Academic Year: 2016-2017
Semester: Summer
Date: July 31, 2017

## Answer All Questions

## Question 1

(a)If $A=\left[\begin{array}{ccc}1 & -2 & 1 \\ 0 & 3 & 2 \\ 2 & -1 & 1\end{array}\right], \quad B=\left[\begin{array}{lll}2 & 1 & 2 \\ 3 & 1 & 0\end{array}\right]$ and $C=\left[\begin{array}{lll}2 & -1 & 3 \\ 1 & -3 & 1\end{array}\right]$

Find, if possible, $A+B, B+C, A . B, B . A, B . C, B^{t} . C,|A|,|C|$.
(b)Find the eigenvalues and eigenvectors of the matrix : $A=\left[\begin{array}{cc}-1 & 1 \\ 4 & 2\end{array}\right]$.

## Question 2

(a)Solve the linear systems: (i) $\mathrm{x}-\mathrm{y}=2, \quad \mathrm{x}+2 \mathrm{y}=0,-2 \mathrm{x}+\mathrm{y}=3$.

$$
\text { (ii) } \mathrm{x}-\mathrm{y}+\mathrm{z}=2, \quad 2 \mathrm{x}+\mathrm{z}=7, \quad-\mathrm{x}+\mathrm{y}+2 \mathrm{z}=1
$$

(b)If a drug exists in three dosage forms: The first of concentration $1 \mathrm{mg} /$ tablet, The second of concentration $2 \mathrm{mg} /$ tablet, The third of concentration $4 \mathrm{mg} /$ tablet. If the pharmacist wanted to produce 8 tablets of concentration $3 \mathrm{mg} /$ tablet by mixing whole tablets. Find two possible solutions.

## Question 3

Mathematics: OCM 103
Final Exam
Duration Time: 2 Hours
No. of questions: 4 Total Mark: 60
No. of questions: 4 Total Mark: 60

Faculty of Pharmacy
(a)Find $\mathbf{y}$ where:
(i) $y=2 x^{-3}-x^{3}-3$
(ii) $y=x+e^{x} \cdot \log x$
(iii) $y=2+\cos x .3^{x}$
(iv) $y=[x-\cos x]^{8}$
(v) $y=\sqrt{x}+\frac{\ln x}{x^{5}}+\frac{3}{4}$
(vi) $y=\sin x+\sin ^{4} x$
(b) Find the integrals:
(i) $\int\left(x^{2}+\frac{1}{x^{2}}+\frac{1}{x}\right) d x$
(ii) $\int(\cos 2 x+\sin x) d x$
(iii) $\int\left(1+x-3^{x}\right) d x$
(iv) $\int\left(x^{2}-3\right)^{2} d x$
(v) $\int x \cdot \sin x d x$
(vi) $\int \frac{x}{x^{2}-2 x-3} d x$

## Question 4

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

Find y as function of the time t where the initial quantity is 16 units.
Find (i)The value of y after 4 hours.
(ii)The time at which there exists $25 \%$ of drug in the blood.
(b)If the quantity of a drug in the blood decreases according to the data :

| Time: | t | 0 | 2 | 4 | 6 | 8 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Hours |  |  |  |  |  |  |
|  | Quantity: | y | 20 | 17 | 13 | 8 |
| Units |  |  |  |  |  |  |

From these data, find the relation : $\mathrm{y}=\mathrm{a} \mathrm{e}^{\mathrm{bt}}$. Also, find the value of y at $\mathrm{t}=2$.

