

BETCE 3RD YEAR 2ND SEM. EXAM.-2019

SYSTEM SOFTWARE

Time: Three hours

Full Marks: 100

Set I Answer any *ten* questions Each question carries two marks 10x2

1. a) SIC/XE stands for Simplified _____ Computer.
- b) What does the assembler directive RESW do?
- c) LOCCTR is a variable that is used to help in the assignment of _____.
- d) The linkage editor performs _____ of all control sections relative to the start of the linked program.
- e) What is dynamic linking?
- f) What is the difference between MACROS and MACROX ?
- g) What does MEND signify?
- h) Replacement or run-time computations by compile time computations is called _____.
- i) _____ involves replicating the body of the loop to reduce the number of tests required to be carried out, if the number of iterations are constant.
- j) What is the function of a scanner in the compilation of a program?
- k) Name the two basic parsing techniques.
- l) Write a regular expression to represent the set of all strings of 1's and 0's having exactly one '1' or one '0'.

Set II Answer any *three* questions Each question carries ten marks 10x3

2. a) (i)What are SIC assembler directives? Give examples.(ii)How is compatibility ensured between SIC and SIC/XE machines? 3+2+5
- b) Explain the operation of a two pass assembler to be used in a hypothetical machine. 10
- c) Suppose that a computer primarily uses direct addressing but has several different instructions formats. What problems does this create for the relocation-bit approach to progress relocation? How might these problems be solved? 5+5
- d) (i)Differentiate between literal and immediate operand, with examples. (ii)What are control sections? 4+6

Set III Answer any *three* questions Each question carries *ten* marks 10x3

3. a) What do you mean by concatenation of macro parameters? Give an example of how macro processors allow parameters to be concatenated with other character strings. 4+6
- b) Describe how the lexical specifications of a programming language can be described by regular expressions. 10
- c) Explain recursive macro expansion with an example. 10

[Turn over

d) Consider the following piece of code:

```
begin
while a>b do
begin
  x=y+z
  a=a-b
end
  x=y-z
end
```

Construct the corresponding parse tree 10

Set IV Answer any *two* questions Each question carries *ten* marks 10x2

4. a) What are the differences between a parse tree and a syntax tree? Construct the syntax tree for the following expressions from its parse tree: **a-4+c** 5+5
- b) Give the intermediate code of the following subroutine in the form of quadruples- 10

```
BEGIN
  SUM   :=0;
  SUMSQ :=0;
  FOR   I:= 1 TO 100 DO
    BEGIN
      READ (VALUE);
      SUM   := SUM + VALUE;
      SUNSQ := SUMSQ + VALUE * VALUE
    END
  MEAN   := SUM DIV 100;
  VARIANCE := SUMSQ DIV 100- MEAN * MEAN;
  WRITE (MEAN, VARIANCE)
END
```

c) Construct an NFA for the following regular expression R.

$$R = a|ab^*|aa^*b$$

Derive a DFA for the NFA obtained, minimize the states of the DFA and show the result in the form of a state table. 10