Register Number: ……………………..

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Fifth Semester

COMPUTER SCIENCE AND ENGINEERING

CSE111: Theory of Computation

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The contrapositive of the statement " If H then C" is _____
   a) If C then not H   b) If not C then H
   c) If not C then not H   d) If C then H

2. The NFA allows to make a transition without receiving an input symbol is called
   a) Grammar   b) Epsilon transition
   c) Set   d) Extended transition

3. A technique which is used to prove certain languages are not regular is _____
   a) Pumping lemma   b) Regular expression
   c) Regular language   d) Deterministic Finite automata

4. Table filling algorithm is used to
   a) Find equivalence   b) Find partitioning
   c) Find inequivalence   d) Minimize the automata

5. Parse tree is used to represent the following in CFG _____
   a) Derivation   b) Non terminals
   c) Terminals   d) Productions

6. Ambiguity in grammar is _____
   a) Having one right most derivation   b) Having one left most derivation
   c) Having two different parse trees   d) No derivation tree

7. CFG stands for
   a) Condition Free Grammar   b) Context Flexible Grammar
   c) Context Free Grammar   d) Control Free grammar

8. Each cell in a Turing Machine holds _____
   a) Blank symbol   b) Input
   c) Tape head   d) Tape symbols

9. A language L is in NP - complete then
   a) L is in NP   b) L is in L^1
   c) L is not in LP   d) L^1 is in L

10. MPCP means
    a) Modern Post Correspondence Problem   b) Modified Post Correspondence Probability
    c) Modified Previous Correspondence Problem   d) Modified Post Correspondence Problem

PART B (10 x 2 = 20 Marks)

11. What is called finite automata?

12. What are regular expressions?

13. Mention about the operations of regular expressions.

14. State Arden's theorem.

15. Construct an CFG representing the set of palindromes over (0+1)*

16. What are the applications of CFG?

17. What is called GNF?

18. List out any four closure properties of CFL.

19. What is called recursive language?

20. What are the various representation of TM?

PART C (5 x 14 = 70 Marks)

21. a) (i) Differentiate DFA and NFA with an example.   (4)
       (ii) Prove that " Let L be set accepted by NFA, then there exists a DFA that accepts   (10)
            L".

(OR)

    b) (i) Convert the following NFA into DFA.   (7)

Trans_ID	0	1
P	{P,Q}	{Q}
Q*	Ó	{P,Q}

       (ii) Prove that " A language L is accepted by some epsilon- NFA, if and only if L is   (7)
            accepted by some DFA".

22. a) (i) Convert the FA in to a regular expression.   (7)

Trans_ID	a	b
1	2	1
2	2	2

    (ii)   Explain about the closure properties of CFL.   (7)

(OR)

b)   Prove that " Every language defined by a regular expression is also defined by a finite automata"

23. a)   Prove the equivalence of push down automata and CFG.

(OR)

b) (i)   If G is a grammar with S→SbS|a, show that G is ambiguous.   (7)

    (ii) Construct a PDA accepting $\{a^n b^m a^n \mid m,n>=1\}$ by empty stack.   (7)

24. a) (i)   What are the steps in simplification of CFG?   (7)

    (ii) Convert the following CFG in to Chomsky Normal Form (CNF)   (7)

        S→AB|Aa, A→aAA|a, B→bBB|b

(OR)

b)   Convert the following in to Greibach Normal Form(GNF)

    A1→ A2A3, A2→A3A1|b, A3→A1A2|a

25. a)   Explain in detail about a language ie not recursively enumerable.

(OR)

b)   Discuss about PCP in detail

****