



10IS662

**Sixth Semester B.E. Degree Examination, Jan./Feb. 2021**  
**Compiler Design**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting at least TWO questions from each part.**

**PART – A**

- 1 a. Explain with a neat diagram, the various phases of compiler. Mention the input and output of each phase. (08 Marks)
- b. Mention the applications of compiler technology. Explain program translation. (06 Marks)
- c. Construct the transition diagram to recognize the tokens given below :  
i) Identifier  
ii) Relational operator in 'C' language  
iii) Unsigned number. (06 Marks)
- 2 a. Define ambiguous grammars. Show that the following grammar is ambiguous :  
 $S \rightarrow iEtS \mid iEtSeS \mid \text{other}$ . (06 Marks)
- b. Define the first and follow rules used in predictive parsing compute the first and follow for following grammar :  
 $E \rightarrow E + n \mid n$  (06 Marks)
- c. For the grammar given below :  
 $S \rightarrow AaAb \mid BbBa$   
 $A \rightarrow \epsilon$   
 $B \rightarrow \epsilon$   
Build the predictive LL(1) parsing table and parse the input string "ba". (08 Marks)
- 3 a. What is shift reduce parser? Explain the conflicts that may occur in shift reduce parsing. (04 Marks)
- b. Given the grammar  
 $S \rightarrow (S) S \mid \epsilon$   
i) Find the LR(0) items  
ii) Construct the SLR(1) parsing table  
iii) Using the table parse the input string ( ) ( ) (12 Marks)
- c. What is meaning of LR(K)? Why LR parsing is attractive. (04 Marks)
- 4 a. Given the grammar  
 $A \rightarrow (A) \mid a$   
i) Construct the set of LR(1) items  
ii) Building the canonical LR(1) parsing table. (10 Marks)
- b. Show that the following grammar  
 $S \rightarrow Aa \mid bAc \mid dc \mid bda$   
 $A \rightarrow d$   
is LALR(1) (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

## PART – B

- 5 a. Give the SDD to compute  $3 * 4 * 5 * 6$  using a grammar suitable for top down parsing. Also compute the annotated parse tree and dependency graph. (08 Marks)
- b. Give the SDD for simple type declaration in 'C'. Give the annotated parse tree for float w, x, y, z. (06 Marks)
- c. Assuming suitable syntax directed definition construct a dependency graph for  $a - 4 + C$  with SDD suitable for top-down parsing. (06 Marks)
- 6 a. Explain how DAG will help in intermediate code generation? Construct a DAG and identify the value number for following sub expression  $a + b + (a + b)$ . (08 Marks)
- b. Define quadruple, triple and indirect triple. (04 Marks)
- c. Describe the syntax directed definition for flow control statements. (08 Marks)
- 7 a. What are Access Links? With a neat figure show how access links are used for finding nonlocal data on stack. (06 Marks)
- b. Write a note on heap management. (06 Marks)
- c. Mention the design goals and garbage collector. Discuss the performance metrics to be considered while designing a garbage collector. (08 Marks)
- 8 a. How register allocation and evaluation order plays an important role in code generation. (06 Marks)
- b. Explain the following code optimization with example :  
i) Finding local common sub-expression  
ii) Dead code elimination. (10 Marks)
- c. What are basic blocks how do you partition three address code into basic blocks. (04 Marks)

\*\*\*\*\*