

Department of Computer Science & IT
The Islamia University of Bahawalpur

MCS -3rd - **Morning**
Midterm – 09 June 2016
Instructor: Dr. Nadeem Akhtar

Subject: Theory of Automata and Formal Languages
Time: (1 hr 30 mins.) 90 mins.
(Marks: 50)

<p>Q1. Short questions</p> <p>a) Write the formal definition of Context Free Grammar. Give an example.</p> <p>b) Define Ambiguous Grammar. Give an example.</p> <p>c) Differentiate between the transition function of NFA and DFA. Give an example</p> <p>d) Differentiate between Regular Language and Context-Free Language. Give an example of both</p> <p>e) Differentiate between Regular Expression and Context-Free Grammar. Give an example of both</p> <p>f) Describe the relationship between Regular Expression and Finite Automata.</p>	(30)
<p>Q2. Construct a CFG for the language $\{0^n1^n \mid n \geq 0\} \cup \{1^n0^n \mid n \geq 0\}$</p> <p>Write the derivation of the string 111000 and 0011 in this grammar</p>	(10)
<p>Q3.</p> <p>a) $\Sigma = \{0, 1\}$. Describe the language denoted by the following regular expression.</p> <p>$1^*0 \cup 0^*0$</p> <p>Also construct Finite Automata that recognizes this language</p> <p>b) $\Sigma = \{a, b\}$. Describe the language denoted by the following regular expression.</p> <p>$a(a \cup b)^*aba$</p> <p>Also construct Finite Automata that recognizes this language</p>	(10)