PG/IIS/FA-202/13

M.Sc. 2nd Semester Examination, 2013

FA

PAPER—202

Full Marks : 50

Time : 2 hours

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

MODULE – I

(*Finite Automata*)

[*Marks* : 25]

Answer any *two* questions : 10 × 2

1. (*a*) Construct a DFA accepting all strings w over $\{a, b\}$ such that the number of b's in w is 2 mod 3. 5

(*b*) Construct a Moore machine equivalent to the mealy Machine given below :

Present state	Next State			
	$a = 0$		$a = 1$	
	State	Output	State	Output
$\rightarrow q_1$	q_1	1	q_2	0
q_2	q_4	1	q_4	1
q_3	q_2	1	q_3	1
q_4	q_3	0	q_1	1

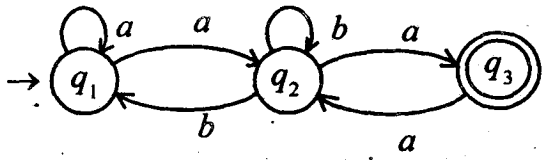
5

2. (*a*) Construct a Grammar generating

$$L = \{wCw^T \mid w \in \{a, b\}^*\}.$$ 3

(*b*) What do you mean by Regular Expressions ? Give examples. 2

(*c*) Construct a regular expression corresponding to the state diagram described by the following F.A. 5



3. (*a*) Show that the set $L = \{ a^{i^2} \mid i \geq 1 \}$ is not regular. 5

(*b*) Find a reduced grammar equivalent to the grammar *G* whose productions are : 5

$$S \rightarrow AB \mid CA, B \rightarrow BC \mid AB, A \rightarrow a, C \rightarrow aB \mid b$$

4. (*a*) Construct an equivalent finite automata -

$$ba + (aa + b)\, a^*b$$ 5

(*b*) Write a short note on Chomsky classification of grammars. 5

[*Internal Assessment* : 5 Marks]

MODULE – II

(*Compiler Design*)

[*Marks* : 25]

Answer any *two* questions : 10×2

1. (*a*) Consider the following grammar : 5

$S \rightarrow Aa \mid Bb \mid cC$

$C \rightarrow Ab \mid Ba$

$A \rightarrow D$

$B \rightarrow D$

$D \rightarrow \in$.

Construct LL(I) parsing table. Is the grammar LL(1) ? Why or why not ?

(*b*) Consider the following grammar :

$S \rightarrow aAb$

$A \rightarrow Aa \mid \in$

Design SLR(I) parser for the grammar of the grammar. If LALR(I) parser is designed for this grammar. How many states the LALR(I) parser will have ? 5

2. (*a*) Define token, pattern and lexemes also give examples. 5

(*b*) Explain the meaning of handle. "If the grammer is ambiguous then there exist exactly one handle for each right sentential form". —Comment. 5

3. (*a*) Construct DFA for the regular expression $(a/b)^*\ abb\ \#$ 5

(*b*) Why LR parsing is attractive ? What is annotated parse free ? Give one example. 2 + 3

4. (*a*) Generate three address code for : 5

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if a < b then
    while c > d do
        x = x + y
else
    do   p = p + q
    while 1 <= f
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(*b*) What is basic block ? How partitioned the basic block ? What is flow graph ? Give example. 1 + 2 + 2

[*Internal Assessment* : 5 Marks]