# Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India

(Autonomous College Affiliated to University of Mumbai)

## End Semester Examination

April/May 2018

Max. Marks: 100 Duration: 3 Hours

Class: T.E. Semester: VI

Course Code: CPC601 Branch: Computer

Name of the Course: Synoptic of System Programming and Compiler Construction

**Instruction:**

(1) All questions are compulsory

(2) Draw neat diagrams

(3) Assume suitable data if necessary

| Q No. | | Max. Marks | CO |
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| Q.1 (a) | Write short notes on following:-<br>A. Recursive descent parsing<br>correct pseudo code or algorithm- 3 marks<br>explanation- 2 marks<br>B. Removal of Left recursion along with types with example.<br>Definition - 1 mark<br>Types of recursion's explanation along with their removals with example - 2 marks each implies 4 marks | 10 | CO3 |
| Q.1 (b) | Draw the diagram of phases of compiler. Illustrate the output after each phase of the compiler for the following statement:<br><br>d=b*b-4*a*c<br>Diagram with correct labels - 2 marks<br>Correct output of each phase along with description - 8 marks<br>The output of each phase should be shown sequentially, otherwise 1 mark for each will be deducted for disturbing the order of sequence. | 10 | CO3 |

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| Q.2 (a) | Consider the following grammar<br><br>$S \rightarrow AaAb / BbBa$<br><br>$A \rightarrow \varepsilon$<br><br>$B \rightarrow \varepsilon$<br><br>A. Construct CLR parsing table.<br>B. State with reason that the above grammar is CLR or not?<br>augmenting grammar- 1 mark<br>correct canonical collection of LR(1) items that includes proper arrows shown, state numbers mentioned properly, labelling to the transitions– 4 marks<br>1 incorrect state or transition is tolerable, if exceeded 0.5 marks will be deducted for each incorrect state. but if the same state is responsible for checking whether the grammar is CLR or not, then 0 marks will be given.<br>correct parsing table- 4 marks<br>1 incorrect entry in parsing table is tolerable, if exceeded 0.5 marks will be deducted for each incorrect entry.<br>correct reason for stating whether the grammar is CLR grammar or not - 1 mark<br><br>OR<br><br>What is an operator grammar? Explain operator precedence parser with the help of following grammar and parse the input string "id+id".<br>$E \rightarrow E + E \mid E * E \mid id$<br><br>operator precedence grammar definition- 1 mark else 0 marks<br>correct reason of writing whether the given grammar is operator grammar or not - 1 mark<br>correct operator relation table - 4 marks<br>1 incorrect entry in operator relation table is tolerable, if exceeded 0.5 marks will be deducted for each incorrect entry.<br>correct parsing method along with the table of stack, input buffer and action shown at each step - 4 marks | 10 | CO3 |
| Q.2 (b) | What do you mean by dependency graph? Give an algorithm to construct dependency graph from parse tree? explain with example<br>2 Marks : Dependency graph<br>5 Marks : Algorithm<br>3 Marks : Example | 10 | CO3 |

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| Q.3 (a) | With reference to IBM 360/370 draw and explain flowchart of pass2 of direct Linking Loader? specify the databases used by it.<br>6 Marks : Flowchart and explaination 4 Marks : Databases used<br><br>OR<br><br>Consider the following program segments<br>PG1 START<br>ENTRY SYM11<br>EXTRN PG2, SYM23<br>SYM11 DC A(SYM11 - PG1), (SYM23 – PG2)<br>END<br><br>PG2 START<br>ENTRY SYM23<br>EXTRN PG1, SYM11<br>SYM21 DC A(SYM11- 2),A(SYM21)<br>SYM22 DC A(PG2 + 4 ),A (SYM21 – PG2)<br>SYM23 DC A(SYM21 – PG1)<br>END<br>Assume these two programs are to be loaded starting at location 400 in order PG1 and PG2. Fill the GEST for each symbol. Also give the ESD and RLD card entries for the above program segments.<br>4 Marks : GEST<br>3 Marks : ESD<br>3 Marks : RLD | 10<br><br>10 | CO1 |
| Q.3 (b) | With reference to IBM 360/370 draw and explain flowchart of pass2 of assembler? specify the databases used by it.<br>6 Marks : Flowchart<br>4 Marks : atabases | 10 | CO2 |
| Q.4 (a) | Explain code generator algorithm in detail.<br>6 Marks: algorithm<br>4 Marks: getreg function<br><br>OR<br><br>What are the different issues in code generator? explain.<br>02 Marks for each issue * 5 Marks | 10<br><br>10 | CO4 |
| Q.4 (b) | Draw and Explain flowchart of pass2 of macroprocessor.<br>06 Marks: flowchart<br>04 Marks: explaination | 10 | CO2 |

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| Q.5 (a) | Why is Intermediate code needed in the translation process by compiler ? Describe a suitable formats for intermediate code. 02 : need of ICG<br>For each format 2 Marks * 4 formats<br><br>OR<br><br>What do you mean by basic block ? Explain with example How to partition Three address code into basic blocks?<br>02 : Basic block concept<br>04 : Explanation<br>04 : Example | 10<br><br>10 | CO4 |
| Q.5 (b) | Write short notes on:<br>A. YACC tool - 2 marks for purpose<br>3 marks for structure of .y file<br>B. Garbage collection and compaction -<br>2.5 marks for garbage collection<br>2.5 marks for compaction | 05<br>05 | CO3<br>CO5 |