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

(An Autonomous Institution affiliated to VTU, Belagavi)

Third Semester, B.E. - Computer Science and Engineering

Semester End Examination; Dec - 2017/Jan - 2018

System Software

Time: 3 hrs

Max. Marks: 100

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

UNIT - I

- 1 a. Explain SIC/XE machine Architecture. 12
- b. Suppose ALPHA, GAMMA and BETA is arrays of 100 bytes. Write a sequence of instructions for SIC to perform $GAMMA = ALPHA + BETA$. 8
- 2 a. List the differences between system software and application software. 4
- b. Write a SIC/XE program to set $BETA = 4 * ALPHA / 9$. 6
- c. Explain ultra SPARC Architecture. 10

UNIT - II

- 3 a. Write and explain the algorithm for pass-2 of two-pass assemblers. 10
- b. Describe the data structures used by assemblers during Pass-1. 4
- c. Explain the following assembler directives with example each : 6
- i) EQU ii) RESB iii) WORD.
- 4 a. What are the different record formats used in order to obtain the object code? Give their formats. 10
- b. Explain the following with respect to assembler design : 10
- i) Expression ii) Symbol defining statements.

UNIT - III

- 5 a. Write and explain the simple Bootstrap loader program. 10
- b. Explain with an example how relocation can be done by using : 10
- i) Modification Record ii) Bit masking.
- 6 a. Write an algorithm for Pass -1 of loaders. 7
- b. With a suitable diagram, explain dynamic linking process. 7
- c. Write an algorithm for Absolute loaders. 6

UNIT - IV

- 7 a. Explain the following with an example each : 10
- i) Macro Definition ii) Macro Invocation iii) Macro Expansion.
- b. Explain the following with example : 10
- i) Generation of unique labels ii) Concatenation of macro parameter.

- 8 a. Write 1-pass macro processor algorithm. 10
b. Briefly explain recursive macro expansion. 5
c. Explain MASM macro processor. 5

UNIT - V

- 9 a. Explain the structure of LEX program with an example program. 10
b. Explain shift reduce parsing with example. 6
c. Explain the following with respect to LEX : 4
i) yylen() ii) yywrap().
10 a. Write a YACC program to recognize the grammar $\{a^n b^n \mid \text{where } n \text{ is odd}\}$. 7
b. Write a YACC program to test the validity of a simple arithmetic expression. 7
c. Write a LEX program to count the number of spaces, words and lines in a given input string. 6

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