Sardar Patel Institute of Technology

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(Autonomous College Affiliated to University of Mumbai)

End Semester Examination
May 2022

Max. Marks: 60 **Duration: 120 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**

Question No.	Question	Max. Marks	CO
Q. 1 A	perform Optimization of DFA for the following regular expression using firstpos() , lastpos(), followpos(). (a | b)*abb	*8*	**CO2** ,
Q.1 B	Write notes on Garbage Collection and Compaction. Explain Mark and Sweep algorithm. OR Explain the mechanism for accessing nonlocal data with reference to Runtime storage management with example.	*7*	**CO4**
Q. 2 A	Explain Operator precedence parsing algorithm. with an example . show use of precedence functions with small examples.	*6*	**CO2**
Q. 2. B	Explain structure of Lex program. with an example. Also explain how to use Lex tool	*4*	**CO2**
Q. 2. C	Solve following MCQs i) Type checking is normally done during (A) Lexical analysis (B) Syntax analysis (C) Syntax directed translation (D) Code optimization	*5*	**CO1 -CO 5**

ii) In compiler optimization, operator strength reduction uses mathematical identities to replace slow math operations with faster operations. Which of the following code replacements is an illustration of operator strength reduction ?

(A) . Replace P + P by 2 * P or Replace 3 + 4 by 7.

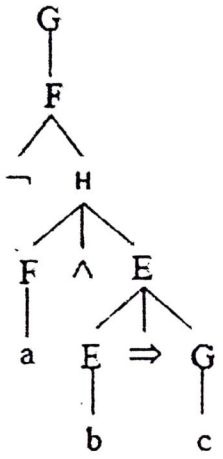
(B) Replace P * 32 by P < < 5

(C). Replace P * 0 by 0

(D) Replace (P < <4) – P by P * 15

iii)

Consider the following Parse Tree



Which of the following precedence relation is correct?

A. ∧ is right associative

B. ⇒ is right associative

C. ⇒ is having highest precedence

D. ¬ is having highest precedence

iv)

Match the following group

Group – I

I) Handle
II) Sentential form
III) Reduced item
IV) Bottom up parser

Group – II

1) Sequence of symbols derived from start symbol
2) RHS of any production
3) A production has a dot at the end
4) Reverse of Right most derivation

A. I-1 II-3 III-4 IV-2
B. I-1 II-4 III-2 IV-3
C. I-2 II-4 III-3 IV-1
D. I-2 II-1 III-3 IV-4

v). _____ are used to keep track of memory locations where the values of identifiers are stored.

(A) . Register descriptor
(B) . Address descriptor
(C). Both A and B
(D) None of the above

Q.3.A- Consider the basic block given below, — CO3

t1 = a * b
t2 = c - d
t3 = t1 * t2
t4 = e / t3
t5 = t3 + t4
t6 = t5 * f
t7 = t1 / t3
t8 = t7 * t6

Construct DAG . — 2
Apply heuristic optimal ordering to it — 3
apply code generation algorithm to generate code. — 3

Q3. B.	Give 3 address code for following code fragment
	if ((a < b)
	{
	while(c > d)
	x = x + y
	}
	else
	do
	{
	p = p + q;
	} while(e <= f);
		7	

Q.4. A	Write an algorithm for a one pass macro processor. Show how it works with examples. show original text , expanded text , deftab , nametab argtab table.	*8*	CO5
Q4. B.	With reference to SIC (SIMPLIFIED INSTRUCTIONAL COMPUTER) architecture explain the following points. i) Memory ii) Registers iii) instruction format iv)Addressing modes with examples.	*1* *2* *2* *2*	CO5