Pulak

36 (5) IT 312

2021
(Held in 2022)

FORMAL LANGUAGE AND AUTOMATA THEORY

Paper : IT–312

Full Marks : 100

Time : Three hours

**The figures in the margin indicate full marks for the questions.**

*Answer **all** Questions.*

1. What is the difference between DFA and NFA ? What do you understand by DFA and NFA are equivalent ?   5

2. Design an automaton that accepts all string over {0, 1} where three consecutive one or two consecutive zero is always a substring.   10

3. Design an automaton that accept strings over {0,1} where the decimal equivalent of the string is not divisible by two. 10

4. Minimize the following DFA. 15
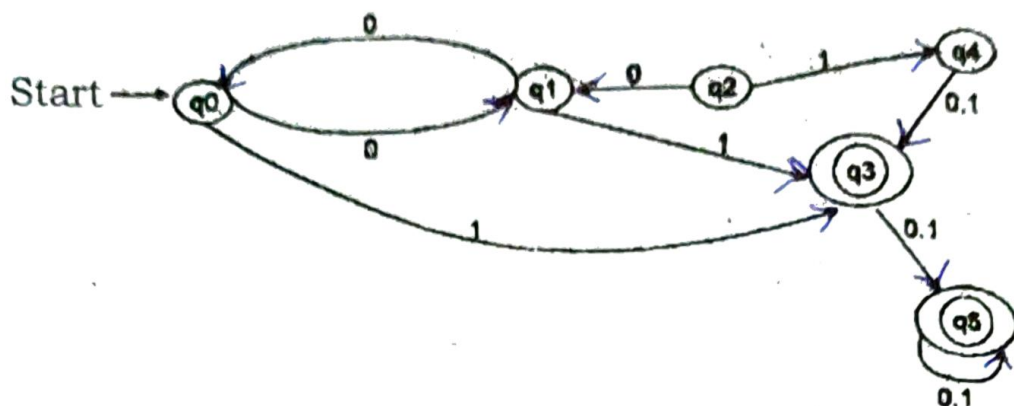
5. Mention whether following languages are regular or not. Prove your answer.

$$10+10=20$$

(a) $L = 0^n 1^n 0^m$ where n and m are any arbitrary +ve integers

(b) $L = 0^n 1^m 0^p$ where n, m and p are any arbitrary +ve integers.

6. Write the CFG for the language $L = \{0^n 1^m 3^m 2^n$, where n and m are any +ve integer } 10

7. Design PDA for the language $L = 0^n 1^n$ where $n > 0$.   15

8. Prove that $L = 0^p$, where p is any prime number, is not regular.   15

$S \rightarrow 0S2 \mid 0r2 \mid c2 \mid \epsilon$

$P \rightarrow 1P3 \mid 13 \mid \epsilon$

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