DHBW
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- Comprehension Questions -

Industry 4.0 - Digital Transformation
TWIE23

Faculty Industrial Engineering

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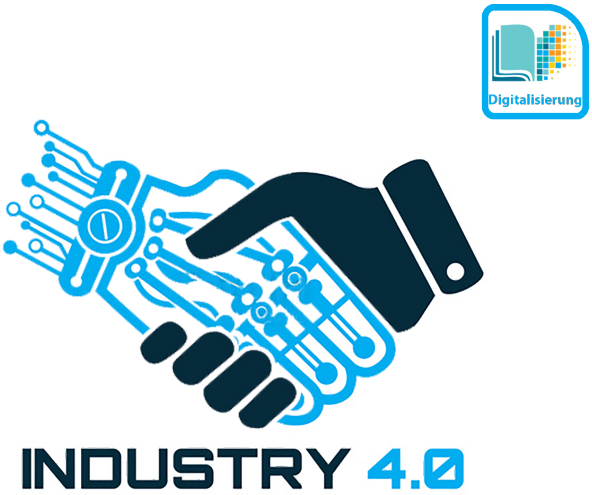

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KAPITEL 1

Digital Transformation

1.1 Comprehension Questions

1. How do Big Data and Smart Data differentiate?

2. Name the three stages in which the digital transformation works from a company's perspective:

3. What was the start for the digital transformation?

4. Give three examples of enabler technologies:

5. In which five steps can the digital transformation be successfully implemented in companies?

6. What is predictive analytics?

7. Name the four levers through which the digital transformation works:

KAPITEL 2

Disruptive Technologies

2.1 Comprehension Questions

1. Describe in your own words the theory of disruptive technologies.

2. According to which two types do you categorize disruptive technologies?

3. Give three examples of disruptive technologies.

4. How can already established market players protect themselves against disruptive innovations?

5. What alternative model regarding innovation management do you know?

KAPITEL 3

Autonomous driving and risk ethics

3.1 Comprehension Questions

1. How should the term „autonomy“ be understood in the field of autonomous driving?

2. How can the decline in traffic fatalities be explained? Please provide at least three examples.

3. What does the concept called „Semulin“ entail?

4. What question arises when considering the causes of errors in road traffic from a risk-ethical perspective with regard to the use of autonomous vehicles?

5. How will the decision-making process change in autonomous driving?

6. What is meant by the term „crash optimization “?

KAPITEL 4

Artificial Intelligence

4.1 Comprehension Questions

1. What are the main subfields of artificial intelligence?

2. What does the “Turing Test“ state?

3. At what point is a system considered intelligent according to Ertel?

4. How does a weak AI differ from a strong one?

5. What are the three ways of learning in machine learning?

6. When is deep learning preferred over machine learning?

7. What does the research field of neural networks take as a model?

KAPITEL 5

Extended Reality (XR)

5.1 Comprehension Questions

1. What is meant by the term “immersion“?

2. What do “AR“ and “VR“ mean, and how do the representations of objects differ between these technologies?

3. How is the term reality defined, from which language does the term derive, and how does it differ from virtuality?

4. What area does XR technology come from, and what factors have enabled its wider use?

5. Name a commercial use of AR and a benefit that results from its use.

6. Name one application area in industry for each of VR, MR, and AR technology and explain three advantages of each of the three application areas.

7. Explain a specific example from the industry where the company has benefited from implementing XR technology.

8. Name two opportunities that arise from the use of XR and one risk. Provide a suggestion for how the risk could be counteracted.

KAPITEL 6

Blockchain Technology

6.1 Comprehension Questions

1. What is a blockchain and how does it ensure digital trust?

2. Name one benefit and one risk of using blockchain in supply chains.

3. What does each block in a blockchain contain?

4. Name two main differences between Proof of Work and Proof of Stake.

5. What is a hash function used for in blockchain?

6. Explain the difference between public and private blockchain networks.

7. What does the Merkle root represent in a blockchain block?

KAPITEL 7

Cryptocurrencies

7.1 Comprehension Questions

1. Why are cryptocurrencies not a currency by definition?

2. Explain the term ßcalabilityïn relation to cryptocurrencies in your own words. Why is scalability important?

3. Explain the possibilities of M2M transactions using a self-selected example.

4. List four possible areas for the application of self-sovereign identity management:

5. Assign the associated unique selling proposition to the cryptocurrency.

1.Bitcoin	a) Developed according to academic standard
2.Tether	b) Private operator that finances itself by issuing new XRP0
3.Cardano	c) Rooted in real values
4.IOTA	d) Soon changeover of the consensus algorithm
5.Ethereum	e) maximum 21 Mio. units possible
6.Ripple	f) Focus on M2M communication

