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SF-6521

B. E. - II (Sem. IV) (Inst. & Ctrl.) Examination

May / June - 2011

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 (SEM. 4) (INST. & CTRL.)

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

(2) Black figures to the right indicate full marks.
(3) Assume suitable data if required.
(4) Use of non programmable calculator is allowed.

1 Answer in brief : **10**

(i) Define absolute and relative errors. **2**

(ii) What is error propagation ? **2**

(iii) State the formula for the multiplication of two n×n matrix. **2**

(iv) What is pivotal condensation of pivoting in terms of matrices ? **2**

(v) Define symmetric matrix and give its example. **2**

2 Attempt any two : **20**

(a) Do all the matrices have their inverses ? Why ? Find the characteristic equation of matrix.

$$F = \begin{pmatrix} 3 & 2 & 4 \\ 2 & 0 & 2 \\ 4 & 2 & 3 \end{pmatrix}$$

(b) Write the algorithm for secant method.

(c) Explain Newton Raphson Method in detail.

3 Attempt any two : **20**

(a) Solve the following system of equation using Matrix inversion method :

$2x_1 - 2x_2 + 5x_3 = 13$

$2x_1 + 3x_2 + 4x_3 = 20$

$3x_1 - x_2 + 3x_3 = 10$

(b) Explain Runge Kutta method in detail.

(c) Solve the following system of equation using Jacobi's method :

$20x_1 + x_2 - 2x_3 = 17$

$3x_1 + 20x_2 - x_3 = -18$

$2x_1 - 3x_2 + 20x_3 = 25$

4 (a) Answer in brief : **10**

(i) Write down the generalized equation for Newton's backward interpolation method.

(ii) What is interpolation ? How is it useful ?

(iii) What is parabolic interpolation ?

(iv) Define trignometric interpolation.

(v) State any two methods for solution of ordinary differential equations.

(b) Explain the Newton Cotes integration formula. 8

5 (a) Write the algorithm for Newton's backward difference interpolation method. 8

(b) What is error in difference ? 8

OR

5 (a) Write the algorithm for Newton's divided difference interpolation method. 8

(b) Explain Simpson's 1/3rd rule for tabulated functions. 8

6 Answer any two : **16**

(i) Given the following table of values, find y (2.5) using the Lagrangian interpolation of order 3.

X	0	1	2	3
Y(x)	0	1	8	27

(ii) Given the function f(x) as

x	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Y	1	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0

Compute the integral of f(x) between x=0 and x=1.0 by Trapezoidal rule.

(iii) Explain adaptive integration.
