Surname: ..... Forename: ..... MatrNo.: .....

Exam: Mathematics 2

Hamburg University of Applied Science
Faculty of Engineering & Computer Science, Department of Information and Electrical Engineering
Prof. Dr. Robert Heß, July 3rd 2018, duration: 90 Min.
Permitted aids: up to six A4-pages of personal notes (i.e. single sided sheets)

Result: ..... of 100 points Mark: ..... points.

Problem 1 (15 points)

Solve the following integral: $\int x^2 \sin(x)\,\mathrm{d}x$

Problem 2 (10 points)

Evaluate the gradient of the following function: $f(x, y, z) = \sqrt{x^2 + y^2} + \sin(2z)$

Problem 3 (15 points)

Analyse the differential equation $y'x = 1$ by the following steps:

a) Draw the slope field for $y(x)$ on the interval $x, y \in [-2, 2]$

b) Find the solution of $y(x)$

c) Check your result for $y(x)$ by inserting it into the DE

Problem 4 (30 points)

For the differential equation $y''' - 2y'' = 3(y' + x^2 - 1)$ find the general solution $y(x)$.

Problem 5 (10 points)

You choose 6 out of 10 possible people for a volleyball team. How many options do you have?

Problem 6 (20 points)

The length of candles are specified with 100 mm with a tolerance of ±3 mm. For the actual produced candles you discover an average length of 99 mm with a standard deviation of 2 mm. Assuming normal distribution what failure rate in percent do you expect?