| Eng. Mathematics and Physics Department<br>Mathematics 2-Code: Math 102<br>Final Exam: 31 / 7 / 2011<br>Time Allowed: **2 hours** | Modern University For Technology & Information<br>**Faculty of Engineering** | Academic year: 2010 / 2011<br>Semester: Summer<br>Examiner: Dr. Mona Mehanna<br>Dr. Mohamed Eid |
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| **Answer 5 questions only** | | **Marks** |

**Question 1**

(a)Using mathematical induction to prove the validity of the following: 4

$$\frac{1}{2.3}+\frac{1}{3.4}+\frac{1}{4.5}+\cdots+\frac{1}{(n+1).(n+2)}=\frac{n}{2(n+2)}.$$

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

**Question 2**

(a)Solve the following linear system by inverse method: 5

$x+y+z=5,\quad 2x-y+z=2,\quad 2x+2y-z=4$

(b) Using the binomial theorem, expand $\sqrt{5-2x^3}$. 3

**Question 3**

(a) Use De Moiver's theorem to evaluate $(4-8i)^{\frac{5}{2}}$. 2

(b) Find the sum to n terms of the series: $\sum_{r=1}^{n}\frac{1}{(r+2)(r+3)}$ 3

(c )Solve the equation $x^3-12x+16=0$ if the number 2 is a repeated root. 3

**Question 4**

(a)Complete the statement: The parabola is locus of moving point such that…. 2

(b)Write the equation of parabola with focus F(5, 0) and direcrtix x = 1. 2

(c)Separate the lines $2x^2+3xy-2y^2-x+3y-1=0$. 4

**Question 5**

(a)Determine the center and radius of the circle $x^2+y^2-6x+8y=0$. 2

(b)Write the equation of plane passing through the points: 3

(2, – 1, 1), (1, 2, 1), (0, 3, 3).

(c)Find center, vertices and sketch the hyperbola $y^2-x^2+4x=0$. 3

**Question 6**

(a)Sketch the surfaces: (i) $y^2-x^2-z^2=0$ (ii) $x^2+y^2+z^2-4y-5=0$ 2+2

(b)Find center, vertices and sketch the ellipse $9x^2+4y^2-36x=0$ 4

*Good luck* *Dr. Mona Mehanna* *Dr. Mohamed Eid*

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| Engineering Mathematics Department<br>Course Code: Math 102<br>Analytical Geometry<br>Time Allowed: 75 Minuets | Modern University<br>For Technology & Information<br>Faculty of Engineering | Academic year: 2010 / 2011<br>Semester: Summer<br>Mid-Term Exam<br>Examiner: Dr. Mohamed Eid<br>16 – 7 – 2011 |

[1]Complete the statement: Parabola is the locus of moving point such that….

[2]Separate the lines $x^2 + xy - 6y^2 + 5y - 1 = 0$ and find the angle between them.

[3]Write the equation of circle with center (2, – 1) and radius 3.

[4]Find center, vertices and foci of the ellipse $4x^2 + 9y^2 - 24x = 0$ and sketch its curve

[5]Sketch the curve $y^2 - 4x - 2y - 3 = 0$

*Good Luck*

Quiz I 2 – 7 – 2011

[1]Complete the statement: The circle is the locus of moving point such that….

[2]Separate the lines $2x^2 + xy - y^2 + 5x - y + 2 = 0$ and find the angle between them.

[3]Write the equation of circle where the points (2, – 1), (4, 1) are ends of diameter and determine its center.

Quiz II 23 – 7 – 2011

[1] Find center, vertices of the curve and sketch $2x^2 - y^2 + 4x + 2y - 5 = 0$

[2]Write the equation of hyperbola with foci (2, 0), (2, 8) and the transverse axis 6

[3]Eliminate the cross term xy from the equation $x^2 - 4xy + y^2 - 15 = 0$ and sketch the curve in the new coordinates.

[4]Write the equation of plane passing through the points (2, – 1, 1), (2, 0, 3), (– 1, 3, 3)