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| **Register No.** |  |  |  |  |  |  |  |  |  |  |

**FACULTY OF ENGINEERING & TECHNOLOGY, SRM UNIVERSITY**

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**Cycle Test – I/Question paper**

**Academic Year: 2017-2018**

**Program offered: B.Tech(CSE) Year / Sem: III/V**

**Max. Marks: 100 Duration: 3 hours Date of Exam: 24-10-17**

**Course Code and Title: 15CS32OE Computational Logic**

**SET - B**

**PART A**

Answer **ALL**questions **1\*20=20**

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| **Sl.No** | **Question** | **Course Outcome** | **Bloom’s Taxonomy** | **Marks** |
|  | Which operator is used to hold next operator?a)□ b)○ c)◊ d)ᶸ | b | Evaluate | 1 |
|  | Which binds more tightly?a)┐ B) $⍱$x c) Ǝx d) none  | c | Application | 1 |
|  | BDT terminal nodes labeled with\_\_\_\_\_a)Boolean variables b)numeric variables c)decimal value d)fraction value | c | Evaluate | 1 |
|  | Give Shannon’s expressiona)f=xf(x)+x’f(x’) b)f=f(x)+f(x’) c)f=f(x)+xf(x’) d)f=f(x’)+fx’ | c | Evaluate | 1 |
|  | Each non terminal node has how many edgesa)2 b)1 c)4 d)5 | a | Application | 1 |
|  | Proof rule for equality introduction isa) /t=t =I b)t/t=t =I c) t1/t=t1 =I d) t3/t1=t2 =i | c | Evaluate | 1 |
|  | Which of the following reflective propertyA)t1=t1 b)t1=t2 c)t3=t d)t1=t1’ | c | Application | 1 |
|  | Which of the following is symmetric property?a)t1=t2˫t2=t1 b)t3=t1˫t3=t1 c)t=t’˫t=t’ d)t1˄t2˫t2˄t1 | a | Evaluate | 1 |
|  | Formula for introducing existential quantifier.a)ф[t/x] / Ǝxф b)ф2[t1/x] / Ǝxф c) t/Ǝxф Ǝxi d)none of the above | a | Evaluate | 1 |
|  | What is the logical equivalence of the statement “someone likes everyone” ?a)¥xlikes(a,x) bƎy[$⍱$xlikes(y,x)]c.Ǝxlikes(y,x) d)none of the above | a | Evaluate | 1 |
|  | What is the logical translation of the following statement? “None of my friends are perfect”a)$∃x(F(x)˄˥p(x)$ b) $∃x(˥F(x)˄p(x)$ b) $∃x(˥F(x)˄˥p(x)$ d) $˥∃x(F(x)˄p(x)$ | c | Evaluate | 1 |
|  | Which one of the following is “NOT” logical equivalent to $˥∃x(⍱y\left(a\right)˄⍱z\left(b\right))$ ?a) $⍱x(∃x(˥b)͢\rightarrow $⍱y(a)) b) ⍱x(⍱x(b)→∃y(˥x))c) $⍱x(⍱y(a)\rightarrow ∃z(˥b)$) d) ⍱x(∃y(˥a)→∃z(˥b)) | c | Evaluate | 1 |
|  | Which of the following two are equivalent?i) $˥⍱x(p\left(x\right))$ ii) $˥∃x(p\left(x\right))$ iii) $˥∃x($˥p(x)) iv) $∃x(˥p\left(x\right))$a) I and III b) I and IVc) II and III d) II and IV | c | Evaluate | 1 |
|  | Identify the correct translation into logical notation of the following assertion.* 1. a)$(∃x)(boy(x)\rightarrow (⍱y)(girl\left(y\right)˄taller\left(x,y\right)))$
	2. b) ($\left(∃x\right)boy\left(x\right)a\left(⍱y\right)girl(y)˄taller(x,y)))$
	3. c) ($∃x)(boy(x)\rightarrow \left(⍱y\right)girl(y)\rightarrow taller$(x,y)))
	4. d) $\left(∃x\right)boy(x)˄(⍱ygirl\left(y\right)\rightarrow taller\left(x,y\right)))$
 | c | Application | 1 |
|  | In the parse tree when we walkup at beginning and we don’t have any quantifiers then it is calleda) free variable b) Bound c)sub variable d)none of the above | c | Evaluate | 1 |
|  | Temporal logic is a formal system for reasoning about \_\_\_\_?a.Time b.speed c.accelerator d.velocity | a | Application | 1 |
|  | Which operator symbol is for universal operator?a)□ b)○ c)◊ d)ᶸ | b | Evaluate | 1 |
|  | What is the textual notation for globally?a)Gф b)Fф c)Yф d)none | b | Evaluate | 1 |
|  | What is the symbolic notation for eventually past?a) | b | Evaluate | 1 |
|  | Temporal logic formula is\_\_\_a)statistically true b)Statistically false c)technically trued)technically | b | Evaluate | 1 |

**PART B**

Answer any **FIVE** questions **5\*4=20**

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| **Sl.No** | **Question** | **Course Outcome** | **Bloom’s Taxonomy** | **Marks** |
|  | Construct the parse three for the following equation.a)$⍱x(p(x)⟶q(x)⋀s(x,y)$ b)$⍱x\left(p\left(x\right)⋀q\left(x\right)\right)⟶(┐p(x)Vq(y)$ | c | Analysis | 22 |
|  | Write the equations for quantifiers introduction and elimination | b | Comprehension | 4 |
|  | Deduce p(t),$⍱x(p$(x)⟶┐q(x)Ⱶ┐q(t) |  a, c | Application | 4 |
|  | Explain the logical equivalences of predicate logic | a , c | Comprehension | 4 |
|  | Explain resolution in predicate logic | c | Synthesis | 4 |
|  | List out the operator in temporal logic. | c | Knowledge | 4 |
|  | Discuss OBDD | c | Evaluation | 4 |

**PART C 5\*12=60**

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| **Sl.No** | **Question** | **Course Outcome** | **Bloom’s Taxonomy** | **Marks** |
|  | Assuming that x is not free in ᴪa)$⍱xᶲ⋀ᴪ⟛⍱x(φ⋀ᴪ$)b)┐⍱xφ⟛$∃x┐φ$ (OR) | c | Knowledge | 66 |
|  | Describe Unification , Ground resolution in predicate logic | a | Knowledge | 6 6 |
|  | Explain Robinson’s unifications algorithm (OR) |  a , b, c | Synthesis | 12 |
|  | Illustrate Semantics of predicate logic,  | b | Comprehension | 12 |
|  | Paraphrase the general solution for predicate logic (OR) | c | Comprehension | 12 |
|  | Summarize Soundness and completeness of predicate logic |  a, b | Comprehension | 12 |
|  | Discuss about free and bound variable (OR) | b , c | Analysis | 12 |
|  | Demonstrate the past temporal logic with example | a | Analysis | 12 |
|  | Discuss about BDD in detail (OR) | b | Evaluation | 12 |
|  | Describe the following1. Branching time logic
2. Linear time logic
 | c | Knowledge | 66 |