Invigilator's Signature and Date

Set-1

KIIT DEEMED TO BE UNIVERSITY

Spring End Semester Examination-2022

Roll No.	
Registration No.	
Name	
Date of Exam	

COMPILER DESIGN (CS 3008)

6th Semester B.Tech

SECTION-A

(Answer All Questions)

Time: 30 Minutes **Full Marks = 2 × 7 = 14 Marks**

Question No	Question	Write the correct option here.

Q.No:1	Count the number of tokens:
	main()
	{
	int a=10, c=0;
	int b=20;
	c=a+b;
	printf("sum=%d",c);
	}
	A. 10
	B. 32
	C. 30
	D. None	

Q.No:2	Which grammars are not parsed through recursive descent grammar? A. Left recursive grammar B. Right recursive grammar C. Unambigious grammar D. None	

Q.No:3	Choose the code optimization technique to which it belongs to.
	a=3 ;\\(value of a is not used afterwards)
	b=a+b;
	b=b+32;
	A. Code motion
	B. Dead code elimination
	C. Copy propagation
	D. none	

Q.No:4	Consider the productions A → PQ and A → XY. Each of the five non-terminals A, P, Q, X, and Y has two attributes: s is a synthesized attribute and i is an inherited attribute. Consider the following rules. Rule 1 : P.i = A.i + 2, Q.i = P.i + A.i, and A.s = P.s + Q.s Rule 2 : X.i = A.i + Y.s and Y.i = X.s + A.i Which one of the following is TRUE? A. Only Rule 1 is L-attributed. B. Neither Rule 1 nor Rule 2 is L-attributed. C. Both Rule 1 and Rule 2 are L-attributed. D. Only Rule 2 is L-attributed E. None	
Q.No:5	Consider the grammar P→xQRS Q→yz/z R→w/ε S→y Find FOLLOW(Q)? A. {R} B. {w} C. {w,y} D. {w,$} E. None	
Q.No:6	Which of the following is used for grouping of characters into tokens? A. Parser B. Code generator C. Lexical analyser D. Symbol table.	
Q.No:7	Consider the grammar defined by the following production rules, with two operators * and + S→ T * P T→ U/ T * U P→ Q+P/ Q Q→ id U→id Which one of the following is TRUE? A. + is right associative, while * is left associative B. + is left associative, while * is right associative C. Both + and * are right associative D. Both + and * are left associative.	

****

Invigilator's Signature and Date

Set-1

KIIT DEEMED TO BE UNIVERSITY

Spring End Semester Examination-2022

COMPILER DESIGN (CS 3008)

6th Semester B.Tech

SECTION-B

(Answer Any Three Questions.)

Time: 1 Hour and 30 Minutes **Full Marks = 12 × 3 = 36 Marks**

Q.No:8 A. Find the FIRST and FOLLOW of the following grammar: [4+4+4]

S→aBDh/ bBc
B→eC
C→bC/ ϵ
D→EF
E→g/ ϵ
F→f/ ϵ

B. Design the parsing LL(1) parsing table for the above grammar.

C. Parse the given string using the above grammar. String: "bebc$"

Q.No:9 A. Design LR(1) automation for the following grammar. [4+4+4]

A→B/BaA
B→bC
C→Cb/ Cc/ε

B. Construct LALR(1) and CALR(1) parsing table for the above grammar.

C.Analyze the concept of handle pruning in parsing with an example. Cite the conflicts in SR parsing

Q.No:10 A. Translate the statement a=a+(x+b)*-z/d into: [4+4+4]

i. Quadruples.

ii. Triples.
iii. Indirect Triples.

B. Construct a DAG for the code mentioned in above question.

C. Consider the program fragment:

```
void main()
{
int a;
a = 0;
while (a < 10) {
Print(a % 2 == 0);
a = a + 1;
}
}
```

Generate the three-address code for it.

Q.No:11 A. Consider the SDD shown below.

PRODUCTIONS	SEMANTIC RULES
$T \rightarrow FT'$	T'.inh=F.val T.val= T'.syn
$T' \rightarrow *F\ T'_1$	T'_1.inh= T'.inh × F.val T'.syn= T'_1.syn
$T' \rightarrow \epsilon$	T'.syn= T'.inh
$F \rightarrow$ digit	F.val=digit.lexval

i. Give the annotated parse tree for the string "4*5*6".
ii. Give the dependency graph for annotated parse tree.
iii. Give any two topological sorts for the dependency graph.

