SCHOOL OF

CAT I –M.TECH.

rse Name: Theory of Computation

se Code: SWE1006

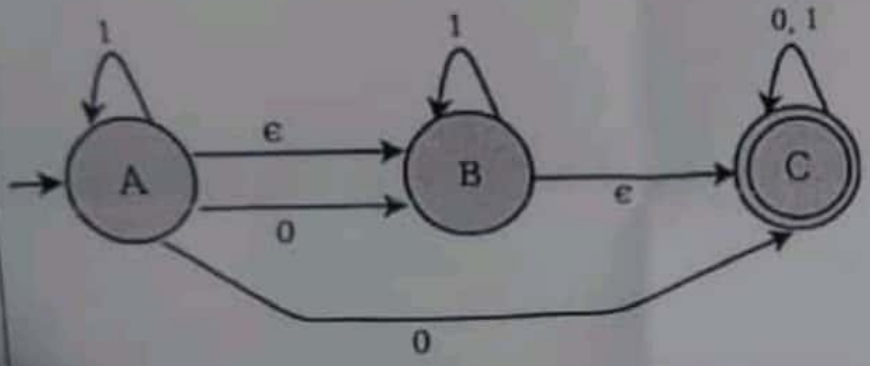
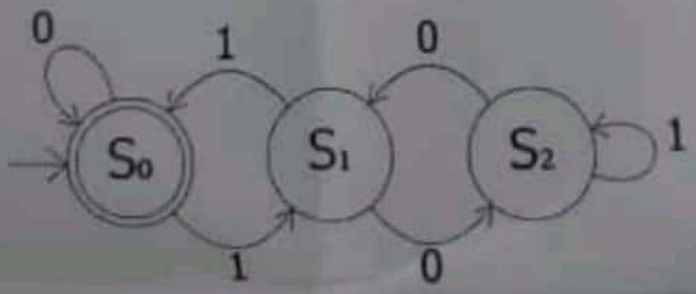
: C.I+TC.I

Duration: 90 Mins

Max. Marks : 50



ANSWER ALL QUESTIONS

| | Question | Marks |
|---|---|---|
| | Find minimal DFA's for the following languages.<br>A. $L=\{w \mid n_a(w) \bmod 3 > n_b(w) \bmod 3\}$.<br>B. $L=\{W_1 ab W_2 \mid W_1 \in (a,b)^*\}$. | 10 |
| | Convert the following ε-NFA into an equivalent DFA.<br>  | 10 |
| 3 | Prove that, if $L_1$ and $L_2$ are a regular language, its concatenation $L_1.L_2$ will also be regular. Find the regular expression and regular language for the following Finite Automata:<br>  | 10 |
| 4 | Construct a mealy machine that takes binary number as input and produce 2's compliment of a number as an output. Assume the string is read LSB to MSB and end carry bit is discarded. | 10 |
| 5 | State and prove the pumping lemma. Determine whether or not the following language on $\Sigma = \{a, b\}$ is regular. $L = \{a^n b^{2n} \mid n \geq 1\}$ | 10 |