

**KABARAK**



**UNIVERSITY**

**EXAMINATIONS**

**2008/2009 ACADEMIC YEAR**

**FOR THE DEGREE OF BACHELOR OF COMPUTER  
SCIENCE**

**COURSE CODE: COMP 327**

**COURSE TITLE: APPLIED NUMERICAL ANALYSIS**

**STREAM: Y3S1**

**DAY: TUESDAY**

**TIME: 2.00-4.00 P.M.**

**DATE: 9/12/2008**

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**INSTRUCTIONS:**

The paper has **three** sections  
In SECTION A attempt ALL questions  
In SECTION B answer ANY TWO  
In SECTION C answer any ONE.

**PLEASE TURN OVER**

**SECTION A (answer ALL 30 marks)**

1. In performing numerical calculations three types of errors are encountered. Explain the errors. (6 marks)
2. What is an algorithm? State the five characteristics of a good algorithm. (6 marks)
3. Write an algorithm and C++ program to implement the solution of a quadratic formula. (6 marks)
4. Using Bolzano's/Interhalving method find a real root of the equation  $x^2-25=0$ . (6 marks)
5. Write a comprehensive Algorithm to demonstrate how the above method can be solved in programming. (6 marks)

**SECTION B (attempt any TWO 20 marks)**

6. a) Given the formula for the Regula falsi method as

$$X_1 = \frac{af(b)-bf(a)}{f(b)-bf(a)}$$

Solve for a positive root of  $f(x) = x^3-4x+1=0$ . (10 marks)

7. Write a C++ object oriented program to implement the above formula. (10 marks)
8. State and use the Newton Raphson formula to solve  $x^3-d=0$  starting with  $x_0=2.5$   $d=25$ . (10 marks)
9. Compare the iterative methods i.e. Newton-Raphson method, bisection method, falsi position method, secant method. (10 marks)

**SECTION C (answer any one question)**

10. Describe the least squares method of fitting a straight line with an algorithm. (20 marks)

11. Solve by Gauss-elimination method, the following system of equations.

$$\begin{aligned} 4.12x-9.68y + 2.01z &= 4.93 \\ 1.88x-4.62y + 5.50z &= 3.11 \\ 1.10x-0.96y + 2.72z &= 4.02 \end{aligned} \quad (20 \text{ marks})$$