4E1216

B. Tech. IV-Sem. (Back) Exam., Oct.-Nov. - 2020
Computer Science & Engineering
4CS4 – 06 Theory of Computation
CS, IT

Time: 2 Hours

Maximum Marks: 82
Min. Passing Marks: 29

Instructions to Candidates:

Attempt all ten questions from Part A, four questions out of seven questions from Part B and two questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may 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 _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 What is Turing Machine?

Q.2 Difference between DFA and NDFA.

Q.3 What is push down automata?

Q.4 Differentiate NP-complete and NP-hard problem.

Q.5 What is parsing?

Q.6 What is finite automate?

Q.7 What is mealy machine?

Q.8 What is deciding properties of CFL?

Q.9 What is ambiguity?

Q.10 What is pumping lemma?

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PART - B

Q.1 Explain the difference between deterministic and Non-deterministic pushdown automata.

Q.2 State and explain pumping lemma for regular sets. Prove that following expression is regular or not regular using pumping lemma.

$$L = \{a^n b^m : n \leq m + 3\}$$

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Q.3 Design a turing machine that computes 2's complement of the given string over the $\Sigma = \{0, 1\}$. Also show the output of the machine for string "00000".

Q.4 Explain context free grammar. Also differentiate it from context sensitive grammar.

Q.5 Explain traveling sales man problem.

Q.6 Construct a Push Down Automata (PDA) for language

$$L = \{a^n b^{n+m} a^m | n, m \geq 0\}$$

Q.7 Design whether the strings abb, aba and abb abb are accepted by transition graph or not.

PART – C

Q.1 Explain Hamilton path problem.

Q.2 Write short note on : [Each part have equal marks]
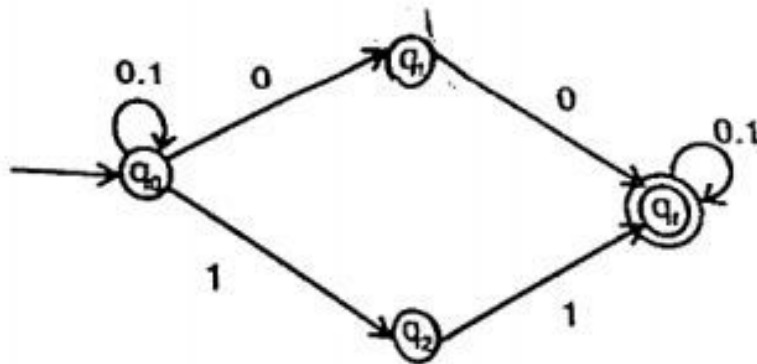
(a) Recursive and recursively enumerable language.   [3×5=15]

(b) Properties of context free grammar

(c) Variation of Turing machine

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Q.3 Differentiate between deterministic and non- deterministic finite automata. Convert the following non-deterministic transition system into deterministic system

Q.4 How can a pushdown automata be constructed for a given language? Explain with example.

Q.5 Explain Greibach and Chomsky Normal form.