

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION-SEPT. 2018

B.Tech. Vth Semester

COURSE CODE: 10B11CI513

MAX. MARKS: 15

COURSE NAME: Theory of Computation

COURSE CREDITS: 04

MAX. TIME: 1 hr

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. ϵ represents empty string.

Ques 1: a) Consider a Non deterministic finite machine $M = (\{A, B, C\}, \{a, b\}, \delta, A, \{C\})$ where

δ is given by:

[2 MARKS]

$$\delta(A, a) = \{A\} \quad \delta(A, b) = \{A, B\}$$

$$\delta(B, a) = \{C\} \quad \delta(B, b) = \{C\}$$

Construct an equivalent DFA.

b) Construct the DFA which accepts all the strings over $\Sigma = \{a, b\}$ that contains exactly 4 a's and at least 2 b's. [2 MARKS]

Ques 2: a) The minimum possible numbers of states of a DFA that accepts a regular language

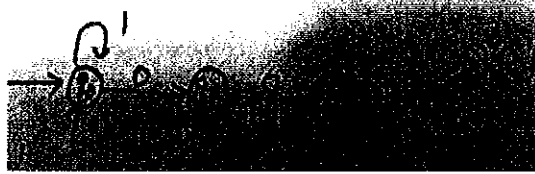
$$L = \{w_1aw_2 \mid w_1, w_2 \in \{a, b\}^*, |w_1| = 2, w_2 \geq 3\}.$$

[2 MARKS]

b) Construct the regular expression to the following FA. [2 MARKS]



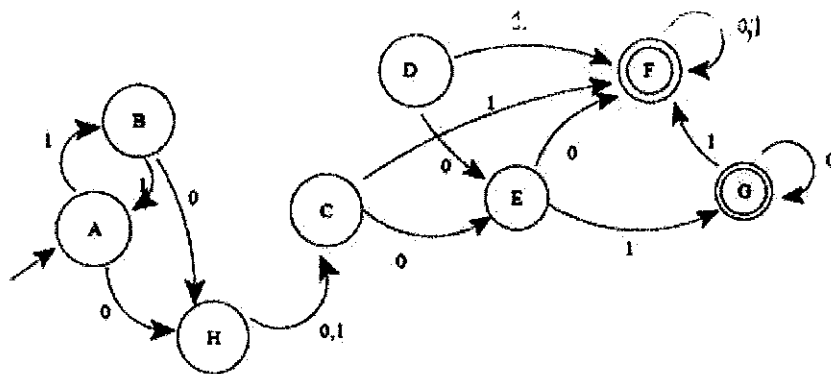
Ques 3: a) Let 'S' denotes set of 7 bit binary string in which 1st, 4th, and last bit is 1. Find out the number of strings in 'S' that are accepted by given below machine? Write all possible strings in set 'S'? [2 MARKS]



- b) Find the number of states in minimal DFA that accepts all the strings over $\Sigma = \{a, b\}$ where length of a string is exactly 'n'.
[2 MARKS]

Ques 4: Minimize the given DFA.

[3 MARKS]



JUIT T1 EXAMIN...