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

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

P. Pages : 2 **GUG/S/25/11187**

Time : Three Hours * 1 2 6 0 * Max. Marks : 80

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

Either:

1. a) State and prove the pumping lemma for regular sets. **8**

b) Show that following are not context free languages- **8**

i) $\left\{a^n b^n c^m \middle| n \le m \le 2n\right\}$

ii) $\left\{a^i b^j \middle| j = i^2\right\}$

OR

c) Define CNF and find a grammar in CNF equivalent to- **8**

$S \rightarrow aAbB$

$A \rightarrow aA / a$

$B \rightarrow bB / b$

d) State the 6-Greibach Normal form in detail. **8**

Either:

2. a) What do you mean by Turing Machine? Explain Turing machine is enumerators. **8**

b) Explain PDA and construct a PDA for accepting $\left\{a^n b^m c^n \middle| m, n \ge 1\right\}$ by null Store Construct the CFG for accepting the same set. **8**

OR

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

d) Explain following- **8**

i) Offline Turing Machine

ii) Multistack Turing machine

Either:

3. a) Describe Kernel Symbol table format for debugging. **8**

b) Write a detail note on splitting the kernel. **8**

OR

c) Explain user space device driver and its purpose. **8**

d) Discuss how device driver interact and handle the errors. **8**

Either:

4. a) Write a detail note on memory segmentation. **8**

b) Explain CPU architecture of 8086 family. **8**

OR

c) Write a note on- **8**

i) Instruction set

ii) Addressing modes

d) Explain types of relocation in detail. **8**

5. Solve all the questions.

a) Explain one way finite automata in short. **4**

b) Write a note on Church's hypothesis. **4**

c) Explain the system calls in brief. **4**

d) Write a short note on compilation process. **4**

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