Student Exam No._____

GANPAT UNIVERSITY

B. Tech. Semester: VII (Computer Engineering/Information Technology)

Regular Examination November – December 2013

2CE702/2IT702: Compiler Design

Time: 3 Hours **Total Marks: 70**

Instruction 1. Figures to the right indicate full marks
2. Each section should be written in a separate answer book
3. Be precise and to the point in your answer

Section – I

Que. – 1 **12**

A Explain components of compiler in detail. **6**

B Do as directed: **6**

1. Generate RE and design a DFA that reads strings made up of {0, 1} and accept only those strings which ends with either 00 or 11.
2. Write a CFG for the R.E. 0*1(0+1)* and design FA for given R.E.

OR

Que. – 1 **12**

A Answer the following: **6**

1. Define Compiler. What are the characteristics of good compiler?
2. Do as directed:

a. Consider the following grammar:

expr -> expr + term
expr -> expr – term
term -> 0 | 1 |…..|9
Draw parse tree for the string 9-5+2.

b. Perform the Left factoring of following Grammar.
A -> ad | a | ab | abc | b

B Find First () and Follow () for the following grammar, construct predictive parsing table and check whether grammar is LL (1) or not? **6**

S-> Aba/ bCA
A-> cBCD/ϵ
B-> CdA/ad
C-> eC/ ϵ
D-> bSf/a

Que. – 2 **11**

A Do as directed: **8**

1. Eliminate useless symbols from given CFG.

i)A-> xyz/Xyzz
X-> Xz/xYx
Y-> yYy/XZ
Z-> Zy/z

ii)S-> aC/SB
A-> bSCa
B-> aSB/ bBC
C-> aBC/ad

2. Eliminate ϵ production from the given CFG.

i)S->ACB/CbB/Ba
A-> da/BC
B-> gC/ ϵ
C-> ha/ ϵ

ii)S-> AaA
A-> Sb/bCC/ ϵ
C-> CC/abb/ ϵ

B Eliminate ϵ and unit production from given CFG.

S-> A/BAabB
A-> abA/a
B-> bB/ ϵ

OR 11

Que. – 2

A What is LL(1) grammar? Construct Predictive parsing table for the following grammar. Check given grammar is LL(1) or not? Here $ is the end marker. 6

S'-> S$
S-> qABC
A-> a/bbD
B-> a/ ϵ
C-> b/ ϵ
D-> C/ ϵ

B Do as directed: 5

1. Generate the CFG for the Regular Expression 0*1*(0+1)* and draw leftmost derivation for the string 0010.
2. Eliminate the left recursion from given CFG.

A-> AcB/cC/C
B-> Bb/id
C-> CaB/BbB/B

12

Que. – 3

A. Answer the following: 8

1. Explain Recursive Decent parser with example.
2. Consider the following grammar:

S-> 0B/1A
A-> 0/0S/1AA
B-> 1/1S/0B

For the string 00110101, find left most derivation & check the ambiguity.

B. Explain R-R conflict and S-R conflict in CLR with example. 4

Section – II

Que. – 4 12

A Construct a SLR Parsing table for the following grammar: 6

E-> E+T/T
T-> TF/F
F-> F*/a/b
Show the parsing for the string a*+a.

B Consider the following grammar: 6

S-> Aa
S-> bAc
S-> Bc
S-> bBa
A-> d
B-> d
And construct a CLR Parsing table.

OR

Que. – 4 12

A Answer the following: 6

1. Explain working of Shift-Reduce Parser with diagram.
2. What is translator? List out and define different translator. 6

B Construct LALR parsing table for the following grammar: 11

S-> XX
X-> xX/y

Que. – 5 6

A Explain the method for error recovery in detail. 5

B Do as directed:

1. Apply loop splitting on the following C code:

```
a=10;
for(i=0;i<10;i++)
{
    m[i] = n[i] + n[a];
    a=i;
}
```

2. Explain the data structures which are used by each phase of compiler.

OR

Que. – 5 11

A List out various approaches for symbol table organization. Explain any two in detail. 6

B Differentiate following: 5

1. Top down parser and Bottom up parser.
2. Loop fission and Loop fusion.

Que. – 6 12

A Explain types of grammar in detail. 6

B Answer the following: 6

1. Explain Three Address Code with example.
2. Define: Handle. Consider the following grammar and show the handle of each right sentential form for the string (b, (b, b)).
   S-> (L)/b
   L-> L,S/S

END OF PAPER