Assignment #4

No late assignments accepted!

ECE449, Intelligent Systems Engineering — Fall 2019

Department of Electrical and Computer Engineering, University of Alberta — Dr. Petr Musilek

Points: 10

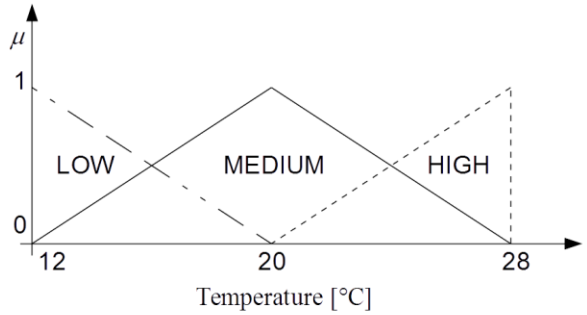
Due: Thursday, October 10, 2019, 3:30 PM, in the assignment box in the ETLC atrium

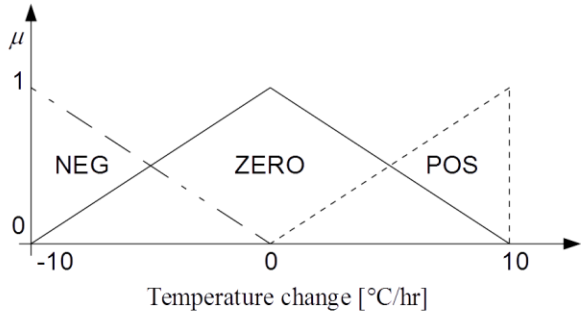
Note: Show your work! Marks are allocated for technique and not just the answer.

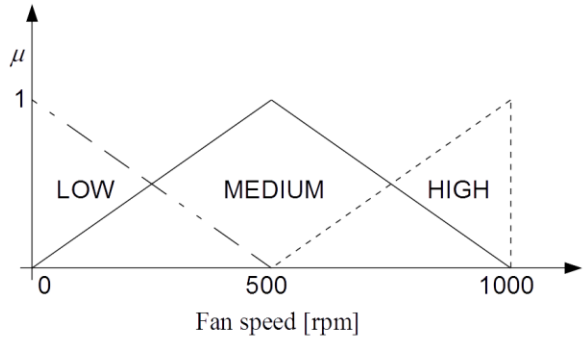
Student Name:

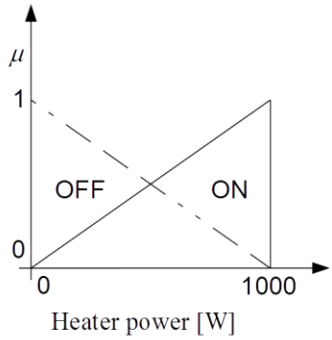
ID Number:

1. [10 marks] A fuzzy system is used to control the temperature in a room. The inputs to the controller are the 'Temperature' and 'Temperature change'. The outputs are the 'Fan Speed' and 'Heater power'. The membership functions are shown in the following figures









and the rule base is described by the following table

	LOW	**MEDIUM**	**HIGH**
NEG	LOW/ON	ON/LOW	MEDIUM/ON
ZERO	LOW/ON	LOW/OFF	MEDIUM/OFF
POS	LOW/OFF	MEDIUM/OFF	HIGH/OFF

If the temperature is 22° C and the change of temperature is 4° C/hr, answer the following questions:

a) What is the result of fuzzification of those inputs?

b) Use the rules and Mamdani inference to specify the output fuzzy membership functions.

c) Calculate the 'Heater power' and 'Fan speed' using your choice of defuzzification method.