# PD-389-S.E.-CV-19

## M.Sc. COMPUTER SCIENCE (3rd Semester)

Examination, Dec.-2020

### Paper-I

### THEORY OF COMPUTATION AND COMPILER DESIGN

Time : Three Hours]

[Maximum Marks : 80

[Minimum Pass Marks : 29

Note : Answer from both the Sections as directed. The figures in the right-hand margin indicate marks.

## Section-A

1. Answer the questions:-                                                                              1x10=10

   (a) Which at the following language is not context free?

   (i) $L = \{ww^T \mid w \in \{0,1\}^*\}$   (ii) $L = \{a^n b^n \; n \geq 0\}$

   (iii) $L = \{ww \mid w \in \{0,1\}^*\}$   (iv) $L = \{a^n b^m c^m d^n \mid n, m \geq 0\}$

   (b) Language accepted by a push down automata is........

   (i) Type 0   (ii) Type 1   (iii) Type 2   (iv) Type 3

   (c) Recursive descant parser is a type at..........

   (i) LL parsers   (ii) LR parsers   (iii) LALR parser   (iv) SLR parsers

   (d) Which at the following is not a part as 5 type finite automata?

   (i) Input alphabet (ii) Transition function  (iii) Initial state  (iv) Output alphabet

   (e) How many types are used to define push down automata?

   (i) 5   (ii) 6   (iii) 7   (iv) 8

   (f) Finite automata require minimum.........number at stacks.

   (i) 0   (ii) 1   (iii) 2   (iv) 3

   (g) Which is the most suitable data structure to represent the derivation is compiler?

   (i) Queue   (ii) Tree   (iii) Linked list   (iv) Hash Table

   (h) Regular expansion for all string over $\{a, b\}$ that starts with ab and ends with bba is.

   (i) $aba^* b^* bba$   (ii) $ab(ab)^* bba$   (iii) $ab(a + b)^* bba$   (iv) All at the mentioned

   (i) Post correspondence problem is.

   (i) Decidable decision problem (ii) Undecidable decision problems

   (iii) Not a decision problem        (iv) None at the mentioned

   (j) Which of the following does not belong to the closure properties as NP class?

   (i) Union   (ii) Concentration   (iii) Reversal   (iv) Complement

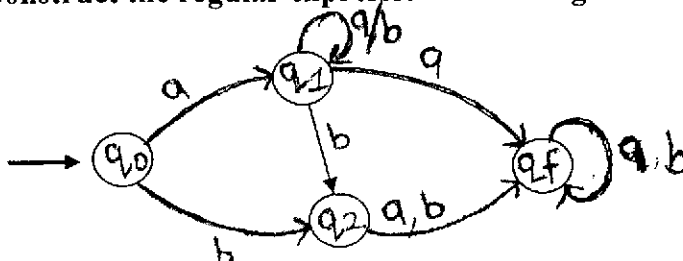2. Answer all questions is very short:-                                                              2x5=10

   (a) Write the formal definition at NFA.

   (b) Write the process at converting finite automata to regular Grammar.

   (c) What in CFL? Write the example at Ambiguity in CFG.

   (d) Define Turing machine.

   (e) Write the phases at compiler in sequence.

## Section-B                                                                              12x5=60

Answer all questions.

3. Construct the regular expression from the given automata.

**OR**

Construct finite automata that accept binary number divisible by 3.

4. What is push down automata? Design the push down automata that accept the following language.

$$L = \{wcw^T | w \in \{a, b\}^*\}$$

**OR**

Design a push down automata for accepting $L = \{a^n b^m c^n | m > 1, n \geq 0\}$ by final state.

5. Explain Turing machine in detail.

**OR**

What is GNF? Write the process at converting CFL into the GNF.

6. What is parser? Explain deferent types at parsing with suitable example.

**OR**

What are LR parsers? Explain with suitable example.

7. What is peephole optimization? Explains its use with suitable example.

**OR**

Explain the issue at designing the code generator.