Total No. of Questions : 8]

SEAT No. :

P6781

[Total No. of Pages : 2

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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

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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

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