



**GIET UNIVERSITY, GUNUPUR - 765022**  
M. C. A (Third Semester) Regular Examinations, January - 2024  
**MCA20301 - Compiler Design**

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

**PART - A****(2 x 10 = 20 Marks)**

Q.1. Answer <i>ALL</i> questions	CO #	Blooms Level
a. What is the front end and back end of a compiler?	CO1	L1
b. Design the NFA for Integer numbers representation.	CO1	L3
c. What are the different actions performed by the S-R parser?	CO2	L2
d. Eliminate left factoring in the following grammar S → iEtS   iEtSeS   a E → b	CO1	L4
e. Consider the following LR (0) grammar. What is the problem? S → W W W → a W → ab	CO2	L5
f. What do you mean by syntax-directed definition?	CO3	L1
g. What are the different error recovery strategies in compiler design?	CO3	L2
h. What are the benefits of using intermediate code generation over direct code generation?	CO3	L2
i. Consider the following expression and construct a DAG for it. ((a + a) + (a + a))	CO4	L6
j. What are the objectives of peephole optimization?	CO4	L1

**PART - B****(10 x 5 = 50 Marks)**Answer *ANY FIVE* questions

	Marks	CO #	Blooms Level
2. a. Explain the different steps involved in the Language Processing System.	5	CO1	L1
b. Justify whether the given grammar is LL (1) or not and construct a predictive parsing table. S → aBa B → bB   ε	5	CO2	L5
3. a. What are the features and types of Compilers?	5	CO1	L1
b. What are the steps required for converting NFA to DFA? What is the procedure for converting regular expression into minimized DFA?	5	CO2	L3
4. a. Consider the following grammar and construct a Parse Tree for the string <b>2 * ( 5 + 3 ) / 4</b> using Right Most Derivation. E → E A E E → ( E ) E → id A → +   -   *   /   ^	5	CO2	L6

b.	Consider the following grammar and compute all non-terminal symbols' FIRST() and FOLLOW(). $S \rightarrow B c \mid D B$ $B \rightarrow a b \mid c S$ $D \rightarrow d \mid \epsilon$	5	CO1	L4
5. a.	Construct the SLR (1) parsing table for the following grammar: $E \rightarrow E+T \mid T$ $T \rightarrow T * F \mid F$ $F \rightarrow (E) \mid id$	5	CO2	L6
b.	Explain the different components of the operator precedence parser.	5	CO3	L2
6. a.	What is the purpose of LR (1) items? Explain briefly with an example.	5	CO3	L2
b.	Differentiate between Synthesized Attributes and Inherited Attributes	5	CO3	L2
7. a.	What is the role of a Symbol Table in the Compiler?	5	CO3	L3
b.	Write the quadruples and triples for the following given Expressions: $a: = -b * (c + d)$	5	CO4	L3
8. a.	Where to apply Optimization? What are the different Phases of Optimization?	5	CO4	L4
b.	What are the rules for any given code that can be partitioned into basic blocks?	5	CO4	L1

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