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END-SEMESTER EXAMINATION (MAY - 2017)
SEMESTER - IV (SESSION - 2016-17)
 B.Tech CSE (Common to all sections)

Subject Code: CS0204
 Subject: Theory of Computation

Duration: 3 hours
 Max. Marks: 100

Instructions

- All Questions are compulsory
- The Question paper consists of 2 sections - Part A contains 10 questions of 2 marks each. Part B consists of 5 questions of 16 marks each.
- There is no overall choice. Only Part B question include internal choice.

PART - A
 (2 * 10 = 20 Marks)

1. Define Regular Expression
2. Define Transition System
3. What is Push down Automata.
4. Shortly explain Chomsky Normal Form (CNF)
5. Define Turing Machine
6. Describe the types of Turing Machine.
7. Define decidable and undecidable problem
8. Define Recursive and Recursive Enumerable language
9. Write down the properties of Recursive and Recursive Enumerable language.
10. Construct DFA diagram to accept string of a's and b's

PART - B

(16 * 5 = 80 Marks)

11. Design a DFA that accepts set of strings such that every string ends with 01; over alphabet {0, 1} also derive transition table and transition functions.

OR

Define Grammar and describe the types of Grammar. Give suitable example for the types of Grammar

12. Construct a DFA equivalent to an NFA whose transition is defined by the given table

State	a	b
→q ₀	q ₀ ,q ₁	q ₂
q ₁	q ₀	q ₁
(q ₂)	-	q ₀ ,q ₁

OR

(P.T.O)

Define Derivation tree and write down the properties of derivation tree. And draw a derivation tree for the string "aabbaa" for the CFG given by

$$S \rightarrow aAS \mid a$$

$$A \rightarrow SbA \mid SS \mid ba$$

13. Construct PDA for the language $L = \{ a^n b^{2n} \mid n \geq 1 \}$

OR

Describe block diagram of Push down Automata and explain components of Push down Automata.

Eliminate useless symbol, unit production and null production (if any) from the following grammar

Convert the given CFG to CNF $S \rightarrow ABA$

$$A \rightarrow aA \mid \epsilon,$$

$$B \rightarrow bB \mid \epsilon,$$

15. Let G be the grammar $S \rightarrow aB \mid bA$

$$A \rightarrow a \mid aS \mid bAA$$

$$B \rightarrow b \mid bS \mid aBB \text{ for the string}$$

"aaabbabbba" find 1) Leftmost derivation 2) Parse

OR

Distinguish between

a) DFA and NDFFA

b) DPDA and NPDA

