

Hall Ticket Number:

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Code No. : 17656 N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (I.T.) VII-Semester Main & Backlog Examinations, Dec.-23/Jan.-24**Compiler Construction**

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	List the major data structures in a compiler	2	1	1	1
2.	Define token. Consider the set of tokens, {ab, abc, abd, b, bc, bb, ca, cd, da, daa}. What is the sequence of maximal length tokens generated from the input "abcabbdadaadacaabcb".	2	4	1	2
3.	Describe Handle Pruning with an example.	2	1	2	2
4.	Eliminate left recursion from the CFG, $G_1 = (\{a, b, c, d\}, \{A, B\}, P, A)$, where $P = \{A \rightarrow Aa \mid Aab \mid Bc, B \rightarrow BAa \mid d\}$.	2	3	2	2
5.	Draw the syntax tree and DAG for the following expression $((((c*d)+(a+b))*(c*d))+d)$	2	2	3	1
6.	Distinguish between synthesized attributes and inherited attributes.	2	2	3	1
7.	List the various fields of an activation record	2	1	4	1
8.	Identify the optimization technique used for optimizing the following code for(i=1;i<=50;i++) { x=i*7; }	2	2	4	1
9.	Calculate the instruction cost of the following code sequence MOV X,R0 MOV Y,R1 SUB R1,R0 BLTZ R0,*R3	2	3	5	2
10.	Describe peephole optimization techniques with an example.	2	1	5	1
Part-B (5 × 8 = 40 Marks)					
11. a)	Explain the different phases of a compiler with a neat diagram. Show the output of each phase of the compiler for the following code segment and explain briefly $E = 0.5 * m * v * v;$	5	2	1	1
b)	What is LEX? Explain in detail different sections of LEX program. Write a LEX program to recognize Unsigned integers in the program.	3	2	1	1

Contd... 2

R-305

12. a)	Write a Recursive Descent Parser for the following grammar $S \rightarrow cAd$ $A \rightarrow ab \mid a$ and for the input "cad" and trace the parser.	3	3	2	1
b)	Construct an SLR parsing table for the grammar $G: S \rightarrow L=R \mid R, L \rightarrow *R \mid id, R \rightarrow L$. Is it SLR(1) grammar?	5	4	2	1,2
13. a)	Define SDD. Write the syntax directed definition for desktop calculator grammar and also draw the annotated parse tree for the input string $3*5-4$	4	3	3	1
b)	What is a three-address code? Translate the following expression into quadruple, triple, and indirect triple structures. $a[i] = a + (b * c + d)$	4	4	3	1
14. a)	Discuss stack based run time environment with an example.	3	2	4	1
b)	Generate the 3-address code for the following programming construct and obtain the basic blocks for generated code $i = 1$ do $sum = sum + a[i] * b[i]$ $i = i + 1$ while($i \leq 20$);	5	3	4	1,2
15. a)	Explain various issues in the design of the code generation phase.	4	1	5	1
b)	Construct machine code for the following statements. Assume the size of each scalar variable is 4 bytes long $A = B[i] \quad C = D[j] \quad E = A + C$	4	3	5	2
16. a)	Describe input buffering strategy used in lexical analysis phase.	4	2	1	1
b)	Consider the grammar $S \rightarrow xABC$ $A \rightarrow a \mid bbD$ $B \rightarrow a \mid \epsilon$ $C \rightarrow b \mid \epsilon$ $D \rightarrow c \mid \epsilon$ Construct predictive parsing table for the given grammar.	4	4	2	1,2
17.	Answer any <i>two</i> of the following:				
a)	Explain L-Attributed definition with suitable example	4	1	3	1
b)	What are the principal sources of optimization in a code? Illustrate with suitable examples.	4	2	4	1
c)	Describe Register allocation using graph coloring with an example	4	2	5	1

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level - 1	20%
ii)	Blooms Taxonomy Level - 2	31.25%
iii)	Blooms Taxonomy Level - 3 & 4	48.75%
