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Roll No. :

320555(20)

B. E. (Fifth Semester) Examination, Nov.-Dec. 2021
(New Scheme)
(Civil Engg. Branch)

**NUMERICAL METHODS & COMPUTER
PROGRAMMING**

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all question. Part (a) is compulsory from each question & carry 2 marks. Attempt any two parts from part (b), (c) and (d) from each question & carries 7 marks. Draw suitable diagram.

Unit-I

1. (a) Define keywords & variables in C++? 2
- (b) Give syntax for : (any two)
- (i) If-else
 - (ii) While

[2]

(iii) Do-while

(iv) For

and explain with small example.

7

(c) Write a C++ program to determine the bending moment in a desired section at a simply supported beam subjected to a UDL.

7

(d) What is switch case statement? Write a program in C++ to program addition, subtraction, multiplication & division using switch case.

Unit-II

2. (a) What do you mean by array?

2

(b) Write a program in array to perform addition of two matrices.

7

(c) Differentiate between call by value & call by reference, giving suitable examples of each.

7

(d) Write a program to calculate deflection 'y' using function where,

[3]

$$y = \frac{5}{384} \frac{WL^4}{EI}$$

take the values of W , L , E & I through the keyword.

7

Unit-III

3. (a) What is graphics Initialization?

2

(b) Explain the purpose of the following functions with syntax (any two) :

7

(i) rectangle ()

(ii) circle ()

(iii) line ()

(c) Write a graphics program to draw the cross section of a singly reinforced beam of rectangular cross section.

7

(d) Write a graphics programme in C++ to draw concentric circles. Take input by user.

7

Unit-IV

4. (a) Write the normal equation of the curve $y = ae^{bx}$.

2

[4]

(b) Solve by Gauss Jordan Method :

7

$$2x - 3y + z = -1$$

$$-x + 4y + 5z = 25$$

$$3x - 4y + z = 2$$

(c) Growth of bacteria (N) in a culture after 't' has is given in the following table :

T : 0 1 2 3 4 5 6

N : 32 47 65 92 132 190 275

Fit a curve of the form $N = ab^t$ and estimate N

when $t = 7$

7

(d) Solve the equation by Gauss-Elimination method :

7

$$2x + 4y + z = 3$$

$$3x + 2y - 2z = -2$$

$$x - y + z = 6$$

Unit-V

5. (a) What do you mean by central differences?

2

(b) Apply Runge-Kutta method to find an approximate

[5]

value of y when $x = 0.2$

$$\frac{dy}{dx} = x + y \quad \& \quad y(0) = 1$$

7

(c) Given that

$$\frac{dy}{dx} = x^2(1+y), \quad y(1) = 1, \quad y(1.1) = 1.233,$$

$$y(1.2) = 1.548, \quad y(1.3) = 1.979,$$

evaluate $y(1.4)$ by Milne's Method.

7

(d) Evaluate: (any two)

7

(i) $\Delta \tan^{-1} x$

(ii) $\Delta \left(\frac{x^2}{\cos 2x} \right)$

(iii) $\Delta (e^x \log 2x)$