

M.Sc.- I (Computer Science) (CBCS Pattern) Sem-II  
**PSCSCT05 - Paper-I : Theory of Computation & System Programming**

P. Pages : 2

Time : Three Hours



**GUG/W/22/11187**

Max. Marks : 80

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- Notes :
1. All question are compulsory and carry equal marks.
  2. Draw well labelled diagram whenever necessary.
  3. Avoid vague answer and write answers relevant and speech in question.

**Either:**

1. a) Prove by the method of induction on n, 8
- i)  $n! \geq 2^{n-1}$
  - ii)  $\sum_{i=0}^{\sigma} D = \frac{n(n-1)}{2}$
- b) Define Finite Automata. Explain with example about two way finite automata. 8
- OR**
- c) Explain Greibach normal form with example. 8
- d) Explain the decision algorithm for Regular sets. 8

**Either:**

2. a) Prove that CFL'S are closed under union, concatenation and Kleene closure. 8
- b) Design a PDA for Accepting 8
- $$L = \{a^n b^m c^m d^n \mid n, n \geq 1\}$$
- OR**
- c) What is Turing machine? Give the techniques of Turing machine construction. 8
- d) Design Turing Machine to recognize. 8
- $$L = \{a^m, b^n \mid m, n \in \text{Natural no.}\}$$

**Either:**

3. a) Write a note on:- 8
- i) Version numbering
  - ii) Security issues.
- b) What do you mean by Device Drivers? Explain the role of device drivers in detail. 8
- OR**
- c) Explain the phases of compiler in detail. 8
- d) Explain the Kernel symbol table in detail. 8

**Either:**

4. a) What do mean by recursive macros? Explain in details. **8**  
b) Explain CPU architecture of 8086 family. **8**

**OR**

- c) Explain the memory segmentation and address computation in detail. **8**  
d) Write a note on. **8**  
i) Addressing model.  
ii) Instruction set and formats.
5. Solve all the questions.
- a) Write a application of finite automata. **4**  
b) Explain the regular grammar and unrestricted grammar in shortly. **4**  
c) Explain the module parameters. **4**  
d) Explain the Relocation and program relocation. **4**

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