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## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Fifth Semester, B.E. - Information Science and Engineering

Semester End Examination; Dec - 2016/Jan - 2017

System Software

Time: 3 hrs

Max. Marks: 100

*Note: Answer FIVE full questions, selecting ONE full question from each unit.*

### UNIT - I

- 1 a. Distinguish between system software and application software. 4
- b. What is upward compatible? How is it ensured between SIC and SIC/XE? 4
- c. Write a SIC and SIC/XE program to copy the contents of array Alpha of 100 words to array Beta of same size. 12
- 2 a. With respect to Pentium pro architecture explain the following :
  - i) Instruction format 10
  - ii) Data format 10
  - iii) Registers 10
  - iv) Addressing modes. 10
- b. Explain the instruction formats and addressing modes of SIC/XE machine architecture. 10

### UNIT - II

- 3 a. Generate the object code for each statement and write the object program for the following SIC / XE program.

Given that : CLEAR = B4, LDA = 00, LDB = 68, ADD = 18, TIX = 2C, JLT = 38, STA = 0C

```

SUM      -  START      0
FIRST    -  CLEAR      X
          LDA          #0
          + LDB        #TOTAL
          BASE        TOTAL
LOOP     -  ADD        TABLE, X
          TIX         COUNT
          JLT         LOOP
          STA         TOTAL
COUNT  -  RESW        1
TABLE   -  RESW        2000
TOTAL   -  RESW        1
          -  END        FIRST

```

10

- b. What are control sections? Explain how linking is performed between control sections? 10

- 4 a. Explain how multi-pass assembler handles the following forward reference :
- (i) HALFSZ EQU MAXLEN/2
  - (ii) MAXLEN EQU BUFF END – BUFFER
  - (iii) PREVB T EQU BUFFER – 1 10
  - (iv) BUFFER RESB 4096
  - (v) BUFFEND EQU \*
- Assume that, when assembler goes to line (iv), location counter contains 1034 (HEX).
- b. Explain the design options of one-pass assembler. 10

**UNIT - III**

- 5 a. With source code, explain the working of bootstrap loader. 10
- b. Illustrate linking and relocation with sample programs. 10
- 6 a. Explain machine independent features of loader. 10
- b. Write and explain the pass 2 algorithm of linking loader. 10

**UNIT - IV**

- 7 a. Explain the data structures used in Macro processor with example. 8
- b. With an example, explain generation of unique labels in macros. 6
- c. Explain the advantages and disadvantages of general purpose macro processor. 6
- 8 a. Explain the process of conditional macro expansion with example. 8
- b. Write and explain DEFINE and EXPAND procedures in one pass macro processor. 12

**UNIT - V**

- 9 a. Write a LEX program to compute word, character and line count in a given file. 6
- b. Explain briefly LEX and YACC interaction. 4
- c. What are regular expressions? Explain the characters used in forming regular expressions. 10
- 10 a. Explain the ambiguity in arithmetic expression. What is the ambiguity in parsing  $2 + 3 \times 4$ ? 10  
Explain the solution for it.
- b. Write a YACC program to evaluate a simple arithmetic expression involving operation +, -, \*, /. 10

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