Exam No: _____

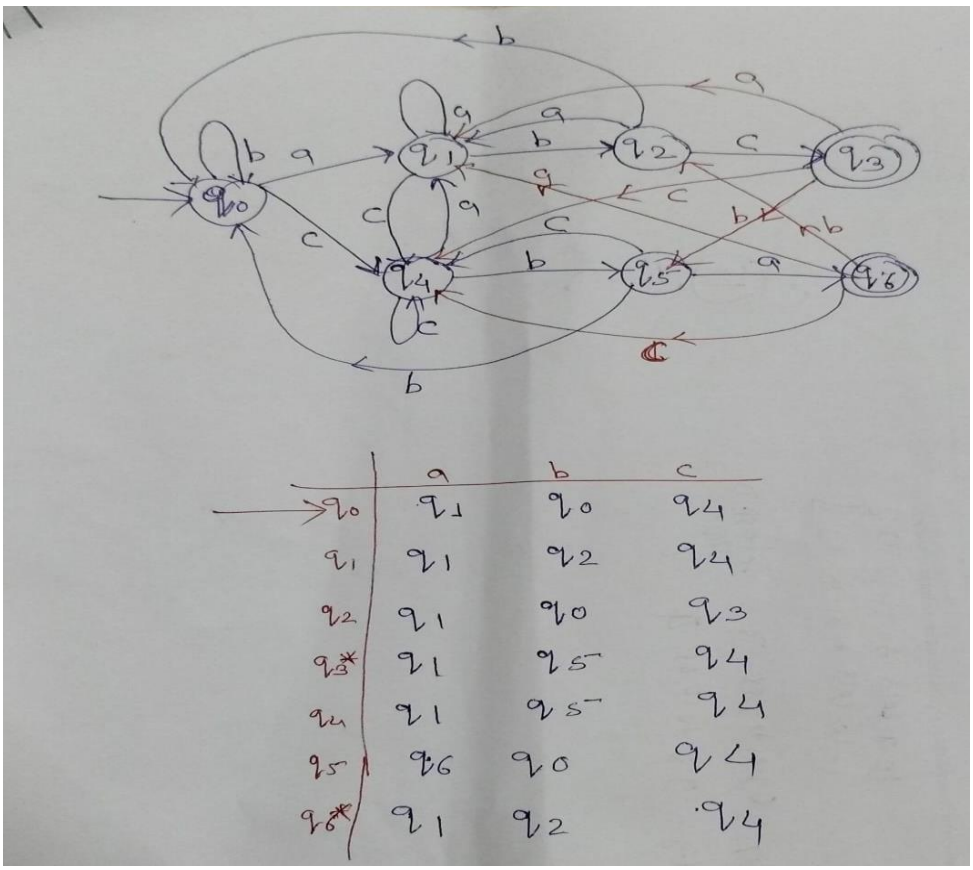
GANPAT UNIVERSITY
B. TECH SEM-VI (CE/IT/CE(AI)/CE(IOT)/IT(IOT))
FIRST INTERNAL EXAMINATION – MARCH 2024
2CEIT601: Theory of Computation_SOLUTIONS

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 necessary.
4) The text just below marks indicates the Course Outcomes Numbers, (CO) followed by the bloom's taxonomy level of the question, i.e., R: Remembering, U: Understanding, A: Applying, N: Analyzing, E: Evaluating, C: Creating.

Q.1 Construct the minimal DFA that accept all string of a' s, b's and c's where each string ends with "abc" or "cba" as a substring and also make the transition table for given DFA. **[5] 1C**

Solutions:



	a	b	c
→ q0	q1	q0	q4
q1	q1	q2	q4
q2	q1	q0	q3
q3*	q1	q5	q4
q4	q1	q5	q4
q5	q6	q0	q4
q6*	q1	q2	q4

Q.2 Do as directed: **[4] 1R**

1. If R and R' are equivalence relations in a set A, check that R ∩ R' is an equivalence relation in A.

Solutions: This relation is Equivalence.

