

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

