Sardar Patel Institute of Technology

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(Autonomous College Affiliated to University of Mumbai)

End Semester Examination
May 2023

Max. Marks: 100 **Duration: 180 min.** **Class: T.E.**

Semester: VI **Course Code: CS 306** **Branch: COMP**

Name of the Course: Compiler Construction

Instructions:

(1) **All Questions are Compulsory**
(2) **Draw neat diagrams**
(3) **Assume suitable data if necessary**

Q. No	Question	Max Marks	CO
Q1 A	apply optimization of DFA on the regular expression given expression (a|b)*	15	CO1
Q1 B	1. List the 2 benefits of using machine independent intermediate form (ICG) 2. Represent Indexed assignments of the form x = y[i] and x[i]=y using triples 3. consider the following statement	2 2 6	CO3

```
 while ( a < b )
 {
   if ( c < d )
       x = y + z
else
      x = y - z
}
```

Generate 3 AC for the above statement done

Q. No	Question	Max Marks	CO
Q2 A	For the following grammar construct LR(0) parser . please note that in production rule(1) R → R | R '|' **is terminal** Construct an LR(0) parsing table for the following grammar: (1) R → R | R (2) R→ RR (3) R→ R* (4) R→ (R) (5) R—> a (6) R→ b Are there any conflicts in the table ? Suggest a remedy for it ?	08 02	CO2

P.T.O

Q2 B	Explain Mark and Sweep Algorithm and Garbage Collection with an example	10	CO4
Q3 A	For the following grammar construct LL(1) parser table and parse the string (a - a) $S \rightarrow (S\text{-}F) \mid F$ $F \rightarrow a$	10	CO2
	OR		
Q3 A	1. Differentiate between Synthesized attribute and Inherited attributes along with an example. 2. Explain the general structure of the Lex specification file . Write a sample code to recognise following tokens 1. identifier 2. Reserved words (if , else , switch) 3. integer numbers and fractional numbers 4. relational operators (< , <= , > , >= ,!= , ==)	04 06	CO2 CO2
Q3 B	What do you mean by backpatching ? for the boolean expression a==b && (c==d || e==f) Using the translation scheme for Boolean expression, 1. draw an annotated parse tree with the true and false lists for each subexpression. 2. Also generate the 3AC , assuming that the address of the first instruction generated is 100.	10	CO3
Q4 A	With reference to SIC Macro processor explain conditional macro expansion ? also explain the following directives related with it along with example 1. MACRO processor function %NITEMS 2. WHILE-ENDW	10	CO5
Q4 B	State various assembler directives (at least 5) and explain with example	10	CO5
	OR		
Q 4 B	Explain the the format of H , T and E records structure of SIC assembler with suitable example	10	

P.T.O

Q5	Consider the basic block given below t1 = c + d t2 = a + b t3 = t1 - t2 t4 = e + f t5 = t3 * e t6 = t5 * h t7 = t1 * t4 t8 = t7 - t6 Construct DAG Apply Heuristic Ordering (Optimal) to it. Apply code generation algorithm to generate the code	15	CO4

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