

UG/4th Sem/H/22(CBCS)

2022

COMPUTER SCIENCE (Honours)

Paper Code : DC-8

[Theory of Computation]

(CBCS)

Full Marks: 32

Time: Two hours

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

Group- A

Answer any *six* questions from question no.1. Each question carries two marks.

2×6=12

1. (a) Find the regular expressions for the set of all strings over $\{a, b\}$ with three consecutive b's.
- (b) Design a DFA that accepts all the strings that ends with aa , where $\Sigma = \{a, b\}$.
- (c) Find the highest type number which can be applied to the following productions as per Chomsky classification – $S \rightarrow aSb, S \rightarrow a$.
- (d) Explain Turing machine with example.
- (e) Differentiate between Mealy and Moore machine.
- (f) Is it possible to design a finite automata that accepts the language $L = \{a^n b^n \mid n \geq 1\}$? Justify.
- (g) What is derivation tree?

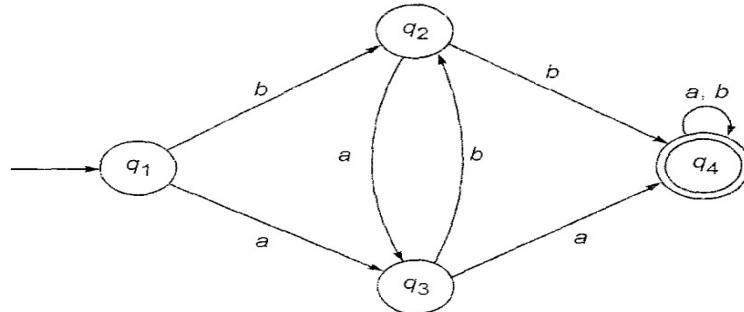
Group- B

Answer any *two* questions.

10×2=20

2. (a) Construct a regular grammar for the regular expression $(a+b)^* abb$.
- (b) Construct the regular expression corresponding to the following finite automata.

(2)



5+5=10

3. (a) Construct a Turing Machine to accept the set of all strings over $\{0, 1\}$ ending with 011.
(b) Differentiate between deterministic and non-deterministic finite automata. 5+5
4. (a) Find the language generated by the following grammar :
 $S \rightarrow 0S1 \mid 0A1, A \rightarrow 1A \mid 1$.
(b) Construct the grammar that accepts the following language :
 $L = \{ 0^n 1^{2n} \mid n \geq 1 \}$.

5+5
