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

[1](a) Find y` where:

(i) $y = 3\sin x + 2^x$ (ii) $y = x^3 \log x$ (iii) $y = \frac{4^x}{3+\cos x}$ — 6

(b) Find the integrals: (i) $\int (x^2 + 3^x)dx$ (ii) $\int x \log x \, dx$ — 8

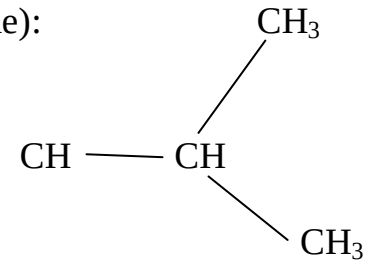
(iii) $\int (x + \frac{1}{x} + \frac{1}{x^2})dx$ (iv) $\int_2^3 (3x^2 + 2)\, dx$

[2](a)If $A = \begin{bmatrix} 1 & 2 & 1 \\ 4 & 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 & 1 \\ 0 & 1 & 4 \end{bmatrix}$. Find, if possible, A + B, A.B, A^t.B — 4

(b) Determine the type of solution of the linear system: — 4

2x + y + z = 0, x + 2y + 3z = 1, 3x + 3y + 4z = 1

(c)Write the matrix of chemical compound (Propane): — 3



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

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 produce 12 tablets containing 2 mg / tablet by mixing whole tablets of each type. Find all possible solutions.

(b)A drug in the blood decreases according to equation $y_0 - y = 8t$, where — 5

y is the quantity at a time t (t: hours) and the initial quantity $y_0 = 120$ units.
Find (i)The time at which 75 % of drug exists in the blood.
(ii)The time at which 40 % 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 5 hours.

Good luck *Dr. Mohamed Eid*

I-Name: Group: ID: .

[1]Determine the type of solution of the linear system: $\begin{bmatrix} 1 & 1 & -2 \\ 2 & 1 & 1 \\ 3 & 2 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 3 \\ 4 \end{bmatrix}$

[2] 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.

……

Answer

II-Name: Group: ID: .

[1]Determine the type of solution of the linear system: $\begin{bmatrix} 1 & 1 & -2 \\ 2 & 1 & 1 \\ 3 & 2 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 3 \\ 5 \end{bmatrix}$

[2] 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 25 tablets containing 2 mg / tablet by mixing whole tablets of each type. Find all possible solutions.

……

Answer

III-Name: Group: ID: .

[1]Determine the type of solution of the linear system: $\begin{bmatrix} 2 & 1 & -2 \\ 1 & 1 & 1 \\ 3 & 2 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix}$

[2] If a medicine exists in 3 dosage forms :
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 20 tablets containing 3 mg / tablet by mixing whole tablets of each type. Find all possible solutions.

……

Answer

IV-Name: Group: ID: .

[1]Determine the type of solution of the linear system: $\begin{bmatrix} 2 & -1 & 1 \\ 1 & 2 & 1 \\ 3 & 1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 3 \\ 0 \end{bmatrix}$

[2] If a medicine exists in 3 dosage forms :
First type of concentration: 1 mg /tablet
Second type of concentration: 3 mg /tablet
Third type of concentration: 5 mg /tablet
If the pharmacist wanted to produce 20 tablets containing 2 mg / tablet by mixing whole tablets of each type. Find all possible solutions.

……

Answer

ID: Name: .

[1]Find y` where: (a) $y = 3x^3 + \sin^2 x$ (b) $y = [\log x + \cos x]^4$

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

[3]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 + C, A + B^t, A.C, |A.B|

……

Answer