Quiz 2 (*Aug 29, Marks: 3, Duration: 25 mins*) **COL703, Aug-Nov 2022**

Name: **Entry No.:**

1. **[1 marks]** Given the premises $(p \to q)$ and $(r \to s)$, use resolution to prove the conclusion $(p \vee r \to q \vee s)$.

2. **[1 marks]** Prove that a disjunction of literals $l_1, l_2, \ldots, l_m$ is valid if and only if there are $1 \leq i, j \leq m$ such that l_i is $\neg l_j$.

3. **[1 marks]** Consider the following popular puzzle. When asked for the ages of her three children, Mrs. Baker says that Alice is her youngest child if Bill is not her youngest child, and that Alice is not her youngest child if Carl is not her youngest child. Encode these facts, and the necessary background knowledge that only one of the three children can be her youngest child, into propositional logic formulas. Use propositions a, b and c to denote that Mrs. Bakers youngest child is Alice, Bill and Carl, respectively. Show with resolution that Bill is her youngest child.