[07 – 3113]

III/IV B.Tech. DEGREE EXAMINATION.

First Semester

Computer Science and Engineering

Elective I — FORMAL LANGUAGES AND
AUTOMATA THEORY

(Common with Information Technology)

(Effective from the admitted batch of 2004–2005)

Time : Three hours   Maximum : 70 marks

Question No. 1 is compulsory.

Answer any FOUR from the remaining.

All questions carry equal marks.

Answer to all parts of any question at one place.

1. (a) What is the difference between strings and
the words of a language?

   (b) What is null string (Λ)?

   (c) What is a palindrome?

   (d) What is meant by equivalent of FA's?

   (e) Define kleene star.

   (f) What is Reverse of a string?

   (g) Define Regular Expression.

2. (a) How NFA is different from DFA? Explain with example. (7)

   (b) Design a DFA which accepts all the strings with even number of 0's and odd number of 1's over an alphabet {0, 1}. (7)

3. (a) Write the procedure to minimize a DFA and give an example. (7)

   (b) Explain the finite automata with outputs Moore and Mealy machines with simple examples. (7)

4. (a) What is context-sensitive language? How Linear Bounded Automata is related with it? (7)

   (b) Explain the procedure for the inter conversion of regular grammar and finite automata with an example. (7)

5. Minimize the grammar G given into equivalent grammar by removing useless symbols and productions from it. And also explain the reason for minimisation of grammar.

   $S \rightarrow aAa$ $A \rightarrow Sb \mid bCC \mid DaA$ $C \rightarrow abb \mid DD$

   $E \rightarrow aC$ $D \rightarrow aDA$.

6. (a) Define Push Down Automata (PDA). Discuss about the language accepted by PDA. (7)

   (b) Design nondeterministic PDA for the language $L = \{0^n 1^n / n \geq 1\}$. (7)

7. (a) Define Turing machine. Explain the significance of movements of R/W head. (7)

   (b) Design a turing machine to recognize the language $L = \{a^n b^n / n \geq 1\}$. (7)

8. (a) Write about LR(0) grammar. (7)

   (b) Explain halting problem in a turing machine. (7)