

267 APR 2023

27 APR 2023

Reg. No.

Question Paper Code

11820

**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023**

Sixth Semester

**Computer Science and Engineering**

**CS8602 - COMPILER DESIGN**

(Regulations 2017)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |                                                                              | <i>Marks,<br/>K-Level, CO</i> |
|------------------------------------------------------------------------------|-------------------------------|
| 1. State the differences between Compiler and Interpreter.                   | 2,K2,CO1                      |
| 2. List the cousins of compilers.                                            | 2,K1,CO1                      |
| 3. Define ambiguous Grammar with examples.                                   | 2,K1,CO2                      |
| 4. Construct a parse tree for $-(id+id)*id$ .                                | 2,K2,CO2                      |
| 5. Mention the rules of Type Checking.                                       | 2,K1,CO3                      |
| 6. Write down syntax directed definition of a simple desk calculator?        | 2,K1,CO3                      |
| 7. What is an activation record? Give the structure of an activation record. | 2,K1,CO4                      |
| 8. What do you mean by copy propagation?                                     | 2,K1,CO4                      |
| 9. Draw the DAG for the statement $a=(a*b+c)-(a*b+c)$ .                      | 2,K2,CO5                      |
| 10. When does a Dangling reference occur?                                    | 2,K1,CO5                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) What are the phases of the compiler? Explain the phases in detail. Write down the output of each phase for the expression  $a:=x*100+y/z$ . 13,K3,CO1
- OR**
- b) (i) Explain the compiler construction tools in detail. 5,K2,CO1  
(ii) Explain language processing system with a neat diagram. 8,K2,CO1
12. a) (i) Discuss input buffering techniques in detail. 7,K2,CO2  
(ii) Draw the transition diagram for relational operators and unsigned numbers. 6,K2,CO2
- OR**
- b) Convert the Regular Expression  $abb(a|b)^*$  to DFA using direct method and minimize it. 13,K3,CO2

*K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create*

**11820**

13. a) Consider the following Grammar 13, K3, CO3  
 $E \rightarrow E+T \mid T$   
 $T \rightarrow TF \mid F$   
 $F \rightarrow F* \mid a \mid b$   
Construct the SLR parsing table for the above grammar.

**OR**

- b) (i) Construct parsing table for the grammar and find the moves made by the predictive parser on input  $id+id*id$ . Find FIRST and FOLLOW 8, K3, CO3  
 $E \rightarrow E+T$   
 $E \rightarrow T$   
 $T \rightarrow T*F$   
 $T \rightarrow F$   
 $F \rightarrow (E) \mid id$ .
- (ii) Construct parse tree for the input string  $w=cad$  using Top Down parser 5, K3, CO3  
 $S \rightarrow cAd$   
 $A \rightarrow ab \mid a$ .

14. a) (i) Discuss specification of simple type checker. 7, K2, CO4  
(ii) Explain and Construct SDD for construct a syntax tree for assignment statements: 6, K2, CO4  
 $S \rightarrow id:=E$   
 $E \rightarrow E1+E2$   
 $E \rightarrow E1*E2$   
 $E \rightarrow -E1$   
 $E \rightarrow (E1)$   
 $E \rightarrow id$ .

**OR**

- b) Explain in detail about the various forms of three address instruction with suitable examples. 13, K2, CO4

15. a) (i) Discuss the issues in code generation with examples. 6, K2, CO5  
(ii) Write a note on simple code generator. 7, K2, CO5

**OR**

- b) (i) Explain about Parameter passing methods. 7, K2, CO5  
(ii) Discuss in detail about Storage allocation strategies. 6, K2, CO5

**PART - C (1 × 15 = 15 Marks)**

16. a) Construct the DAG for the following Basic Block:

*15,K3,CO6*

1.  $t1:=4*i$
2.  $t2:=a[t1]$
3.  $t3:=4*i$
4.  $t4:=b[t3]$
5.  $t5:=t2*t4$
6.  $t6:=prod+t5$
7.  $prod:=t6$
8.  $t7:=i+1$
9.  $i:=t7$
10. if  $i \leq 20$  go to (1).

**OR**

b) Explain briefly about the principal sources of optimization.

*15,K3,CO6*