No. of Printed Pages : 4

CS-73

BACHELOR OF COMPUTER APPLICATIONS (BCA) (Pre-Revised)

Term-End Examination

CS-73 : THEORY OF COMPUTER SCIENCE

Time : 3 Hours] *Maximum Marks : 75*

Note: Question number 1 is compulsory. Attempt any three questions from the rest.

1. A. Design a DFA over alphabet Set { a, b}, accepting all string that begin with a. 2

   b. Explain various symbols used in BNF Notation. 3

   c, Write the regular expression over alphabet set Σ = { 0,1} that contain 0l or l0 as substring. 3

   d. Define Type - 2 Grammar. Find the language generated by the grammar. 5

   e. Prove that the class of regular language is closed with respect to intersection. 5

   f. Define Non deterministic Finte automaton. 2

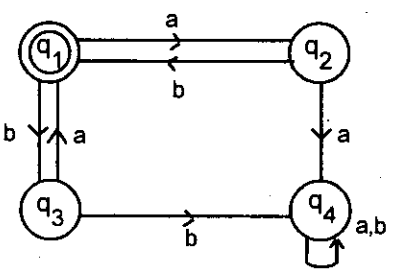
g. Obtain a NFA which accepts $\alpha = \left\{ w \in (a,b)^* \right\} \ |w| \geq 3$ and third symbol of w from the right end is a. 5

h. Define primitive recursive function show that the function 5

f (x, y) = x + y is

primitive recursive.

2. a. Find the regular expression for 5



b. Construct the F.A for the regular expression. 5

(abc + de)*

c. Write the CFG for the language. 5

$\alpha = \{ a^m b^n c^{m+n} \quad m,n \geq 0 \}$

3. a. Construct the PDA of the language. 5

$\alpha = \{ a^m b^n \quad n \geq 0 \}$

b. If L_1 and L_2 are Context Free language then L1 L2 is Context Free. 5

c. Design a TN concatenate two strings suppose. 5

w_1 =II w_1=III

q_0 IIbIII $\vdash^*$ q_fIIIII

4. a. For any two recursive language. 5

L1 & L2 Show that L1$\cap$ L2 is also recursive.

b. Consider the function- 5

equals(x,y) = 1 if x = y
= 0 $x \neq y$

Show that the function is primitive recursive.

c. Define NP complete Problems. Show that vertex cover problem is NP complete. 5

5. a. Find the solution of the following PCP problem. 5

L=(0, 01000,01)

M=(000, 01, 1)

b. Define the following- 5

i. Pumping Lemma for CFG

ii. Post Correspondence Problem 5

c. Select the dominant term having the steepest increase in n & specify the lowest Big- oh complexity. 5

$n^2 \log_2 n + n(\log_2 n)^2$

—x—