Course Code:	CST402/CST412	

Seventh Semester B.E (Computer Science and Engineering) Examination

LANGUAGE PROCESSORS

Time: 2 Hours]	[Max. Marks: 40

Instructions to Candidates:

1. All questions carry marks as indicated against them.
2. Assume suitable data and illustrate answers with neat sketches wherever necessary.

Question		Description of Question	Marks	CO
1	(a)	Construct the DFA corresponding to the regular expression "ab(a|b)b" using direct method of conversion from regular expression to DFA.	(4M)	CO1
		--OR--		
	(b)	Discuss the role of LEX and YACC in compiler design. Write YACC program and corresponding LEX program to compute the value of arithmetic expressions.	(4M)	CO1
2	(a)	Construct the LL(1) parsing table for the grammar and write the error recovery routines for phrase level error recovery in LL parser. Show the string parsing for the string **"id id+id"** E→ TE′ E′ → +TE′ | ε T→ FT′ T′→ *FT′ | ε F→ id	(6M)	CO2
	(b)	Construct SLR parsing table for: S→ CC C→ cC C→d	(2M)	CO2
		--OR--		
	(c)	Construct SLR parsing table and parse the input string "yzxx S→ AxB | Bc A→yA | z B→xB | ε	(4M)	CO2
	(d)	Design an LALR parser for the following grammar: S→aAd | bBd | aBc |bAc A→ e B→ e	(4M)	CO2
3	(a)	Generate the Three Address code for the array assignment statement: B [I,J,K]= A using SDTS. Also show the annotated parse tree for the same. Dimensions of array B are 10x20x30 having bpw as 4.	(4M)	CO3
		--OR--		

	(b)	Construct the annotated parse tree and using SDTS generate the three address code corresponding to:
		(i) while(a>b and b<c){
		a=a+1
		}
		(ii) for(i=1,i<2;i=i+1)
		{
		a=a+1
		}
			(4M)	CO3

	(c)	Construct the annotated parse tree and translate the following into three address code using SDTS for switch statement:
		switch(x)
		{
		case1: a=b
		case2: switch(a)
		{
		case 1: b=2
		case 2: b=a+2
		}
		}
			(4M)	CO3

4	**(a)**	Write the C code for merge sort. Draw the activation tree when numbers 5 8 1 9 4 2 7 3 are to be sorted. Also show the intermediate control stacks having the activation records.	(3M)	CO1
	(b)	State all the errors that can occur in each phase of compilation and how they are handled.	(3M)	CO1
		--OR--		
	(c)	Explain how data is stored in symbol table. Use appropriate data structure. Include level of nesting information also. Elaborate using an sample high level language code.	(3M)	CO1

5	**(a)**	Find the Program flow graph and detect the loop in the following and compute the values of IN, OUT, GEN and KILL.
		a=0;
		b=1;
		c=2;
		L2: if (b>100) goto L3;
		a=a+1
		d=e+f
		L1: if (b>50) goto L3;
		c=a;
		g=10*d;
		h=g+c;
		b=b+2;
		goto L1;
		b=b+4;
		goto L2;
		L3: i=b;
			(7M)	CO4

6	**(a)**	Generate the optimal order of execution using heuristic algorithm and then generate code using simple code generation T1=x*y T2=z+x T3=w/T2 T4=T1+T3	(5M)	CO4

	(b)	Compute the cost vector at each node of the DAG for the given three address code using the dynamic approach. T1=b+c T2=a*T1	(2M)	CO4
	--OR--			
	(c)	Find the optimal number of registers for the computation: T1=a+b T2=c*d T3=e-T1 T4=f+t2 T5=T3+T4 Also generate the target code using gencode() procedure.	(7M)	CO4