June 2014

Bachelor of Computer Application (BCA) Examination

VI Semester

Computer Oriented Numerical Methods

Time : 3 Hours] [Max. Marks : 50

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

1. (a) In case of normalized floating point representation, associative and distribututive laws are not always valid. Prove this statement with examples each.
   (b) Write a 'C' program to find out the roots of a numeric equation using false position method.
   (c) Evaluate $\sqrt{12}$ to four decimal places by Newton's iterative method.
2. (a) What do you mean by ill-conditioned equations ? How can you improve the accuracy of solution of an ill-conditioned system ? Explain.
   (b) Write an algorithm for solving simultanous equations using Gauss-Jordan method.
   (c) What in meant by a curve of best fit ? Explain the method of least square with suitable example.
3. (a) Kind the value of e1.17 using Gauss forward formula; given :

x	:	1	1.05	1.10	1.15	1.20	1.25	1.30
e^x	:	2.7183	2.8577	3.0042	3.1582	3.3201	3.4903	3.6693

   (b) Prove the following :

   (i) $\Delta = \frac{1}{2}\delta^2 + \delta\sqrt{1+\frac{\delta^2}{4}}$

   (ii) $\Delta + \nabla = \frac{\Delta}{\nabla} - \frac{\Delta}{\nabla}$.

   (c) Write a C program to evaluate y = f (x) for a given value of x using Lagrange's formula.
4. (a) Evaluate $\int_0^1 \frac{dx}{1+x}$ by dividing the interval of integration into 8 equal parts. Hence, find $\log_e 2$ approximately.

(b) Find x for which y is maximum and finl this value of y; given :

x	:	1.2	1.3	1.4	1.5	1.6
y	:	0.9320	0.9636	0.9855	0.9975	0.9996

(c) Derive Newton-Cote's quadrature formula. And, hence use this formula to derive trapezoidal and Simpson's rules also.

5. (a) Write a program in 'C' to find the solution of ordinary differential equations using Euler's method.

(b) Discuss Runga Kutta second and fourth order methods.

(c) Use Picard's method to solve the differential equation :

$$\frac{d^2y}{dx^2} = x^3\left(\frac{dy}{dx} + y\right)$$

where $y = 1$, $\frac{dy}{dx} = \frac{1}{2}$ when $x = 0$, obtain the results upto third approximation.

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