M.Sc.-I (Computer Science) (CBCS Pattern) Semester - II

PSCSCT05 - Paper-I : Theory of Computation & System Programming

P. Pages : 2 **GUG/S/23/11187**

Time : Three Hours * 1 3 6 5 * Max. Marks : 80

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

Either:

1. a) Explain NDFA with E-moves and 2DFA. **8**

b) Prove following language as not Regular $L = \left\{0^{n,n} \mid n \geq 1\right\}$ **8**

OR

c) What is finite state machine? Explain in detail. **8**

d) Construct DFA which accepts languages of all string over the alphabet $\Sigma = (a, b)$ **8**

i) Contain ab as substring.

ii) Contains two consecutive zeros any where in the string 0m $\Sigma = \{0, 1\}$

Either:

2. a) Explain Chomsky Hierarchy with the help of diagram. **8**

b) Explain and define PDA with diagram and Design PDA for language accepting string over $\Sigma = (a, b)$, $L = \left\{a^n b^n \mid n \geq 1\right\}$ **8**

OR

c) Describe the Turing Machine as enumeration. **8**

d) Give a grammar for the language N(M) where $M = \{q_0, q_1\}, \{0,1\}, \{x, z_0\}, \delta, q_0, z_0, \phi\}$ and δ is given by : **8**

$\delta(q_0, 0, z_0) = \left\{\left(q_{0,} xz_0\right)\right\}$, $\delta(q_1, 1, x) = \{(q_1, \in)\}$

$\delta(q_0, 0, x) = \left\{\left(q_{0,} xx\right)\right\}$, $\delta(q_1, \in, x) = \{(q_1, \in)\}$

$\delta(q_0, 1, x) = \left\{\left(q_{2,} \in\right)\right\}$, $\delta(q_1, \in, z_0) = \{(q_1, \in)\}$

Either:

3. a) What are security issues in Device Drivers. **8**

b) Explain phases of compiler in detail. **8**

OR

c) Explain the various class of devices and modules. **8**

d) Differentiate between Kernel Module and application. **8**

Either:

4. a) Explain the concepts of Loading and Linking in detail. **8**

b) What are different addressing modes? **8**

OR

c) What are interrupts? Explain Interrupt service Routines. **8**

d) Explain Instruction set and formats of 8086 microprocessor family. **8**

5. Attempt **all** the questions.

a) Explain Application of Finite state Automata. **4**

b) What is context sensitive language. **4**

c) Describe Kernal symbol table in detail. **4**

d) Explain Role of Assemblers and Macros in detail. **4**

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