

2023

Full Marks : 70

Time : 3 hours

Answer from **all** the Groups as directed.*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*

GROUP—A

(Compulsory)

1. Choose the *correct* answer of the following: 2×10

(a) Which of these is NOT a relational or logical operator ?

(i) =

(ii) ||

(iii) ==

(iv) !=

(2)

(b) We can not use keyword 'break' simply within _____.

(i) While

(ii) For

(iii) If-else

(iv) Do-while

(c) The global variables are _____

(i) External

(ii) Internal

(iii) Both External and Internal

(iv) None of these

(d) The #include < stdi.h > is a

(i) Inclusion directive

(ii) File inclusion directive

(iii) Preprocessor directive

(iv) None of the above

(Turn Over)

UDHC-V-Math (DSE-1) Gr.B

(Continued)

- (e) Comment on the C statement given below: `int(*P) [5]`:
- (i) A ragged array
 - (ii) An array p of pointers
 - (iii) A pointer p to an array
 - (iv) None of these
- (f) Numerical techniques more commonly involve.
- (i) Elimination method
 - (ii) Reduction method
 - (iii) Iterative method
 - (iv) Direct method
- (g) Errors may occur in performing numerical computation on the computer due to which of the following reasons ?
- (i) Operator fatigue
 - (ii) Back substitution
 - (iii) Rounding errors

- (iv) Power fluctuations
- (h) The positive root of the equation $x^3 - 4x - 9 = 0$ using Regula Falsi method and correct to 4 decimal places
- (i) 2.7506
 - (ii) 2.6570
 - (iii) 2.7065
 - (iv) 2.7605
- (i) In the Gauss elimination method for solving a system of linear algebraic equations, triangularization leads to
- (i) Diagonal matrix
 - (ii) Lower triangular matrix
 - (iii) Upper triangular matrix
 - (iv) Singular matrix
- (j) Order of convergence of Regular Falsi method is

(5)

- (i) 1.321
(ii) 1.618
(iii) 1.5
(iv) 2.0
(v) None of these

GROUP—B

Answer any *four* questions of the following: 5×4

2. Discuss Bisection method for the solution of equations.
3. Define
- (a) Algorithms
 - (b) Flow chart
 - (c) Arithmetic and input/output instructions
4. Discuss about Decision statements and Decision control structure with an example.

(6)

5. Define
- (a) Arrays
 - (b) Pointers
6. Discuss different types of file formatting.
7. Write short notes on single-step method to solve ordinary differential equation.
8. Define interpolation and discuss divided differences schemes.
9. Discuss about direct methods for solving systems of linear equations.

GROUP—C

Answer any *two* questions of the following:

- 10.(a) Write short notes: 15×2
- (i) Logical and conditional operators
 - (ii) Case control structures
- (b) Why is C called as a mid-level programming language? 10

11. What is the main objective of C language? Give five prime features of the C programming language. What are basic data types supported in the C programming language? 15

12.(a) The velocity v (km/min) of a train which starts from rest, is given at fixed intervals of time t (min) as following:

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t 2 4 6 8 10 12 14 16 18 20

v 10 18 25 29 32 30 11 5 2 0

Find the approximate distance covered by Simpson's rule. 8

(b) Using numerical differentiation method find the first derivative $\frac{dy}{dx}$ at $x = 0$ for the given data. 7

X 0 1 2 3 4

$f(X)$ 2 1 2 5 2

13.(a) Find the root of $(x^3 - 4x - 9) = 0$ by using regula-falsi method.

(b) Find step by step Lagrange's interpolation polynomial curve passing through the points (0, 1), (1, 0) and (3, 10).