

GANPAT UNIVERSITY
U. V. PATEL COLLEGE OF ENGINEERING
B. TECH. SEMESTER – VI (COMPUTER ENGINEERING / INFORMATION
TECHNOLOGY/COMPUTER ENGINEERING-ARTIFICIAL INTELLIGENCE)
FIRST INTERNAL EXAMINATION, MARCH -2023
2CEIT601: THEORY OF COMPUTATION

Time: 1 Hour]

[Total Marks: 20

Instructions:

1. Figures to the right indicate full marks.
2. Be precise and to the point in your answer.
3. Assume suitable data, if required.
4. The text just below marks indicates the Course Outcomes Nos, (CO) followed by Bloom's taxonomy level of the question, i.e., R: Remember, U: Understand, A: Apply, N: Analyze, E: Evaluate, C: Create

Q-1 Do as directed:(04)
1A

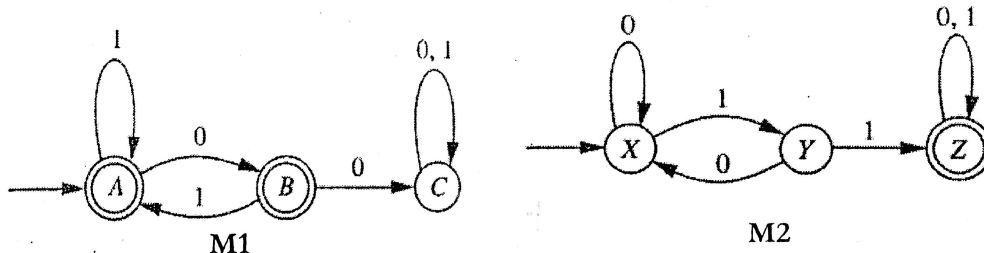
- a) Prove by a truth table that the following formula is a tautology:
 $(\sim q \rightarrow \sim p) \wedge (q \rightarrow p) \rightarrow (p \leftrightarrow q)$
- b) A relation on the set $\{x, y, z\}$ is given. Check whether the following relation is equivalent relation or not: (Write justification).
 $R = \{(x, x), (y, y), (z, z), (x, y)\}$
- c) Simplify the expression $(A \cup B) - A$.
- d) If $p = \text{He is poor}$, $q = \text{He is laborious}$, then write the statement "He is poor but is not laborious" in symbols (i.e., in the proposition logic).

Q-2 Construct the minimal DFA that accepts all strings of 0's and 1's where each string starts with 0 and ends with 1001 as a substring. (04)
1C

Q-3 Write the Regular Expression for the following languages: (04)

- a) The language of strings containing either ab or bba as substring over $\Sigma \{a, b\}$. 1C
- b) The language of all the strings containing exactly two 0's over $\Sigma \{0, 1\}$.
- c) The language of all strings that do not end with 01 over $\Sigma \{0, 1\}$.
- d) The language of all strings not containing 00 over $\Sigma \{0, 1\}$.

Q-4 Let M1 and M2 be the DFA as given below, recognizing the languages L1 and L2 respectively: (04)
2U

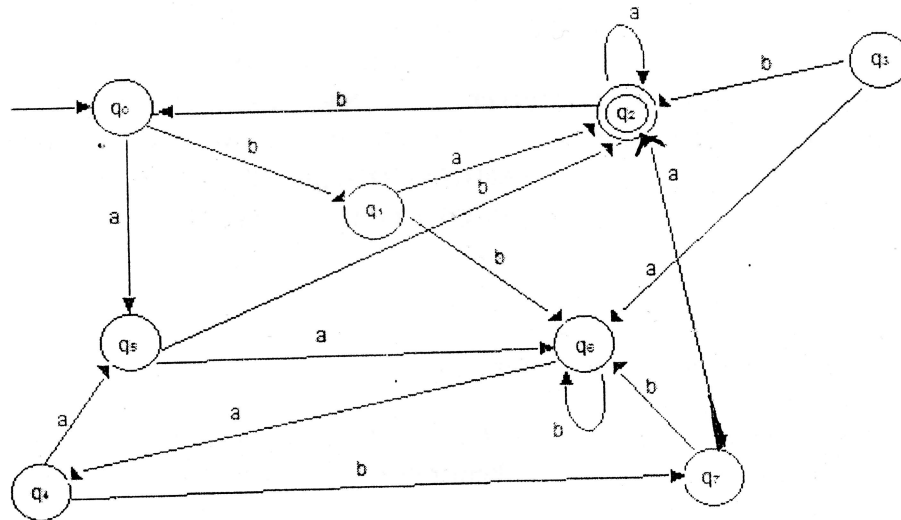


Draw the DFA recognizing the following languages:

- a) $L1 \cup L2$
- b) $L1 - L2$

Q-5 Apply the Minimization technique to the given DFA:

(04)
1A



END OF PAPER