BTS–IV(S)–04.22–0237 Reg. No. | | | | | | | | |

A

B.Tech. Degree IV Semester Supplementary Examination April 2022

CS 15 -1404 AUTOMATA LANGUAGES AND COMPUTATIONS

(2015 Scheme)

Time: 3 Hours Maximum Marks: 60

PART A

(Answer *ALL* questions)

(10 × 2 = 20)

I. (a) Draw the transition diagram of a finite automata that accepts string over the alphabets {0,1} which ends with 00.

(b) Explain what do you mean by epsilon closure of a state.

(c) What is the application of Arden's theorem in finite automata?

(d) Write the regular expression for the language over {0,1} in which every 0 is immediately followed by 11.

(e) Construct the finite automata equivalent to the regular expression $10 + (0 + 11)\ 0^*1$.

(f) Write a CFG, which generate palindrome for binary numbers.

(g) Explain ambiguous grammar with an example.

(h) What are the different methods of string acceptance in a Push Down Automata?

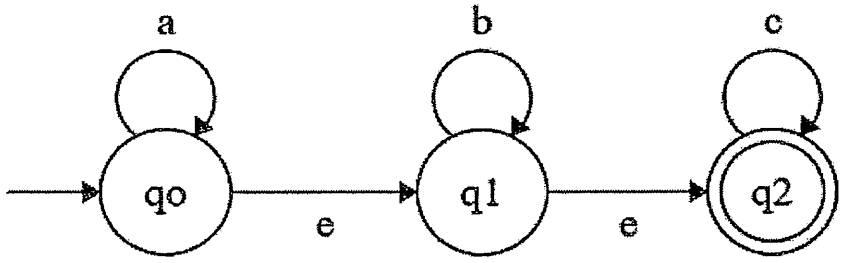
(i) What do you mean by decidable and undecidable problems?

(j) Explain Linear Bounded Automata.

PART B

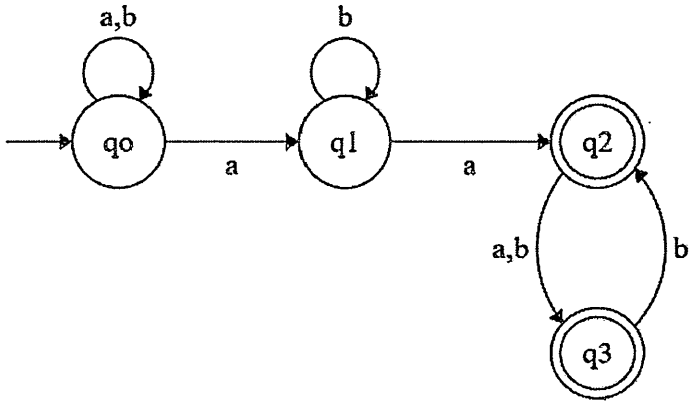
(4 × 10 = 40)

II. Convert the following NFA to NFA without epsilon transition. (10)



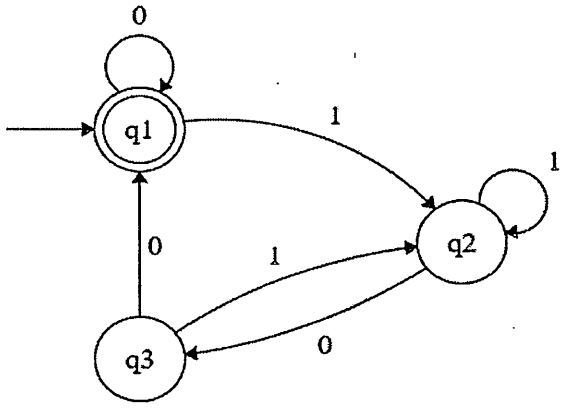
OR

III. Convert the NFA to DFA. (10)



(P.T.O.)

IV. Construct a regular expression corresponding to the following state diagram. (10)



OR

V. (a) State Pumping Lemma. (4)

(b) Using Pumping Lemma prove that: L = $\{0^n$ / n is perfect cube$\}$ is not regular. (6)

VI. Convert the grammar into GNF. (10)

S → AB

A→ BS/a

B→ SA/b

OR

VII. Design a push down automata for $L = \{a^n b^m / n > m \geq 0\}$. (10)

VIII. Design a Turing Machine that recognizes the language of all strings of even length over alphabets $\{a, b\}$. (10)

OR

IX. Explain different techniques for Turing machine construction. (10)

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