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

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

P. Pages : 2 **GUG/W/24/11187**

Time : Three Hours * 4 2 7 9 * Max. Marks : 80

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

Either:

1. a) Explain with suitable example- **8**
i) Ambiguous Grammar ii) CFG

b) Convert the given Regular expression into equivalent DFA. **8**
i) $10+(0+11)0^*1$
ii) $01\left[((10)^*+111)^*+0\right]^*1$

OR

c) Consider the grammar **8**
$S \rightarrow aAs \mid a$
$A \rightarrow SbA \mid ba$ for the string
aabbaa
Find:
i) Leftmost derivation
ii) Rightmost derivation

d) Explain the decision algorithm for Regular sets. **8**

Either:

2. a) Design Turing machine for multiplication. **8**

b) Prove that following languages are not CFL's. **8**
i) $L=\left\{a^i b^i c^i \middle| i \geq 1\right\}$ ii) $L=\left\{a^i \middle| i \text{ is prime}\right\}$

OR

c) Design a PDA for accepting **8**
$L=\left\{WCW^R / W \text{ is in } (0+1)^*\right\}$

d) Explain Church's Hypothesis in detail. **8**

Either:

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

b) Explain Kernel Symbol Table in detail. **8**

OR

c) Explain the process of building and running modules in detail. **8**

d) Explain classes of Devices and modules in detail. **8**

Either:

4. a) Enlist and explain general purpose registers in 8086 microprocessor. **8**

b) What is loader? Explain loading schemes in detail. **8**

OR

c) Elaborate the overview of compilation process. **8**

d) Write a detailed note on Interrupt and their routines. **8**

5. Solve all the questions.

a) Explain Non Deterministic finite automata. **4**

b) Write a short note on context free languages. **4**

c) Explain splitting the kernel in short. **4**

d) Explain in short near and far procedures. **4**

****