CSE 209

B. Tech. IVth SEMESTER EXAMINATION, 2024-25

BACHELOR OF TECHNOLOGY

5927

(CSE)

Theory of Automata & Formal Languages

Time : Three Hours] [Maximum Marks : 75

Note: There are **three** sections (**A, B** and **C**) and Candidate has to attempt question from all sections. Marks are indicated against each section.

Section-A

1. Attempt all Parts of the following : 5×3=15

   (a) Explain Chomsky hierarchy of grammar classification.

   (b) Design the DFA that accepts an even number of a's and even number of b's.

   (c) State the Pumping Lemma theorem for Regular Languages.

   (d) Define PDA. Draw the graphical Representation for PDA

   (e) Define context Free Grammar (CFG).

Section-B

Note : Answer all questions of the following : 4×5=20

2. (a) Define CFG. Remove unit Production from the following CFG.

So → S

S → ASA/aB/a/SA/AS/S

A → B/S

B → b

Or

(b) Describe Mealy and Moore machines with example.

3. (a) Explain the closure properties of Regular expression.

Or

(b) Explain Ambiguous and Unambiguous Grammar with example.

4. (a) Explain Two stack PDA.

Or

(b) Is context free Grammar closed under union ? If yes, give an example.

5. (a) Explain CNF and GNF form of CFG with example.

Or

(b) Explain NFA with example.

Section-C

Note : Answer any two question of the following : 2×20=40

6. (a) Convert the given Grammar to CNF.

S → aAD

A → aB/bAB

B → b

D → d

(b) Convert the given Grammar to GNF.

(i) S → aAb/bB

A → a/b

B → b

(ii) If a CFG is in GNF, then for a derivation of String w of length n. How many Production need to derive the string ? Explain with example.

7. (a) What is Push Down Automata (PDA) ? Design the PDA for the Language

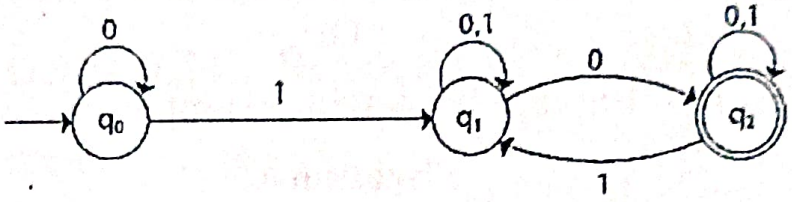
$L = \{wcw^R / w \in \{a, b\}^*\}$

(b) Design Turing machine for

$L = \{a^n b^n / n >= 1\}$

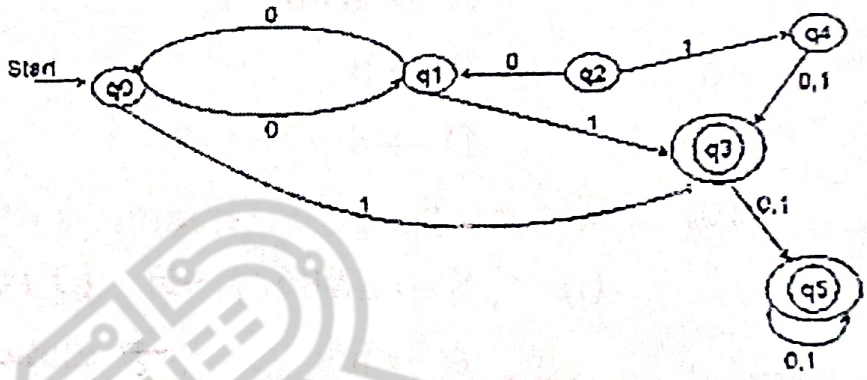
8. (a) Explain church Turing Thesis.

(b) Convert given NFA to DFA.



9. (a) Contract the F.A. for regular expression 0^*1+10.

(b) Minimize the given DFA.



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