DHBW
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- Comprehension Questions -

Industry 4.0 - Smart Factory
TWIE23

Industrial Engineering

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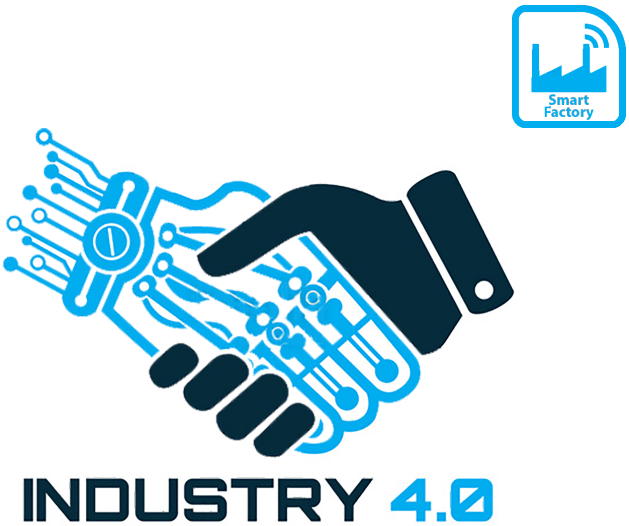

Contents

CHAPTER 1

Smart Factory - Motivation and Definition

1.1 Comprehension Questions

1. Name three advantages that benefit customers in the smart factory:

2. How can these goals be achieved?

3. From a physical point of view, what components does a CPS consist of?

4. What does the abbreviation CPPS stand for?

5. Name three characteristics of CPPS:

6. Name three advantages of active workpiece carriers:

CHAPTER 2

Development of Automation

2.1 Comprehension Questions

1. In which direction does the level of detail in the automation pyramid increase?

2. What characterises **central** control?

3. Give three examples of how the future is negatively changed by using CPS systems:

4. What does the future development mean for the employees?

CHAPTER 3

Technological Fundamentals and Standards

3.1 Comprehension Questions

1. Name the two most important auto-ID techniques for objects:

2. What does the abbreviation RFID stand for?

3. Which two barcode versions are used for identification?

4. What is the meaning of the abbreviation (OMG)?

5. Which modelling languages do you know?

CHAPTER 4

Basic Concepts of a Smart Factory

4.1 Comprehension questions

1. How do production companies respond to order fluctuations?

2. Which two classical actors are involved in the value creation process?

3. Which actors are new?

4. What does the abbreviation MTI mean?

5. Why is big data important in smart services?

CHAPTER 5

Reference Architecture

5.1 Comprehension Questions

1. What is reference architecture?

2. In which areas are reference architectures used in the production process?

3. How is innovation created through standardisation?

   Innovations are promoted by:

CHAPTER 6

Smart Factory Engineering

6.1 Comprehension Questions

1. What is CASE?

2. Name the 2 classes of engineering tools:

3. Name 3 objectives of Virtual Engineering:

4. What is UCD?

5. What is requirements engineering?

6. What is meant by modelling?

7. What advantages do smart products offer?

8. In which 3 core elements can product solutions be divided?

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CHAPTER 7

Digital Twin

7.1 Comprehension Questions

1. How is a digital twin defined?

2. What are the different types of digital twins?
   Name at least three.

3. Which three parts does a digital twin consist of?

4. Name two opportunities and two risks in using digital twins.

5. What kind of possibilities are conceivable in the future?

6. Future challenges of digital twins?

CHAPTER 8

Security Risks in the Smart Factory

8.1 Comprehension Questions

1. Which two risk areas do you know about in smart factories?

2. Why are production plants particularly at risk in terms of safety?

3. What is the BMWi?

4. Name 3 proposals for action by the BMWi against hacker attacks?

5. What do you call the collected techniques that lead to the brainstorms?

CHAPTER 9

Sustainability in Production

9.1 Comprehension Questions

1. How can the term sustainability be described?

2. What are the effects of missing out on the idea of sustainability?
   Name at least three.

3. What types of sustainability are there?

4. Name two opportunities or advantages of a sustainable product policy.

5. What are the goals of sustainable production? Name at least three:

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6. Name 3 alternative environmental and efficiency technologies:

7. Briefly explain the concept of Product Carbon Footprint.

8. What is Sustainable Supply Chain Management?

9. Briefly explain the circular economy and name three advantages.

10. Briefly explain what material flow management is. What steps are required to create the flow chart of a material flow analysis?.

11. Why is Siemens a pioneer in the field of sustainability? What measures have been taken to reduce emissions? Name three.

CHAPTER 10

Smart Logistics

10.1 Comprehension Questions

1. Name four advantages of digital transformation in the logistics sector:

2. How can logistics meet the increased customer requirements?

3. Name three ways in which logistics can use IT to become more customer-focused:

4. What characterises digital supply chain management?

5. How do predictive analytics and prescriptive analytics differ?

CHAPTER 11

IO Link

11.1 Comprehension Questions

1. On which automation level are IO-Link sensors and actuators located?

2. Who develops and manages the IO-Link brand?

3. In which operating modes can IO-Link sensors be operated?

4. What different data does an IODD contain?

5. Which different data are sent cyclically or which data packets are sent acyclically?

6. What are the advantages of IO-Link technology?