May 2006

Bachelor of Computer Application (BCA) Examination

VI Semester

Computer Oriented Numerical Methods

Time : 3 Hours] [Max. Marks : 50

***Note :** Solve any two from each question. All questions carry equal marks.*

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1. (a) What are Normalized Floating Point Operations? Explain each with example.

   (b) Solve $\sin x = 1 + x^3$ using Newton Raphson Method.

   (c) Write a C program for Bisection Method.

2. (a) What is Pivoting? Explain with suitable example.

   (b) Solve the system of equations by Gauss Elimination Method :

$$x + y + z = 6.6$$
$$x - y + z = 2.2$$
$$x + 2y + 3z = 15.2$$

   (c) Find the curve of best fit of the type $y = ae^{bx}$ to the following data by the method of least squares :

x	:	1	5	7	9	12
y	:	10	15	12	15	21

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3. (a) Using Newton's Forward Interpolation formula find the value of f (1.6) if :

x	:	1	1.4	1.8	2.2
y	:	3.49	4.82	5.96	6.5

   (b) The following are the no. of deaths in four successive ten-year age groups. Find the no. of deaths at 50-55 age groups :

Age groups :	25-35	35-45	45-55	55-65
Deaths :	13229	18139	24225	31496

   (c) The following table gives the viscosity of all oil as a function of temperature. Use Lagrange's formula to find the viscoity of oil at a temperature of 140° :

Temprature	:	110°	130°	160°	190°
Viscosity	:	10.8	8.1	5.5	4.8

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4. (a) Caculate the value of the following integrals by Trapezoidal ule :

$$\int_4^{5.2} \log x \, dx.$$

(b) Write a pogram for Simpson's 1/3 rule.

(c) Apply Simpson's 3/8 rule to evaluate $\int_0^2 \frac{dx}{1+x^3}$ to two decimal places by dividing the range into eight equal parts.

5. (a) Using Taylor's series metod solve $y' = xy + y^2$, $y(0) = 1$ at $x =$ 0.1, 0.2, 0.3.

(b) Solve $\frac{dy}{dx} = 1 - y$, $y(0) = 0$ in the range $0 \leq x \leq 0.3$ using Euler's method.

(c) Using Runge-Kutta fourth order, solve for y (0.1), y (0.2) and y (0.3) given that $y'\ xy + y^2$, $y(0) = 1$.

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