Hall Ticket Number:

Code No. : 32113

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (C.S.E.) III Year II-Semester Main Examinations, May-2017

Compiler Construction

Time: **3** hours Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. Define interpretation and distinguish between interpreters and compilers.
2. Design grammar for the following language: The set of all strings of 0s and 1s with an equal number of 0s and 1s.
3. Differentiate top down and bottom up parsers
4. Eliminate immediate left recursion for the following grammar:

   E -> E+T | T

   T -> T * F | F

   F -> (E) | id
5. What are the advantages of generating intermediate code vis-a-vis generating target program itself?
6. Define widening type conversion and narrowing type conversion with an example.
7. What is a garbage collector?
8. Explain various issues with stack allocation.
9. Distinguish between Abstract Syntax Tree and Control Flow Graph.
10. What is Code Motion optimization?

Part-B (5 × 10 = 50 Marks)

11. a) What is error recovery? Discuss various error recovery methods used in lexical analysis. [5]

    b) Explain Lex specification with an example. [5]

12. a) Consider the following grammar [5]

       S->AS|b

       A->SA|a.

    Construct an SLR parsing table for the same.

    b) Write steps to find first and follow and construct first set and follow set for the following grammar: [5]

       $S \rightarrow 0 \mid A$

       $A \rightarrow AB$

       $B \rightarrow 1$

13. a) Construct different types of three address codes notations for the following expression. [5]

       (a+b)*(c/d)+e

    b) Write the SDT for if-then-else construct. [5]

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14. a) Distinguish static and dynamic storage allocation and explain heap storage allocation. [4]

    b) Show the symbol table for the following C program: [6]

```
int w, x, y, z;
        int i = 1;
        int j = 2;
          {
          int i = 3;
          j = 4;
          w = i + j;
          }
        x = i + j;
          {
          int j = 5;
          y = i + j;
          }
        z = i + j;
```

15. a) What is the DAG of an expression tree? What are its uses? [3]

    b) Translate the following program into intermediate representation and construct the corresponding expression DAG for it. [7]

```
d := b * c
e := a + b
b := b * c
a := e - d
```

16. a) Explain how input buffering happens in lexical analysis. [2]

    b) Write CLR table for the following grammar: [8]

$S \rightarrow L$

$L \rightarrow L\ b\ L \mid A$

$A \rightarrow a$

17. Answer any ***two*** of the following:

    a) Dangling else problem in parsing of imperative languages. [5]

    b) Instruction scheduling: the complexity and an algorithm for the same. [5]

    c) Register allocation using graph colouring. [5]