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| **SESSION** | **APRIL 2025** |
| **PROGRAM** | **MASTER OF COMPUTER APPLICATIONS (MCA)** |
| **SEMESTER** | **I** |
| **COURSE CODE & NAME** | **DCA6108 DISCRETE MATHEMATICS & GRAPH THEORY** |
|  |  |
|  |  |

### **SET - I**

**1. Find the inverse of the matrix**

**using the adjoint method.**

### **Ans 1.**

### **Inverse of a Matrix Using Adjoint Method**

We are given the matrix:

**Step 1: Find the Determinant of A (|A|)**

Using cofactor expansion (along the first row):

Calculate each 2×2 determinant:

Its Half solved only

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**2. Find the solution to the following system using elimination:**

### **Ans 2.**

### **Solving System of Equations Using Elimination Method**

Given system:

**Step 1: Eliminate x from Equations (1) and (3)**

From (1):

**3. Let . If , find the composition , also check the bijective-ness of mappings. Marks:**

### **Ans 3.**

### **Function Composition and Bijective Nature**

Given:

* Sets: (Set of integers)
* Functions:

We are asked to:

**4. Verify that**

### **Ans 4.**

### **Propositional Logic Verification**

We are given a proposition:

and asked to verify whether it is **always true** (i.e., a **tautology**).

**Step 1: Understand the Expressions**

**5. The table shows the height distribution (in cm) of students in a school:**

| **Height (cm)** | **Frequency** |
| --- | --- |
| **140 - 150** | **5** |
| **150 - 160** | **12** |
| **160 - 170** | **17** |
| **170 - 180** | **8** |
| **180 - 190** | **5** |

**Find the median height of the students.**

### **Ans 5.**

### **Median of Height Distribution**

Given table:

| Height (cm) | Frequency (f) |
| --- | --- |
| 140 – 150 | 5 |
| 150 – 160 | 12 |
| 160 – 170 | 17 |
| 170 – 180 | 8 |

**6. Explain the Degree in Directed Graph.**

### **Ans 6.**

### **Degree in Directed Graph**

**Definition of Degree in Directed Graphs**

In graph theory, a directed graph (digraph) is a set of vertices connected by directed edges (arcs). Each edge has a direction, meaning it goes from one vertex to another.

In a directed graph, each vertex has two degrees:

1. In-degree (deg⁻): Number of edges coming into a vertex.