Roll No. ………………..

2119

B. E. 4th Sem. (CSE)

Examination – December, 2011

THEORY OF AUTOMATA & COMPUTATION

Paper : CSE-206-E

Time : Three hours]　　　　　[Maximum Marks : 100

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complain in this regard, will be entertained after examination.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Define a primitive recursive function ? Prove that the following function is primitive recursive.

(i)　$f(x, y) = x + y$

(ii) Conditional function i. e. if $x_1 \neq {}^\wedge$ than x_2 else x_3.

(iii) $f(x_1 y) = x^y$.

2. (a) Prove that every contex sensitive language is recursive. **10**

(b) Find the language generated by the grammar $S \rightarrow AB$? $A \rightarrow A1/0$, $B \rightarrow 2B/3$. **10**

Can the above language be generated by language of higher type.

3. (a) What do you mean by undecidability ? Discuss the halting problem encountered by Turing Machines. **10**

(b) Prove the PCP with two lists x = (01, 1, 1)y = $(01^2, 10, 1^2)$ has no solution. **10**

4. Construct a PDA for language generated by the CFG. **20**
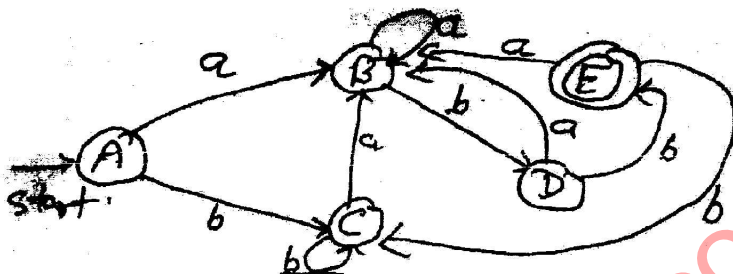
$$S \rightarrow S + S \mid S * S \mid 4$$

terminals are +,*,4

Non-terminal is S.

5. Write the procedure to convert a grammar to GNF. Apply this procedure to following grammar to convert it to GNF. **20**
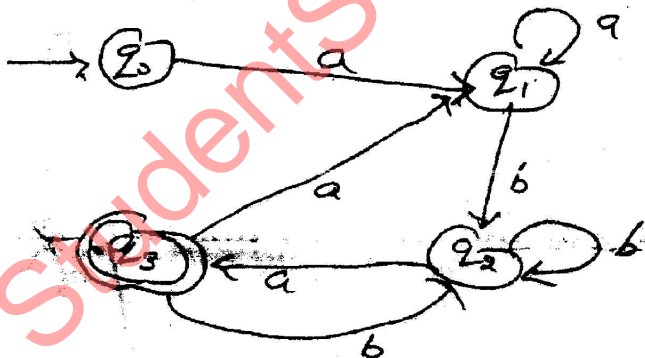
$S \rightarrow AB$, $A \rightarrow BSB$, $A \rightarrow BB$, $B \rightarrow aAB$, $B \rightarrow a$, $A \rightarrow b$.

6. Write the algorithm to minimize the number of states of DFA. Apply this to minimize the states of following DFA. **20**

7. Design moore and Mealy M/c for input from $(0 + 1 + 2)^*$. Print the residue moclulo of 5 of the input treating it as ternary (base 3, with digits 0, 1, 2), number.   20

8. (a) Find the regular expression from the following transition diagram.   10

(b) How an NDFA with epsilon-moves (E-moves) can be converted to DFA ? Illustrate.   10