



**Exam Guidelines:** This Exam contains 2 questions in 1 page.

**Question (1):**[30 marks]

(a)[10 marks] fit the readings

$x$	1	1.5	2	2.5	3	3.5	4
$y$	0.12	0.52	1.47	3.24	6.21	10.78	17.35

For the exponential curve  $y = m x^c$

(b) [10 marks] Use lagrange's interpolation formula to find  $f(2)$  given that

$x$	0	1	3	6
$y$	2	4	10	18

(c) [10 marks] use simple iteration method to obtain the smallest positive root of the equation  $x^3 - 8x + 5 = 0$ .

**Question (2):** [20 marks]

(a) [10 marks] use Gauss-Seidel method to solve the following system of linear equations: (10 iterations are required)

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

$$x_1 + 5x_2 - 2x_3 = 10$$

$$2x_1 - 4x_2 + 10x_3 = 6$$

(b) [10 marks] obtain the value of  $y$  at  $x = 0.8$  by fourth order Rung-Kutta method if  $y' = \sqrt{x + y}$  and  $x_0 = 0.4$ ,  $y_0 = 0.41$  (take  $h = 0.4$ ). Also calculate  $y(1.2)$ .

With my best wishes

Dr. Mona Sameeh