BANI SWIEF TECHNOLOGICAL UNIVERSITY

Egyptian Korean Faculty of Technological Industry and Energy

Final Exam for First Year Students - (Second Semester 2022/2023)

Program: Autotronics **Course: Mathematics 2** **Total Mark: 90**	**No. of pages: 1** **Time allowed: 2 hours** **Date of exam: 14/6/2023**

Q(1) Solve the following linear system using Cramer's rule:

$$x_1 + 2x_2 + 2x_3 = -3$$
$$2x_1 + 3x_2 - x_3 = 7$$
$$3x_1 + x_2 - 2x_3 = 5$$

$x_1 = -1$
$x_2 = 2$
$x_3 = -3$

Q(2) Given the following table for a function $y = f(x)$:

x	0.1	0.2	0.3	0.4	0.5	0.6	0.7
y	2.03	2.12	2.27	2.48	2.75	3.08	3.47

2.1875 3.2675

From this table approximate $f(0.25)$ and $f(0.65)$:

Q(3) Use Newton's forward differences interpolation formula to find the cubic polynomial which takes the following values:

$x^3 + 3x^2 + 10x + 4$

x	0	1	2	3
y	4	18	44	88

Q(4) Approximate $f(0.8)$ using Gauss's forward and backward formulas from the following tabulated data:

Forward → 0.8408

Backward → 0.83632

x	0	0.5	1	1.5	2
$f(x)$	−0.5	0.5	1	1.3	1.5

Q(5) Find the Lagrange's interpolating polynomial p(x) corresponding to the following table:

x	0	1	3	5
y	5	7	29	115

$x^3 - x^2 + 2x + 5$

Wishing you good luck and success

Prof. Dr. Salah Moawad