Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous College Affiliated to University of Mumbai)

Special Examination
Aug 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	apply optimization of DFA on the regular expression given below (a|b)*abb	15	CO1
Q2 A	Show that the following grammar is LR(1) by constructing a state diagram(closure) and draw a parsing table. Please note S,P,Q are non terminals , a,b,c,d are terminals S : start symbol S → Pa | bPc | Qc | bQa P → d Q → d	10	CO2
Q2 B	1. With example, explain all the rules for calculating the FIRST() and FOLLOW(). 2. Explain how one can remove direct left recursion from the grammar. 3. What is left factoring ? how to remove it if present in the grammar	6 2 2	CO2
Q3 A	for the boolean expression, **P > Q AND Q > R OR P != Q** using the translation scheme for backpatching of Boolean expression, 1. draw an annotated parse tree with the true and false lists for each subexpression.	10	CO3

P.T.O

	2. Also generate the 3AC , assuming that the address of the first instruction generated is 100.		
Q3 B	For a language of arithmetic expressions that can be generated by given grammar E-> E-E | E/E | id i. construct a operator precedence matrix ii. Construct operator precedence function values f() and g() **OR**	10	CO2
Q 3 B	Consider the following grammar E --> TE' E' --> +TE' | ε T --> FT' T' --> *FT' | ε F --> id | (E) *ε denotes epsilon E is start symbol +,*,(,),id are terminals, others are non terminals. Construct LL(1) parser table for above grammar and parse the string **id + id * id**	10	
Q4 A	With reference to SIC Macro processor explain conditional macro expansion along with example. also explain any two assembler directives related to it.	10	CO5
Q4 B	Write the object code for the following program using H,T, and E record of the assembler and also show Symbol table PG1 START 2000 JMP ADD1 JMP ADD2 ADD1 LDA #0708 ADD2 STL #0506 ADD3 STA #1002 DATA1 BYTE C='ABC' DATA2 EQU 20 END Assume opcode for JMP = 10 , LDA = 20 , STL = 30 and STA = 40 all instructions are of Format 2 of SIC assembler.	10	CO5

P.T.O

Q5 A	Consider the basic block given below t1 = p + q t2 = c / d t3 = t2 - t3 t4 = a / b t5 = t3 * t4 t6 = a * t5 t7 = t2 * t3 Construct DAG. Apply heuristic ordering (optimal) to it Apply code generation algorithm to generate code	15	CO4
Q5 B	state various memory allocation strategies. Explain stack allocation strategy with examples.	10	CO4