1. A strain gauge converts _____ to _____.

a. Electrical energy, strain
b. Strain, electrical energy
c. Strain, light energy
d. Light energy, strain

Answer: (b)

Justification: Please refer to Slide 3 of Lecture 1 of Week 1

---

2. Temperature sensor is a type of _____ sensor.

a. Vector
b. Scalar
c. Both (a) and (b)
d. None of the above

Answer: (b)

Justification: Please refer to Slide 19 of Lecture 1 of Week 1

---

3. Solenoid is a type of _____.

a. Actuator
b. Digital sensor
c. Analog sensor
d. None of the above

Answer: (a)

Justification: Please refer to Slide 22 of Lecture 1 of Week 1

4. A typical accelerometer is a type of _____.

a. Actuator
b. Passive Sensor
c. Active Sensor
d. None of the above

Answer: (b)

Justification: Please refer to Slide 15 of Lecture 1 of Week 1

---

5. Which of the following is not a communication protocol for IoT?

a. Zigbee
b. Wireless HART
c. ISA 100
d. Y-Wave

Answer: (d)

Justification: Please refer to Slide 2 of Lecture 2 of Week 1

---

6. Which of the following topologies is supported by WirelessHART?

a. Star
b. Mesh
c. Both (a) and (b)
d. None of the above

Answer: (c)

Justification: Please refer to Slide 26 of Lecture 2 of Week 1

7. Which of the following is not a type of node defined in the Zigbee protocol?

a. Switch
b. Coordinators
c. End devices
d. Routers

Answer: (a)

Justification: Please refer to Slide 14 of Lecture 2 of Week 1

---

8. Z-Wave is a simpler and cheaper alternative to _____ for small to medium range connectivity.

a. ISA 100
b. 6LoWPAN
c. Wireless Hart
d. Zigbee

Answer: (d)

Justification: Please refer to Slide 3 of Lecture 3 of Week 1

---

9. Which of the following is used in ISA 100.11a for resource sharing and collision avoidance?

a. CDMA/CSMA
b. TDMA/CSMA
c. TDMA/CDMA
d. None of the above

Answer: (b)

Justification: Please refer to Slide 9 of Lecture 3 of Week 1

10. Class 3 radios in Bluetooth have an operating range of _____ meter(s).

a. 100
b. 10
c. 1
d. 0.1

Answer: (c)

Justification: Please refer to Slide 13 of Lecture 3 of Week 1

---

11. Which of the following is true for networks of IoT devices?

a. Low throughput, high packet loss
b. High throughput, low packet loss
c. High throughput, high packet loss
d. Low throughput, Low packet loss

Answer: (a)

Justification: Please refer to Slide 2 of Lecture 4 of Week 1

---

12. CoRE framework views sensors and actuators as _____ resources.

a. Energy
b. Data
c. Web
d. None of the above

Answer: (c)

Justification: Please refer to Slide 9 of Lecture 4 of Week 1

13. QoS level-1 in MQTT is also known as _____ delivery.

a. At most once
b. At least once
c. Exactly once
d. None of the above

Answer: (b)

Justification: Please refer to Slide 8 of Lecture 5 of Week 1

---

14. Which of the following is not a type of CoAP message?

a. CON
b. NON
c. NOC
d. RST

Answer: (c)

Justification: Please refer to Slide 11 of Lecture 5 of Week 1

---

15. Which of the following is true for the traditional XMPP protocol?

a. It is a centralized protocol.
b. It does not support interoperability between heterogeneous networks.
c. It works on top of UDP.
d. It is a decentralized protocol.

Answer: (d)

Justification: Please refer to Slides 14 and 15 of Lecture 5 of Week 1

---

1. Which of the following is not an example of a biological megatrend of the fourth industrial revolution?

a. Genetic sequencing
b. Recommender System (IBM Watson)
c. Bitcoin
d. Cell Modification

Answer: (c)

Justification: Please refer to Slides 20 and 21 of Lecture 1 of Week 2

---

2. _____ of manufacturing industry in Industry 4.0 incorporates evaluation of relevant issues and performance metrics.

a. Infrastructure assessment
b. Cost assessment
c. Supply chain assessment
d. Sustainability assessment

Answer: (d)

