Roll No.									

The Assam Royal Global University, Guwahati

Royal School of Engineering & Technology

B.Tech. CSE 6th Semester

Special Supplementary Examination, August 2024

Course: Compiler Design

Code: CSE022C603

Time: 3 hours **Maximum Marks: 70**

Attempt all questions as per instructions given

The figures in the right-hand margin indicate marks

Section-A

Q. No.	Answer the following in brief (within 50 words)	Marks	CO	BT Level

1(a)	Find the number of tokens:
	int main ( )
	{ /* find max of a & b */
	int a = 20, b = 30;
	if (a < b)
	return b ;
	else
	return a;
	}
		2	CO 1	BT 1

1(b)	Show how ambiguity leads to precedence and associativity property violation.	2	CO 2	BT 2
1(c)	Omit non-determinism for the following grammar: $S \rightarrow \beta SS\alpha\alpha S \;/\; \beta SS\alpha S\beta \;/\; \beta S\beta \;/\; \alpha$	2	CO 1	BT 1
1(d)	Which derivation is generated by the top-down parser ?	2	CO 1	BT 1
1(e)	Distinguish between S-attributed and L-attributed Syntax Directed Translation.	2	CO 4	BT 4
1(f)	Define common sub expression elimination with example.	2	CO 1	BT 1
1(g)	Distinguish between basic block and flow graph.	2	CO 4	BT 4
1(h)	What are the issues in the design of code generator?	2	CO 1	BT 1

Section-B

Q. No.	Answer any two of the following (Within 300 words each)	Marks	CO	BT Level
2 (a)	Compare and contrast a compiler and an interpreter with figures.	6	CO 2	BT 2
2 (b)	Explain the problem of left recursion and explain its solution.	6	CO 2	BT 2
2 (c)	Omit left recursion of the following: i. $P \rightarrow P + Q$ ii. $A \rightarrow (B) / b$ $B \rightarrow B * A / A$ iii. $S \rightarrow S0S1S / 01$	6	CO 1	BT 1

Q. No.	Answer any two of the following (Within 300 words each)	Marks	CO	BT Level
3 (a)	Find if the following grammar is LL(1): $E \rightarrow E + T / T$ $T \rightarrow T * F / F$ $F \rightarrow (E) / a$	7	CO 1	BT 1
3 (b)	Construct a the DFA and parse table of LR (0) for the following grammar: $S \rightarrow AA$ $A \rightarrow aA / b$	7	CO 3	BT 3
3 (c)	Show if $T \rightarrow T+T / T*T /$ id is an operator precedence grammar. With the help of the given grammar parse the input string : id +id *id.	7	CO 2	BT 2

Q. No.	Answer any two of the following (Within 300 words each)	Marks	CO	BT Level
4 (a)	Analyze the following Syntax Directed Translation for evaluation. $S \rightarrow AS$ { printf (4)} $S \rightarrow AB$ { printf (2)} $A \rightarrow a$ { printf (5)} $B \rightarrow bC$ { printf (1)} $B \rightarrow dB$ { printf (6)} $C \rightarrow c$ { printf (3)}	7	CO 4	BT 4
4 (b)	Construct a DAG using the following basic block: 1. t1 := 4 * i 2. t2 := a [t1] 3. t3 := 4 * i 4. t4 := b [t3] 5. t5 := t2 *t4 6. t6 := prod +t5	7	CO 3	BT 3

	7. prod := t6 8. t7 := i + 1 9. i := t7 10. if I <= 20 goto (1)			
4 (c)	With a neat diagram explain the format of the Symbol Table and find the tree structures representation of scope information.	7	CO 2	BT 2

Q. No.	Answer any two of the following (Within 300 words each)	Marks	CO	BT Level
5 (a)	Explain the following code optimization techniques with examples. i) Copy propagation ii) Dead code elimination	3+4	CO 2	BT 2

5 (b)	Construct code for the following C program using any code generation algorithm.
	main ()
	{ int i;
	int a[10];
	while (i <= 10)
	a [i] = 0 ;
	}
		7	CO 3	BT 3

5 (c)	Examine the optimization of basic blocks.	7	CO 4	BT 4

Course Outcomes	Marks Allotted	Percentage
CO1	23	Approx 60%
CO2	35	
CO3	21	Approx 20%
CO4	18	Approx 20%