B. Explain peephole optimization with complete example.

****

Invigilator's Signature and Date

Set-2

KIIT DEEMED TO BE UNIVERSITY

Spring End Semester Examination-2022

Roll No.	
Registration No.	
Name	
Date of Exam	

COMPILER DESIGN (CS 3008)

6th Semester B.Tech

SECTION-A

(Answer All Questions)

Time: 30 Minutes **Full Marks = 2 × 7 = 14 Marks**

Question No	Question	Write the correct option here.

Q.No:1	Count the number of tokens:
	switch(inputvalue)
	{
	case 1: b=c*d; break;
	default: b=b++; break;
	}
	
	A. 22
	B. 31
	C. 26
	D. 24	

Q.No:2	Which grammars are not parsed through recursive descent grammar? A. Right recursive grammar B. Left factored grammar C. Unambigious grammar D. None	
Q.No:3	Choose the code optimization technique to which it belongs to. x := 1 y:= 2 c := x + y Can be written as c=3 A. Code motion B. Dead code elimination C. Constant folding D. None	

Q.No:4	Notations for associating semantic rules with productions are-------- A. Syntax directed definition B. Translation scheme C. Both Translation scheme and SDD D. None of the above	
Q.No:5	Consider the grammar S→AbBaCc/ε A→aAb/ba B→bBC/cb C→cCa/ac Find FIRST (S) A. {a,b,c,ε} B. {a,b,ε} C. {ε} D. {a,ε} E. None	
Q.No:6	Which of the following parsers is the most powerful A. Operator-precedence B. LALR C. SLR D. Canonical LR	

Q.No:7	Consider the following C program
	int main()
	{
	integer x;
	return 0;
	}
	Which one of the following phase will throw an error in C compiler
	A. Syntax Analyzer
	B. Semantic Analyzer
	C. Intermediate Code Generator
	D. Lexical Analyzer
	E. None	

****

Invigilator's Signature and Date

Set-2

KIIT DEEMED TO BE UNIVERSITY

Spring End Semester Examination-2022

COMPILER DESIGN (CS 3008)

6th Semester B.Tech

SECTION-B

(Answer Any Three Questions.)

Time: 1 Hour and 30 Minutes **Full Marks = 12 × 3 = 36 Marks**

Q.No:8 A. Find the FIRST and FOLLOW of the following grammar: [4+4+4]

S→ L=R
L→*R/id
R→L

B. Design the parsing LL(1) parsing table for the above grammar.

C. Parse the given string using the above grammar. String: " *id=id$"

Q.No:9 A. Design LR(1) automation for the following grammar. [4+4+4]

S→ aAb/ bB
A→ Aa/ ϵ
B→Bb/ ϵ

B. Construct LALR(1) and CALR(1) parsing table for the above grammar.

C. Analyze the concept of dangling else ambiguity in parsing with an example. Cite the conflicts in SR parsing

Q.No:10 A. Translate the statement A=B+C *D+E *-F into: [4+4+4]

i. Quadruples.
ii. Triples.
iii. Indirect Triples.

B. Construct a DAG for the code mentioned in CO5,CO6 above question.

C. Consider the program fragment:

```
m = 0;
    if (c == 0)
{
m = m+ n*n;
}
else
  {
m = m + n;
}
```

Generate the three-address code for it.

Q.No:11 A. Consider the SDD shown below.

PRODUCTIONS	SEMANTIC RULES
$T \rightarrow FT'$	T'.inh=F.val T.val= T'.syn
$T' \rightarrow *F\ T'_1$	T'_1.inh= T'.inh × F.val T'.syn= T'_1.syn
$T' \rightarrow \epsilon$	T'.syn= T'.inh
$F \rightarrow$ digit	F.val=digit.lexval

i. Give the annotated parse tree for the string "3*5*7".
ii. Give the dependency graph for annotated parse tree.
iii. Give any two topological sorts for the dependency graph.

