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Code No. : 17636 S

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD*Accredited by NAAC with A++ Grade***B.E. (I.T.) VII-Semester Supplementary Examinations, July-2022****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.	Differentiate between analysis part and synthesis part of a compiler.	2	1	1	1
2.	What is the role of lexical analyzer?	2	1	1	1
3.	Define left factoring.	2	1	2	1
4.	Eliminate left recursion from the following grammar. E → E + T T T → T * F F F → (E) id	2	1	2	1
5.	What is L-attributed definition?	2	1	3	1
6.	List the various forms of three address instructions.	2	1	3	1
7.	What is an Activation record? What are its contents?	2	1	4	1
8.	What is a basic block? Give an example.	2	1	4	1
9.	Differentiate register allocation and register assignment.	2	1	5	1
10.	Define instruction cost. Determine the costs of the following instruction sequences. LD R ₀ , b ADD R ₀ , c ST a, R ₀	2	1	5	1
Part-B (5 × 8 = 40 Marks)					
11. a)	Discuss about LEX- Lexical analyzer generator.	4	2	1	2
b)	Write the regular definitions for identifiers and unsigned numbers and also draw the transition diagrams for recognition of identifiers and unsigned numbers.	4	2	1	2
12. a)	Compute FIRST and FOLLOW for the following Grammar: E → E+T T T → T*F F F → (E) id.	3	3	2	2
b)	Construct predictive parsing table for the following grammar and show the parser steps for the input ((a)). A → (A) a	5	3	2	3

Contd... 2

13. a)	Translate the expression $-(a+b)*(c+d)+(a+b+c)$ in to quadruple, and triple structures.	3	3	3	3
b)	The following grammar generates binary numbers with a "decimal" point: $N \rightarrow L.L$ $L \rightarrow L B B$ $B \rightarrow 0 1$ Design an SDD to compute $N.dval$, the decimal-number value of an input string. Justify your design with the following example. The translation of string 101.101 should be the decimal number 5.625.	5	3	3	3
14. a)	Explain in brief about the following optimization techniques with suitable examples. i) Common Sub-expression elimination ii) Copy propagation iii) Constant folding	3	2	4	2
b)	What is a leader of basic block? Write the algorithm to partition the three-address code into basic blocks. Draw the flow graph for matrix multiplication.	5	4	4	2
15. a)	What are the issues in the design of code generator? Explain.	3	2	5	2
b)	Discuss about the code generation algorithm. Generate three-address code for the following C statement. $x = a + b * c.$ Convert your three address code into machine code, using the simple code generation algorithm, assuming three registers are available. Show the register and address descriptors after each step.	5	4	5	3
16. a)	Explain the role of assembler, compiler, loader and linker in the language processing system with a neat diagram.	3	2	1	1
b)	Construct SLR parsing table for the following grammar and show the actions of the parser for the input string $()()\$$. $S \rightarrow S (S)$ $S \rightarrow \epsilon$	5	3	2	3
17.	Answer any <i>two</i> of the following:				
a)	Explain in brief about Type checking and Type Conversion.	4	2	3	2
b)	What is reference counting? Explain how they are used in garbage collection.	4	2	4	2
c)	Explain in brief about peephole optimization techniques.	4	2	5	2

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

i)	Blooms Taxonomy Level - 1	25%
ii)	Blooms Taxonomy Level - 2	36.25%
iii)	Blooms Taxonomy Level - 3 & 4	38.75%
