End
while I <=20
end 8

b. Explain the abstract syntax tree (AST) with your own example. 6

UNIT-V

9. a. What is an object code? Explain the object code fromin detail. 7

b. What is DAG? Explain the applications of DAG in detail. 7

10. a. What is code optimization? Briefly describe the concept of code optimization and how it can be used to improve the code. 8

b. Briefly describe the concept of code optimization and how it can be used to improve the code. 6

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UG/PG Even Semester Examination, 2025

COMPUTER SCIENCE

(8th/2nd Semester)

Course No.: MCS-802/MS-202

(Principles of Compiler Design)

Full Marks: 70

Pass Marks: 28

Time: 3 hours

The figures in the right margin indicate full marks for the question.
Answer any five questions selecting one from each unit.

UNIT-I

1. a. Lexical analysis: what is it? Describe the architecture of a lexical analyzer with advantages and disadvantages. 8

b. What is the difference between a compiler and an interpreter? 6

2. a. Write the differences between lexical analysis and parser (syntax analysis). 8

b. Draw the DFAs for the following regular expressions:

I. [0 - 7] [0 - 7] *

II. (a|b)* abb 3+3=6

UNIT-II

3. a. Consider the following grammar:

S→ L = R

S→ R

L→ *R

L→ id

R→ L

I. Is the grammar SLR? Justify your answer? 3

II. Is the grammar canonical LR? Justify your answer? 5

b. What is the difference between a FIRST () and a FOLLOW ()? 6

4. a. FOLLOW () - what is it? The algorithms for computing FOLLOW () of grammar symbols should be explained with an example. 8

b. Parser tree- what is it? Write the advantages of parser tree in detail. 6

UNIT-III

5. a. What is a dynamic storage allocation? In detail, what are the problems associated with dynamic storage allocation schemas? 6

b. What is type equivalence? Draw the type trees for the following pairs of type declaration and argue whether they are type equivalent or not.

```
struct list1
{
        int val;
        struct list1 *next;
}
struct list2
{
        int val;
        struct list2 *next;
}
```

3+5=8

6. a. What is type checking? Distinguish between static and dynamic type checking. 7

b. Describe the stack allocation strategy of the runtime environment with an example. 7

UNIT-IV

7. a. What is intermediate code from? Describe the various intermediate code from in detail. 8

b. Semantic analysis: what is it? Describe the semantic analysis phase in detail. 6

8. a. What do you mean by THREE ADDRESS CODE? Generate the three-address code forthe following code:

```
begin
        PROD: = 0;
        I: =1;
do
begin
        PROD:=PROD + A[I] B[I];
        I:=I+1;
```