

[No. of Printed Pages - 4]

BTC/UCS-405

Roll No.

BACHELOR OF TECHNOLOGY (COMPUTER
SCIENCE & ENGINEERING), BACHELOR OF

TE

3. What is undecidability? Explain PCP and modified PCP in detail.
4. Prove that $L = \{a^p : p \text{ is prime No.}\}$ is not regular.
5. Give DFA that accepts the language $L((a+b)^* b(a+bb)^*)$.
6. Define Partial function. Prove that the function $f(x, y) = \max(x, y)$ is primitive recursive.

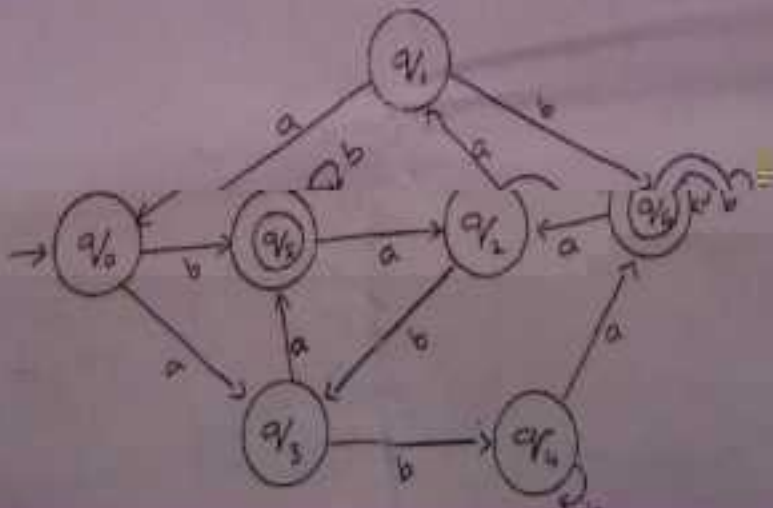
SECTION - B (20 Marks)

Attempt any two questions.

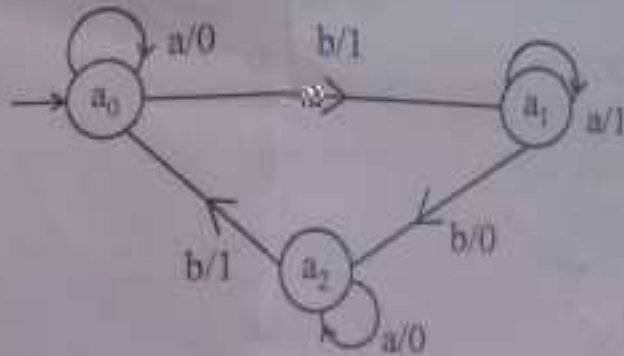
Each question carries 10 marks.

7. Explain the normal forms of CFG. Reduce Language $L = \{a^m b^n c^m d^m / m, n \geq 1\}$ into (i) Chomsky Normal form (CNF) (ii) Greibach Normal form (GNF).

8. (i) Minimize the Finite automation given below and show both given and reduced are equivalent.



(ii) Convert the following Mealy Machine into Moore Machine.



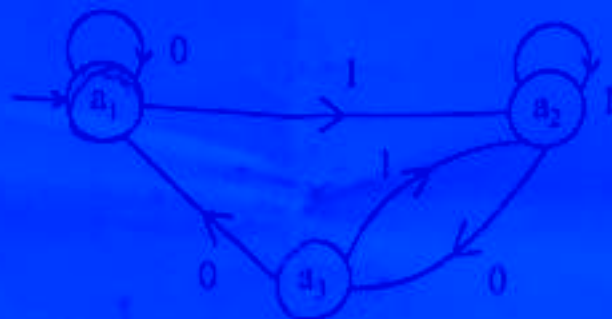
9. Define Turing Machine (TM). Design a TM for the Language $L = \{a^n b^n \mid n \geq 1\}$. Show the computation

SECTION - C

(20 Marks)

(Compulsory)

(v) Construct Regular Expression for the following Finite Automata :



(vi) Explain Chomsky's hierarchy for formal Languages. Give production Rule and Language Accepted by each type of Language.

P.T.O.

(c) Differentiate between Recursive & Recursive Enumerable Language. Show that if L_1 and L_2 is Recursive then their Union ($L_1 \cup L_2$) is also Recursive.

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(d) Explain the following with an example

(i) Pumping Lemma for CFG

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(ii) My-Hill-Nerode Theorem

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