Quiz 8 (*Nov 14, Marks: 3, Duration: 30 mins*) **COL703, Aug-Nov 2022**

Name: **Entry No.:**

1. **[1 marks]** How can ROBDDs be used to check if $A \vDash B$, for propositional logic formulas A and B. Use the technique that you have proposed to check if $(p \to (q \to r)) \vDash ((p \to q) \to (p \to r))$.

2. **[1 marks]** Find a modal logic formula whose corresponding property is *density*, i.e. for all $x, z \in W$ such that $R(x, z)$, there exists a $y \in W$ such that $R(x, y)$ and $R(y, z)$. Argue that your formula is correct.

3. **[1 marks]** Given a Kripke model with a finite set of worlds, we may represent a world in this model quite naturally with a propositional logic formula derived from the valuation. (Assume that we can always add extra atomic propositions, if required, to make enough distinctions.) A subset of worlds may then be represented as a disjunction (of the formulas corresponding to the worlds in the set).

   Draw an ROBDD (use the alphabetical order) representing the formula for the set of worlds where $\Box p \to p$ is true in the model shown below.