

M.SC. (Computer Science) – I (CBCS Pattern) Second Semester CBCS
PSCSCT05 - Theory of Computation & System Programming Paper – I

P. Pages : 2

Time : Three Hours



GUG/W/18/11187

Max. Marks : 80

- Notes :
1. All questions are compulsory and carry equal marks
 2. Draw neat and labeled diagram and use supporting data whenever necessary.
 3. Avoid vague answer and write specific answer selected.

1. Either :

- a) Construct DFA'S equivalent to the NFA'S $(\{p, q, r, s\}, \{0, 1\}, \delta, p, \{s\})$, 8

States	0	1
p	p, q	p
q	r	r
r	s	--
s	s	s

Fig. Transition Table for δ

- b) Show that following sets are not a Regular sets. 8

i) $L = \{a^n b^n \mid n > 0\}$ is not regular set.

ii) $L = \{a^{2n} \mid n \geq 1\}$ is not regular set.

OR

- c) Convert the grammar with the following productions into CNF. 8

$$S \rightarrow bA / aB$$

$$A \rightarrow bAA / aS / a$$

$$B \rightarrow aBB / bS / b$$

- d) Consider the grammar, 8

$$S \rightarrow aAs \mid a$$

$$A \rightarrow SbA \mid ba \text{ for the string } aabbba$$

find :

- i) Leftmost derivation. ii) Rightmost derivation.

2. Either :

- a) Design a PDA for accepting a Language. 8

i) $L = \{0^n 1^n \mid n \geq 1\}$

ii) $L = \{a^n b^{2n} \mid n \geq 1\}$

- b) Prove that following Languages are not CFL'S. 8
- i) $L = \{a^i b^i c^i \mid i \geq 1\}$ ii) $L = \{a^i \mid i \text{ is prime}\}$

OR

- c) Design a TM to recognize the language. $L = \{0^n 1^n \mid n \geq 1\}$ 8
- d) Design a TM for addition of two positive 'x' and 'y' compute 'x + y'. 8

3. Either :

- a) What is device driver's? Explain Role of Device Driver's. 8
- b) Explain Building & Running modules in details? 8

OR

- c) Explain Interaction & Shutdown in detail. 8
- d) Explain the following terms. 8
- i) Security Issues.
- ii) Module Parameters.

4. Either :

- a) What is Registers? Explain general Purpose Registers in detail. 8
- b) Explain the following terms. 8
- i) Memory Segmentation and Address computation.
- ii) Addressing modes.

OR

- c) What is Instruction? Explain different types of Instruction. 8
- d) What is loader? Explain Loading Schemes in detail. 8

5. Solve all the question.

- a) Explain the applications of finite Automata. 4
- b) Explain the Chomsky Hierarchy. 4
- c) Explain Splitting the kernel. 4
- d) Explain Near & far procedures. 4
