UDHB-Sem-IV–M (CC-10)

2021

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.

Calculator is allowed.

GROUP—A

(Compulsory)

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

(*a*) Which of the following is responsible for conversion of C programs to machine language

(*i*) Operating system

(*ii*) An editor

(*iii*) A compiler

(*iv*) An interpreter

(*b*) Which of the following is not a valid relational operator ?

(*i*) *

(*ii*) = =

(*iii*) > =

(*iv*) < =

(*c*) A name having a few letters, numbers and special character __ (under score) is called

(*i*) Keywords

(*ii*) Reserved keywords

(*iii*) Tokens

(*iv*) Identifiers

(*d*) What is/are the type/types of numeric constant/constants used in C programming language ?

(*i*) Integer constant

(*ii*) Real constant

(*iii*) Both (*i*) and (*ii*)

(*iv*) None of these

(*e*) Which is/are the integer constant/constants ?

(*i*) Decimal integer constant

(*ii*) Octal integer constant

(*iii*) Hexadecimal integer constant

(*iv*) All of the above

(*f*) If $f(x)$ be a polynomial of nth degree then

(*i*) $\Delta^n f(x) = 0$

(*ii*) $\Delta^{n-1} f(x) = \text{const}$

(*iii*) $\Delta^{n+1} f(x) = 0$

(*iv*) $\Delta^{n+1} f(x) = \text{const}$

(*g*) The value of Δe^x is

(*i*) $e^x - e^{x+h}$

(*ii*) $e^x - e^{x-h}$

(*iii*) $e^{x+h} + e^x$

(*iv*) $e^{x+h} - e^x$

(*h*) The error in the Trapezoidal rule is of the order of

(*i*) h

(*ii*) h^2

(*iii*) h^3

(*iv*) 1

(*i*) If $y_0 = 580$, $y_1 = 556$, $y_2 = 520$, $y_4 = 384$ value of y_3 is

(*i*) 1860

(*ii*) 930

(*iii*) 465

(*iv*) 234

(*f*) If $f(x)$ is given at the points $a = x_0, x_1, x_2, ..., x_n = b$ of the interval $[a, b]$, where $x_0 < x_1 < x_2 < ... < x_n = b$ then the problem of finding $f(x)$ at a point lying in any of the sub-intervals $[x_{r-1}, x_r]$ is known as

(*i*) Extrapolation

(*ii*) Interpolation

(*iii*) Correlation

(*iv*) Estimation

GROUP–B

Answer any *four* questions : 5 × 4

2. What is the difference between algorithm and flow chart ?

3. What do you mean by an array ? Name all types.

4. Write a C-program for counting negative, positive integers and zeros in a given set of integers using do-while loop.

5. What is the stremp ( ) function ? What is the value it returns when two strings are (*i*) identical, (*ii*) not identical ?

6. Write down the difference between False position and Bisection methods of finding real roots of an equation with example.

7. Use Newton's method to find the root of the equation $x \sin x + x \cos x = 0$.

8. Solve the Gauss elimination method :

$$3x + 4y + 5z = 18$$
$$2x - y + 8z = 13$$
$$5x - 2y + 7z = 20$$

9. If $y(1) = -3$, $y(3) = 9$, $y(4) = 30$ and $y(6) = 132$, find the four point Lagrange interpolation polynomial that takes the same values as the function y at the given point.

GROUP–C

Answer any *two* questions : 15 × 2

(*Continued*)

10. (*a*) What are desirable program characteristic of C-program ? Explain each of them briefly 8

(*b*) What is a structure ? How does a structure differ from an array ? How to declare structure variables ? 7

11. (*a*) Write the names of four basic data types supported by C-language. Write the algorithm to find the roots of a quadratic equation $ax^2 + bx + c = 0$. 8

(*b*) What is the meaning of volatile variable in C Write a C-programme to count characters, words and lines in a text 7

12. (*a*) State Regula-Falsi method for the evaluation of the real root of a numerical equation $f(x) = 0$. The equation $x^3 - x^4 - x^1 - 1 = 0$ has one root real between 1.4 and 1.5. Find the root to four places of decimals by Regula-Falsi method. 8

(*b*) Find the root correct to three places of decimals of the equation $x^4 - x - 10 = 0$ using Newton Raphson method. 7

(Turn Over)

13. (*a*) State the formula for Simpson's rule for numerical integration Employing Simpson's rule prove that

$$\int_0^1 \frac{dx}{(1+x)} \log^2 = 00.69315$$ 8

(*b*) Find the first and second derivatives at the point $x = 1.1$ of the function $y = f(x)$ tabulated below; by the process of numerical differentiation. 7

x	1	1.2	1.4	1.6	1.8	2.00
$f(x)$	0	1.280	0.5440	1.2960	2.4320	4.00