M.Sc. 2nd Semester Examination, 2023

COMPUTER SCIENCE

PAPER – COS-202

Full Marks : 50

Time : 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

COS-202(M_1)

GROUP – A

Answer any **two** of the following questions : 2×2

1. Construct a grammar generating the language
$L = \{a^n b^m c^m d^n \mid m, n \geq 1\}$

2. Simplify the following grammar :

$S \rightarrow aA/aBB$

$A \rightarrow aaA/\varepsilon$

$B \rightarrow bB/bbC$

$C \rightarrow B$

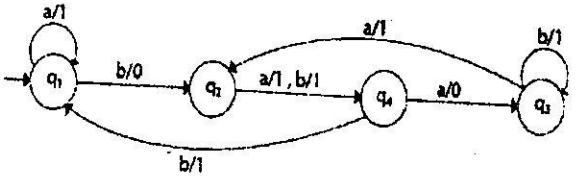
3. Why an FA with ε transition is called NFA ?

4. Define CNF and GNF.

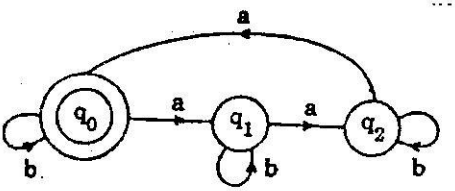
GROUP – B

Answer any **two** of the following questions : 4×2

5. Conversion of mealy machine to moore machine for following automat.



6. Find the Regular Expression (R.E.) for the following Finite Automata



7. Convert the following grammar into CNF

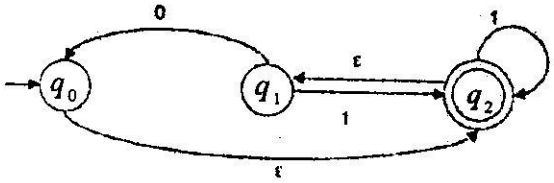
$S \rightarrow aAbB$
$A \rightarrow aA/a$
$A \rightarrow bB/b$

8. Write the closure properties of CFG with examples.

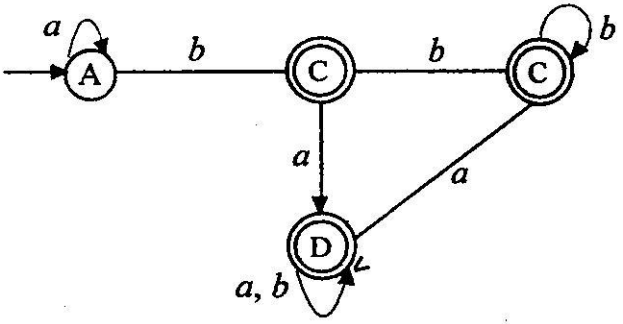
GROUP – C

Answer any **one** of the following questions : 8×1

9. Construct a FA for the RE L = (a + b) + a(a + b)* (ab + ba). Convert the following NFA with null move to an equivalent DFA by the ε-closure *method.*



10. Show that L = palindrome over {a, b} is not regular. Construct a RE from the following FA using arden's theorem.



[Internal Assessment – 05 Marks]

COS-202(M_2)

GROUP – A

Answer any **two** questions : 2×2

11. What are the features and capabilities of Symbol table ?

12. Define CLOSURE (I) and GOTO (1, X) functions.

13. Why LR Parser is Attractive ?

14. What is the role of type checker ?

GROUP – B

Answer any **two** questions : 4×2

15. What do you mean by Error Recovery in LR Parsers ? Describe in details.

16. Construct an LL (1) Parsing table for the following Grammar :

$S \rightarrow aBDh$

$B \rightarrow Cc$

$C \rightarrow Bc \mid \in$

$D \rightarrow EF$

$E \rightarrow g \mid \in$

$F \rightarrow f \mid \in$

17. Differentiate between Syntax-Directed Definitions vs. Syntax-Directed Translation with example.

18. Construct the LR (I) Parsing Table for the following Grammar.

$S \rightarrow CC$
$C \rightarrow aC$
$C \rightarrow d$

GROUP – C

Answer any **one** question : 8×1

19. (*a*) **Draw the syntax tree and DAG for the following Expression :**

$$(a*b) + (c - d)*(a*b) + b$$ 2

(*b*) **Write quadruples, triples and indirect triples for the following expression**

$$-(a*b) + (c + d) - (a + b + c + d)$$ 2

(*c*) Difference ebtween SLR, CLR and LALR parsers. 2

(*d*) What is flow graph ? Give an example. 2

20. Construct LALR parsing table for the grammar

$S \rightarrow L = R/R$

$L \rightarrow *R \mid id$

$R \rightarrow L.$ 8

[Internal Assessment — 05 Marks]