B. Explain code motion in details with example.

****

Invigilator's Signature and Date

Set-3

KIIT DEEMED TO BE UNIVERSITY

Spring End Semester Examination-2022

Roll No.	
Registration No.	
Name	
Date of Exam	

COMPILER DESIGN (CS 3008)

6th Semester B.Tech

SECTION-A

(Answer All Questions)

Time: 30 Minutes **Full Marks = 2 × 7 = 14 Marks**

Question No	Question	Write the correct option here.

Q.No:1	Count the number of tokens:
	main()
	{
	int a=10, c=0, int b=5;
	c=a-b; //Difference
	printf("Difference=%d", c);
	}
	
	A. 32
	B. 22
	C. 54
	D. None	

Q.No:2	What do you mean by ambigious grammar? A. left factored grammar B. Right recursive grammar C. Left recursive grammar D. Grammar with left factor and left recursion condition	
Q.No:3	Which one of the following is false: A. A basic blosk is a sequence of instructions where control enters the sequence at the begining and exits at the end B. Available expression analysis can be used for commom subexpression elimination C. Live variable analysis can be used for common subexpression elimination D. X=4*5; X=20; is an example of common subexpression elimination. E. none	

Q.No:4	From the following production with semantic rule E.val is-------. E → E1 + T { E.val = E1.val + T.val} A. Synthesized attribute B. Inherited attribute C. Syntax attribute D. None of the above	
Q.No:5	Consider the grammar S→tABCD A→qt/t B→r/ ε C→q/ε D→p Find FOLLOW(A) A. {r,q,p,t} B. {r,q,p} C. {ε,r,q,p} D. {$,r,q,p} E. None	
Q.No:6	The process by which program code is converted into machine language is called ____ A. Execution B. Declaration C. Documentation D. Compilation E. None	

Q.No:7	Consider the following C program
	int min(){ // line 1
	int i, n;// line 2
	for (i=0;I
	
	While creating the object module, the compiler's response about line no 3 is
	A. Only syntax error
	B. Only lexical error
	C. No compilation error
	D. Both syntax and lexical error
	E. None	

****

Invigilator's Signature and Date

Set-3

KIIT DEEMED TO BE UNIVERSITY

Spring End Semester Examination-2022

COMPILER DESIGN (CS 3008)

6th Semester B.Tech

SECTION-B

(Answer Any Three Questions.)

Time: 1 Hour and 30 Minutes **Full Marks = 12 × 3 = 36 Marks**

Q.No:8 A. Find the FIRST and FOLLOW of the following grammar: [4+4+4]

S→aAC| Bb
A→eD
B→f| g
C→h | i
D→bE|ϵ
E→eD | dD

B. Design the parsing LL(1) parsing table for the above grammar.

C. Parse the given string using the above grammar. String: " fb$"

Q.No:9 A. Design LR(1) automation for the following grammar. [4+4+4]

S→ aAd | bBd | aBe | bAe
A→ c
B→ c

B. Construct LALR(1) and CALR(1) parsing table for the above grammar.

C. Analyze the concept of viable prefix in parsing with an example. Cite the conflicts in SR parsing

Q.No:10 A. Translate the statement P=Q+R *Q+R *Q into: [4+4+4]

i. Quadruples.
ii. Triples.
iii. Indirect Triples.

B. Construct a DAG for the code mentioned in above question.

C. Consider the program fragment:

```
m = 0;
if (c == 0)
{
   m = m+ n*n;
 }
else
{
 m = m + n;
 }
```

Generate the three-address code for it.

Q.No:11 A. Consider the SDD shown below.

PRODUCTIONS	SEMANTIC RULES
$T \rightarrow FT'$	T'.inh=F.val T.val= T'.syn
$T' \rightarrow *F\ T'_1$	T'_1.inh= T'.inh × F.val T'.syn= T'_1.syn
$T' \rightarrow \epsilon$	T'.syn= T'.inh
$F \rightarrow$ digit	F.val=digit.lexval

i. Give the annotated parse tree for the string "5*7*9".
Ii. Give the dependency graph for annotated parse tree.
iii. Give any two topological sorts for the dependency graph.

B. Explain dead code elimination with detailed example.