



### Försättsblad Prov Original

Kurskod	Provkod	Tentamensdatum
M T O 1 9 A	T 1 0 1	2 0 1 8 - 0 6 - 0 4
Kursnamn	Maskinteknik AV, Mekanik	
Provnamn	Tentamen	
Ort	Sundsvall	
Termin	V18	
Ämne	Elektronik	

# Exam in “Mechatronics”

Course: “Mechatronics”: MT019A

Date: 4th of June, 2018

Examiner: Peng Cheng Office Tel: 010-1428495

Requirement: write **very clear letters** on paper, write **only one question** per page!!!

Allowed to use: Pen (**not pencil!**), eraser, ruler. **Pocket calculator is not allowed!**

Marks: Each question has the same mark.

Number of marks (p)	Grade
>=26	A
>=22	B
>=18	C
>=14	D
>=10	E (Approved) ☺
<10	F

- 1) What is a mechatronic system? What are the key elements of a mechatronic system? Give out at least **two** everyday examples of mechatronic system.(2p)
- 2) Convert the decimal numbers 5 and 15 to hex and binary format. (2p)
- 3) Calculate the results with sub-steps for logical expression: (A AND B) OR (NOT C), for A=1, B=1, C=0 (2p)
- 4) What are the differences between the combinational logic design and sequential logic design? (2p)
- 5) What is an operational amplifier? And what characteristics an ideal op-amp has? (2p)
- 6) What are low-pass and high-pass filter used for? And what is the difference between them? (2p)
- 7) What are the functions of an ADC and a DAC? And how many different outputs are possible from a 4bit ADC? (2p)
- 8) What is aliasing? And how to avoid it? (2p)
- 9) What is a rotary optical encoder typically used for? What is a proximity sensor used for? (2p)
- 10) What is the difference between a solenoid and a relay? (2p)
- 11) What are the differences between a brushless permanent magnet motor and an induction motor? And in order to control a motor, what will change if you change its operating voltage and current? (2p)
- 12) What is a servo motor?(2p)
- 13) What is the major advantage of a hydraulic drive system in comparison to electrical drive system in application? (2p)
- 14) What are the purpose and the function of a control system? (2p)
- 15) What factors are in consideration when you analyze a control system design for stability? (2p)