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| ***Regulation: R20Subject code:***C:\Users\india\Desktop\tkrcet-logo.jpgC85PC3  TKR COLLEGE OF ENGINEERING AND TECHNOLOGY  (Autonomous, Accredited by NAAC with ‘A’ Grade)  *Model paper-1*  **B.Tech III Year I Semester Regular Examinations, December-2022**  **COMPILER DESIGN**  ***(***CSE-DATA SCIENCE***)***  ***Maximum Marks: 70*** Duration: 3 hours  **Note:** **1.This question paper contains two parts A and B.**  **2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.**  **3. Part B consists of 5 Units. Total 10 questions it consists.**  **4. Part-B each question carries 12 marks and may have a, b, c, d as sub questions.** | | |
| Part-A | | | |
| **All the following questions carry equal marks (10x1M=10 Marks)** | | | |
| 1 | | Define compiler. | |
| 2 | | What is meant by semantic analysis? | |
| 3 | | Define parser. | |
| 4 | | Define left factoring. | |
| 5 | | Define a syntax-directed translation | |
| 6 | | What is called an abstract or syntax tree? | |
| 7 | | Define code generations. | |
| 8 | | Give short note about call-by-name? | |
| 9 | | What is code motion? | |
| 10 | | Define local optimization. | |
| Part-B | | | |
| Answer All the following questions. (**5X12M=60Marks)** | | | |
| 11 | Convert the RE **(a|b)\*abb** into NFA E and find the equivalent minimum state DFA. | | |
|  | **OR** | | |
| 12 | What is the role of transition diagrams in the construction of lexical analyzer? | | |
| 13 | Check whether the following grammar is SLR(1) or not. Explain your answer the reason. **S**→  **L=R ,S**→**R, L**→  **\*R ,L**→  **id, R**→ **L.** | | |
|  | **OR** | | |
| 14 | Generate the SLR parsing table for the following grammar  **E**→**E+T,E**→**T, T**→**T\*F, T**→**F, F**→ **(E), F**→**id.** | | |
| 15 | i. Define S-attribute. Construct parse tree, syntax tree, annotated parse tree for the input string is **5\*6+7;**.  ii. Define inherited attribute. Give one example | | |
|  | **OR** | | |
| 16 | What is type checker? Explain the specification of a simple type checker. | | |
| 17 | i. Explain in brief about peephole optimization techniques.  ii. Explain different methods for register allocation and assignment. | | |
|  | **OR** | | |
| 18 | Explain in detailed about description on DAG.Give one example. | | |
| 19 | Explain in detail about:  i. Common sub expression  ii. Dead code elimination. | | |
|  | **OR** | | |
| 20 | Explain in detail about:  i. Copy propagation.  ii.Constant folding. | | |

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| Part-A | | | |
| **All the following questions carry equal marks (10x1M=10 Marks)** | | | |
| 1 | | Define patterns/lexeme/tokens. | |
| 2 | | Define assembler and its types. | |
| 3 | | What is dangling else problem? | |
| 4 | | What is meant by viable prefixes? | |
| 5 | | Define back patching. | |
| 6 | | Construct Three address code for the following  **position := initial + rate \*** 60 | |
| 7 | | What are basic blocks? | |
| 8 | | Define stack allocations. | |
| 9 | | What is meant by Reduction in strength? | |
| 10 | | Define data flow equations. | |
| Part-B | | | |
| Answer All the following questions. (**5X12M=60Marks)** | | | |
| 11 | Convert the RE **(a|b)\*abb** into NFA E and find the equivalent minimum state DFA. | | |
|  | **OR** | | |
| 12 | What is the role of transition diagrams in the construction of lexical analyzer? | | |
| 13 | i. Consider the grammar: **E→ E+E, E→ E\*E, E→id** Perform shift reduce parsing of the input string **“id1+id2+id3”**  ii.Write the differences between **SLR, CLR, LALR** parsers. | | |
|  | **OR** | | |
| 14 | Write an algorithm for constructing CLR parsing table Following Grammar **S→CC, C→aC, C→d** | | |
| 15 | i. Differentiate between L attribute and S attribute.  ii. Describe the evaluation order of SDT with an example | | |
|  | **OR** | | |
| 16 | Write the translation scheme to generate intermediate code for assignment statements with array references | | |
| 17 | Explain in brief about Heap Storage allocation strategy. | | |
|  | **OR** | | |
| 18 | i. Differentiate between Static and Dynamic Storage allocation Strategies.  ii. Explain in brief about simple code generator. | | |
| 19 | i.Explain in detail about loop optimization technique with example.  ii. Explain in detail about Copy propagation and constant folding. | | |
|  | **OR** | | |
| 20 | What is a Flow Graph? Explain how a given program can be converted in to a Flow graph? | | |