2. If p = Ram is beautiful, q = Ram is mixable, r = His friends like Ram,
   Then write the following statements with the help of Zero order logics:
   (a) If Ram is beautiful then either Ram is mixable or his friends like Ram.
   (b) If Ram is not beautiful then he is mixable or his friends like him.

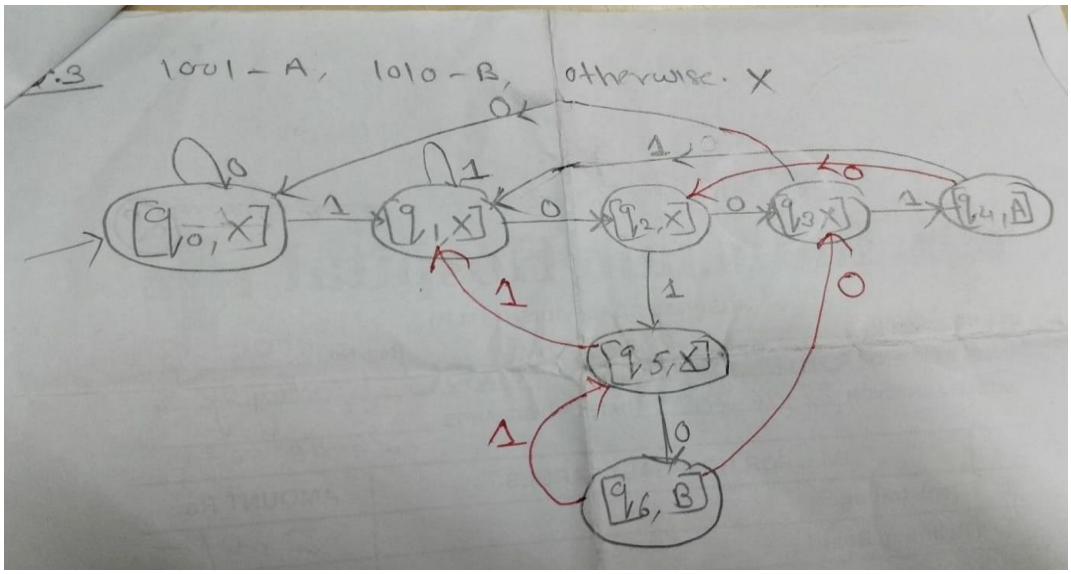
Solutions: (a) (p→q) V (p→r) (b) p→(q V r)

3. If U = {2, 3, 4, 5, 6, 7, 8, 9, 10, 11}, A = {3, 5, 7, 9, 11} and B = {7, 8, 9, 10, 11}, Then find (A – B) ′.

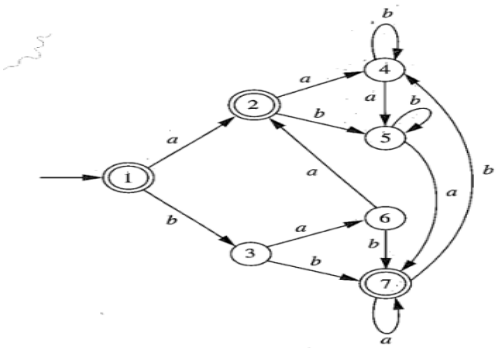
Solutions: (A – B) ′= { 2,4,6,7,8,9,10,11}

Q.3 Design a Moore machine for a binary input sequence such that if it ends with a substring 1001, the machine output A, if the input ends with a substring 1010, it outputs B otherwise it outputs X. **[3] 2C**

Solutions:

