Petroleum University of Technology

Petroleum Faculty of Ahwaz

Final Exam of 1st Term of 89-90

Course Title: Applied Mathematics/Numerical Methods		**Exam Date:** Bahman 2, 1389
Exam Time: 180 Min.	**OPEN BOOK**	**Level:** B.Sc☑ M.Sc☐ Ph.D.☐
Student Full Name:		**Student Number:**

1. Use Müller's method to determine the positive root of $f(x) = x^3 + x^2 - 3x - 5 = 0$

2. Determine the root of the following system

$$\begin{cases} x^2 + 1 - y^2 = 0 \\ 2\cos(x^2) - y = 0 \end{cases}$$

In the box $0 \le x \le 2$, $0 \le y \le 2$

3. Use Gauss – Saidel method to solve the following system

$$\begin{cases} 2x - 6y - z = -38 \\ -3x - y + 7z = -34 \\ -8x + y - 2z = -20 \end{cases}$$

4. Calculate $A = 2x + y' + \int_0^1 y\,dx$

as accurate as possible, y is given in the following table

x	0	0.2	0.4	0.6	0.8	1
y	1	0.64	0.36	0.16	0.04	0

5. Calculate the integral $\int_0^1 (1 + x + y + y')^2\,dx$

y is the solution of the following initial value problem.

$y' = 3y - x + 2 \qquad y(0) = 5$

6. Solve the following boundary value problems to calculate y at $x = 3$ and $x = 6$

$7y'' - 2y' - y + x = 0$

$y(0) = 5$, $y(9) = 10$

7. The following data can be modeled by the equation

$$k = \frac{ac^2}{b + c^2}$$

Use a transformation to linearise this equation. Then use linear regression to estimate a and b and predict k at $c = 2$.

c	0.5	0.8	1.5	2.5	4
k	1.1	2.4	5.3	7.6	8.9

Good luck…