ROLL NO. _____

**Code: CS22** **Subject: SYSTEM SOFTWARE**

## ALCCS – OLD SCHEME

**Time: 3 Hours** **FEBRUARY 2012** **Max. Marks: 100**

***PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.***

**NOTE:**

- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

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**Q.1** a. Explain differences between the use of Macros and that of Subroutines.

b. Define a deterministic finite automaton. Construct a DFA that can recognize only string 0120 on the input symbols {0,1,2}.

c. What are various categories of assembly language statements? Give at least one example of each category.

d. Define Sequencing Symbol and Expansion Time Variable.

e. How literal references are handled in Pass I assembler? Show by taking a suitable example.

f. Write a regular expression for a real number with optional fraction.

g. List the advantages of Top-Down parsing without backtracking. What is a predictive parser? **(7 × 4)**

**Q.2** a. Define Parsing. Use Bottom Up parsing to parse the string <id>∗<id>+<id> using the grammer **(8)**

E::=T+E|T
T::=T ∗V|V
V::= <id>

b. Name various categories of PL grammers giving example of each. **(5)**

c. Write a brief note on: LEX and YACC **(5)**

**Q.3** a. What do you mean by linear and non-linear search data structures? Give examples in each category. Describe implementation of the three basic operations in one linear and one non-linear data structure. **(9)**

b. How collision occurs in hash table organization? Briefly describe three methods for collision handling giving suitable example. **(9)**

**Q.4** a. Define a language processor. Describe various types of language processors. **(7)**

b. What is dynamic debugging? How does a debug monitor facilitate dynamic debugging? Write various steps involved. **(7)**

c. List the desirable properties of an intermediate representation (IR). **(4)**

**Q.5** a. How a two-pass assembler differs with a one-pass assembler? List the tasks performed by the analysis and synthesis phases of an assembler. **(9)**

b. Assemble the following part of the program manually, showing the resultant object code and symbol table using Load-and-Go assembler. (You may use the Instruction set table given at the end) **(9)**

| Location | Label | Operation | Operand |
|---|---|---|---|
| 12 | | READ | PV |
| -- | | -- | |
| 47 | | LOAD | PV |
| 49 | | ADD | THERM+1 |
| 51 | | STORE | PV |
| -- | | -- | |
| 92 | PV | SPACE | |
| 93 | THERM | CONST | 386.2 |
| 94 | | CONST | 374.9 |

**Q.6** a. Explain various data structures used by One-Pass Macro processor. **(6)**

b. Write a macro that swaps two variables. **(6)**

c. Explain flow of control during macro expansion. What is the goal of advanced macro facility? **(6)**

**Q.7** a. List the various types of loaders highlighting features for each of them. **(6)**

b. Write a brief note on dynamic linking. Discuss in brief a linkage editor for an IBM PC. **(6)**

c. What is use of static overlay generator? Explain giving a suitable example. **(6)**

| Operation Code | | |
|---|---|---|
| Symbolic | Machine | Length |
| ADD | 02 | 2 |
| BR | 00 | 2 |
| BRNEG | 05 | 2 |
| BRPOS | 01 | 2 |
| BRZERO | 04 | 2 |
| COPY | 13 | 3 |
| DIVIDE | 10 | 2 |
| LOAD | 03 | 2 |
| MULT | 14 | 2 |
| READ | 12 | 2 |
| STOP | 11 | 1 |
| STORE | 07 | 2 |
| SUB | 06 | 2 |
| WRITE | 08 | 2 |