Justification: Please refer to Slide 4 of Lecture 2 of Week 2

---

3. Which of the following is not an element of globalization?

a. Energy price
b. Supply Chain Management
c. Business Models
d. None of the above

Answer: (d)

Justification: Please refer to Slide 5 of Lecture 2 of Week 2

4. Which of the following incorporates the knowledge of international and local cultures in business models?

a. Sustainable modification
b. Sustainable customization
c. Mass customization
d. Mass modification

Answer: (c)

Justification: Please refer to Slide 10 of Lecture 2 of Week 2

---

5. Which of the following is true about recession and depression?

a. Duration of recession ranges between a few months to 2 years, whereas that of depression is more than 2 years
b. Duration of depression ranges between a few months to 2 years, whereas that of recession is more than 2 years
c. Duration of recession ranges between a few months to 3 years, whereas that of depression is more than 3 years
d. Duration of depression ranges between a few months to 3 years, whereas that of recession is more than 3 years

Answer: (a)

Justification: Please refer to Slides 24 and 25 of Lecture 2 of Week 2

---

6. Which of the following is true for lean approach?

a. Looks from tasks perspective
b. Looks from production perspective
c. Looks from overall expenditure perspective
d. Looks from customers perspective

Answer: (d)

Justification: Please refer to Slide 3 of Lecture 3 of Week 2

---

7. Over processing refers to –

a. Doing more work in a product than the customer values
b. Producing more product sooner than the customers are ready for
c. Inactivity period of people due to lack of material or information
d. None of the above

Answer: (a)

Justification: Please refer to Slide 6 of Lecture 3 of Week 2

---

8. Which of the following types of works can be observed in a product's value stream?

a. Value-added
b. Incidental
c. Both (a) and (b)
d. None of the above

Answer: (c)

Justification: Please refer to Slide 7 of Lecture 3 of Week 2

---

9. Which of the following principles should be followed for the implementation of people engagement in a lean production system?

a. Learn, Adapt, Do
b. Learn, Do, Teach
c. Learn, Teach, Adapt
d. Adapt, Do, Teach

Answer: (b)

Justification: Please refer to Slide 15 of Lecture 3 of Week 2

10. Smart and connected products help in _____by optimizing the resources.
    a. Enhancing performance
    b. Enabling remote services
    c. Assisting in product repairing
    d. All of the above

Answer: (d)

Justification: Please refer to Slide 9 of Lecture 4 of Week 2

---

11. The function of digital layer in a smart business model includes –

    a. Storing Data
    b. Analyzing Data
    c. Processing Data
    d. All of the above

Answer: (d)

Justification: Please refer to Slide 22 of Lecture 4 of Week 2

---

12. Which of the following is an advantage of running smart factories?

    a. Reduced predictability
    b. Improved quality
    c. Increased cost
    d. Reduced safety

Answer: (b)

Justification: Please refer to Slide 4 of Lecture 5 of Week 2

13. Which of the following is not a component of a smart factory?

a. Smart devices
b. Smart engineering
c. Smart homes
d. Innovation

Answer: (c)

Justification: Please refer to Slide 5 of Lecture 5 of Week 2

---

14. Which of the following is a supporting technology for smart factories?

a. Smart grid
b. Big data
c. Both (a) and (b)
d. None of the above

Answer: (c)

Justification: Please refer to Slide 17 of Lecture 5 of Week 2

---

15. Which of the following is used to operate instruments remotely in smart factories?

a. Augmented Reality
b. Supply chain
c. Both (a) and (c)
d. None of the above

Answer: (a)

Justification: Please refer to Slide 22 of Lecture 5 of Week 2

---

1. Which of the following is true about Cyber-Physical Systems?

a. It is a generalization of “embedded systems”
b. It possesses computation, communication, and controlling capabilities
c. Both (a) and (b)
d. None of the above

Answer: (c)

Justification: Please refer to Slide 3 of Lecture 1 of Week 3

---

2. State true or false — “Cyber-Physical systems are equipped with control systems with feedback loop”.

a. True
b. False

Answer: (a)

Justification: Please refer to Slide 7 of Lecture 1 of Week 3

---

3. What is Single Source of Truth (SSoT) in the context of collaboration productivity in Industry 4.0 ?

a. Practice of formatting information models to store every data element exactly once
b. Practice of formatting information models to store every data element exactly twice
c. Practice of formatting information models to store duplicate copy of every data element
d. None of the above

