|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Roll No. |  |  |  |  |  |  |  |  |  |  |  |  |



**PRESIDENCY UNIVERSITY**

**Bengaluru**

|  |
| --- |
| **End - Term Examinations – JANUARY 2025** |
| **Date:** 04 - 01-2025 **Time:** 09:30 am – 12:30 pm |

|  |  |  |
| --- | --- | --- |
| **School:** SOCSE | **Program:** B.Tech - CIT | |
| **Course Code :** ECE3086 | **Course Name :** Industrial Internet of Things | |
| **Semester**: VII | **Max Marks**: 100 | **Weightage**: 50% |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | 26 | 27 | 23 | 24 | NA |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Answer ALL the Questions. 10 x 2 Marks=20 Marks** | | | | |
| **1** | List in any case two ways that IIoT and IoT differ from one another. | **2 Marks** | **L1** | **CO1** |
| **2** | Give a brief explanation of the IoT "smart city" concept. | **2 Marks** | **L2** | **CO1** |
| **3** | Provide a concise overview of the Industrial Internet concept, including the protocols and application domain. | **2 Marks** | **L2** | **CO1** |
| **4** | Elucidate the notion of Cyber Physical System within the Internet of Things area. | **2 Marks** | **L1** | **CO2** |
| **5** | List the four fundamental IIoT implementation structures. | **2 Marks** | **L1** | **CO3** |
| **6** | Explain the advantages of industrial automation in modern factories and manufacturing workshops. | **2 Marks** | **L2** | **CO3** |
| **7** | Analyze how OT and IT vary from an IIoT standpoint. | **2 Marks** | **L3** | **CO3** |
| **8** | Enumerate a minimum of six benefits of industrial automation in contemporary manufacturing facilities. | **2 Marks** | **L3** | **CO3** |
| **9** | List the three types of services that the cloud of things offers. | **2 Marks** | **L4** | **CO4** |
| **10** | Discuss briefly about the pros and cons of using AR and VR in workplace safety. | **2 Marks** | **L4** | **CO4** |

**Part B**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Answer the Questions Total 80 Marks** | | | | | |
| **11.** | **a.**  **b.** | What are interconnected factories? Briefly elucidate the impact of networked factories on future industries.  Describe the idea of future smart factories in the context of the Internet of Things. | **5**  **Marks**  **5**  **Marks** | **L1**  **L1** | **CO1**  **CO1** |
| **or** | | | | | |
| **12.** | **a.**  **b.** | Elucidate the notion of future factories. What are the essential components required for the implementation of future factories?  Provide a brief overview of the Industry 4.0 approaches that must be used for the IIoT. | **5**  **Marks**  **5**  **Marks** | **L1**  **L1** | **CO1**  **CO1** |
|  |  |  |  |  |  |
| **13.** | **a.**  **b.** | Draw the overall IIoT reference model as proposed by ITU, distinctly depicting the vertical and horizontal layers.  Specify the general architectural requirements of IoT within the ITU framework. | **5**  **Marks**  **5**  **Marks** | **L1**  **L1** | **CO1**  **CO1** |
| **or** | | | | | |
| **14.** | **a.**  **b.** | Sketch the accepted IIoT reference model proposed by IIC, clearly showing the vertical and horizontal layers.  Enlighten on the Industrial Internet Consortium (IIC) method of IIoT architecture implementation. | **5**  **Marks**  **5**  **Marks** | **L1**  **L1** | **CO1**  **CO1** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **15.** |  | Describe the distinctions between the IIoT ITU model and the IIC reference architecture. List the applications and problems of using IIoT in factories and future industries. | **10**  **Marks** | **L2** | **CO2** |
| **Or** | | | | | |
| **16.** |  | Create a block diagram of the Cyber Physical System that clearly illustrates the functions of the actuators and sensors. | **10**  **Marks** | **L2** | **CO2** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **17.** |  | Elucidate the concept of industrial automation necessary for Industry 4.0 applications, accompanied by an appropriate diagram. Illustrate the fundamental block diagram of a PLC system, indicating the bidirectional and unidirectional busses. | **15**  **Marks** | **L2** | **CO2** |
| **Or** | | | | | |
| **18.** |  | Examine in detail the applications and problems of the Industrial Internet of Things (IIoT) in the development of future factories. | **15**  **Marks** | **L2** | **CO2** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **19.** |  | Discuss about the distinctions between virtual and augmented reality as they relate to factories of the future. Give examples of how AR and VR are used in the construction and industrial sectors. | **15**  **Marks** | **L3** | **CO3** |
| **Or** | | | | | |
| **20.** |  | Explain the benefits of augmented and virtual reality in industrial automation. Demonstrate the roles of AR / VR in the oil and gas industries. | **15**  **Marks** | **L3** | **CO3** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **21.** | **a.**  **b.** | Discuss the specific sensors that are employed in thermal power plant IIoT applications.  Discuss in depth the deployments and applications of IIoT in the healthcare industry. | **10**  **Marks**  **10**  **Marks** | **L4**  **L4** | **CO4**  **CO4** |
| **Or** | | | | | |
| **22.** | **a.**  **b.** | Analyse the components and uses of data analytics in the Industrial Internet of Things (IIoT) in detail.  Distinguish between cloud and edge computing regarding the installation of Industrial Internet of Things (IIoT). | **10**  **Marks**  **10**  **Marks** | **L4**  **L4** | **CO4**  **CO4** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***