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**SRM Institute of Science and Technology**

**SET D-AK**

**College of Engineering and Engineering and Technology**

**School of Computing**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

**Academic Year: 2023-24 ODD**

**Test: CLAT 2**  **Date: 10.10.2023**

**Course Code & Title: 18CSE351T-Computational Logic**  **Duration:** 110 mins

**Year & Sem:** III & IV Year / V & VII Sem. **Max. Marks:** 50

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| **Q. No** | **Question** |
| 1 | Briefly discuss on Completeness of propositional logic  If all valid propositions of PL are theorems of PC, then PC  is called complete to PL  Every nonempty consistent set is satisfiable. |
| 2 | Prove the validity of the sequent using Propositional natural deduction  p → (q ∨ r) ⊢ ¬q → (p → r) |
| 3 | 1. Use ¬, →, ∧ and ∨ to express the following declarative sentences in propositional logic; in each case state what your respective propositional atoms p, q, etc. mean   Cancer will not be cured unless its cause is determined and a new drug for cancer is found     1. Draw the parse trees of the following formulas   ¬ ((¬q ∧ (p → r )) ∧ (r → q)) |
| 4 | Use the predicates,  InBox(x): x is in the box  Red(x): x is red  Animal(x): x is an animal  Cat(x): x is a cat  Dog(x): x is a dog  Boy(x): x is a boy  Prize(x): x is a prize  Won(x, y): x won y  to formalize the following sentences   1. All red things are in the box 2. Only red things are in the box 3. No animal is both a cat and a dog 4. Every prize was won by a boy 5. A boy won every prize |
| 5 | Determine the following formula is well formed or not    Wff  Wff  Wff  Not wff  Not wff |
| **Q. No** | **Question** |
| 6 | Prove the validity of the sequent   1. p → q ⊢ (r → p) → (r → q)      1. p → q, r → s ⊢ p ∧ r → q ∧ s 2. q → r ⊢ (p → q) → (p → r) |
| 7 | 1. For the given formula   (∀x (P(x) ∧ Q(x))) → (¬P(x) ∨ Q(y))  ∃x2((P(x3) ∧ P (x1)) → P(x2))  (a) Draw the parse tree  (b) Identify all bound and free variable     1. Discuss briefly on Universal Quantifiers and Existential Quantifiers with examples |