Answer: (a)

Justification: Please refer to Slide 6 of Lecture 2 of Week 3

---

4. Which of the following is/are the main goal(s) of PLM?

a. Maximize product revenue
b. Decrease product-associated costs
c. Increase product's value
d. All of the above

Answer: (d)

Justification: Please refer to Slide 10 of Lecture 2 of Week 3

---

5. Which of the following is not a method/technique to refine production across the lifecycle in PLM?

a. ABC
b. DFS
c. PAY
d. All of the above

Answer: (c)

Justification: Please refer to Slide 21 of Lecture 2 of Week 3

---

6. State true or false — "Augmented reality amplifies the present perception of reality".

a. False
b. True

Answer: (b)

Justification: Please refer to Slide 4 of Lecture 3 of Week 2

---

7. _____ gives an outcome when the reader is sensed by a camera and visual marker.

a. Marker-based AR
b. Markerless AR
c. Projection-based AR
d. Superimposition-based AR

Answer: (a)

Justification: Please refer to Slide 10 of Lecture 3 of Week 3

---

8. Which of the following uses a real world setting for its functioning --

a. AR
b. VR
c. Both (a) and (b)
d. None of the above

Answer: (a)

Justification: Please refer to Slide 4 of Lecture 3 of Week 3

---

9. Virtual reality incorporates _____ and _____ sensory feedback.

a. auditory, visual
b. temperature, humidity
c. solid, liquid
d. None of the above

Answer: (a)

Justification: Please refer to Slide 15 of Lecture 3 of Week 3

---

10. State true or false — “Artificial Intelligence is a creation of software having intuitive decision-making ability”.

a. True
b. False

Answer: (a)

Justification: Please refer to Slide 3 of Lecture 4 of Week 3

---

11. _____ is a subset of machine learning that can learn automatically by finding the features of the object on its own.

a. Deep learning
b. Artificial intelligence
c. Human learning
d. None of the above

Answer: (a)

Justification: Please refer to Slide 10 of Lecture 4 of Week 3

---

12. SQL stands for —

a. Structured Query Language
b. Semantic Query Language
c. Source Query Language
d. Safe Query Language

Answer: (a)

Justification: Please refer to Slide 4 of Lecture 5 of Week 3

---

13. Which of the following is not a characteristic of Big Data ?

a. Velocity
b. Veracity
c. Vitality
d. Value

Answer: (c)

Justification: Please refer to Slide 6 of Lecture 5 of Week 3

---

14. HDFS is a file system derived from open-source codes of _____.

a. Smart FS
b. KFS
c. GFS
d. None of the above

Answer: (c)

Justification: Please refer to Slide 18 of Lecture 5 of Week 3

---

15. Which of the following feature(s) is/are essential for cloud-based analytics methods as per NIST?

a. Wide network access
b. Method grouping
c. Fast flexibility
d. All of the above

Answer: (d)

Justification: Please refer to Slide 24 of Lecture 5 of Week 3

---

1. Which of the following is/are the component(s) of Cyber Security?

    (a) Application security
    (b) Information security
    (c) Network security
    (d) All of the above

Answer: (d)

Justification: Refer to slide 5 of lecture 1 from week 4

---

2. Application firewall is an example of _____ countermeasure.

    (a) Hardware
    (b) Software
    (c) Both (a) and (b)
    (d) None of the above

Answer: (b)

Justification: Refer to slide 6 of lecture 1 from week 4

---

3. What does OPSEC stand for?

    (a) Outer Precision Security
    (b) Operational Security
    (c) Optional Security
    (d) None of the above

Answer: (b)

Justification: Refer to slide 9 of lecture 1 from week 4

---

4. What are the three main parts of SDCMA?

(a) Software plane, hardware plane, EIF
(b) Security plane, hardware sensor, EIF
(c) Security plane, hardware plane, EIF
(d) None of the above

Answer: (a)

Justification: Refer to slide 20 of lecture 1 from week 4

---

5. Which of the following issues is/are raised due to the lack of a proper standardization?

(a) Device interoperability
(b) Semantic interoperability
(c) Security and privacy
(d) All of the above

Answer: (d)

Justification: Refer to slide 13 of lecture 2 from week 4

---

6. what is/are the benefit(s) of IIoT?

