JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATIONS-2022

B.Tech-III Semester (CS/IT/ECE/Civil/BT)

COURSE CODE (CREDITS): 18B11CI513 (3)   MAX. MARKS: 15

COURSE NAME: Theory of Computation

COURSE INSTRUCTORS: Dr. (Amit, Shubham, Vipul, Rakesh, Yugal)   MAX. TIME: 1 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1. Each question carries one mark only.

I.   Suppose that you have two machines one is DFA and other is NFA then how you define deterministic and non-deterministic FA and why it is called so.   [CO1]

II.   In a given FA some states are active and possibly one dead state, so how you can define the usefulness of the dead state with an example.   [CO2]

III. Assume that you have a machine and you are getting (n+1) output from the (n) inputs then on which machine you are working draw a suitable diagram.   [CO3]

Q2. Each question carries two marks only. Attempt any 6 questions.

I.   A class of language is closed under concatenation; now prove it by constructing a transition function for 'N' to recognize A1.A2.   [CO1]

II.   Construct a DFA over Σ = (a, b) that accept a L : (w | w has exactly three a's and at least three b's).   [CO2]

III. Convert the following regular expression $(a + b)^*$ aba to an NFA.   [CO2]

IV.   Write a RE for a Language L that contains even number of a's and b's in any order with its DFA.   [CO2]

V.   Draw the computation branches of the following machine on input: 010110:   [CO2]

VI.   Prove the equivalence of NFAs and DFAs by defining all the tuples without considering null moves (to keep your proof simple).   [CO3]

VII. Specify all the tuples of a "FA with outputs".   [CO3]