

**III.B.TECH- I-SEM (R20)-I MID EXAMINATIONS-November-2023 Date: 02.11.2023**

**Subject: FLAT Time: 10:00 TO 11:30 AM**

**Branch: CSE, IT, CSC & CSM Marks: 25 M**

***Answer All Questions In Part-A& Part-B***

**PART-A 5X2=10 M**

1. Define Transition diagram with example. **(CO1)**

2. Write about the applications of Finite Automata? **(CO1)**

3. Write down the differences between Moore Machines and Mealy Machines? **(CO1)**

4. Define context free grammar with example. **(CO3)**

5. State Arden’s theorem. **(CO2)**

**PART-B 3X5=15 M**

6. a) Convert the following NFA with ε to DFA shown in figure. **(CO1)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **a** | **b** | **ε** |
| **→P** | **Φ** | **P** | **Q** |
| **Q** | **Q** | **Φ** | **R** |
| \***R** | **Q** | **P** | **Φ** |

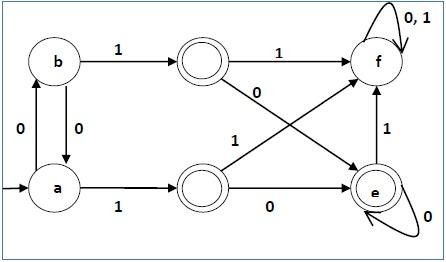
b) Design Finite Automaton which accepts set of all strings not containing aaa as substring over

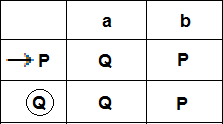
input alphabet {a,b}. **(CO1)**

## (OR)

7. a) Design DFA for the language all strings over {0,1} which are ending with 000**. (CO1)**

b) Minimize the following DFA shown in figure.

 **(CO2)**

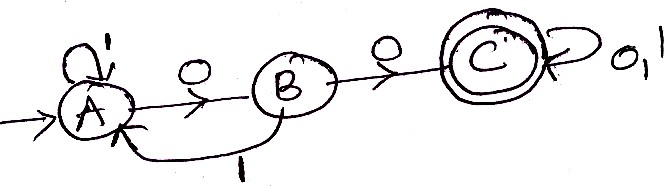
 8. a) Convert the following Finite Automata to it’s equivalent Regular Expression as shown in figure. **(CO2)**

b) Construct Finite Automata for the regular expression (**0+1)\*(00+ 11)\*1. (CO2)**

## (OR)

9. a) Construct Finite Automata for ((aaa+bbb)\*aa)\*bba.  **(CO2)**

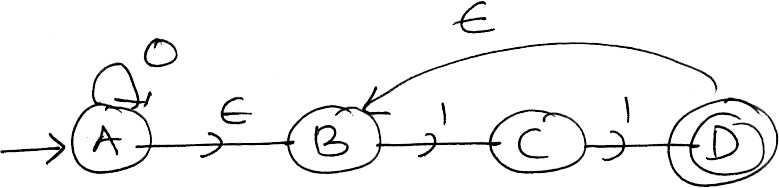
b) Explain about the identity rules of Regular Expressions. **(CO2)**

 10. a) Write a R.E. for the following DFA:  **(CO2)**

b) Prove that the following language {ap| p is prime} is not Regular. **(CO2)**

**(OR)**

11. a) Convert the following NFA with € moves to DFA shown in figure**. (CO3)**



b) Design Finite Automaton which accepts set of all strings not containing 101 as substring**. (CO6)**

**SCHEME OF EVALUATION**

**Part –A**

| **SNO** | **THEORY** | **MARKS** | **TOTAL** |
| --- | --- | --- | --- |
| **1** | Define Transition diagram with example. | **2** | **2** |
| **2** | Write about the applications of Finite Automata? | **2** | **2** |
| **3** | Write down the differences between Moore Machines and Mealy Machines? | **2** | **2** |
| **4** | Define context free grammar with example. | **2** | **2** |
| **5** | State Arden’s theorem. | **2** | **2** |

**Part –B**

| **SNO** | **THEORY** | **MARKS** | **TOTAL** |
| --- | --- | --- | --- |
| **6** | a) Convert the following NFA with ε to DFA shown in figure.   |  |  |  |  | | --- | --- | --- | --- | |  | **a** | **b** | **ε** | | **→P** | **Φ** | **P** | **Q** | | **Q** | **Q** | **Φ** | **R** | | \***R** | **Q** | **P** | **Φ** |   b) Design Finite Automaton which accepts set of all strings not containing a aa as substring over input alphabet {a,b}.    OR | **5** | **5** |
| **7** | a) Design DFA for the language all strings over {0,1} which are ending with 000**.**  b) Minimize the following DFA shown in figure. | **5** | **5** |
| **8** | a) Convert the following Finite Automata to it’s equivalent Regular Expression as shown in figure.  b) Construct Finite Automata for the regular expression (**0+1)\*(00+ 11)\*1.**  **OR** | **5** | **5** |
| **9** | a) Construct Finite Automata for ((aaa+bbb)\*aa)\*bba.  b) Explain about the identity rules of Regular Expressions. | **5** | **5** |
| **10** | a) Write a R.E. for the following DFA:  b) Prove that the following language {ap| p is prime} is not Regular.  OR | **5** | **5** |
| **11** | a) Convert the following NFA with € moves to DFA shown in figure**.**    b) Design Finite Automaton which accepts set of all strings not containing 101 as substring**.** | **5** | **5** |