Roll No. ....

BCA-11/BA-IT-12

Bachelor of Computer Applications

Sixth Semester Examination-2015

BCA-20

System Programming

Time : 3 Hours   **Maximum Marks :** 60

Note : This paper is of sixty (60) marks divided into three (03) sections A, B, and C. Attempt the questions contained in these sections according to the detailed instructions given therein.

Section - A

(Long Answer Type Questions)

Note : Section 'A' contains four (04) long-answer-type questions of fifteen (15) marks each. Learners are required to answer any two (02) questions only.   (2×15=30)

1. Explain Hierarchy of grammars with suitable example.

2. (a) Construct a DFA for the regular expression aa*/bb *.

   (b) Construct a DFA over Σ = (a,b) which produces not more than 3 a's.

3. (a) State the Pumping lemma for CFG.

   (b) What is meant by halting problem?

4. List various phases of a language processor. Explain roles of each phase of it.

Section - B

(Short Answer Type Questions)

Note : Section 'B' contains eight (08) short-answer-type questions of five (05) marks each. Learners are required to answer any four (04) questions only.   (4×5=20)

1.   Write unambiguous production rules (grammar) for arithmetic expression containing +, - , *, / and ^ (exponentiation).

     Construct parse tree for :

       <id> - <id> * <id> ^ <id> + <id>

2.   Construct DFA for following regular expression:
        a* (b* + c*) (a + c) *

3.   Describe working of LL(1) parser and parse following string:

     |- <id> * <id> * <id> + <id> -|

4.   Explain relocation and linking requirements in segmented addressing with suitable example.

5.   Differentiate between top-down and bottom-up parser.

6.   Explain following with suitable example :

     a. Loaders

     b. Turing Machine

7.   Write difference between one pass and two pass assembler.

8.   Explain Symbol table and Mnemonics table with suitable example.

Section - C

(Objective Type Questions)

Note : Section 'C' contains ten (10) objective-type questions of one (01) mark each. All the questions of this section are compulsory.   (10×1=10)

1. A linker program

   a. Places the program in the memory for the purpose of execution.

   b. Relocates the program to execute from the specific memory area allocated to it.

   c. Links the program with other programs needed for its execution.

   d. Interfaces the program with the entities generating its input data.

2. Resolution of externally defined symbols is performed by

   a. Linker   b. Loader

   c. Compiler   d. Editor

3. Translator for low level programming language were termed as

   a. Assembler   b. Compiler

   c. Linker   d. Loader

4. Consider the following language:

   $L = \{a^n \, b^n \, c^n \, d^n \mid n \geq 1\}$

   L is

   a. CFL but not regular

   b. CSL but not CFL

   c. regular

   d. type 0 language but not type 1

5. Consider the following language

   $L = \{a^n \, b^n \mid n \geq 1\}$

   L is

   a. CFL but not regular

   b. CSL but not CFL

c. regular

d. type 0 language but not type 1

6. A language is regular if and only if

   a. accepted by DFA   b. accepted by PDA

   c. accepted by LBA   d. accepted by Turing machine

7. Regular expression are

   a. Type 0 language   b. Type 1 language

   c. Type 2 language   d. Type 3 language

8. L and ~L are recursive enumerable then L is

   a. Regular   b. Context free

   c. Context sensitive   d. Recursive

9. Regular expressions are closed under

   a. Union   b. Intersection

   c. Kleen star   d. All of the mentioned

10. A Turing machine that is able to simulate any other Turing machine is called a:

   a. Universal Turing machine

   b. Global Turing machine

   c. Simulated Turing Machine

   d. None of the above