(a) Improves productivity
(b) Enables remote diagnosis
(c) Reduces operation time
(d) All of the above

Answer: (d)

Justification: Refer to slide 24 and 25 of lecture 2 from week 4

---

7. Which of the following sensors is used for tracking miners in mining industries?

(a) Strata monitoring sensor
(b) RFID tags
(c) Gas sensor
(d) Temperature sensor

Answer: (b)

Justification: Refer to slide 18 of lecture 2 from week 4

---

8. What is the third wave in the three waves of innovation?

(a) Industrial revolution
(b) Internet revolution
(c) Industrial internet
(d) IIoT revolution

Answer: (c)

Justification: Refer to slide 4 of lecture 3 from week 4

---

9. How many key elements are there in the Industrial Internet?

(a) 5
(b) 2
(c) 3
(d) None of the above

Answer: (c)

Justification: Refer to slide 10 of lecture 3 from week 4

---

10. Which of the following best describes a smart sensor?

    (a) Sensor with small memory, processor, and communication interface
    (b) Sensor with only memory
    (c) Sensor with only LED
    (d) Sensor with only Buzzer

Answer: (a)

Justification: Refer to slide 7 of lecture 4 from week 4

---

11. Which of the following is not a part of a smart sensor node?

    (a) ADC
    (b) DAC
    (c) Actuator
    (d) None of the above

Answer: (d)

Justification: Refer to slide 9 of lecture 4 from week 4

---

12. Which of the following is not a hardware specific Intel library for IoT devices?

    (a) UPM
    (b) MRAA
    (c) Both (a) and (b)
    (d) All of the above

Answer: (b)

Justification: Refer to slide 14 of lecture 4 from week 4

---

13. What is/are the application(s) of GPS tracker in IIoT?

    (a) Tracking real-time objects
    (b) Spot significant places
    (c) Analyze traffics
    (d) All of the above

Answer: (d)

Justification: Refer to slide 18 of lecture 4 from week 4

---

14. What is the prime characteristic of Industry 3.0?

    (a) Computer and automation
    (b) Mass production
    (c) Mechanization
    (d) None of the above

Answer: (a)

Justification: Refer to slide 2 of lecture 5 from week 4

---

15. What is/are the benefit(s) of Industrial Process 4.0?

    (a) Cost reduction
    (b) Service-oriented deployment
    (c) Both (a) and (b)
    (d) None of the above

Answer: (c)

Justification: Refer to slides 11 and 12 of lecture 5 from week 4

---

1. Amazon applies the features of IIoT to reduce the operational cost and increase the operational latency in _____.

(a) Goods production
(b) Human resource management
(c) Warehouse management
(d) None of the above

Answer: (c)

Justification: Refer to slide 5 of lecture 1 from week 5

---

2. The smart factory features of Cisco & Fanuc include _____.

(a) Failure forecasting
(b) Predictive Maintenance
(c) ZDT
(d) All of the above

Answer: (d)

Justification: Refer to slide 7 of lecture 1 from week 5

---

3. Which of the following does John Deere facilitate?

(a) Precision agriculture
(b) Traffic navigation system
(c) Drone-based package delivery
(d) None of the above

Answer: (a)

Justification: Refer to slide 9 of lecture 1 from week 5

---

4. Which of the following belongs to the building blocks of a generic business model?

(a) Revenue generation and Margins
(b) Non-competitive strategy
(c) Logistics structure
(d) None of the above

Answer: (a)

Justification: Refer to slide 3 of lecture 2 from week 5

---

5. The Subscription Model is capable of generating _____.

(a) One-time revenue
(b) No revenue
(c) Recurring revenue
(d) None of the above

Answer: (c)

Justification: Refer to slide 13 of lecture 2 from week 5

---

6. In which of the following scenarios can IoT products be used as “a proxy to sell another product”?

(a) Sell products which does not require refills
(b) Sell products which requires refills
(c) Collect data from users while providing services
(d) None of the above

Answer: (b)

Justification: Refer to slide 25 and 26 of lecture 2 from week 5

---

7. Which of the following raise(s) the need for new business models for IoT?

(a) Increased business opportunities due to the advent of IoT
(b) Unstructured ecosystem in IoT
(c) Extended scope beyond the company level to ecosystem level
(d) All of the above

