

Code No: 5405AQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M. Tech II Semester Examinations, October/November - 2020

**THEORY OF COMPUTATION**

(Computer Science)

Time: 2 Hours

Max. Marks: 75

Answer any five questions  
All questions carry equal marks

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1.a) Convert the following NFA to DFA (figure 1).

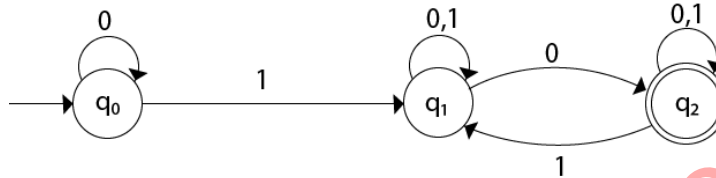


Figure 1

- b) Define regular expressions and write its applications and closure properties of regular sets. [7+8]
- 2.a) Design context free grammar for  $L = \{a^n cb^n | n \geq 0\}$ .
- b) Define push down automata? Explain its working principle and representation. [7+8]
- 3. Design a Turing machine for  $m+n$  and  $m-n$  where  $m, n$  positive integers. [15]
- 4. Write decision algorithms for context free grammar and illustrate with examples. [15]
- 5. Explain P and NP class problems and illustrate with example. [15]
- 6.a) Construct NFA for  $01^*+11$  regular expression.
- b) Reduce the following automata (figure 2). [7+8]

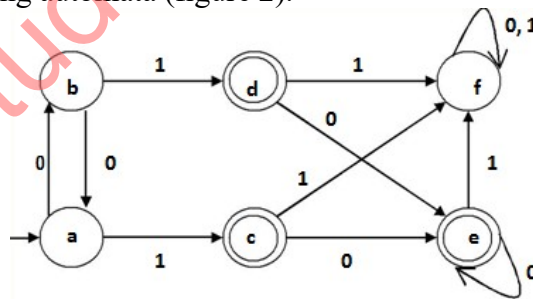


Figure 2

- 7.a) What is Chomsky normal form(CNF)? Write the procedure to convert a grammar to CNF.
- b) Convert the following to CNF. [7+8]  
 $S \rightarrow aAbB$        $A \rightarrow aA/a$        $B \rightarrow bB/b$
- 8. Write a note on:
  - a) Turing machine and its working principle.
  - b) Offline and multi tape Turing machines. [7+8]

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