

M.Sc.- I (Computer Science) (NEP Pattern) Semester-I
NEP-24-3 / 01MSCCS04.3 - Paper-IV - Elective-III : Theory of Computation & System Programming

P. Pages : 2

Time : Three Hours



GUG/W/23/15083

Max. Marks : 80

- Notes :
1. All the questions are compulsory and carry equal marks.
 2. Draw neat and labelled diagram whenever necessary.
 3. Avoid vague answer and write specific answers relevant and specific to questions only.

Either:

1. a) Construct DFA which accepts languages of all strings over the alphabet $\Sigma = (a, b)$ 8
i) Starting with a and end with b
ii) Contain ab as substring
- b) Prove by the Method of induction on n. 8
i) $\sum_{i=1}^n i = \frac{n(n+1)(2n+1)}{6}$
ii) $\sum_{i=1}^n i = \frac{n(n+1)}{2}$

OR

- c) Explain Mealy Machine with example. 8
- d) Show that the following set is regular 8
 $\{a_1a_3a_5\ldots a_{2n-1} \mid a_1a_2a_3\ldots a_{2n} \text{ is in } L\}$

Either:

2. a) Prove that $L = \{0^p \mid p \text{ is prime}\}$ is not CFL 8
- b) Design a turing machine to recognize set of string with an equal no. of 0's and 1's. 8

OR

- c) Explain Chomsky Hierarchy with the help of diagram. 8
- d) Prove that CFLs are closed under union, concatenation and kleene closure 8

Either:

3. a) Explain briefly Kernal symbol table. 8
- b) Explain Role of device driver in detail. 8

OR

- c) Explain: 8
- i) Security Issue
 - ii) Version Numbering.

- d) Explain phases of compiler in detail. 8

Either:

4. a) Explain Memory Segmentation and Address capitation in detail. 8
- b) What is recursive macros? Explain in detail. 8

OR

- c) What is linking? Explain Relocation and program relocation. 8
- d) Explain processing of Binary, ASCII and BCD data in detail. 8

5. Attempt all the questions.

- a) Explain ambiguous grammar with suitable example. 4
- b) Define PDA, Explain its Block diagram and acceptability of languages by PDA. 4
- c) Write a short note on- Doing it user space explain. 4
- d) Write a short note on linking. 4
