Basic Science Department Mathematics II Code: Math 102 Final Exam: January, 2014 Time Allowed: 2 hours	Modern University For Technology & Information Faculty of Engineering	Academic year: 2013 / 2014 Semester: Autumn Examiner: Dr. Mohamed Eid
Answer All questions		Total Mark 40

ممنوع إستخدام المحمول كألة حاسبة. يُسمح **فقط** بإستخدام الألة الحاسبة العادية

Do not use Mobile as Calculator. Only use regular Calculator

Question 1

(a) If $A = \begin{bmatrix} 1 & 3 & 0 \\ 2 & 1 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 \\ 1 & 1 \\ 4 & 3 \end{bmatrix}$ — 6

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

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

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

$x + y + z = 5,\ x - y + 2z = 2,\ 2x + 3z = 5.$

Question 2

(a) Using the binomial theorem, expand $\frac{1}{3-2x}$ — 2

(b) Find S_n, S_{10} from the series: (i) $\sum_{r=1}^{n} \frac{1}{r^2+r}$ (ii) $\sum_{r=1}^{n} 2r(r^2+1)$ — 4

Question 3

(a)State the definition hyperbola. — 2

(b) Write the equation of circle where $(2, -3), (1, 2)$ are ends of diameter. — 2

(c) Find the angle between the lines and separate them $x^2 + xy - 2y^2 = 0$. — 3

(d)Determine the vertex, focus and sketch the parabola $x^2 - 4x + 8y - 12 = 0$. — 3

Question 4

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

(b)Determine the type of the curve: $2x^2 - 3xy + 2y^2 - 16 = 0$ — 4

(c)State the type of surface: — 2

(i) $x^2 + y^2 + z^2 + 4x - 5 = 0$ (ii) $x^2 + (z-2)^2 = (y-3)^2$

Good luck *Dr. Mohamed Eid*

Basic Science Department Math. 2 Code: Math 102 Mid-Term Exam: November, 2013 Time Allowed: 60 Minutes	Modern University For Technology & Information Faculty of Engineering	Academic year: 2013 / 2014 Semester: Autumn Examiner: Dr. Mohamed Eid
Answer All questions		**Total Mark: 30**

ممنوع إستخدام المحمول كألة حاسبة. يُسمح **فقط** بإستخدام الألة الحاسبة العادية

Do not use Mobile as Calculator. Only use regular Calculator

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

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

[2] Find the eigenvalues and the eigenvectors of the matrix $A = \begin{bmatrix} 2 & 4 \\ 1 & 2 \end{bmatrix}$. — 6

[3] Write the following equations in matrix form and determine the type of solution : — 4

$x - y + z = 1$, $2x + y = 4$, $3x + z = 6$.

[4] Using the binomial theorem, expand: $\frac{1}{\sqrt[3]{8-2x}}$. — 4

[5] Find S_n , S_{10} from the series: — 8

(a) $\sum_{r=1}^{n} \frac{1}{r^2+3r+2}$ (b) $\sum_{r=1}^{n} 3r(r+4)$

Good luck *Dr. Mohamed Eid*

I	Group	ID	Name

[1]State the definition of the straight line.

[2]Write the equation of tangent of the circle $x^2 + y^2 + 4x - 2y - 11 = 0$ at (2, 1).

[3]Write the equation of straight line that passes through the mid-point of (2, – 1), (0, 3) and its slope is 2.

[4]Find the points of intersection of the circles

$x^2 + y^2 + 2x + 2 = 0$, $x^2 + y^2 + y + 2 = 0$

[5]Write the equation of parabola where the focus is F(– 2, 0), directrix is $y + 4 = 0$.

II	Group	ID	Name

[1]State the definition of the circle.

[3]Write the equation of straight line that passes through the mid-point of (2, – 1), (0, 3) and its slope is 2.

[3]Find the points of intersection of the circles

$x^2 + y^2 + 2x + 2 = 0,\ x^2 + y^2 + y + 2 = 0$

[4]Write the equation of tangent of the circle $x^2 + y^2 + 4x - 2y - 11 = 0$ at (2, 1).

[5] Write the equation of parabola where the focus is F(– 2, 0), directrix is $y + 4 = 0$.

III	Group	ID	Name

[1]State the definition of the parabola.

[2]Write the equation of straight line that passes through the mid-point of (2, – 1), (0, 3) and its slope is 2.

[3]Write the equation of tangent of the circle $x^2 + y^2 + 4x - 2y - 11 = 0$ at (2, 1).

[4] Write the equation of parabola where the focus is F(– 2, 0), directrix is $y + 4 = 0$.

[5]Find the points of intersection of the circles

$x^2 + y^2 + 2x + 2 = 0$, $x^2 + y^2 + y + 2 = 0$