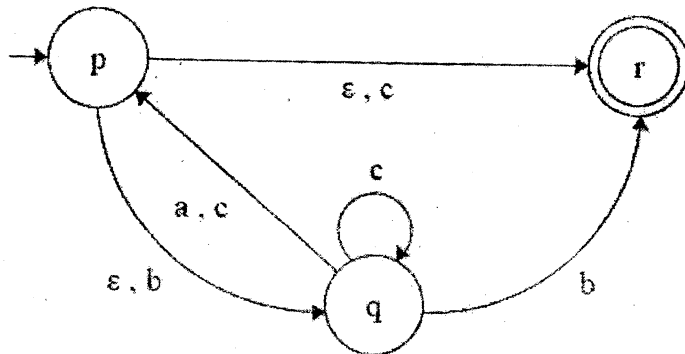5. (a) Construct a DFA equivalent to the NDFA, whose state transition diagram is given below figure.   10 (CO2)

OR

(b) Construct a Mealy machine which can output EVEN, ODD according as the total no. of 1's encountered is even or odd. The input symbols are 0 and 1. Convert this mealy machine to an equivalent Moore machine.

H   Roll No. ..2194026...........

TCS–402

B. TECH. CSE
(FOURTH SEMESTER)
MID SEMESTER
EXAMINATION, April, 2023
FINITE AUTOMATA & FORMAL LANGUAGES
Time : 1½ Hours
Maximum Marks : 50

Note : (i) Answer all the questions by choosing any *one* of the sub-questions.

(ii) Each question carries 10 marks.

1. (a) Construct a minimal DFA over input alphabet $\Sigma = \{a, b\}$ such that accept all the string starting with 'ab' and $|w|$ mod 4 = 3.   10 (CO1)

OR

(b) Design a NFA for L = {all the string in which third symbol from RHS is 'a' and convert that NFA to the corresponding DFA.   10 (CO1)
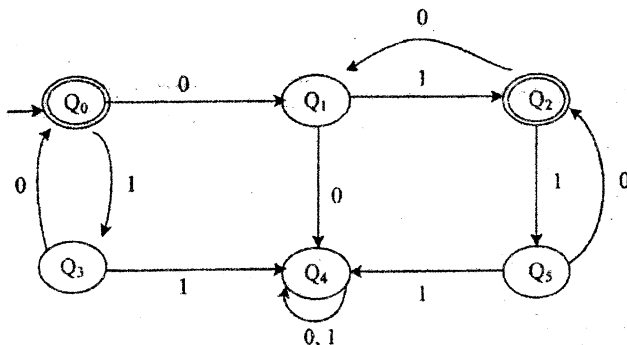
P. T. O.

2. (a) Construct a minimal DFA that accept all the number of base 3, which when converted into decimal should be divided by 3. Given that $\Sigma = \{0, 1, 2\}$.   10 (CO1)

OR

(b) Construct deterministic finite automata (DFAs) recognizing the following languages over the alphabet $\{a, b\}$:

$L = a^n b^m \mid n >= 0, m >= 0$ and $n + m$ is an even number.   10 (CO1)

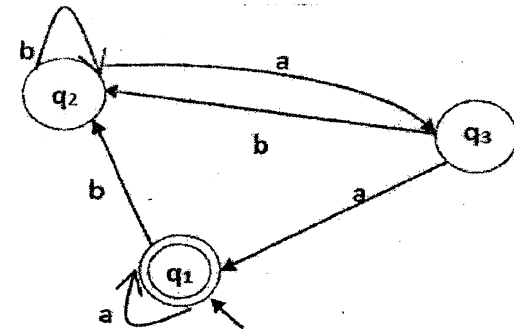3. (a) Construct a minimum DFA equivalent to the DFA given in below figure : 10 (CO2)
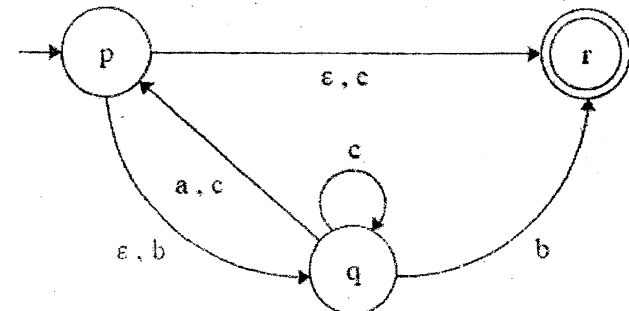
OR

(b) Construct a DFA with reduced states equivalent to the regular expression.

$10 + (0 + 11) \, 0{*}1$ 10 (CO2)

4. (a) Find the regular expression from the given automata using Arden's theorem. 10 (CO2)

OR

(b) Convert the following ε-NFA to its equivalent NFA.   10 (CO2)