Total No. of Questions – [06] Total No. of Printed Pages: [2]

G.R. No.	

DECEMBER 2021 - ENDSEM EXAM

T. Y. B. TECH. (COMPUTER ENGINEERING) (SEMESTER - I)

COURSE NAME: LANGUAGE PROCESSOR AND COMPILER CONSTRUCTION

COURSE CODE: CSUA31181

(PATTERN 2018)

Time: [1 Hr] [Max. Marks: 30]

Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4, Q.5 OR Q.6.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1) a) Compute the First() and Follow() for the given grammar [4]

S -> ABCDE
A -> a / €
B -> b/ €
C -> c
D -> d / €
E -> e / €

b) Check whether LL(1) parser will accept this grammar or not? [6]

S -> (L) | a
L -> SL1
L1 -> € | ,SL1

OR

Q.2) a) Explain Types of Parsers in Compiler Design with diagram [4]

b) Check whether SLR(1) parser will accept this grammar or not? [6]

S -> AA
A -> aA
A -> b

Q.3) a) Translate the following expression into 3-address code and then represent it into Quadruples, Triple and Indirect Triple form. [4]

a = b * c – b * d

b) For the productions of the sample grammar for assignment statement, design an abstract translation scheme for emitting 3-address statements. You can assume a procedure GEN(), for notational convenience. [6]

A->id:=E
E->E+E
E->id

Where "id" represent identifier(variable), and " E", the arithmetic expression with addition, only.

OR

Q.4) a) Design dependency graph for the following grammar: [4]

$E \rightarrow E+T / T$

$T \rightarrow T*F / F$

$F \rightarrow id$

The expression given is: 5+8* 10

b) Differentiate between Parse tree and Syntax tree. Construct syntax tree for the following expression and obtain its postfix notation, showing the steps used to obtain it. [6]

a+(b*c)^d

Q.5) a) Discuss loop optimization techniques with suitable examples. [4]

b) For the following three address code [6]

$t_1 := c + 5$

$t_2 := b / t_1$

$p = 30$

$q = p * s$

$x = p - 10$

$t_3 := c + 5$

$t_4 := b / t_3$

$t_5 := t_2 + t_4$

$a := t_5$

which optimization technique can be applied to this code? Justify your answer.

OR

Q.6) a) Explain with example instruction selection and register allocation issues in code generation. [4]

b) For the machine that contains two registers R1 and R2, and following instructions, [6]

MOV MEM, REG

MOV REG, MEM

ADD REG1, REG2

ADD MEM,REG

SUB REG1, REG2

SUB MEM,REG

MOV REG1,REG2

Generate target code for following expression using optimal code generation algorithm.

$Z = (X + Q) - (X - R) + (R - S) + (R - S)$