TTE-5326: Factory Communication Systems
2009-10 Academic Year
Exam date: December 14th, 2009
Prof. Dr. Jose L. Martinez Lastra (Department of Production Engineering/Tampere University of Technology)

Name: _____
Student number: _____

Return THESE sheets together with your answer sheets

Comments:
There are 5 questions. You can score a max of 6 points for each question.
*Course 532**6** = Only English! Dictionary is allowed during exam*

Questions

1. A) Describe OSI model.

   B) Where TCP/IP and UDP protocols can be mapped in this model? Which of the mentioned protocols could be a better choice for the factory networks, why?

   C) Where CAN protocol is located in the OSI model?

2. A) Describe flow control principles: '**sliding window**' and '**stop & wait**'. When and why each of these principles can be selected?

   B) Describe **Pulse Code Modulation** principles. What effect makes a 1-bit change in the length of the code? When and why the application of **non-linear coding** can be considered?

3. A) What are the **differences** between sensor networks, fieldbus networks, control networks and safety buses?

   B) Give examples of **message-oriented** and **I/O-oriented protocols**. List benefits and drawbacks of message- and I/O-oriented protocols.

4. A) Compare **DeviceNet** and **Interbus** communication technologies. Name the key points for choosing one or another technology.

   B) What is the purpose of the **Communication Profile Families**?

5. Explain briefly and concisely the following:

   A) Main idea behind ISA100 and its relevance for Factory Communication Systems?

   B) Channel hopping schemes used in ISA100 (mention the differences between schemes).

   C) How ISA100 deals with the delivery of critical and non-critical messages?

Please do not forget to write your name and student number!