

D1ACS2403

(2 Pages)

Name.....

Reg.No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2024
(Regular/Improvement/Supplementary)

COMPUTER SCIENCE
FCSS1C03 – THEORY OF COMPUTATION

Time: 3 Hours

Maximum Weightage: 30

Section A: Short answer questions. Answer any *four* questions. Each carries *two* weightage.

1. Find the DFA that accepts:
i) a^*b+b^*a ii) set of strings over $\{a,b\}$ beginning and ending with a .
2. Define Context Free Grammars with examples.
3. State and prove Chomsky's hierarchy.
4. State and explain Post Correspondence Problem.
5. Define Church Thesis.
6. Explain Homomorphism.
7. State the steps for minimization of DFA.

(4 × 2 = 8 weightage)

Section B: Short essay questions. Answer any *four* questions. Each carries *three* weightage.

8. Explain about leftmost and rightmost derivations of CFG.
9. Describe the closure properties of recursive enumerable languages.
10. Explain the properties of regular languages.
11. Define CNF and GNF.
12. Describe about finite automata with epsilon transitions.
13. With the help of Myhill Nerode theorem, prove that $L = \{a^n b^n \mid n \geq 0\}$ is not regular.
14. Write out the relationships between complexity classes.

(4 × 3 = 12 weightage)

(P.T.O.)

Section C: Essay questions. Answer any *two* questions. Each carries *five* weightage.

15. State Cook's theorem. Explain P, NP, NP Completeness classes in detail.
16. Show the equivalence of standard Turing Machine with multitape and non-deterministic Turing machines.
17. Show the equivalence of LBA and Context Sensitive grammar (CSG) with an example.
18. Describe the equivalence of DFA and NFA with an example.

(2 × 5 = 10 weightage)