**Assignment 1**

**Due Date: 5 Nov, 2021**

**Submission Guidelines:**

1. Submit your handwritten document directly to your instructor.
2. Mention your Name, Roll No and section
3. Plagiarism and copied assignments will be heavily penalized.
4. Late Submission will not be accepted
5. Send your assignment to your CR.

**Question 1**

Let *p* and *q* be the propositions

*p* : It is below freezing. (including negations).

*q* : It is snowing

Write these propositions using *p* and *q* and logical connectives

**a)** It is below freezing and snowing.

**b)** It is below freezing but not snowing.

**c)** It is not below freezing and it is not snowing.

**d)** It is either snowing or below freezing (or both).

**e)** If it is below freezing, it is also snowing.

**f )** Either it is below freezing or it is snowing, but it is

not snowing if it is below freezing.

**g)** That it is below freezing is necessary and sufficient

for it to be snowing.

**Question 2**

Let *p*, *q*, and *r* be the propositions

*p* :You have the flu.

*q* :You miss the final examination.

*r* :You pass the course.

Express each of these propositions as an English sentence.

**a)** *p* → *q* **b)** ￢*q* ↔ *r*

**c)** *q* →￢*r* **d)** *p* ∨ *q* ∨ *r*

**e)** *(p* →￢*r)* ∨ *(q* →￢*r)*

**f )** *(p* ∧ *q)* ∨ *(*￢*q* ∧ *r)*

**Question 3**

Express each of these system specifications using predicates, quantifiers, and logical connectives.

1. At least one mail message, among the nonempty set of messages, can be saved if there is a disk with more than 10 kilobytes of free space.
2. Whenever there is an active alert, all queued messages are transmitted.
3. The diagnostic monitor tracks the status of all systems except the main console.
4. Each participant on the conference call whom the host of the call did not put on a special list was billed.