[3863] – 155

T.E. (Information Technology) (Semester – II) Examination, 2010
SYSTEM SOFTWARE (2003 Course)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **any three** questions from **each** Section.*
*2) Answers to the **two** Sections should be written in **separate** answer books.*
*3) **Neat** diagrams must be drawn **wherever** necessary.*
*4) Figures to the **right** indicate **full** marks.*
*5) Assume **suitable** data, if **necessary**.*

SECTION – I

1. a) List the system programs which reside in the system permanently. Briefly explain each one of these stating the reason why they must reside permanently in system. **8**
   b) Explain the following language processor tools : **6**
      i) LEX ii) YACC
   c) Write the significance of debug monitor. **4**

OR

2. a) Explain the pass structure of a typical language processor. **8**
   b) Define the terms : **6**
      i) Language processor ii) Linker
      iii) Macro iv) Interpreter
   c) Compare the following : **4**
      i) Compiler and an Interpreter.
      ii) System program and application program.

3. a) What feature of assembler makes it mandatory to design a two pass assembler ? Explain with the help of an example. **6**
   b) For the following sample code show the output of PASS-I of two PASS assembler. Also show the entries of base register table.

```
SIMPLE   START    100
         BALR     15, 0
         USING    *, 15
LOOP     L        R1, TWO
         A        R1, FOUR
         ST       R1, FOUR
         CLI      FOUR +3, 4
         BNE      LOOP
         BR       14
R1       EQU      1
TWO      DC       F'2'
FOUR     DS       F
         END
```

   Assume : BALR and BR are of two bytes. L,A,ST,CLI,BNE are of four byte instructions. **10**

OR

P.T.O.

4. a) For the following input source, show the contents of various Macro definition table and Macro name table and Argument list array.

```
          START
          SR          2, 2
          L           1, DATA1
          MACRO
          ADD_MAIN    &ARG1
          L           1, &ARG1
          A           1, =F'10'
          SR          3, 3
          ST          1, &ARG1
          MEND
          AR          2, 2
          MACRO
          ADD_SECOND  &A1,&A2,&A3
          ADD_MAIN    &A1
          ADD_MAIN    &A2
          ADD_MAIN    &A3
          MEND
          ADD_MAIN    DATA1
          ADD_SECOND  X1, X2, X3
          ADD_SECOND  X2, X1, X3
DATA1     DC          F'20'
X1        DC          F'25'
X2        DC          F'30'
X1        DC          F'35'
          END
```

12

b) Comment on the statement: "Programs with macros require more space at run time than program with functions". **4**

5. a) With the help of examples, explain top-down parsing scheme. **8**

b) Enlist the various databases/data structures used in lexical analyzer. Give the format of each of these. **8**

OR

6. a) Consider the following grammar :

$A \rightarrow aB$

$B \rightarrow Ab$

$B \rightarrow b.$

Show stepwise procedure for recognizing the input string "aabb" using bottom up parsing technique. **6**

b) Enlist the bottlenecks in topdown parsing. Briefly describe them. **8**

c) What is lexical analysis ? **2**

SECTION – II

7. a) For the statement given below generate intermediate code in the format

i) Quadruple ii) Triple iii) Parse Tree iv) Postfix Notation

$A = - P*(- Q + R)$ **8**

b) Explain with the help of suitable examples.

i) Common sub expression elimination

ii) Dead code elimination. **8**

c) With respect to the phases of compiler, state TRUE or FALSE :

i) Memory allocation for an identifier is done by lexical analysis phase

ii) Code generation phase can update Identifier table entries. **2**

OR

8. a) Explain in brief machine dependent optimization techniques. **4**

b) Explain the term activation record and explain its use in storage allocation. **6**

c) Write an algorithm for code generation for '+' operator. Clearly mention the assumptions made. **8**

9. a) In the default loading schemes, binding takes place at various points during the life of a process. Define the term "bind" and give example. **4**

b) What point in time do each of the following loading schemes perform binding

i) Absolute loader ii) Dynamic linking loader. **4**

c) Explain with the help of flowchart, the design of an absolute loader. **8**

OR

10. a) What information must be supplied by an assembler to direct linking loader ? Explain the significance of this information with respect to the design of direct linking loader. **8**

b) Enlist two advantages and disadvantages of binding at load time over binding at assembly time. **4**

c) Briefly explain : Self relocating programs. **4**

11. a) Comment on the statements :

i) "Printer drivers are all dynamic link libraries"

ii) "Few dynamic link libraries are termed as *resource only*"

iii) "Library files are used by the linker to resolve function calls in the source code"

iv) "Call back functions are essentially address timer message" **8**

b) Explain the term Dynamic Data Exchange. **8**

OR

12. a) What are the advantages and disadvantages of dynamic linking with import ? **4**

b) Write short note on :

i) Different methods of specifying link ii) Class Libraries **12**
