

Kenmerk : TW2015/DWMP/010/ha

Course : **Discrete Mathematics for Technical Computer Science**

Date : October 3, 2016

Time : 08.45–09.45 hrs

**Motivate all your answers. The use of electronic devices is not allowed.
A formula sheet is included.**

In this exam: $\mathbb{N} = \{0, 1, 2, 3, \dots\}$.

1. Let $n \in \mathbb{N}$, $n \geq 2$ and let $S = (a_1, a_2, \dots, a_n)$ be a sequence of n real numbers ($a_i \in \mathbb{R}$ for all $1 \leq i \leq n$). Give quantified expressions for the following statements.

(a) [2 pt] All numbers in S are distinct.

(b) [4 pt] Exactly one number in S is equal to 6.

2. [6 pt]

Prove the validity of the following argument using the "Laws of Logic" and the "Rules of Inference".

$$\frac{\neg(p \wedge r) \quad \neg p \rightarrow (q \wedge r)}{\therefore \neg q \rightarrow (p \wedge \neg r)}$$

3. [6 pt]

Let A , B and C be sets in a universe \mathcal{U} . Prove that:

$$A \cup (B - C) = (A \cup B) - (C - A).$$

Total: 18 points