

Total No. of Questions : 8]

SEAT No. :

P6781

[Total No. of Pages : 2

[6181]-407

**B.E. (Artificial Intelligence and Data Science)  
INDUSTRIAL INTERNET OF THINGS  
(2019 Pattern) (Semester - VII) (417523B) (Elective - III)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates:*

- 1) Solve questions Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if necessary.

**Q1) a) Describe the functions of the following IIoT components: [6]**

- i) Sensors
- ii) Gateways
- iii) Routers

**b) What is a cloud broker and why is it used in IIoT? [6]**

**c) How can WSNs be used to collect data from industrial environments? [6]**

OR

**Q2) a) Describe the functions of the following IIoT components: [6]**

- i) Modems,
  - ii) Cloud brokers
  - iii) Servers
- b) Explain the difference between a sensor and a transducer. [6]**
- c) Explain the importance of data filtering and aggregation at the IIoT sensing layer. [6]**

**Q3) a) Explain how IIoT cloud platforms can be used to enable remote monitoring and control of industrial assets. [6]**

- b) Compare and contrast the different features of leading IIoT cloud platforms (e.g. Predix, PTC ThingWorx, Microsoft Azure). [6]**
- c) Describe the process of designing and developing a digital twin. [6]**

OR

*P.T.O.*

- Q4)** a) Identify the key factors to consider when choosing an IIoT cloud platform. [6]  
b) Discuss the challenges and benefits of using an IIoT cloud platform to implement a digital twin. [6]  
c) Assess the security and privacy challenges associated with IIoT cloud platforms. [6]
- Q5)** a) Compare and contrast different message integrity protection mechanisms for IIoT systems. [9]  
b) Select and implement an appropriate identity establishment mechanism for a given IIoT application. [8]
- OR
- Q6)** a) Describe how to ensure the integrity of messages in a given IIoT system. [9]  
b) Define the following IIoT security components: [8]  
i) identity establishment  
ii) access control  
iii) non-repudiation  
iv) availability
- Q7)** a) Explain how smart robots can be used to improve the efficiency and productivity of industrial processes. [9]  
b) Assess the challenges and benefits of implementing cyber manufacturing systems in different industries. [8]
- OR
- Q8)** a) Describe the concept of Industry 5.0 (Society 5.0). How does it build upon Industry 4.0, and what new societal challenges and opportunities does it aim to address? [9]  
b) Define the terms : [8]  
i) smart metering  
ii) smart irrigation  
iii) smart office  
iv) smart logistics