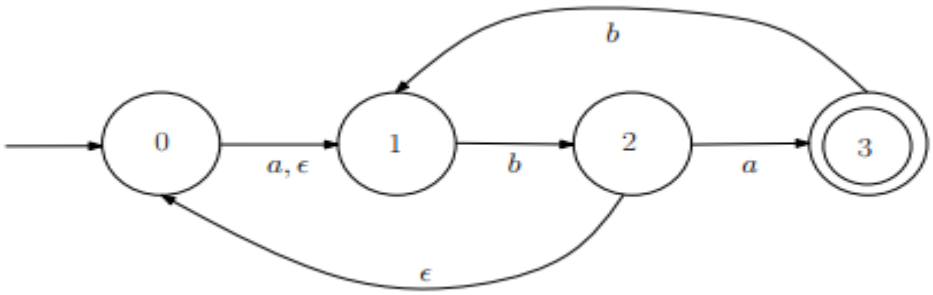


Q.4 Apply Partition Algorithm to Minimized the given DFA: **[3] 1A**

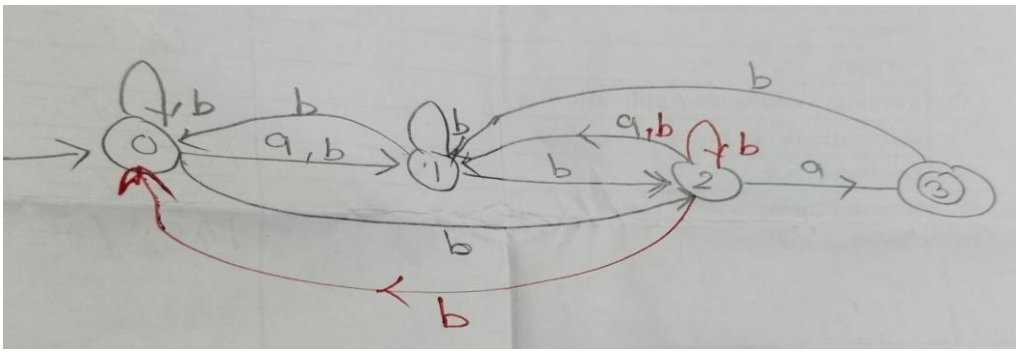


Solutions: ITS MINIMIZED DFA.

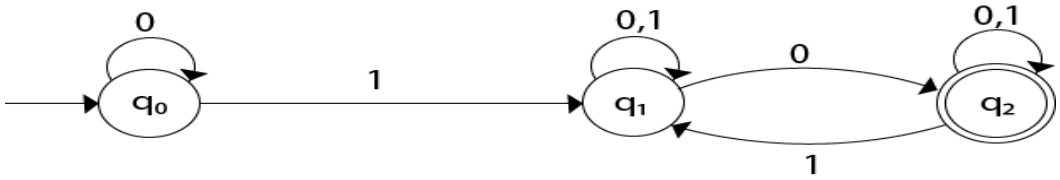
Q.5 Convert the given Null NFA to its equivalent NFA. **[3] 2A**



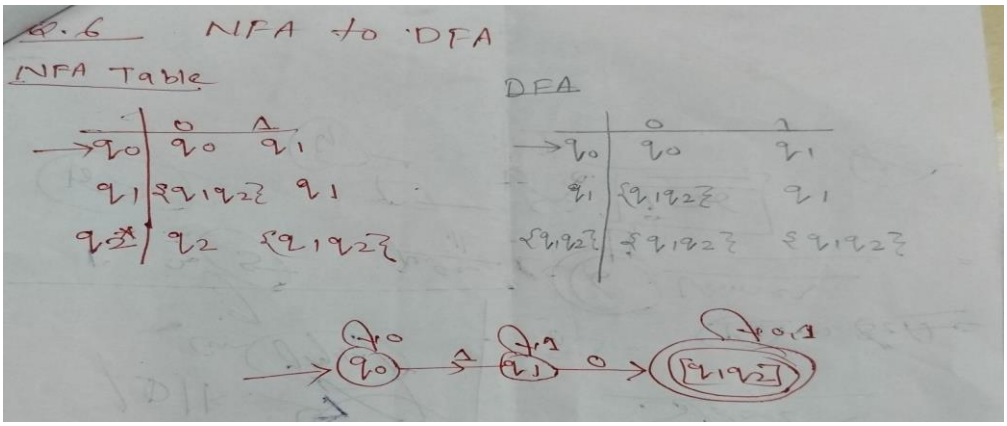
Solutions:



Q.6 Convert the given NFA to its equivalent DFA: **[2]**
2A



Solutions:



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