GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

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Registration No: | | | | | | | | | | |

Total Number of Pages : 3 **B.TECH**

4th Semester Regular Examination-April-May 2019

BCSPC4040_ Theory of Computation

(Regulations 2017) Common to CSE / IT Branches

Time : 3 Hours Maximum : 100 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) 10 x 2=20 Mark

Q.1. Answer *All* Questions.

a Dead state is ------- [CO1] [PO1]
a) Accepting State b) Not Accepting State c) Final State d) None of the above

b The following is the transition function for a DFA [CO1] [PO2]
a) δ: Q x E -> Q b) δ: E -> Q c) δ: Q x E x Q -> Q d) δ: Q -> E

c Regular expression for the set of strings of a's and b's ending with abb [CO2] [PO1]
a) (a+b) * abb b) (a+b)abb c) (a+b)+ d) ab

d What is Arden's Theorem R=Q+RP---------- [CO2] [PO1]
a) R= RP* b) R=QP* c) R=RP* d) R=PP*

e A grammar is said to be------- if its language has exactly one parse tree for a string. [CO2] [PO1]
a) Ambiguous b) Unambiguous c) Regular d) Simple

f Which of the following denotes Chomsky hierarchy? [CO3] [PO1]
a) REG ⊂ CFL ⊂ CSL ⊂ type0 c) CFL ⊂ REG ⊂ type0 ⊂ CSL
b) CSL ⊂ type0 ⊂ REG ⊂ CFL d) CSL ⊂ CFL ⊂ REG ⊂ type0

g What are the components of Turing machine? [CO3] [PO2]
a) Tape b) Head c) Control unit d) All the above

h Language accepted by Turing Machine___ [CO3] [PO1]
a) Recursive Language c) Context Free Language
b) Recursively Enumerable Language d) Regular Language

i The following is a NP hard problem [CO4] [PO1]
a) Dead Lock Prevention c) Halting Problem
b) Bleedy Anomaly d) Coloring Problem

j The following is a P class problem [CO4] [PO2]
a)Shortest Path Problem c) Dining Philosopher Problem Coloring Problem d) Halting Problem

PART – B: (Short Answer Questions) 10x2=20 Marks

Q.2. Answer *ALL* questions

a Write any two applications of NFA. [CO1] [PO1]
b List the differences between NFA and DFA. [CO1] [PO2]
c Define context free grammar. [CO2] [PO1]
d What is the significance of Pumping Lemma for Regular languages? [CO2] [PO1]
e When can you say that some grammar is ambiguous? [CO2] [PO1]
f Write the tipples that represents PDA. [CO3] [PO1]
g Write the type of productions accepted in GNF(Greibach Normal Form) [CO3] [PO2]
h What is an undecidable problem? [CO3] [PO1]
i Write the tipples that represents TURING machine. [CO4] [PO1]
j Define NP Hard problem. [CO4] [PO2]

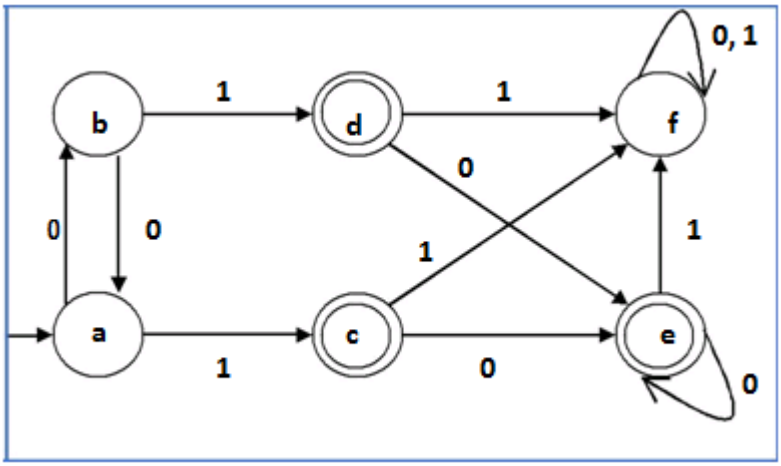
PART – C: (Long Answer Questions) **15x4=60 Marks**

Answer *ALL* questions

Q.3

a Write the mathematical definition of DFA. Design DFA which accepts even number of a's and even number of b's where the input is a,b. [CO1] [PO1]

