PAPER ID-310913

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM V) THEORY EXAMINATION 2024-25
COMPILER DESIGN

TIME: 3 HRS **M.MARKS: 70**

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 07 = 14**

Q no.	Question	CO	Level
a.	Write and explain the steps of language processing system.	CO1	K1
b.	Discuss ambiguity problem with example.	CO1	K2
c.	Describe the importance of left factoring the grammars with example.	CO2	K2
d.	List down the conflicts during Shift-Reduce parsing.	CO2	K1
e.	Write SDT to convert infix to postfix expression.	CO3	K6
f.	List the various error recovery strategies for a lexical analysis.	CO4	K4
g.	Discuss about constant folding.	CO5	K2

SECTION B

2. Attempt any *three* of the following: **07 x 3 = 21**

a.	Discuss the role of Bootstrapping. Also Explain the lexical analysis and syntax analysis phases of the compiler with a suitable example.	CO1	K2
b.	Construct the LALR parsing table and parse tree for the input string: "abab" by using following grammar: $X \rightarrow YY$ $Y \rightarrow aY$ $Y \rightarrow b$	CO2	K6
c.	Differentiate between synthesized and inherited attributes. Write Syntax-directed definition of a simple desk calculator.	CO3	K4, K6
d.	Discuss the stack allocation and heap allocation strategies of the runtime environment with an example.	CO4	K2
e.	Explain in details about loop jamming and loop optimization.	CO5	K1

SECTION C

3. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Explain in detail the process of compilation for the statement: $a = b + c + d * 70$	CO1	K3
b.	Write CFG's to represent : i. A language consisting of strings mode up of odd number of 1 & odd number of 0. ii. The language $L = \{a^{n+m} b^n \mid m, n \geq 1\}$.	CO1	K5

4. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Test whether the grammar is LL(1) or not, and construct parsing table for it. $S \rightarrow 1AB \mid \varepsilon$ $A \rightarrow 1AC \mid 0C$ $B \rightarrow 0S$ $C \rightarrow 1$	CO2	K4

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b.	Find the precedence and function table of the following grammar by using operator precedence technique. $P \rightarrow SR \mid S$ $R \rightarrow bSR \mid bS$ $S \rightarrow WbS \mid W$ $W \rightarrow L * W \mid L$ $L \rightarrow id$	CO2	K5

5. Attempt any *one* part of the following: 07 x 1 = 07

a.	Translate the following arithmetic expression into quadruples and triples: i. $(x + y) * (y + z) + (x + y + z)$ ii. $a = -b * (c + d) + b$	CO3	K3

b.	Generate three address code for the following code:
	switch $(p + q)$
	{
	case i: $x = x + 1$
	case ii: $y = y + 2$
	case iii: $z = z + 3$
	default: $c = c - 1$
	}
		CO3	K6

6. Attempt any *one* part of the following: 07 x 1 = 07

a.	Draw the format of Activation Record in stack allocation and explain each field in it.	CO4	K1
b.	Explain various data structures used for symbol table along with the function of error handling phase of compiler.	CO4	K1

7. Attempt any *one* part of the following: 07 x 1 = 07

a.	Define the role of DAG. Construct a DAG for the basic block: $a[i] = b$ $* p = c$ $d = a[j]$ $e = * p$ $* p = a[i]$	CO5	K6

b.	Construct the flow graph for the following code segment:
	for (i = 0; i < n; i++)
	for (j = 0; j < n; j++)
	C[i,j] = 0;
	for (i = 0; i < n; i++)
	for (j = 0; j < n; j++)
	for(k = 0; k < n; k++)
	C[i,j] = C[i,j] + A[i,k] * B[k,j]
		CO5	K6