BACHELOR OF SCIENCE (COMPUTER SCIENCE) (CBCS - 2018 COURSE)
T.Y.B.Sc.(Computer Science) Sem-V : WINTER :- 2021
SUBJECT: THEORETICAL COMPUTER SCIENCE

Day : Monday
Date 24-01-2022 **W-20116-2021**

Time : 02:00 PM-05:00 PM
Max. Marks: 60

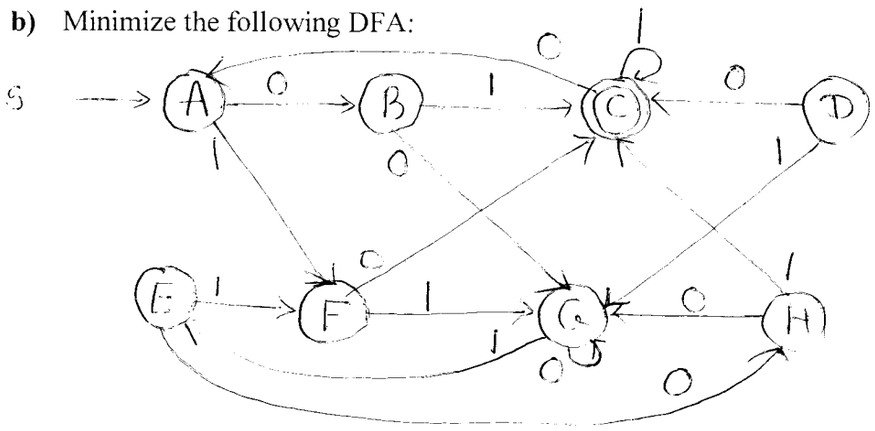
N. B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labelled diagrams **WHEREVER** necessary.

Q. 1 Answer **ANY TWO**: **(12)**

a) Construct DFA for language over $\Sigma = \{a, b\}$ such that it accepts all strings starting with 'a' and ending with 'b'

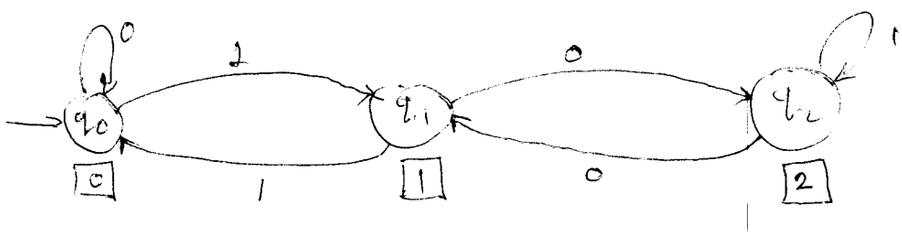
b) Minimize the following DFA:



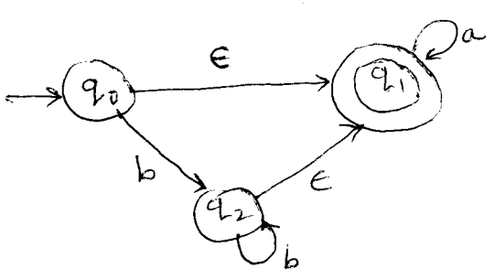
c) Design a Mealy machine for accepting all strings ending with 0 and 1 over {0, 1}

Q. 2 Answer **ANY TWO**: **(12)**

a) Consider the given Moore machine for finding residue mod – 3 for any binary number and convert to its equivalent Mealy machine.



b) Convert the given NFA with ∈ transition into NFA with ∈ - transition.



c) Write a note on Chomsky hierarchy.

P. T. O.

Q. 3 Answer **ANY TWO**: **(12)**

a) Differentiate between NFA and DFA.

b) Construct a PDA for $L = \{a^n\ b^n | n >= 1\}$.

c) Construct DFA for a language ending with 'c' over $\{a, b, c\}$.

Q. 4 Answer **ANY THREE**: **(12)**

a) What is reduction? Give an example.

b) Write a note on push down automata.

c) Describe basic Turing machine model.

d) How to remove ambiguity from grammar? Explain with example.

Q. 5 Answer **ANY FOUR**: **(12)**

a) Define - regular language, symbol.

b) What is parse tree? Explain with example.

c) Differentiate between left derivation and right derivation.

d) Describe in brief GNF.

e) State the steps in simplification of grammar.

f) Explain FA in brief.

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