

**B.TECH. SEM -V INFO. TECH. 2014 COURSE (CBCS) : WINTER -  
2017**

**SUBJECT: THEORY OF AUTOMATA AND FORMAL LANGUAGES**

Day : **Thursday**  
Date : **11/01/2018**

**W-2017-2149**

Time **02.30 PM TO 05.30 PM**  
Max.Marks:60

**N.B.**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data if necessary.

- Q.1** a) Construct finite automata to check divisibility by 3 tester for decimal numbers. **(06)**  
b) Compare Mealy machine and Moore machine with example. **(04)**

**OR**

- Q.1** a) Explain process of conversion of Moore machine to Mealy machine **(06)**  
b) Construct DFA for given NFA **(04)**

$\Sigma$ States	0	1
P	{P,Q}	-
Q	R	S
R	S	-
S	S	S

- Q.2** Write a short note on 'pumping lemma for regular expressions'. **(10)**

**OR**

- Q.2** Prove that the language  $L = \{ a^n b^{n+1} \mid n > 0 \}$  is non-regular using pumping lemma. **(10)**

- Q.3** Write a short note on 'Chomsky Hierarchy'. **(10)**

**OR**

- Q.3** Write process of conversion of left linear grammar to right linear grammar with suitable example. **(10)**

- Q.4** Construct PDA accepting strings of type  $1^n 0^{n+2}$  **(10)**

**OR**

- Q.4** Construct PDA for accepting language  $L = \{ a^{2n} \mid n > 0 \}$  **(10)**

- Q.5** Design a Turing machine to increment the value of any binary number by 1. **(10)**

**OR**

- Q.5** Design a Turing machine to check well formedness of parenthesis. **(10)**

- Q.6** Give applications of Turing machine. **(10)**

**OR**

- Q.6** Write detailed applications of automata theory in compiler phases. **(10)**

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