

5E3164	Roll No. _____	Total No. of Pages : 3
	5E3164 B.Tech. V Sem.(Re-Back) Exam. Dec. 2012 Computer Science 5CP/CS6.1 Logic and Functional Programming	

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

Attempt any five questions selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. Nil 2. Nil

UNIT-I

- Q.1. (a) What do you mean by a Proposition? How can assertion in English language can be expressed as Proposition? Give example. 8
- (b) What do you mean by 'Tautology'? How can a tautology be identified from the truth table. 8
- Q.2. (a) For Proposition a & b, write the truth table for 8
($\neg a$), ($a \wedge b$), ($a \vee b$), ($a \Rightarrow b$) & ($a = b$)
- Q.2. (b) Translate the following into propositions by introducing suitable identifiers:
(i) Whether or not its raining, I am going for swimming.
(ii) If it is raining, I am not going for swimming.
(iii) If it rains while I am swimming, I'll go to home. 8

UNIT-II

- Q.3. (a) State with proof : De Morgan's law for equivalence of propositions. 8
- (b) Simplify the following propositions: 8

(i) $x \vee (y \vee x) \vee \neg y$

(ii) $(x \vee y) \wedge (x \vee \neg y) \wedge (\neg x \vee y) \wedge (\neg x \vee \neg y)$

(iii) $(x \wedge y) \vee (x \wedge \neg y) \vee (\neg x \wedge y) \vee (\neg x \wedge \neg y)$

(iv) $x \Rightarrow (y \Rightarrow (x \wedge y))$

Q.4. (a) Prove that the proposition

$$(\neg (b \Rightarrow c) \wedge \neg (\neg b \Rightarrow (c \vee d))) \Rightarrow (\neg c \Rightarrow d) \text{ is a tautology.} \quad 8$$

(b) Explain with suitable example; The law of implication

$$a \Rightarrow b \text{ can also be rewritten as } \neg a \vee b. \quad 8$$

UNIT-III

Q.5. (a) What do you mean by Predicate logic? Explain how it provides a powerful way to represent assertions as compared to Propositional logic. 8

(b) Consider the assertion in English-
 "If it rains, then for all individuals, either he takes umbrella or he gets wet." using suitable identifiers, construct the expression in Predicate logic. 8

Q.6. (a) Comment on the statement-"A predicate is a generalization of Propositional variable". Also give suitable example. 8

(b) differentiate between Free and Bound variables. Give example by using the wff of the assertion "All soldiers were either loyal to captain or wants to kill him". 8

UNIT-IV

Q.7. (a) Explain how Prolog is suitable for Logic Programming by giving notation of the given assertion : 'Fail' if 'class not attended' or 'Exam not Given' or 'No self study' 8

Q.7 (b) Define Unification. Explain its significance in simplification of wff. 8

Q.8. (a) How can 'List data structure is defined in Prolog? Give suitable example.

- (b) Focus upon the strength and weakness of Prolog as a language for solving the assertions in English language. 8

UNIT-V

- Q.9. (a) Give the formal definition and notation of Lambda Calculus'. Also focus upon its importance in computational models. 8
- (b) Comment on the statement -Lambda Calculus is a functional programming language with higher order functions and no side effects. 8
- Q.10. (a) Explain the feature of LISP that it is a suitable programming language for functional programming paradigm. 8
- (b) Explain the following in context of LISP. Also give syntax.
- (i) Recursion and Conditionals
 - (ii) Lists
 - (iii) Symbols
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