Answer: (d)

Justification: Refer to slide 10 and 11 of lecture 2 from week 5

---

8. Which of the following is a type of IIoT business model?

(a) Cloud-based
(b) Service-oriented
(c) Process-oriented
(d) All of the above

Answer: (d)

Justification: Refer to slide 4 of lecture 3 from week 5

---

9. Which of the following is/are the challenge(s) of the security framework in IIoT business model?

(a) Device level authentication
(b) Application security
(c) Both (a) and (b)
(d) None of the above

Answer: (c)

Justification: Refer to slide 25 of lecture 3 from week 5

---

10. Which of the following is/are considered as the safety requirement(s) in IIRA infrastructure?

(a) Condition of operating system
(b) No unexpected risk of physical injury to people
(c) Damage to property or environment is avoided
(d) All of the above

Answer: (d)

Justification: Refer to slide 3 of lecture 4 from week 5

---

11. What is IIRA?

(a) Industrial Internet Reference Academy
(b) Industrial Interoperable Reference Architecture
(c) Industrial Internet Reference Architecture
(d) Informative Internet Reference Architecture

Answer: (c)

Justification: Refer to slide 2 of lecture 4 from week 5

---

12. IIRA v1.8 includes a _____-tier architecture.

(a) 4
(b) 3
(c) 2
(d) 5

Answer: (b)

Justification: Refer to slide 14 of lecture 4 from week 5

---

13. The gateway-mediated edge architecture in IIRA v1.8 consists of _____.

(a) IIoT edge system
(b) Local Area Network
(c) Gateway connecting the Wide Area Network
(d) All of the above

Answer: (d)

Justification: Refer to slide 18 of lecture 4 from week 5

---

14. How many types of IIRA viewpoints are described by IIC?

(a) 4
(b) 3
(c) 2
(d) 5

Answer: (a)

Justification: Refer to slide 2 of lecture 5 from week 5

---

15. Execution of a task in the usage viewpoint of IIRA includes _____.

(a) Logistics map
(b) Role
(c) Managerial map
(d) all of the above

Answer: (b)

Justification: Refer to slide 11 of lecture 5 from week 5

---

1. What does a magnetostrictive sensor measure?

    (a) Time-varying strain in ferromagnetic materials
    (b) Time-varying strain in non ferromagnetic material
    (c) Both of the above
    (d) None of the above

Answer: (a)

Justification: Refer to slide 21 of lecture 1 from week 6

---

2. In IIoT applications, a pressure sensor is used to measure _____.

    (a) the atmospheric pressure in different Geographical location
    (b) the pressure in hydraulics systems
    (c) Both (a) and (b)
    (d) None of the above

Answer: (b)

Justification: Refer to slide 22 of lecture 1 from week 6

---

3. What does a PIR sensor detect?

    (a) Motion of human body parts
    (b) Pulse
    (c) Blood pressure
    (d) Infrared radiation from human body

Answer: (d)

Justification: Refer to slide 24 of lecture 1 from week 6

---

4. Which of the following is/are not referred to as the electrical variations of gas sensing methods?

(a) Polymer
(b) Gas chromatograph
(c) CNT or carbon nanotube
(d) MOS or Metal Oxide Semiconductors

Answer: (b)

Justification: Refer to slide 3 of lecture 2 from week 6

---

5. What does VOC stand for?

(a) Volatile Organic Compound
(b) Volatile Organic Communication
(c) Variable Organic Communication
(d) Volatile Ontological Compound

Answer: (a)

Justification: Refer to slide 9 of lecture 2 from week 6

---

6. “If the exposure of the sensor to the target gas is stopped, the sensor resistance can return back to its base resistance value” --- which of the following terms represents this characteristic of a generic gas sensor?

