Total page: 03

PG CBCS

M.SC. Semester-II Examination, 2022

COMPUTER SCIENCE

PAPER: COS-202

Full Marks: 40 **Time: 2 Hours**

Write the answer for each unit in separate sheet

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

COS 202.M1: TOPIC NAME AUTOMATA THEORY

Marks: 20

GROUP-A

Answer any two questions: **2×2=4**

1. What are the applications of automata theory?
2. Define the Finite Automaton and write down the Transition function.
3. Differentiate NFA and DFA
4. What is a regular expression?

GROUP-B

Answer any two questions: **2×4=8**

1. Explain Chomsky Hierarchy for Formal Language.
2. Design a Pushdown Automata for the language

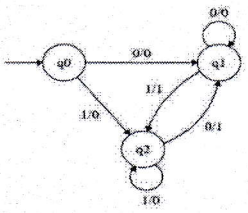
   $L = \{a^n b^n \mid n > 0\}$.
3. Construct the finite automata equivalent to the regular expression
   $(0 + 1)^*(00 + 11)(0 + 1)^*$
4. (i) Write down the definition of a Grammar.
   (ii) Let $G = (\{S, A_1, A_2\}, \{a, b\}, P, S)$, where P consists of
   $S \rightarrow aA_1A_2a$,
   $A_1 \rightarrow b\ a\ A_1\ A_2\ b$,
   $A_2 \rightarrow A_1\ a\ b$,
   $a\ A_1 \rightarrow b\ a\ a$,
   $b\ A_{2\,b} \rightarrow a\ b\ a\ b$
   Test whether w = b a a b b a b a a a b b a b a

GROUP-C

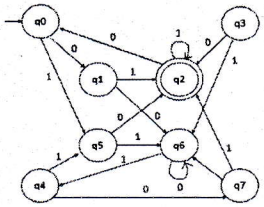
Answer any one question: **1×8=8**

1. (i) Differences between Mealy Machine and Moore Machine
   (ii) Convert Mealy Machine to Moore Machine

[P. T. O]



2. Minimization of DFA



COS 202:M2 COMPILER DESIGN

Marks: 20

GROUP-A

Answer any two question: **2×2=4**

1. State the difference between Top Down Parsing and Bottom Up Parsing?
2. Short Note: YACC
3. State the difference between Dynamic linker and Loader?
4. What is Lexeme pattern and constant?

GROUP-B

Answer any two question: **2×4=8**

1. What is code optimization? Explain machine dependent and independent code optimization
2. Calculate FIRST and FOLLOW for the following grammar?

   S->xABC

   A->a|bbD

   B->a|ε

   C->b|ε

[P. T. O]

D->c|ε

3. Find the item sets for the following grammar using CLR parsing method

G:S→ AS

S→b

A→ SA

A→a

4. Let G be a Context Free Grammar for which the production rules are given below:

S->aB|bA

A->a|aS|bAA

B->b|bS|aBB

Drive the string "aaabbabbba" using the above grammar (using Left Most Derivation and Right Most Derivation).

GROUP-C

Answer any one question: **1×8=8**

1. Write quadruples, triples and indirect triples for the expression a := (-c * b) + (-c * d) Compare quadruples, triple and indirect triple.
2. What is basic block? List out the basic blocks and draw the flow graph for the following code.
    1. location = -1
    2. i=0
    3. i <100 goto 5
    4. goto l3
    5. t_1=4i
    6. t_2=A[t_1]
    7. if t_2 = x goto 9
    8. goto 10
    9. location = i
    10. t_3 = i+1
    11. i = t_3
    12. goto 3
    13. ...

****