Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering
End Sem Examination Dec-2023
RA3EL06 Industry 4.0

Programme: B.Tech. Branch/Specialisation: RA

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. What is/are the essential components of a smart factory? **1**

(a) Smart Machines (b) People at Work

(c) Trained Personnel (d) All of these

ii. When did the first industrial revolution take place? **1**

(a) Seventeenth Century

(b) Eighteenth Century

(c) Nineteenth Century

(d) Twentieth Century

iii. What are the applications of AI in Airbus? **1**

(a) Improve the productivity of the manufacturing process

(b) Increase the amount of raw materials required

(c) Decrease the cost of per unit product

(d) Minimize the time required for production

iv. Which of the following statements is true? **1**

(a) IoT is a subset of IIoT

(b) IIoT is a subset of IoT

(c) All the devices in IoT are connected to the internet

(d) All IIoT devices are connected to the internet

v. The automation of communication between devices, with no human intervention. **1**

(a) Sensor (b) Machine to Machine (M2M)

(c) Big data (d) Wearables

vi. The second level in the traditional automation pyramid is- **1**
(a) ERP
(b) Manufacturing Execution System (MES)
(c) Process level control
(d) Production level

vii. In the digital age what two major inventions changed production and paved the way to automation- **1**
(a) Model control systems
(b) Switches and relays
(c) Programmable Logic Controllers (PLC) and robots
(d) Process automation

viii. As per the proposed framework for industry 4.0, which of the following technologies fulfil the decentralization design principle? **1**
(a) Adaptive robotics
(b) Data analytics & artificial intelligence
(c) Cyber security
(d) None of these

ix. A virtual copy of the smart factory which is created by linking sensor data with virtual plant models and simulation models well known as- **1**
(a) Virtualization (b) Modularity
(c) Decentralization (d) Real-time capability

x. Flipkart is looking at robotics to improve efficiency in- **1**
(a) Production (b) Delivery
(c) Warehouses (d) None of these

Q.2 i. What is Industry 4.0? **2**
ii. What is the difference between Industry 4.0 and the Internet of Things (IoT)? **3**
iii. Elaborate technologies behind Industrial revolution 4.0. **5**
OR iv. What are Cyber-Physical Systems? Explain in detail. **5**

Q.3 i. What is cloud computing & its role. **2**
ii. Write a short note on artificial intelligence with reference to Industry 4.0. **8**
OR iii. What is big data? Write applications of big data. **8**

Q.4 i. Define RPA. **3**
ii. Explain Human-Robot Collaborative Manufacturing. **7**
OR iii. Write a note on industrial robotics application on manufacturing, maintenance and assembly. **7**

Q.5 i. Explain cyber security in Industry 4.0. **4**
ii. Write a short note on cyber security challenges and solution in smart factories. **6**
OR iii. Explain the concept of virtual & augmented reality. **6**

Q.6 Attempt any two:
i. Write the short notes on smart logistic **5**
ii. Explain industrial IoT platforms & ecosystems **5**
iii. Explain predictive maintenance & conditioning monitoring. **5**

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Marking Scheme
RA3EL06 (T) Industry 4.0

Q.1	i.	(a) Smart Machines		**1**
	ii.	(b) Eighteenth Century		**1**
	iii.	(a) Improve the productivity of the manufacturing process		**1**
	iv.	(b) IIoT is a subset of IoT		**1**
	v.	(b) Machine to Machine (M2M)		**1**
	vi.	(b) Manufacturing Execution System (MES)		**1**
	vii.	(c) Programmable Logic Controllers		**1**
	viii.	(b) Data analytics & artificial intelligence		**1**
	ix.	(a) Virtualization		**1**
	x.	(c) Warehouses		**1**
Q.2	i.	Industry 4.0	(As per explanation)	**2**
	ii.	Difference between Industry 4.0	(As per explanation)	**3**
		The Internet of Things (IoT)	(As per explanation)	
	iii.	Technologies….. revolution 4.0.	(As per explanation)	**5**
OR	iv.	Cyber-Physical Systems	(As per explanation)	**5**
Q.3	i.	Cloud computing	1 Mark	**2**
		Its role.	1 Mark	
	ii.	Artificial …… Industry 4.0.	(As per explanation)	**8**
OR	iii.	What is big data	3 Marks	**8**
		Applications of big data.	5 Marks	
Q.4	i.	Define RPA.	(As per explanation)	**3**
	ii.	Human-Robot Collaborative	3 Marks	**7**
		Manufacturing with HRC.	4 Marks	
OR	iii.	Industrial ….. manufacturing	4 Marks	**7**
		Maintenance and assembly.	3 Marks	
Q.5	i.	Explain cyber security in Industry 4.0.	(As per explanation)	**4**
	ii.	Cyber security challenges	3 Marks	**6**
		Solution in smart factories.	3 Marks	
OR	iii.	The concept of virtual	3 Marks	**6**
		Augmented reality.	3 Marks	
Q.6		Attempt any two:		
	i.	Smart logistic	(As per explanation)	**5**
	ii.	Industrial IoT platforms	3 Marks	**5**
		Ecosystems	2 Marks	
	iii.	Predictive maintenance	3 Marks	**5**
		Conditioning monitoring.	2 Marks	

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