6	a	With a neat diagram, explain language processing system.
	b	Construct predictive passing table for the following grammar: $lexp \rightarrow atm/list$ $atom \rightarrow num/id$ $list \rightarrow (lexp - seq)$ $lexp - seq \rightarrow lexp\ lex - seq/lexp$
		OR
7	a	Explain different phases of a compiler and show the translation of the statement $a = b - c * 5$ as an example for each phase of the compiler.
	b	With a neat diagram, explain i/p buffering technique of lexical analysis.
8	a	For the grammar below, construct $LALR$ passing table. Also state the difference between $LR(1)$ and $LALR$. $S \rightarrow CC$ $C \rightarrow cC$ $C \rightarrow d$
	b	Write the grammar and syntax directed definition for a simple calculator and show the evaluation of expression $3 * 4 + 2$.
		OR
9	a	Using ambiguous grammar show how to overcome the shift-reduce and reduce-reduce conflicts in SLR passing technique.
	b	Discuss the application of syntax directed translation.
10	a	For the expression below: $a = b * -c + b * -c$. i) Write three address code and its quadruple and triple representation. ii) Construct directed acyclic graph(DAG).
	b	Discuss the design issues of code genation in detail.
		OR
11	a	Write the three address code for the following: $i = 2$ $i = i + 3$ $if(i < 10)$ $\quad i = 20;$ $else$ $\quad i = 30;$
	b	Identify the basic blocks and draw the flow graph for the above source code. Write the semantic rule for the following control construct: i) $S \rightarrow while\ (B)S_1$ ii) If $(B)S_1$

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R V College of Engineering
Department of Computer Science and Engineering
CIE - II : Question Paper

Course: (Code)	System Software and Compiler Design (12CS64)	Semester : VI
Date :	Duration : 120 minutes	Staff : UBA,MRA,SM,DD
Name :	USN :	Section : A,B,C,D

Part-A

Sl.no		Marks	* L1-L6	*CO
1.1	Compute the First and Follow for the grammar S→Bb|Cd B→aB| ε C→cC| ε	2	L2	CO3
1.2	Define Left factoring	1	L1	CO2
1.3	State the conditions for the grammar G to be in LL(1)	2	L2	CO2
1.4	Define lexeme and token	2	L1	CO1
1.5	For the grammar S→SS+|SS*|a indicate the handle for i. aaa*a++ ii. SS+a*a+	2	L2	CO3
1.6	Consider the context-free grammar S→SS+|SS*|a a) Show how the string aa+a* can be generated by the grammar b) Construct parse tree for the grammar	2	L3	CO2
1.7	Illustrate the output of semantic analyzer for the statement A=B*4.5+2*C where A and B are floating point variables and C is an integer variable.	1	L2	CO1
1.8	Give an algorithm for sentinel lookahead.	2	L2	CO3
1.9	The interaction between the lexer and parser is implemented by having the parser call the lexical analyzer. Name the command which is responsible for this interaction.	1	L1	CO2

Part-B

Note: Answer all questions

Sl.no		Marks	* L1-L6	*CO
2a.	With the help of diagram discuss language processing system.	5	L1	CO1
2b.	Discuss the technique used to handle large lookaheads safely to speedup the reading of source program.	5	L2	CO2
3a.	For the Grammar G represented by the following productions Z→aMa | bMb | aRb | bRa M→c R→c i. Construct the SLR sets of items and their GOTO function ii. Indicate any action conflicts in sets of Items iii. Construct the SLR-parsing table, if one exists	7	L3	CO4

3b.	Give an algorithm for LR parsing	3	L2
4.	Show that the following grammar is LR(1) but not LALR(1) S→Aa | bAc | Bc | bBa A→d B→d	10	L3
5a.	The following grammars are clearly not LL (1), how would you transform the grammar to make it LL (1)? i. S→(L)|a L→L,S|S ii. S→bSSaaS | bSSaSb |bSb |a	5	L3
5b.	Discuss the error recovery strategies used by parsers.	5	L1
6.	Identify the moves of an LR parser on input id*id with the help of parsing table generated by the grammar E→E+T|T T→T*F|F F→(E)|id	10	L3

COURSE OUTCOMES:

- **CO1**: To understand the relationship between different system software and machine architectur
- **CO2**: To analyze the implementation of different system software.
- **CO3**: To design and implement different system software.
- **CO4**: To implement and demonstrate in-depth knowledge of various technologies related to software tools and their construction.

	L1	L2	L3	L4	L5	L6	CO1	CO2	CO3	CO4
Total Marks	14	17	34	--	--	--	13	19	16	17

R V College of Engineering
Department of Computer Science and Engineering
CIE - III : Question Paper

Course: (Code)	System Software and Compiler Design (12CS64)	Semester : VI	
Date :	Duration : 120 minutes	Staff : UBA,MRA,SM,DD	
Name :	USN :	Section :	A,B,C,D

Part-A

Sno		Marks	* L1-L6	*CO
1.1	List the rules of a semantic analyzer.	2	L2	CO2
1.2	Discuss the difference between SDD and SDT.	2	L1	CO3
1.3	Construct a DAG for the expression I=I+10	2	L2	CO2
1.4	Discuss the benefits of intermediate code generator?	2	L1	CO2
1.5	Mention the functions that are used in backpatching.	2	L1	CO4
1.6	State the rules to find out leaders in a three address code.	2	L1	CO3
1.7	Write a three address code for the expression a < b or c < d?	2	L3	CO4
1.8	Define Peephole optimization	1	L2	CO1

Part-B

Note: Answer all questions

Sl.no		Marks	* L1-L6	*CO
2	Show how the conflicts of shift/reduce and reduce/reduce will be solved for ambiguous grammar in SLR(0) parsing.	2+3+5	L2	CO3
3	Consider the following expression: r= b * -c + b * - c a) Write three-address code and its quadruple and triple representation b) Construct directed acyclic graph.	10	L3	CO4
4a	Write down the semantic rules for three address code generation of Boolean expressions using backpatching.	4	L2	CO2
4b.	Write syntax directed definition to implement a desk calculator to evaluate the string **2+4*6**	2+2+2	L3	CO4
5.	List and explain the issues of code generator with an example for each	10	L1	CO1
6.	Illustrate different techniques of basic block optimisation using suitable example.	10	L2	CO2