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| **SESSION** | **May 2023** |
| **PROGRAM** | **BCA** |
| **SEMESTER** | **III** |
| **course CODE & NAME** | **DCA2101 & Computer Oriented Numerical Methods** |
| **CREDITS** | **04** |

**Set-I**

**1. Find Lagrange’s interpolation polynomial fitting the points** $y(1) = -3, y\left(3\right)= 0, y\left(4\right)= 30, y(6) = 132$**. Hence find y (5).**

**Ans:** To find the Lagrange's interpolation polynomial fitting the given points, we'll use the Lagrange interpolation formula.

**The formula for the Lagrange polynomial is given by:**

P(x) = Σ [i=0 to n] yi \* Li(x)

Where P(x) is the Lagrange polynomial, yi is the y-value at each point, Li(x) is the Lagrange basis polynomial, and n is

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**2. (a) By constructing a difference table and taking the second-order difference as constant find the sixth term of the series 8,12,19,29,42.**

**Ans:** To find the sixth term of the series using the second-order difference, we need to construct a difference table.

**Given series:** 8, 12, 19,

**(b) Find the eigenvalues and eigenvectors of the matrix** $A=\left[\begin{matrix}2&1\\4&5\end{matrix}\right].$

**Ans:** To find the eigenvalues and eigenvectors of the matrix A = [[2, 1], [4, 5]], we need to solve the characteristic equation.

The characteristic

**3. (a) Solve the system of equation by Cramer’s rule**

$3x+y+2z=3$

$2x-3y-z=3$

$x+2y+z=4$***.***

**Ans:** To solve the given system of equations using Cramer's rule, we'll find the determinants of the coefficient matrix and the matrices obtained by replacing each column with the constants from the right-hand side of the equations.

**The system of**

**(b) Evaluate** $\sqrt{12}$**to four decimal places by Newton’s-Raphson formula.**

**Ans:** To evaluate √12 using Newton's-Raphson method, we need to find the root of the equation f(x) = x^2 - 12 = 0.

We can then apply the

**Set-II**

**4. For what value of** $λ \& μ$ **the following system of equations:**

$x + y + z = 6$

$x +2y+3z =10$

$x+2y +λz =μ$ **May have**

**(i) Unique solution**

**(ii) Infinite number of solutions**

**(iii) No solution**

**Ans:** To determine the values of λ and μ for which the given system of equations has a unique solution

**5. Find the equation of the best fitting straight line for the data:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | **1** | **3** | **4** | **6** | **8** | **9** | **11** | **14** |
| **Y** | **1** | **2** | **4** | **4** | **5** | **7** | **8** | **9** |

**Ans:** To find the equation of the best fitting straight line for the given data, we'll use the method of linear regression.

Let's denote the given data points as (x₁, y₁), (x₂, y₂)... (xₙ, yₙ).

**In this case, we have the**

**6. Find the solution for** $x=0.2$ **taking interval length 0.1 using Euler’s method to solve:** $\frac{dy}{dx}=1-y$**. Given**$ y\left(0\right)=0$**.**

**Ans:** To solve the differential equation dy/dx = 1 - y using Euler's method with a step size of 0.1, we can approximate the solution at each step using the following iteration formula:

y\_(n+1) = y\_n + h \*