U.G. 6th Semester Examination - 2021

COMPUTER SCIENCE

[HONOURS]
Discipline Specific Elective (DSE)
Course Code : COM.SC-H-DSE-L-603
(System Programming)

Full Marks : 60   Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

1. Answer any **ten** questions :   2×10=20

    a) What is bootstrap loader?

    b) Define regular expression.

    c) What are the features of a lexical analyzer?

    d) What is parsing?

    e) Differentiate between top down and bottom up parsing techniques.

    f) What are the limitations of absolute loader?

    g) What is the difference between application software and system software?

    h) What is ambiguity? How is it eliminated?

    i) What is the difference between linker and loader?

    j) List the different phases of compiler.

    k) Define lexeme.

    l) What is left factoring?

    m) Define context free grammar.

    n) Give context-free grammar that generates the following language

    $$\left\{w \in \{0,1\}* \mid w = w^R \text{and} |w| \text{is even}\right\}$$

    o) Why intermediate code generation phase is important?

GROUP-B

Answer any **four** questions :   5×4=20

2. Explain the role of assembler, compiler, loader and linker in the language processing system.   5

3. Differentiate between parse tree and syntax tree with an example.   5

4. Explain two-pass assembler in detail with a block diagram.   5

5. What is loader? Explain the working principle of absolute loader.   2+3

6. What is LEX? What is the difference between LEX and YACC? 2+3

7. Explain in brief the left most and right most derivations. Give examples. 4+1

GROUP-C

Answer any **two** questions : 10×2=20

8. a) What are different analysis phases of a compiler? Explain the reasons for separating lexical analysis from syntax analysis.

   b) Define ambiguous grammar. Check whether the following grammar is ambiguous or not.

   $S \rightarrow aAB$
   $A \rightarrow bc / cd$
   $C \rightarrow cd$
   $B \rightarrow c / d$

   (2+3)+(1+4)

9. a) Consider the following grammar:

   $S \rightarrow A$
   $A \rightarrow BA | E$
   $B \rightarrow aB | b$

   i) Construct the LR(1) parser for the above grammar.

   ii) Find the moves made by the LR(1) parser on the input string: aabb.

   b) What is the difference between stack allocation and static allocation? (4+4)+2

10. a) Write three address code for following C code:

    for (i = 1; i < = 1Ø; i + +)
    {
        a[i] = x * 5;
    }

    b) Write down the advantages and disadvantages of binding at load time over binding at assembly time. 5+5

11. Write short notes on any **two** of the following:

    5×2=10

    a) Intermediate code generation

    b) Symbol table

    c) Activation records

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