**Examination Nov/Dec 2019**

**H-1178**

Total No. of Printed Pages:03

**SUBJECT CODE NO:- H-1178**
**FACULTY OF SCIENCE AND TECHNOLOGY**
**T.Y. B.Tech.(CSE) (Sem V)**
**Theory of Computation**
**[Old]**

**[Time: Three Hours]**                                                                                  **[Max.Marks: 80]**

Please check whether you have got the right question paper.

N.B        i.    Q. 1 & 6 are compulsory.
           ii.   Solve any two question from remaining in each section.

### Section A

Q.1        Solve any five                                                                                        10
           a) State principle of mathematical induction
           b) Differential between mealy & moore machine
           c) If $L(r) = set\ of\ all\ strings\ over \sum = \{0.1\} ending\ with$'011'
           d) What is CFG?
           e) What is GNF?
           f) What are application of Regular expression?
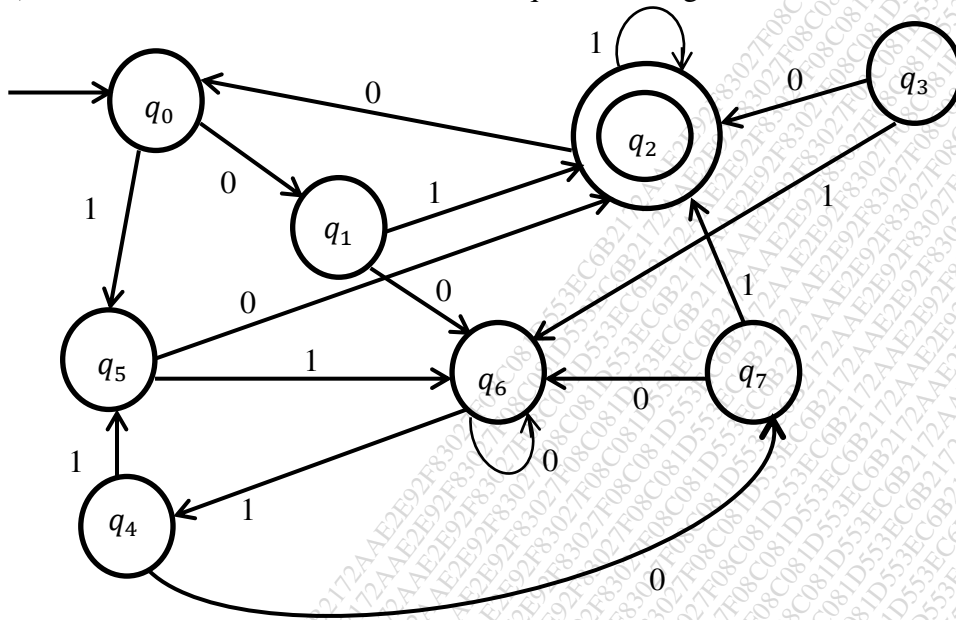
Q.2        a) Construct DFA equivalent to given NFA                                                         08

| State | a | b |
|---|---|---|
| $\rightarrow q_0$ | $\{q_0, q_1\}$ | $q_0$ |
| $q_1$ | $q_2$ | $q_1$ |
| $q_2$ | $q_3$ | $q_3$ |
| $(q_3)$ | — | $q_2$ |

           b) Construct a mealy machine which is equivalent to the moore machines given in table     07
           below & define mealy machine.

| Present state | Next state | | Output Δ |
|---|---|---|---|
| | $q = 0$ | $q = 1$ | |
| $\rightarrow q_0$ | $q_1$ | $q_2$ | 1 |
| $q_1$ | $q_3$ | $q_2$ | 0 |
| $q_2$ | $q_2$ | $q_1$ | 1 |
| $(q_3)$ | $q_0$ | $q_3$ | 1 |

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Q.3    a) Construct minimum state automata equivalent to given DFA.     08



      07

   b) Explain Ambiguous grammar with example.

Q.4    a) For the grammar G which is defines     08
      $S \longrightarrow aB \mid bA$
      $A \longrightarrow a \mid aS \mid bAA$
      $B \longrightarrow b \mid bS \mid aBB$
      Where S as the starting symbol, write the left most & right most derivation for the string "bbaaba".

   b) Find the context free grammar for following language     07
$$L = \{a^n b^m c^k / n = m \ \ or \ \ m \le k; \ \ n \ge 0, m \ge 0, k \ge 0\}$$

Q.5    a) Explain chowsky hierarchy in detail.     07
   b) Reduce the following grammar to CNF     08
      $S \longrightarrow ASA \mid bA$
      $A \longrightarrow B \mid S$
      $B \longrightarrow C$

## Section B

Q.6    Answer the following questions.     10
      a) What is Linear bounded automata
      b) What is bottom up passing?
      c) What are properties of cfc language?
      d) Define non deterministic PDA.
      e) What is Regular set?

| Q.7 | a) | Construct PDA equivalent to the following context free grammar. | 08 |
|---|---|---|---|

$S \longrightarrow OBB$

$B \longrightarrow OS \mid 1S \mid O$

Test whether 010000 is in language of A

| | b) | Explain various representations of tuning machine. | 07 |
|---|---|---|---|
| Q.8 | a) | Design a Tuning machine to require all string's consisting of an even number of 1's and obtain computation sequence of '11'. | 08 |
| | b) | Write short note on Recursively enumerable languages. | 07 |
| Q.9 | a) | Explain pumping lemma for CFL with suitable example. | 07 |
| | b) | Write the PMT system 'T' for the call for medness of parenthesis to check "( ( ) ( ( ) ) )" | 08 |
| Q.10 | a) | Explain the types of turing machine in detail. | 07 |
| | b) | Construct DFA that accepts there are regular language defined the following right linear grammar. | 08 |

$S \longrightarrow bB$

$B \longrightarrow bC \mid aB \mid b$

$C \longrightarrow a$

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