LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

U.G. DEGREE EXAMINATION – ALLIED
THIRD SEMESTER – NOVEMBER 2024
UPH 3401 – NUMERICAL METHODS AND C++ PROGRAMMING

Date: 15-11-2024   Dept. No.   Max. : 100 Marks

Time: 09:00 am-12:00 pm

	SECTION A - K1 (CO1)	
	Answer ALL the Questions -	**(10 x 1 = 10)**
1.	**Match the following**	
a)	Newton-Raphson Method	– Class
b)	Integration	– Ternary operator
c)	Conditional Operator	– Trapezoidal rule
d)	Object	– Index
e)	Array position	– Iterative method using tangents
2.	**True or False**	
a)	In the Bisection method, the interval is always halved to find the root.	
b)	Simpson's methods are more accurate than the other numerical approximations.	
c)	A declared keyword can be used as a variable name.	
d)	Data is a collection of statements.	
e)	An array is a group of consecutive memory locations with the same name and different data type.	
	SECTION A - K2 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
3.	**Fill in the blanks**	
a)	The _____ method is a bracketing method for finding roots of a function.	
b)	Simpson's _____ rule is an extension of the trapezoidal rule.	
c)	Int is an example of a _____.	
d)	A Program is a set of _____.	
e)	The memory locations within the array are referred to as _____.	
4.	**Answer the following**	
a)	What is the main disadvantage of the Newton-Raphson method?	
b)	Express the formula of the 2nd order Runge-Kutta method.	
c)	Which operator is used to increase a variable's value by one in C++?	
d)	What is a loop in C++?	
e)	What is a function in C++?	
	SECTION B - K3 (CO2)	
Answer any TWO of the following		**(2 x 10 = 20)**

5.	Find the root of the equation $x^4 - x = 10$ using the Newton-Raphson method.
6.	Evaluate $\int_0^1 e^x \, dx$, by the Trapezoidal rule. Divide the range into 6 equal parts.
7.	Explain the basic structure of a C ++ program.
8.	Explain briefly about different loop statements in C++.

SECTION C – K4 (CO3)

Answer any TWO of the following (2 x 10 = 20)

9.	Explain the categories of data types in C++.
10.	Evaluate $\int_0^9 \dfrac{dx}{1+x^2}$ by Simpson's 3/8 rule. Use h = 1.
11.	Solve the system of the following equations using the Gauss elimination method. $$10x - 2y + 3z = 23$$ $$2x + 10y - 5z = -33$$ $$3x - 4y + 10z = 41$$
12.	With an example program, explain about calling a function by value.

SECTION D – K5 (CO4)

Answer any ONE of the following (1 x 20 = 20)

13.	Explain briefly about i) switch, ii) break, iii) continue, and iv) go to statement in C++ with an example each.
14.	Apply Modified Euler's Method to solve y' = x + y, given that y (0) = 1, find y at x = 0.2 using h = 0.1.

SECTION E – K6 (CO5)

Answer any ONE of the following (1 x 20 = 20)

15.	Using the Regula-Falsi method, solve $x^5 - x^4 - x^3 - 1 = 0$ the root lies between 1 & 2.
16.	Discuss in detail about standard and user-defined functions in C++.

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