D 22430   (Pages : 2)

Name...

Reg. No...................................

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, JANUARY 2012

Computer Science

CSC 1C 04—THEORETICAL COMPUTER SCIENCE

(2010 admissions)

Time : Three Hours   Maximum Weightage : 36

Part A

*Answer **all** questions.*
Each question carries 1 weightage.

1. **Define regular expression. Give** one **example.**

2. **Define DFA.**

3. **Explain the term "Homomorphism".**

4. **Define PDA.**

5. **Write an example each of context free and context sensitive grammar.**

6. **Define Context Free Language.**

7. **What is a Turing Machine ?**

8. **Explain Chomsky Hierarchy.**

9. **State Cook's theorem.**

10. **Briefly explain Halting problem.**

11. **Explain resolution.**

12. **State compactness theorem.**

(12 x 1 = 12 weightage)

Part B

Answer any six questions.
Each question carries 2 weightage.

13. **State and explain Kleen's theorem.**

14. **Construct an NFA with three states that accepts the language {ab, abc}*.**

15. **Explain CNF and GNF.**

16. **State closure properties of Context Free Languages.**

17. **Explain Turing acceptable and Turing decidable language classes.**

Turn over

18. Compare standard Turing Machine and Non-deterministic Turing Machine.

19. State closure properties of recursively enumerable languages.

20. Explain post correspondence problem.

21. Explain normal form in propositional calculus.

(6 x 2 = 12 weightage)

Part C

Answer any **three** *questions.*
Each question carries **4** *weightage.*

22. (a) Explin Myhill Nerode theorem and its application.

    (b) Write notes on Boolean Closure properties.

23. (a) State and prove pumping lemma for Non Context Free Language.

    (b) Explain CYK algorithm.

24. (a) Write notes on Context Sensitive Languages.

    (b) Discuss the relationship between Type 0 grammar and Turing Machine.

25. (a) Discuss Church thesis.

    (b) Write a note on NP completeness.

    (c) What is a recursive language ? Explain with example.

26. (a) Explain integer programming from the point of computational complexity.

    (b) Write notes on undecidability.

27. Write notes on :

    (a) Herbrand's expansion theorem.

    (b) Skokelm theorem.

    (c) Resolution in prepositional calculus.

(3 x 4 = 12 weightage)