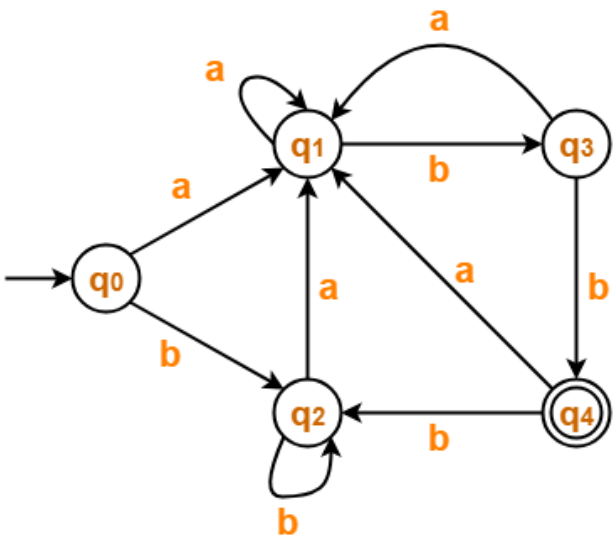
b Check the possibility of minimizing the following DFA. [CO1] [PO2]



7+8

OR

c Check the possibility of minimizing the following DFA. [CO1] [PO1]



8+7

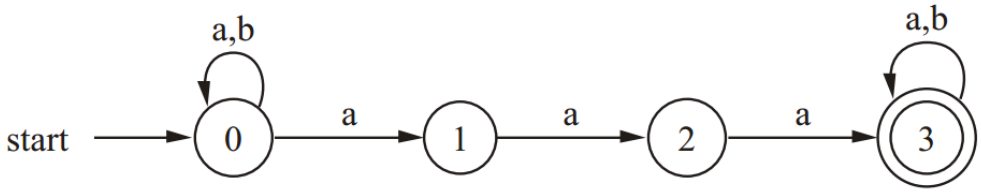
d Write the mathematical definition of NFA. Design NFA which accept strings whose sixth symbol from right is one and third symbol from right is zero. [CO1] [PO2]

Q.4

a List various Closure properties of Regular languages. [CO2] [PO1]

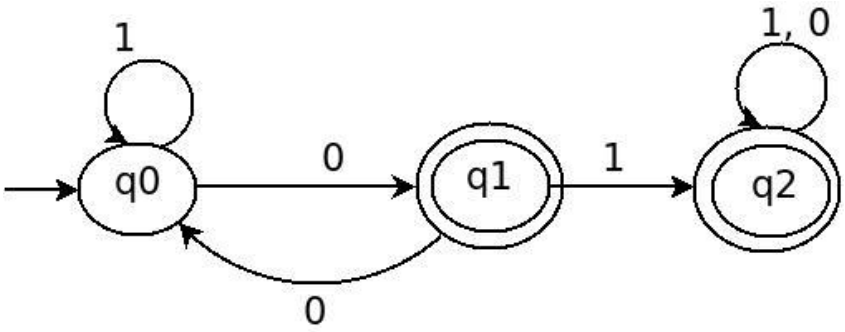
b Find the regular expression equivalent to the following DFA. [CO2] [PO2]

8+7



OR

c Find the regular expression equivalent to the following DFA. [CO2] [PO1]



8+7

d Explain the procedure to convert Regular Grammar to Finite Automaton. [CO2] [PO2]

Q.5

a Design a PDA which accepts strings of type $a^n b^n c^m$ where n>=0 and m>=1. [CO3] [PO1]

8+7

b Elaborate the procedure to convert PDA to CFG. [CO3] [PO2]

OR

c Design a PDA which accepts strings of type $a^n b^n$ where n>2. [CO3] [PO1]

8+7

d Elaborate the procedure to convert CFG to PDA. [CO3] [PO2]

Q.6

a Discuss the importance of Church Turing hypothesis. [CO4] [PO1]

b What is ckermann's function? Explain the same with an example. 8+7 [CO4] [PO2]

OR

c Write the significance of Cantor and Godel numbering. [CO4] [PO1]

d Discuss the classification of P and NP, NP complete and NP Hard problems. 8+7 [CO4] [PO2]

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