LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – COMPUTER SCIENCE

THIRD SEMESTER – NOVEMBER 2014

CS3875–THEORY OF COMPUTATION AND COMPILER DESIGN

ate :

me :

Dept. No. | | Max. : 100 Marks

Part A

Answer ALL questions: (10 x 2 =20)

1. Define a function.
2. Give an example of a non-deterministic finite automaton.
3. Define an automaton.
4. Give the uses of pumping lemma.
5. Write a brief note on Turing machine.
6. Define Interpreter.
7. What is the compiler construction tool used in Syntax Analysis?
8. Define type 2 grammar.
9. Give an example for common subexpression.
10. Define Basic Block.

Part B

Answer ALL questions: (5 x8 = 40)

11. (a) State and prove De Morgan's law.

Or

(b) Discuss the types of grammar and classify them.

12. (a) Find the DFSA corresponding to the following non-deterministic FSA $M = (K, I, \delta, q_0, F)$ where $K = \{q_0, q_1, q_2\}, I = \{a, b\}$ and $F = \{q_2\}$,

δ	a	b
		ϕ
	$\{\ \ \ \}$	
	ϕ	ϕ

Or

(b) Write the algorithm for pumping lemma.

13. (a) Write the significance of Turing machine.

Or

(b) Translate the following assignment statement on different phases
POS = INT + RATE * 60

14. (a) Write an algorithm to convert Regular expression to NFA and NFA to DFA.

Or

(b) Show the configuration of a shift-reduce parser on input string aa+a* for the following grammar S→SS + / S S * / a

15. (a) What is DAG? Construct DAG for the following expression a * (b – c) + (b – c) * d

Or

(b) Describe about the local and loop optimization with an example.

Part C

Answer any TWO questions: **(2 x 20 = 40)**

16. (a) Discuss in detail the theory of computation. Elaborate the types of grammar.

(b) Using pumping lemma show that the language $L = \{a^n b^n\}$ is not regular.   (10+10)

17. (a) State and prove Halting problem of Turing machine.

(b) With a neat sketch explain the different phases of a compiler.   (10+10)

18. (a)Construct the predictive parsing table for
$$S \to i\ E\ t\ S\ S', S' \to e\ S\ /\ \varepsilon, E \to b$$

(b)Explain in detail about Flow Graph.   (10+10)

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