(a) Sensitivity
(b) Selectivity
(c) Reversibility
(d) Stability

Answer: (c)

Justification: Refer to slide 6 and 7 of lecture 2 from week 6

---

7. A generic gas sensing system primarily includes _____.

(a) Sensor module
(b) Processing unit
(c) Analog temperature controller
(d) All of the above

Answer: (d)

Justification: Refer to slide 10 of lecture 2 from week 6

---

8. Which of the following do(es) not refer to the typical communication requirements in industries?

(a) Very high duty-cycle
(b) Real-time
(c) Very low latency
(d) None of the above

Answer: (a)

Justification: Refer to slide 2 of lecture 3 from week 6

---

9. EtherCAT allows PDO/telegram exchange _____.

(a) Among the slave devices
(b) Between the master and the slave devices
(c) Among the master devices
(d) None of the above

Answer: (b)

Justification: Refer to slide 10 of lecture 3 from week 6

---

10. Which of the following follow(s) IEC 61158 standard?

(a) EtherCAT
(b) Profibus
(c) Both (a) and (b)
(d) None of the above

Answer: (c)

Justification: Refer to slide 9 of lecture 3 and slide 3 of lecture 4 from week 6

---

11. MBP is used for transmission and is suitable for hazardous environments. What does "MBP" stand for?

(a) Manchester Bus Parity
(b) Manchester Bit Power
(c) Manchester Bus Power
(d) None of the above

Answer: (c)

Justification: Refer to slide 4 of lecture 4 from week 6

---

12. Which of the following standards is/are followed by CC-Link?

(a) IEC 61058
(b) IEC 61508
(c) IEC 61580
(d) None of the above

Answer: (b)

Justification: Refer to slide 10 of lecture 4 from week 6

---

13. DeviceNet uses _____.

(a) CAN
(b) SAN
(c) PAN
(d) MAN

Answer: (a)

Justification: Refer to slide 14 of lecture 4 from week 6

---

14. Match each element in the left column of the table with each element in the right column of the table correctly.

Industry versions	**Characteristics**
i. 1.0	_____ Electrification
ii. 2.0	_____ Connectivity
iii. 3.0	_____ Mechanization
iv. 4.0	_____ Computation

(a) ii, iv, iii, i
(b) ii, iv, i, iii
(c) iv, ii, i, iii
(d) ii, i, iv, iii

Answer: (b)

Justification: Refer to slide 2 of lecture 5 from week 6

---

15. Which of the following is/are not aligned with the ITU service category?

(a) eMMB
(b) uRRLC
(c) Both (a) and (b)
(d) None of the above

Answer: (c)

Justification: Refer to slide 9 of lecture 5 from week 6

---

1. In North America, which frequency band is used for LoRa?

    (a) 169 MHz
    (b) 433 MHz
    (c) 868 MHz
    (d) 915 MHz

Answer: (d)

Justification: Refer to slide 4 of lecture 1 from week 7

---

2. SIGFOX radio link operates on _____.

    (a) Both licensed and unlicensed ISM band
    (b) Only licensed ISM band
    (c) Only unlicensed ISM band
    (d) None of the above

Answer: (c)

Justification: Refer to slide 5 of lecture 1 from week 7

---

3. What does a DHT sensor measure?

    (a) Temperature
    (b) Humidity
    (c) Both (a) and (b)
    (d) None of the above

Answer: (c)

Justification: Refer to slide 11 of lecture 1 from week 7

---

4. Which of the following IEEE standards is followed by the physical and MAC layer protocols in ZigBee?

(a) IEEE 801.15.4
(b) IEEE 802.15.4
(c) IEEE 803.15.4
(d) IEEE 804.15.4

Answer: (b)

Justification: Refer to slide 5 of lecture 2 from week 7

---

5. Coordinator ZigBee devices act as the bridge between _____.

(a) Different networks
(b) Different edge devices
(c) Different fog devices
(d) All of the above

Answer: (a)

Justification: Refer to slide 6 of lecture 2 from week 7

---

6. In python, how can we install the Xbee library?

(a) pip install xbee
(b) pip3 install xbee
(c) python -m pip install xbee
(d) All of the above

Answer: (d)

Justification: Refer to slide 8 of lecture 2 from week 7. Option (a) is given in the said slide. However, the command observed in Option (b) is used to install the Xbee library in python 3.x. Moreover, the command observed in Option (c) is an alternative to Option (a).

