MCA 2nd Semester Examination, 2023

MCA

(*Computer Design*)

PAPER – MCA-204(CBCS)

Full Marks : 100

Time : 3 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

Answer any *five* questions : 2 × 5

1. What is LL(1) grammar ?

2. Define Lexeme.

3. Define Annotated parse tree.

4. Why LR parsing is good and attractive ?

5. Define LR grammar.

6. What do you mean by left recursion ?

7. What is token ?

8. What is left factoring ?

GROUP–B

Answer any **four** questions : 15×4

9. (*a*) Construct LALR(l) parsers for the following grammar. 10

$S \rightarrow L = R$

$S \rightarrow R$

$L \rightarrow *R$

$L \rightarrow id$

$R \rightarrow L$

(*b*) Show the actions of the parser for the input string " id = **id". 5

10. (*a*) Find the item sets for the following grammar using CLR parsing method, and construct CLR parsing Table. 10

$S \rightarrow AS$

$S \rightarrow b$

$A \rightarrow SA$

$A \rightarrow a$

(*b*) Eliminate left recursion : 5

S-> Sab/SaS/X

X->Xc/a/b

11. (*a*) Construct a predictive parsing table for the following Grammar : 10

$S \rightarrow iEtSS'|a$

$S \rightarrow eS/\varepsilon$

$E \rightarrow b$

(*b*) Find the FIRST and FOLLOW of the following grammar. 5

S->ACB/CbB/Ba

A-> da/BC

B-> g/ε, C → h/∈

12. Consider the following grammar

$S \rightarrow AS \mid b$

$A \rightarrow SA \mid a$

Construct the SLR parse table for the grammar. Show the actions of the parser of for the input string "abababb". 10 + 5

13. (*a*) Explain syntax directed definition with simple examples ? 5

(*b*) What is control and data flow analysis ? Explain with example. 4

(*c*) What are the properties of code generation phase ? 3

(*d*) Define cross compiler. 3

14. (*a*) What are basic blocks ? Write the algorithm for partitioning into Blocks. 2 + 3

(*b*) What is flow graph ? Give one example. 3 + 1

(*c*) What is common sub-expression and how to eliminate it ? Explain with example. 3 + 1

(*d*) Define Dead-code elimination with example. 2

15. Write short note (any *three*) : 5×3

(*i*) Three address code

(*ii*) Code optimization

(*iii*) Bootstrapping

(*iv*) Dependency graph

(*v*) Symbol Table.

16. (*a*) Write quadraples, triples and indirect triples for the following expression–
$(a * b) + (c + d) - (a + b + c + d)$

(*b*) Draw the Syntax tree and DAG for the following expression–
$(a * b) + (c - d) * (a * b) + b.$ 7 + 8

[*Internal Assessment* – 30 Marks]