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| Part-A | | | |
| **All the following questions carry equal marks (10x1M=10 Marks)** | | | |
| 1 | | Define regular set. | |
| 2 | | What is a Loader? What does the loading process do? | |
| 3 | | What are kernel & non-kernel items? | |
| 4 | | Define LR(0) items | |
| 5 | | What is postfix notation? | |
| 6 | | Define Boolean Expression. | |
| 7 | | What is a flow graph? | |
| 8 | | Define static allocations. | |
| 9 | | What is meant by Dead Code? | |
| 10 | | Define use of machine idioms | |
| Part-B | | | |
| **Answer All the following questions.** (**5X12M=60Marks)** | | | |
| 11 | |  | | --- | | Show how an input **a=b+c\*60** get processed in compiler. show the output at each stage of compiler**.** | |  | | | |
|  | **OR** | | |
| 12 | Find the transition diagram for the Regular expression and the Regular definition  **i.a(a|b)\*a**  **ii.((E|a)b\*)\***  iii.All the string of digit with at most one repeated digit   |  | | --- | |  | |  | | | |
| 13 | Calculate FIRST and FOLLOW for the following grammar  **EE+T/T, TT\*F/F, F (E)/id.**. | | |
|  | **OR** | | |
| 14 | i. Write the differences between **SLR, CLR, LALR** parsers.  ii. List out of the types of Parsers available in compiler Design. | | |
| 15 | i. Define syntax tree. Give one example.  ii. Explain the Translation scheme of SDD.Give one example. | | |
|  | **OR** | | |
| 16 | i. Define intermediate code? Translate the expression **(a\*b)+(c+d)-(a+b)** into quadruples, triples and indirect triples  ii. Explain in detail about Flow of control statements. Give one example. | | |
| 17 | Define Activation Record? Explain its usage in stack allocation strategy. How it is different from heap allocation? | | |
|  | **OR** | | |
| 18 | Define reference counting. What is the role of reference counting in garbage collection? | | |
| 19 | What are loop invariant Computations? Explain how they affect the efficiency of a program. | | |
|  | **OR** | | |
| 20 | Explain the following machine independent optimization techniques. | | |

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| Part-A | | | |
| **All the following questions carry equal marks (10x1M=10 Marks)** | | | |
| 1 | | What is a sentinel? What is its usage? | |
| 2 | | What is a Symbol table? | |
| 3 | | Define ambiguity. | |
| 4 | | Define handle pruning. | |
| 5 | | What is annotated parse tree? | |
| 6 | | Define translation scheme. | |
| 7 | | What is dynamic scoping? | |
| 8 | | Define DAG. | |
| 9 | | What do you mean by inner loops? | |
| 10 | | Define constant folding | |
| Part-B | | | |
| **Answer All the following questions. (5X12M=60Marks)** | | | |
| 11 | Explain different phases of a compiler with a neat diagram. | | |
|  | **OR** | | |
| 12 | Construct minimum DFA for RE **(0+1)\*(0+1)01**. | | |
| 13 | Construct the LALR parser for the following Grammar? **S CC , C aC,Cd.** | | |
|  | **OR** | | |
| 14 | Generate the SLR parsing table for the following grammar  **E**→**E+T,E**→**T, T**→**T\*F, T**→**F, F**→ **(E), F** →**id.** | | |
| 15 | Define type checker? Explain the specification of a simple type checker | | |
|  | **OR** | | |
| 16 | i. Describe the evaluation order of SDT with suitable example.  ii. Explain in detail about dependency graphs with suitable example. | | |
| 17 | What is Activation Record? Explain its usage in stack allocation strategy. How it is different from heap allocation? | | |
|  | **OR** | | |
| 18 | Define Symbol table? Explain about the data structures used for Symbol table. | | |
| 19 | Explain in brief about different Principal sources of optimization techniques with suitable examples. | | |
|  | **OR** | | |
| 20 | i. Explain in detail about redundancy elimination techniques.  ii. Explain in detail about constant propagation with example | | |