Total No. of printed pages = 4

BCA 171503

Roll No. of candidate | | | | | | | | | | |

8/2/22 2021

B.C.A. 5th Semester End-Term Examination

SYSTEM SOFTWARE

(New Regulation)

Full Marks – 70 Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer Question No.1 and any *four* from the rest.

1. Choose the correct answer : (10 × 1 = 10)

(i) In a two-pass assembler, the task of the Pass II is to
- (a) separate the symbol, mnemonic opcode and operand fields
- (b) build the symbol table
- (c) construct intermediate code
- (d) synthesize the target program

(ii) A particular keyword, or a sequence of input characters denoting an identifier is called a,
- (a) Token (b) Link list
- (c) Parse tree (d) Buffer

(iii) An assembler stores the symbols in?
- (a) Special purpose register (b) Symbol table
- (c) General purpose register (d) Status flag

(iv) Translators that convert assembly programs to machine codes are known as,
- (a) Compiler (b) Linker
- (c) Assembler (d) Loader

(v) For which of the following condition a grammar is called LL(1)?
- (a) There are multipy-defined entries in the parsing table of the grammar
- (b) The grammar is ambiguous
- (c) The grammar is left recursive
- (d) The parsing table of the grammar has no multiply-defined entries

[Turn over

(vi) A system program that combines the separately compiled modules of a program into a form suitable for execution is called?

(a) Assembler (b) Linker

(c) Compiler (d) Load and go

(vii) What does a Syntactic Analyzer do?

(a) Create parse tree (b) Collect type of information

(c) Maintain Symbol Table (d) None of the mentioned

(viii) Which of the following is used for grouping of characters into tokens?

(a) Parser (b) Code Optimization

(c) Code Generator (d) Lexical Analyzer

(ix) Handle pruning forms the basis of,

(a) Bottom-up parsing (b) Top-down parsing

(c) Both (a) and (b) (d) None of these

(x) Which of the following derivations does a top-down parser use while parsing an input string?

(a) Leftmost derivation

(b) Leftmost derivation in reverse

(c) Rightmost derivation

(d) Rightmost derivation in reverse

Answer any *four* questions from the following.

2. (a) Show the different phases of a compiler with a neat diagram. (6)

(b) Identify the tokens in the following C statement: $x = (a-10)/(a+b);$ (5)

(c) What are regular definitions and regular expressions? (4)

3. (a) For the following grammar, calculate the FIRST and FOLLOW function of the grammar symbols, (8)

S→aBD

B→bDa

D→c | aSc

(b) Show the model of a table driven predictive parser with a neat diagram. (4)

(c) What are the differences between a compiler and an interpreter? (3)

4. (a) Differentiate between back-tracking and no-backtracking parsing. (4)

(b) Draw the parse tree for the string "cace" using the following grammar: (7)

E→cDe

D→ab | B

B→ac

(c) What is the function of loader and linker? What is the difference between static linking and dynamic linking? Give some examples of loaders and linkers. (4)

5. (a) What is a LL(1) grammar? Check whether the following grammar is LL(1) or not, (8)

S → iEtSA | a

A → eS | ε

E → b

(b) Mention the different tasks performed by the first phase and second phase of a two pass assembler. (5)

(c) Mention two software tools for program development. (2)

6. (a) What is the difference between a macro call and subroutine call? (4)

(b) What are synthesized and inherited attributes? How semantic rules are attached to the productions? (4)

(c) Consider the parsing table of a predictive parser as follows, (7)

Non-Terminal	INPUT SYMBOL					
	id	+	*	(	)	$
E	E→TE′			E→TE′		
E′		E′→+TE′			E′→ε	E′→ε
T	T→FT′			T→FT′		
T′		T′→ε	T′→*FT′		T′→ε	T′→ε
F	F→id			F→(E)		

Show the parsing actions taken by the predictive parser for the input string id+id*id

7. (a) What are the data structures used by the first pass and second pass of an assembler? (4)

(b) Write the machine code for the following assembly language program. Assume suitable machine instruction opcodes of your own. (6)

Label	Mnemonic op-code	Operands
	START	1000
	READ	N
	MOVER	B, ='1'
	MOVEM	B, TERM
AGAIN	MUL	B, TERM
	MOVER	C, TERM
	COMP	C, N
	BC	LE, AGAIN
	MOVEM	B, RESULT
	LTORG	
	PRINT	RESULT
	STOP	
N	DS	1
RESULT	DS	20
TERM	DS	1
	END	

(c) Write some advantages of assembly language over machine language. (5)