X-exam in Mechatronics 2003-05-30

Grades: 0-9p: 1, 10-19p: 2, 20-29: 3, 30-39: 4, 40-50: 5.

1

a) What is the difference between directives, standards and harmonized standards? (1p)
b) Identify three ways to minimize ground impedance in circuits. (2p)
c) In what end of a shielded cable is it recommendable to ground the shield, if only the equipment in one end is grounded. (2p)

2

a) In what order does the following items appear in a project: A: Initiation, B: Implementation and Construction, C: Comissioning and handover , D: Design and development. (2p)
b) What is a "baseline" in a project? (2p)
c) Explain the entities Earned value, Budget at completition, Slippage and Overrun. (2p)

3

a) In what order does the followin items appear in a Development process: A: Detailed Design, B: Production ramp-up; C: Concept development, D: System level design, E: Planning, F: Testing and refinement. (2p)
b) Name five (5) steps in a concept generation procedure. (2p)

4

a) What is the difference between a crystalline and amorf structure of a material? (2p)
b) Define the entities "Modulus of elasticity", "Yield strength" and "Tensile strength" by drawing a stress-strain-curve. (2p)
c) Rank the following materials in terms of "Youngs modulus"; Elastomeres, Nylons, Glass, Steel, Ceramics. (2p)
d) Name at least 5 different methods for shaping an object. (2p)

5

a) Propose one method to minimize inductances in capacitive circuits. (2p)
b) What is a servo motor? (2p)
c) Name two position sensor types. (2p)
d) Name two current sensor types/principles. (2p)

6

a) How many layers constitutes the OSI-model for communication? (2p)
b) What is the difference between a LAN and a Fieldbus? (2p)
c) Name the most important features of Terfenol-D. (2p)
d) What is a FPGA? Describe with a few words. (1p)
e) What is a PLC? Describe with a few words. (1p)
f) What is a DSP? Describe with a few words. (1p)
g) Name at least three possible reasons for delays and jitter in real time control systems. (2p)
h) What is Java? (2p)

7

a) What is FEM? (2p)

b) Define the words *Preprocessor*, *Solver* and *Postprocessor*. (2p)

c) What does “integrated analysis” mean in a design process? (2p)