Er. No. 201B354

Semester V (B.Tech.)

Academic Year: 2021-22

Jaypee University of Engineering & Technology, Guna

T-1 (Odd Semester 2022)

18B11CI511 – Theory of Computation

Maximum Duration: 1 Hour

Maximum Marks: 15

Notes:

1. This question paper has five questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except Er. No.).
4. (Marks are indicated in square bracket.)

Marks

Q1. Prove the given equivalence by using logical identities, mention the identities used at each step. **[03]**

$$(\neg P \Rightarrow (\neg P \Rightarrow (\neg P \wedge Q))) \equiv P \vee Q$$

Q2. Obtain the principal disjunctive normal form of the given logical relation : **[03]**

$$(Q \wedge \neg R \wedge \neg S) \vee (R \wedge S)$$

Write proper justification of each step used in the process.

Q3. Design a deterministic finite automata (DFA) to accept strings of ***a's*** and ***b's*** except those containing the substring ***aab*** for the input symbol ***a*** and ***b*** only. **[03]**

Q4. Convert the given non-deterministic finite automata (NFA) in Fig.-1 into an equivalent deterministic finite automata (DFA). **[03]**

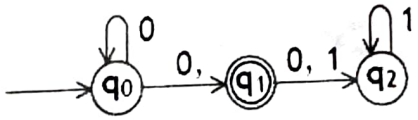

Figure 1

Q5. Use partitioned based method to find the minimum-state FA recognizing the same language as given in Fig.-2. The input symbols are ***a*** and ***b*** only. **[03]**

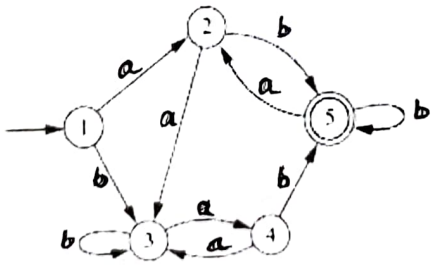

Figure 2