



RM-6581

B. E. II (Sem. IV) (TP & IT) Examination

May / June – 2010

Computational Methods Using 'C'

Time : 3 Hours]

[Total Marks : 100

**Instruction :**

(1)

नीचे दृशविले निशानीवाणी विगतो उत्तरवही पर अवश्य लपवी.  
Fillup strictly the details of signs on your answer book.

Name of the Examination :

**B. E. 2 (Sem. 4) (TP & IT)**

Name of the Subject :

**Computational Methods Using 'C'**

Subject Code No. : **6** **5** **8** **1** Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

- (2) Answers to the **two** sections must be written in **separate** answer books.
- (3) Figures to the **right** indicate full marks.
- (4) Tie **two** sections separately.

### SECTION - I

- 1 (a) Answer the following objective questions : 10
- (i) Define interpolation.
- (ii) Define extrapolation.
- (iii) State Newton's forward interpolation formula.
- (iv) State Gauss's backward interpolation formula.
- (v) What is adjoint of matrix ?
- (vi) Define averaging operator.
- (vii)  $Y_n - Y_{n-1} = \delta y$  \_\_\_\_\_.
- (viii) Define finite difference.
- (ix) Define shift operator.
- (x) Lagrange formula can be employed for equispaced arguments - True or False.
- (b) Derive Gauss's forward interpolation formula. State its 10 location in difference table and criteria for its selection.

- 2 (a) In a density gradient column, the floats of known densities occupy the heights as follows : 10

Height (cms) :	10	20	30	40
Density (g/cc) :	1.37	1.285	1.18	1.125

Determine the densities of polymers that occupy the heights A = 6 cms and B = 38 cms.

- (b) Using Stirling's formula, evaluate  $f(1.22)$ , given

$x$ :	1.0	1.1	1.2	1.3	1.4
$f(x)$ :	0.821	0.891	0.932	0.963	0.985

OR

- 2 (a) Derive Newton's backward interpolation formula. State its applications and location in finite difference table. 10  
 (b) The monthly production of a process house is given as below : 5

Month :	Jan	March	May	July
Production (in lac metres) :	12.4	12.7	13.1	12.3

Estimate the production in April.

- 3 Attempt any **three** of the following : 15  
 (a) Using suitable formula, evaluate  $y$  at  $x = 5$  from the following table :

$x$ :	4	6	8	10
$y$ :	1	3	8	16

- (b) Explain the terms :  
 (i) Transpose of Matrix  
 (ii) Inverse of matrix  
 (c) Following table gives the viscosity of an oil as a function of temperature. Use Lagranges formula to find the viscosity of oil at  $140^{\circ}\text{C}$  :

Temperature ( $^{\circ}\text{C}$ ) :	110	130	160	190
Viscosity :	10.8	8.1	5.5	4.8

- (d) Derive Stirling's formula.

## SECTION - II

- 4 (a) Answer the following objective questions : 10  
 (i) C is the extension used for a C program file - True or False.  
 (ii) Clrer ( ) is present in conio.h - True or False.

- (iii) The statement in c is terminated by semicolour - True or False.
- (iv) Algorithm is written after the 'C' program - True or Flase.
- (v) While loop is used in the program to increase the speed.
- (vi) Define what is numerical differentiation.
- (vii) Velocity can be determined by numerical differentiation method - True or False.
- (viii) State Newton-Cote's quadrature formula.
- (ix) State Picard's formula.
- (x) A partial differential equation is said to be elliptic if  $B^2-4A$ .....

(b) Write a program using 'C' to find roots of equation using Bisection method. 10

- 5 (a) Write a program to implement interpolation using Gauss forward difference method. 10
- (b) Write a program to integrate given values using trapezoidal rule for integration. 5

**OR**

- 5 (a) Write a program to implement interpolation using Newton's backward difference formula. 10
- (b) Write a program to implement interpolation using Lagrange's method. 5

6 Attempt any **three** of following : 15

- (a) Regula - Falsi method of finding the root.
- (b) Find the root of given equation by Regula - Falsi method  $x^3 - 4x - 9 = 0$
- (c) Find the first and second derivatives of  $f(x)$  at  $x = 1.5$ .

x :	1.5	2.0	2.5	3.0	3.5	4.0
$f(x)$ :	3.375	7.000	13.625	24.000	38.875	59.000

- (d) Find from following table, the area bounded by curve and x-axis from  $x = 7.47$  to  $x = 7.52$ .

x :	7.47	7.48	7.49	7.50	7.51	7.52
$f(x)$ :	1.93	1.95	1.98	2.01	2.03	2.06

