Subject Code: KCS502

PAPER ID-411134

Roll No: | | | | | | | | | | | | | |

B.TECH.
(SEM V) THEORY EXAMINATION 2021-22
COMPILER DESIGN

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a. What is the difference between parse tree and abstract syntax tree?
b. Explain the problems associated with top-down Parser.
c. What are the various errors that may appear in compilation process?
d. What are the two types of attributes that are associated with a grammar symbol?
e. Define the terms Language Translator and compiler.
f. What is hashing? Explain.
g. What is do you mean by left factoring the grammars? Explain.
h. Define left recursion. Is the following grammar left recursive?

E → E+E | E*E| a| b

i. What is an ambiguous grammar? Give example.
j. List down the conflicts during shift-reduce parsing.

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

a. Construct the LALR parsing table for the given grammar

S →BB
B→ aB / b

b. What is an activation record? Explain how it is related with runtime storage organization?
c. Write the quadruple, triple, indirect triple for the following expression

(x + y)*(y + z) + (x + y + z)

d. Discuss the following terms:
   i. Basic block
   ii. Next use information
   iii. Flow graph
e. Construct predictive parse table for the following grammar.

E → E + T/T
T →T *F/F
F →F /a/b

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

a. Construct the SLR parse table for the following Grammar

E→E+E
E→E*E
E→id

b. Differentiate between stack allocation and heap allocation.

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4. Attempt any *one* part of the following: 10 x 1 = 10

a. Write syntax directed definition for a given assignment statement:

S → id=E
E → E+E
E →E*E
E→-E
E → (E)
E→id

b. What are the advantages of DAG? Explain the peephole optimization.

5. Attempt any *one* part of the following: 10 x 1 = 10

a. What do you understand by lexical phase error and syntactic error? Also suggest methods for recovery of errors.

b. Discuss how induction variables can be detected and eliminated from the given intermediate code

B2: i:= i+1
t1:=4*j
t2:=a[t1]
if t2<10 goto B2

6. Attempt any *one* part of the following: 10 x 1 = 10

a. Test whether the grammar is LL(1) or not, and construct parsing table for it.

S→1AB / ε
A→1AC/0C
B→0S
C→1

b. Distinguish between static scope and dynamic scope. Briefly explain access to non local names in static scope.

7. Attempt any *one* part of the following: 10 x 1 = 10

a. What are the various issues in design of code generator & code loop optimization?

b. Generate the three address code for the following code fragment.

```
while(a>b)
{
if(c<d)
x=y+z;
else
x=y-z;
}
```