Basic Science Department Mathematics 2 Code: Math 102 Final Exam: 17 – 1 – 2013 Time Allowed: 2 hours	Modern University For Technology & Information Faculty of Engineering	Academic year: 2012 / 2013 Semester: Autumn Examiner: Dr. Mohamed Eid
Answer All questions		Total Marks 40

Question 1

(a) If $A = \begin{bmatrix} 1 & 2 & 0 \\ 2 & 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 \\ 1 & 1 \\ 0 & 4 \end{bmatrix}$ — 4

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

(b) Find the eigenvalues and the eigenvectors of the matrix $A = \begin{bmatrix} 0 & 3 \\ 1 & 2 \end{bmatrix}$. — 4

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

$x + y + z = 5,\ x - y + z = 2,\ 2x + 2z = 7.$

Question 2

(a) Using the binomial theorem, expand $\frac{1}{\sqrt{1-2x}}$ — 2

(b) Using mathematical induction, prove that: — 3

$$\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \cdots + \frac{1}{n.(n+1)} = \frac{n}{(n+1)}$$

(c) If $z_1 = 2 - 3i$, $z_2 = -1 + 2i$. Find $z_1.z_2$, $(z_1 + z_2)^{10}$. — 3

Question 3

(a)State the definition of parabola. — 2

(b)Separate the lines $x^2 + xy - 2y^2 + 3x + 6y = 0$. — 3

Also, find the angle between them.

(c) Write the equation of circle with center (2, – 3) and radius 3/2. — 2

(d)Determine the vertex, focus and sketch the parabola $x^2 - 4x + 8y - 4 = 0$. — 3

Question 4

(a)Find center, vertices and sketch the ellipse $x^2 + 4y^2 + 4x + 8y + 4 = 0$. — 4

(b)Describe the surface $x^2 + y^2 + z^2 - 2x + 4y = 0$ — 3

(c)Write the equation of plane that passes through (1, 2, 3), (2, 1, 1), (3, 0, 2). — 3

Good luck *Dr. Mohamed Eid*

Basic Science Department **Math. 2 Code: Math 102** **Mid-Term Exam: November, 2012** **Time Allowed: 40 Minutes**	Modern University For Technology & Information **Faculty of Engineering**	**Academic year: 2012 / 2013** **Semester:** Autumn **Examiner: Dr. Mohamed Eid**
Answer All questions		* Total **Marks 30**

[1] If $A = \begin{bmatrix} 2 & 2 & -1 \\ 1 & 3 & 0 \\ 0 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 2 \\ 1 & 3 \\ 2 & 4 \end{bmatrix}$ — 8

Find, if possible, A + B, BA, |A|, |B| and |AB|.

[2] Find the eigenvalues and the eigenvectors of the matrix $A = \begin{bmatrix} 1 & 2 \\ 1 & 2 \end{bmatrix}$. — 8

[3] Find S_n, S_{10} from the series: $\sum_{r=1}^{n} \frac{2}{(r+1)(r+2)}$ — 8

[4](a) If $z_1 = 2 - 3i$, $z_2 = -3 + 2i$. Find $z_1 . z_2$, $(z_1 + z_2)^7$. — 6

Good luck *Dr. Mohamed Eid*

Quiz : Math2	ID:	Name:

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

Find, if possible, A + B, A + B^t, |A + B^t|, |AB| and $(AB)^{-1}$

[2] Find the eigenvalues and the eigenvectors of the matrix $A = \begin{bmatrix} 0 & 3 \\ 1 & 2 \end{bmatrix}$.

Answer