

**ArsDigitaUniversity**  
**Month8:TheoryofComputation**  
**ProfessorShaiSimonson**

**Exam2(50points)**

**1.\_\_\_\_\_ (10points)**

**2.\_\_\_\_\_ (18points)**

**3.\_\_\_\_\_ (7points)**

**4.\_\_\_\_\_ (15points)**

**Total\_\_\_\_\_ (50p oints)**



## 2. Name that Set (18 points)

Decide which of the sets below is Deterministic Context Free, Context Free or not Context Free. Prove your answers.

a. The complement of  $0^{2n}1^{3n} \cap 0^n1^{2n}$ .

b.  $\{0^i1^j0^{j+k}1^{i+j+k} \mid i, j > 0\}$ .

c. The set of all strings  $0^i1^j2^k$  where either  $i=j+k$  or  $k=i+j$ .

### 3. Parsing (7 points)

a. Decide whether or not the grammar below generates 001100.

$S \rightarrow SAB|e$   
 $A \rightarrow 0S1|CD|e$   
 $B \rightarrow 1S0|e$   
 $C \rightarrow BC|AC|0$   
 $D \rightarrow CD$

b. Write a grammar that generates all binary strings that have more 0's than 1's.

