

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/24/15083

Max. Marks : 80

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

Either:

1. a) Construct DFA which accepts language of all string over the alphabet $\Sigma = (a, b)$ 8
i) Starting with a & ends with b
ii) Contain ab as substring.
- b) Simplify following CFG 8
 $S \rightarrow AB \mid CA$
 $B \rightarrow BC \mid AB$
 $A \rightarrow a$
 $C \rightarrow aB / b$

OR

- c) Prove that the class of regular sets is closed under complementation. 8
- d) The grammar G is given as $S \rightarrow SbS \mid a$, show that G is ambiguous. 8

Either:

2. a) Design a PDA for accepting. 8
 $L = \{WCW^R \mid W \text{ is in } (0+1)^*\}$
- b) Explain the following: 8
i) Church's hypothesis.
ii) Unrestricted Grammar.

OR

- c) Design a TM to recognize the language 8
 $L = \{0^n 1^n \mid n \geq 1\}$
- d) Explain the context – sensitive language with suitable example. 8

Either:

3. a) Explain the Role of device drivers in detail. 8
- b) Explain in brief: 8
- i) Module parameter
 - ii) Compiling and Loading.

OR

- c) Discuss the security issues for device drivers. 8
- d) Differentiate between running module and Kernal module. 8

Either:

4. a) Explain CPU architecture of 8086. 8
- b) Explain in brief: 8
- i) General purpose registers.
 - ii) Recursive macros.

OR

- c) What do you mean by Interrupt? Explain their routines. 8
- d) Write a short note on: 8
- i) Linking
 - ii) Functions

5. Attempt all the questions:
- a) State and prove pumping lemma for regular sets. 4
- b) Define Turing Machine with tuples and diagram. 4
- c) Describe Kernal symbol table in detail. 4
- d) Write a note on address computation. 4