6. What is the time limit for taxing the profit from trading cryptocurrencies?

7. Name one risk of cryptocurrencies and explain it.

KAPITEL 8

The Working World of the Future - Work 4.0

8.1 Comprehension Questions

1. What are the challenges resulting from demographic change?

2. Which areas of activity are least affected/threatened by automation and digitalization?

3. How can the concept of social partnership help to facilitate a socially acceptable transition to the world of work 4.0?

4. What are the disadvantages of the unconditional basic income?

5. Name two positive consequences of automation in the context of Work 4.0.

KAPITEL 9

Big Data

9.1 Comprehension Questions

1. How is Big Data defined?

2. What is an algorithm?

3. What are the benefits of Big Data? Name two with a short explanation.

4. What is the biggest risk that Big Data brings? (short explanation)

5. What is predictive analytics?

6. Give three examples of where Big Data is being used.

KAPITEL 10

Medicine 4.0

10.1 Comprehension Questions

1. Explain why digitalization of the healthcare system is essential in the future.

2. Name three challenges of digitalization in the healthcare system.

3. Define the term **interoperability**.

4. Name the 5 areas into which eHealth can be divided.

5. How much money could be saved annually in Germany through a digitized healthcare system?

6. Describe the changes that have taken place from Hospital 1.0 to Hospital 4.0.

Explain how the role of the doctor will change in Hospital 4.0.

7. Nennen Sie 4 Systeme, die in der Pflege eines digitalisierten Krankenhauses vorhanden sind.

8. Describe the risks associated with the digitalization of the healthcare system.

9. Name the three areas of telemedicine.

10. How will the digitalization of healthcare develop in the future?

KAPITEL 11

Digital Administration

11.1 Comprehension Questions

1. Describe in your own words what is meant by digital administration.

2. What advantages does e-government offer the population?

3. Name two laws that enable digitalization?

4. How can the transition to a fully digital administration in Germany be successful?

5. What technologies do you know that are transferable to government administration?

6. Explain the extent to which blockchain is of interest to government.

KAPITEL 12

Cultural Digitization

12.1 Comprehension Questions

1. What is ”Kultur Digital”?

2. What are digital serious games?

3. How do NFTs behave with their value?

4. What can be said, in simple terms, about the ownership of a digital work of art?

5. What was the question that arose at the end of the experiment #change of ideas?

6. What types of funding are available from the Federal Cultural Foundation?

7. What is Soundgraph 3.0?

KAPITEL 13

Cloud-Computing

13.1 Comprehension Questions

1. What are the 5 technology characteristics that define cloud computing?

2. What is the meaning of the abbreviation SaaS / PaaS / IaaS?

3. How is cloud computing structured?

   -
   -
   -

4. What other technologies are available besides cloud computing?

5. What means the abbreviation ADV?

KAPITEL 14

Roboter in der Smart Factory

14.1 Comprehension Questions

1. What is meant by additive manufacturing??

2. What is the central role of robotics in the smart factory?

3. In which decade were the first industrial robots introduced?

4. How does ISO 8373:2021 define an industrial robot?

5. How many degrees of freedom does a rigid body have in three-dimensional space, and what movements are these?

6. Name three typical tasks of industrial robots in industry.

7. Which type of robot is particularly suitable for high-speed pick-and-place tasks in the food industry?

8. What advantages do cobots offer in industrial production?

KAPITEL 15

Additive Fertigung in der Industrie 4.0

15.1 Comprehension Questions

1. What is meant by additive manufacturing??

2. How does additive manufacturing differ from subtractive processes?

3. Which file forms the basis for additive manufacturing?

4. Name two advantages of additive manufacturing compared to traditional manufacturing processes.

5. What is meant by Rapid Prototyping (RP)?

6. Briefly describe the working principle of Material Jetting.

7. What role does the powder bed play in Binder Jetting and Powder Bed Fusion?

8. What challenges exist in industrial serial production with additive manufacturing?

9. How does additive manufacturing support Industry 4.0?