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| **SESSION** | **NOVEMBER 2024** |
| **PROGRAM** | **BACHELOR OF COMPUTER APPLICATIONS (BCA)** |
| **SEMESTER** | **III** |
| **COURSE CODE & NAME** | **DCA2101 COMPUTER ORIENTED NUMERICAL METHODS** |
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|  |  |

**SET-I**

### **Q1.**

**Show that: (a)   
(b)**

#### **Ans 1.**

**(a)**

**Proof:**

1. Using the definitions of finite difference operators:
2. Midpoint operator
3. Substituting:

Its Half solved only

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### **Q2.**

**Find Lagrange’s interpolation polynomial fitting the points:**

**Hence find .**

#### **Ans 2.**

**Step 1: Lagrange’s Interpolation Polynomial**

The Lagrange interpolation formula is:

where is given by:

### 

### **Q.3.**

**Evaluate , given the following table of values:**

#### **Ans 3.**

We use **Newton’s Divided Difference Interpolation** formula to evaluate .

**Step 1: Divided Difference Table**

1. Construct the divided difference table:
   * , and so on.

### 

### **Q4.**

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

#### **Ans 4.**

We use the **method of least squares** to find the equation of the best-fitting straight line:

**Step 1: Formulas**

1. Slope ():
2. Intercept ():

### 

### **Q 5.**

**For what values of and does the following system of equations have:**

1. **A unique solution**
2. **An infinite number of solutions**
3. **No solution**

**Given system:**

#### 

#### **Ans 5.**

The general system of equations can be written in matrix form:

where

### 

### **Q6.**

**Find the solution for using an interval length of with Euler’s method to solve:**

#### **Ans 6.**

**Step 1: Euler’s Method Formula**

Euler’s method is given by:

where .

Given:

* Initial condition: