22EM117

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RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU)

I Semester B. E. Examinations May-2023

Common to all programs

ELEMENTS OF INDUSTRY 4.0 (ELECTIVE)

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. Question number 2 is compulsory. Choose any one full question from 3 or 4, 5 or 6, 7 or 8 and 9 or 10.

PART-A

1	1.1	Benefits of Industry 4.0 are _____.	02
	1.2	Features of 2nd industrial revolution are _____.	02
	1.3	Differences between IoT and IIoT are _____.	02
	1.4	Challenges for implementation of Industry 4.0 in *MSMEs* are _____.	02
	1.5	Vertical integration means _____.	02
	1.6	*IT – OT* convergence helps in _____.	02
	1.7	*TPM* refers to _____.	01
	1.8	Digital twin means _____.	02
	1.9	Examples of digital twin are _____.	01
	1.10	A virtual factory is useful for _____ cases.	02
	1.11	Industry 5.0 means _____.	02

PART-B

2	a	Discuss the design principles of Industry 4.0.	08
	b	"Behind the concept Industry 4.0 there is no such thing link one, new single 'Industry 4.0 technology'. It is more the continuous progress of information and communication technology in combination with an exponential groeth of computing, transmission, and storage capacity, which enables the emergence of increasingly powerful, interconnected new technological systems". Explain.	08
3	a	"*M2M* Communication interfaces can be differentiated by their operating range and physical installation, which includes either a wired or wireless communication". Present the different types of communication technologies within the industrial environment.	08
	b	"If you expect to benefit from serious analytics work you will certainly need skilled data scientists, process engineers, and electromechanical engineers." Explain.	08
		OR	
4	a	Discuss the End-to-end integration of the complete value chain.	08
	b	Discuss the typical sensors in Industry 4.0 context.	08

5	a	With a suitable sketch, explain Stereolithography.	08
	b	Explain various applications of additive manufacturing.	08
		OR	
6	a	Discuss industrial applications of *AR*.	08
	b	Explain *AR* Hardware and Software technologies.	08
7		Discuss typical cyber challenges in the following industries a) Finance b) Energy c) Healthcare d) Transportation	16
		OR	
8	a	Explain the role of Cloud and Edge computing.	08
	b	"Corresponding real factory with most of its features and operations should be represented in a virtual factory. A variety of software is used to create a virtual factory". Explain various softwares or the same with features.	08
9	a	Explain energy supply for Intelligent Objects.	08
	b	Discuss Autonomy in Intelligent system.	08
		OR	
10	a	Explain the Technology potential of various Intelligent Objects in production logistics.	08
	b	Discuss Automatic identification and localization in intelligent objects.	08

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RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU)

I/II Semester B. E. Examinations Oct-2023

Common to all programs

ELEMENTS OF INDUSTRY 4.0 (ELECTIVE)

Time: 03 Hours *Maximum Marks: 100*

Instructions to candidates:

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. Question number 2 is compulsory. Choose any one full question from 3 or 4, 5 or 6, 7 or 8 and 9 or 10.

PART-A

1	1.1	How is Industry 4.0 different from previous industrial revolutions?	02
	1.2	What are the challenges of implementing Industry 4.0?	02
	1.3	What are some creative applications of virtual reality for entertainment purposes?	02
	1.4	What kind of hardware is required to experience virtual reality?	02
	1.5	How do you choose the right cloud computing provider?	02
	1.6	What are the advantages of using cloud computing?	02
	1.7	How does artificial intelligence differ from human intelligence?	02
	1.8	How do machines learn in artificial intelligence?	02
	1.9	What is a digital twin and how is it created?	02
	1.10	How can digital twins be used to predict and prevent equipment failures?	02

PART-B

2	a	What are the reasons behind the adoption and implementation of industry 4.0 in manufacturing and production industries?	08
	b	Write a note on various industrial revolutions.	08
3	a	What is the industrial internet of things (IIoT) and how is it transforming the manufacturing industry?	08
	b	What are the opportunities and challenges faced by businesses in adapting to Industry 4.0 technologies?	08
		OR	
4	a	What skills will be important for individuals to posses in order to thrive and succeed in the rapidly advancing Industry 4.0?	08
	b	What is machine to machine communication and how does it facilitate automated data exchange between devices?	08
5	a	How do Digital Integration Platforms streamline business processes and improve communication between various systems and applications?	08

	b	What are the main differences between augmented reality and virtual reality and how are these technologies being used in various industries?	08
		OR	
6	a	What are the benefits and limitations of using Ar and *VR* technologies for training purposes?	08
	b	What are the latest advancements in additive manufacturing technologies and how have they revolutionized the production process in various industries?	08
7	a	How can *MSMEs* adapt to the advancements of Industry 4.0 in order to stay competitive in their respective industries?	06
	b	What are the advantages and disadvantages of utilizing a combination of cloud and edge computing in a data driven business?	06
	c	What steps can individuals and companies take to protect themselves from cyber-attacks and ensure their online safety?	04
		OR	
8	a	What are the benefits and challenges of *IT* and *OT* convergence?	08
	b	What are the emerging technology paradigms in production logistics and how are they changing the way business operator?	08
9	a	What are the key benefits of implementing an intelligent conveyor system in a manufacturing facility?	08
	b	What are the key features of an intelligent production machine and how do they enhance efficiency and production in the manufacturing process?	08
		OR	
10	a	What are some examples of user-oriented functions in intelligent objects, how do these functions enhance the user experience?	08
	b	What are the product oriented functions available in intelligent objects, and how do they enhance the functionality of these objects?	08