

Sample of midterm test from BE5B01DMG

Give reason to your assertions Maximal gain is 20 point, to pass at least 8 points are necessary.

1. [MAX. ZISK: 4 BODY] Given a formula φ of propositional logic

$$\varphi = (a \Leftrightarrow b) \Rightarrow (c \Rightarrow (a \wedge b)).$$

Decide whether the formula φ is satisfiable; if yes give at least one truth valuation in which φ is true.

2. [MAX. ZISK: 8 BODY] Given a relation R on the closed interval $[0, 4]$ of real numbers by

$$x R y \text{ if and only if } x^2 + y^2 + 1 \leq 2x + 4.$$

(a) [MAX. ZISK: 4 BODY] Decide whether 1 $(R \circ R)$ 2.

(b) [MAX. ZISK: 4 BODY] Decide whether 2 $(R^{-1} \circ R)$ 1.

Answer "yes" or "no" is not sufficient. You have to thoroughly justify your answers.

3. [MAX. ZISK: 8 BODY] In \mathbb{Z}_{501} find all x for which

$$41x = 12.$$

Write on sheets of A4 paper. Write your name and surname on each sheet of paper.