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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

Make-up Examination; Jan / Feb - 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. Briefly discuss the SIC/XE machine architecture. 12
- b. Write a sequence of instructions for SIC/XE to set ALPHA equal to (4*BETA-9). Use immediate addressing for the constants. Where ALPHA and BETA are word memory. 8
- 2 a. Explain the following features of SIC machine : 8
- i) Registers ii) Data formats iii) Addressing mode iv) I/O instructions.
- b. Write SIC/XE instructions to implement strcpy() function. i.e., copy one string to another string. 8
- c. Differentiate between RISC and CISC. 4

UNIT - II

- 3 a. Write a complete algorithm for Pass-I of two pass assembler. 10
- b. Briefly explain the following terms : 10
- i) Control Sections ii) Program Blocks.
- 4 a. Generate object code for the following SIC/XE program
- | | | | | |
|--------|-------|---------|-----------|----------|
| FACT | START | 1000 | | |
| FIRST | STL | RETADR | | |
| | JSUB | FACT | | |
| | J | @RETADR | | |
| RETADR | RESW | 1 | | |
| FACT | LDA | NUMBER | STL:14 | LDA:00 |
| | LDX | NUMBER | JSUB:48 | LDX:04 |
| | LDX | #1 | J:3C | MULR: 98 |
| | SUBR | S, X | LDS: 6C | JEQ:30 |
| LOOP | MULR | X, A | SUBR:94 | STA: 0C |
| | SUBR | S, X | COMPR: A0 | RSUB:4C |
| | COMPR | S, X | | |
| | JEQ | EXIT | | |
| | J | LOOP | | |
| EXIT | STA | RESULT | | |
| | RSUB | | | |
| | END | FIRST | | |
- b. With suitable example, explain multi pass assembler. 8

UNIT - III

- 5 a. Briefly discuss the SIC relocation loader algorithm, explain with suitable code. 10
- b. Explain the working principle of the processing of an object program using,
- i) Linking loader 10
- ii) Linkage editor.
- 6 a. Write the source code for bootstrap loader for SIC/XE. 10
- b. Design and explain dynamic linking with loading and calling of a subroutine. 10

UNIT - IV

- 7 a. Write an algorithm for a one-pass macro processor. 15
- b. Briefly discuss concatenation of macro parameters in macro processor. 5
- 8 a. Explain recursive macro expansion. Give example. 10
- b. What is macro? Write and explain the general structure of macro processor. 6
- c. Write a short note on MASM macro processor. 4

UNIT - V

- 9 a. Explain the general structure of LEX. Give suitable example. 10
- b. List any five metacharacters used in LEX. Explain with example. 10
- 10 a. Write a YACC program that accepts the language $a^n b^n \mid n \geq 0$. 10
- b. List and explain any two LEX variables and LEX functions. 10

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