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RM-6521

B. E. - II I.C. (Sem. IV) Examination

May / June – 2010

Computational Methods Using C

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 2 I.C. (Sem. 4) Examination**

Name of the Subject :

☛ **Computational Methods Using C**

☛ Subject Code No. : **6 5 2 1** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

1 (a) Answer in brief :

(1) Define absolute and relative error ? **2**

(2) Give similarities and difference between Jacobi and Gauss Seidal methods to find solution of linear equations. **2**

(3) Compare bisection method and False position method to find the solution of nonlinear equations. **2**

(4) List advantages and disadvantages of bisection method for solution of non linear equations. **2**

(5) Define symmetric matrix and give an example. **2**

(b) Write an algorithm for Newton Raphson method to solve non linear equations. **8**

2 Answer the following questions :

(a) Find the inverse of the following matrix : **8**

1 2 6

2 5 15

6 15 46

(b) Write an algorithm for Gauss-Elimination method. **8**

OR

2 (a) Use false position method to compute the root of the equation : 8

$$\cos x - xe^{x} = 0 \cdot$$

(b) Write an algorithm for Jacobi's method. 8

3 Attempt any two : 16

(a) Solve the following system of equations using Gauss elimination method :

$$2x_1 + 8x_2 + 2x_3 = 14$$

$$x_1 + 6x_2 - x_3 = 13$$

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

(b) Solve the following system of equations using Gauss Seidel method accurate to 4 significant digits :

$$10x_1 + x_2 + 2x_3 = 44$$

$$2x_1 + 10x_2 + x_3 = 51$$

$$x_1 + 2x_2 + 10x_3 = 61.$$

(c) Write an algorithm for the Gauss Jordon method for the solution of system of linear equations.

4 (a) Answer in brief :

(1) Write down generalized equation for NBDI and NDDI. 2

(2) Write down the generalized equation for FDI and explain it. 2

(3) Write down the general formula for Taylor series. 2

(4) Explain ordinary and partial differential equation. 2

(5) What is interpolation ? How is it useful ? 2

(b) Write down the alogrithm for Runge-Kutta Fourth Order Method. 8

5 Answer the following questions :

(a) Write an algorithm for Lagrangian interpolation method. 8

(b) Given the table values as : 8

X	2.5	3.0	3.5	4.0	4.5
Y(x)	9.75	12.45	15.70	19.52	23.75

Find y (4.25) by using Newton's Backward interpolation formula.

OR

5 (a) Given the table values as : 8

X	2.0	2.1	2.2	2.3	2.4	2.5
Y(x)	13.00	14.261	15.648	17.167	18.824	20.625

Find the order of interpolating polynomial.

(b) Write algorithm for Euler's method. 8

6 Attempt any two : 16

(a) Write algorithm for Trapezoidal rule for known functions.

(b) The function f(x) is given as follows :

X	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Y	1	1.01	1.04	1.09	1.16	1.25	1.36	1.49	1.64	1.81	2.0

Compute the integral of f(x) between x=0 and x=1.0 using simpson's $1/3^{rd}$ rule.

(c) Given the table values as :

X	2.5	3.0	3.5	4.0	4.5
Y(x)	9.75	12.45	15.70	19.52	23.75

Find y(4.25) by using Newton's Backward interpolation formula.