time t (t: hours) and the initial quantity $y_0 = 80$ units. 5

Find (i)The time at which 75 % of drug exists in the blood.
(ii)The time at which 25 % of drug exists in the blood.
(iii)The time at which there is no drug in the blood.
(iv)The quantity of drug in the blood after 3 hours.

Good luck *Dr. Mohamed Eid*

Academic Year: 2011 – 2012 Semester: Spring Date: 29 – 3 – 2012 **Time: 1 Hour**	Modern University For Technology & Information Faculty of Pharmacy	Mathematics: MCM 109 Mid-Term Exam Examiner: Dr. Mohamed Eid **Answer all questions**

	Marks
[1]Find the following limits: (a) $\lim_{x\to 2}\frac{x^2-3}{x+2}$ (b) $\lim_{x\to 1}\frac{x^5-1}{x^7-1}$ (c) $\lim_{x\to 0}\frac{3^x-1}{2x}$ (d) $\lim_{x\to 0}\frac{\sin x}{\log(1+x)}$	4
[2] Find y` where: (a) $y = 2x^3+4^x+5$ (b) $y = \cos x \cdot \log x$ (c) $y = \ln x + 3\sin x$ (d) $y = [x^2+2^x]^6$ (e) $y = \frac{2}{x^{-3}}+\frac{1}{3^{-x}}$ (f) $y = \frac{\sin x}{x^2+\cos x}$	6
[3] Find the maximum, minimum and inflection points of the functions: (a) $f(x)=x^3-3x$ (b) $f(x)=\frac{2}{x}+\frac{x}{2}$	6

Good luck *Dr. Mohamed Eid*

I-Name: Group: ID: .

[1]Find the integrals: (a) $\int (2x^3 + 3^x)\, dx$ (b) $\int (x.3^x)\, dx$ (c) $\int_1^2 (x + \frac{1}{x})\, dx$

[2]If $A = \begin{bmatrix} 1 & 2 \\ 0 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 2 \end{bmatrix}$.

Find, if possible: A + B, B + C, A.B, B.C^t.

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Answer

II-Name: Group: ID: .

[1]Find the integrals: (a) $\int (3x^2 + \cos x)\, dx$ (b) $\int \log x\, dx$ (c) $\int_1^2 2x\,(1 + x^2)^5\, dx$

[2]If $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 2 \\ 0 & -3 \end{bmatrix}$.

Find, if possible: A + B, B + C, A.B, $A.B^t$.

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Answer

III-Name: Group: ID: .

[1]Find the integrals: (a) $\int (2^x + \cos x)\, dx$ (b) $\int (x.\cos x)\, dx$ (c) $\int_1^2 (2 + \frac{2x}{3+x^2})\, dx$

[2]If A = $\begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 2 \end{bmatrix}$, B = $\begin{bmatrix} 1 & 2 \\ 0 & -3 \end{bmatrix}$ and C = $\begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 2 \end{bmatrix}$.

Find, if possible: A + B, A + C, A.B, A.C^t.

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Answer

IV-Name: Group: ID: .

[1]Find the integrals: (a) $\int (2 + 3\sin x)\, dx$ (b) $\int \frac{3}{x^2 - 4x + 3}\, dx$ (c) $\int_0^1 (x + 4^x)\, dx$

[2]If $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 2 \\ 1 & 3 \\ 2 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 0 & 2 \end{bmatrix}$.

Find, if possible: A + B, A + C, $A + B^t$, A.B.

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Answer