---

7. How many network topologies are supported by ZigBee?

(a) 2
(b) 4
(c) 3
(d) 5

Answer: (c)

Justification: Refer to slide 5 of lecture 2 from week 7

---

8. Which of the following is/are considered as a message broker in real-time IoT systems?

(a) Apache Kafka
(b) MqTT
(c) Both (b) and (c)
(d) None of the above

Answer: (c)

Justification: Refer to slide 14 of lecture 3 from week 7

---

9. What does CPS stand for?

(a) Cyber Physical System
(b) Cyclic Physical System
(c) Cyber Physical Sequence
(d) Computer-Physiological System

Answer: (a)

Justification: Refer to slide 4 of lecture 3 from week 7

---

10. Smart warehousing uses _____-based framework.

(a) Both RIFT and RIST
(b) Only RIFT
(c) Only RIST
(d) Only REST

Answer: (d)

Justification: Refer to slide 19 of lecture 4 from week 7

---

11. What does iRobot-Factory enforce to improve its manufacturing process?

(a) Cognitive intelligence
(b) Managerial intelligence
(c) Logistic intelligence
(d) All of the above

Answer: (a)

Justification: Refer to slide 14 of lecture 4 from week 7

---

12. The architectural layers of SmartSantander include _____.

(a) Accessible, Authorization, and Accounting subsystem
(b) Authentication, Authorization, and Accounting subsystem
(c) Authentication, Authorization, and Accomodation subsystem
(d) None of the above

Answer: (b)

Justification: Refer to slide 12 of lecture 4 from week 7

---

13. Which of the following is/are considered as the component(s) of AR Drone-based precision agriculture?

(a) Sprayer installed in a tractor
(b) laptop
(c) Both (a) and (b)
(d) None of the above

Answer: (c)

Justification: Refer to slide 7 of lecture 4 from week 7

---

14. What type of computer programs are used to execute the control actions in PLCs?

(a) Pre-defined
(b) Dynamic
(c) Evolutionary
(d) None of the above

Answer: (a)

Justification: Refer to slide 6 of lecture 5 from week 7

---

15. A typical industrial control system includes _____ major components.

(a) 1
(b) 2
(c) 3
(d) 4

Answer: (d)

Justification: Refer to slide 2 of lecture 5 from week 7

---

1. Which of the following is/are the necessary requirements in IIoT analytics?

    (a) Static operation optimization
    (b) Prognostic maintenance
    (c) Historical data analysis
    (d) None of the above

Ans: (b)

Justification: Please refer to slide 4 of lecture 1 from week 8

---

2. Which of the following is/are true for the K-means clustering algorithm?

    (a) One data point may be categorized under multiple cluster heads
    (b) One data point is strictly categorized under a cluster head
    (c) Both (a) and (b) are possible based on the user's requirement
    (d) None of the above

Ans: (b)

Justification: Please refer to slide 9 of lecture 2 from week 8

---

3. Reinforcement learning amalgamates _____ control system.

    (a) No
    (b) An open-loop based
    (c) A closed-loop based
    (d) No of the above

Ans: (c)

Justification: Please refer to slide 13 of lecture 2 from week 8

---

4. Which of the following is/are true for the decision tree algorithm?

(a) Tree-based machine learning approach
(b) Uses non-linear learning function
(c) Includes decision nodes and leaf nodes
(d) All of the above

Answer: (d)

Justification: Refer to slide 12 of lecture 2 from week 8

---

5. Which of the following is true for reinforcement learning?

(a) There is no mapping between input and output features
(b) There is a mapping between input and output features
(c) Reinforced learning is not concerned with the mapping between input and output variables
(d) None of the above

Answer: (b)

Justification: Refer to slide 16 of lecture 2 from week 8

---

6. Which of the following uses ANN for face tagging in photos?

(a) WhatsApp
(b) Orkut
(c) Facebook
(d) None of the above

Answer: (c)

Justification: Refer to slide 23 of lecture 2 from week 8

---

7. Using IIoT and machine learning, Toumetis helps _____ engineers to access real-time data and predict anomalies

(a) Oil and gas
(b) Automobile
(c) Dairy
(d) None of the above

Answer: (a)

Justification: Refer to slide 25 of lecture 2 from week 8

---

8. When did deep learning start to gain popularity?

(a) 2005
(b) 2006
(c) 2007
(d) 2008

Answer: (b)

Justification: Refer to slide 3 of lecture 3 from week 8

---

9. Which of the following is/are true for TOSHIBA?

(a) Inference process at edge
(b) Learning process at cloud
(c) Both (a) and (b)
(d) None of the above

Answer: (c)

Justification: Refer to slide 16 of lecture 3 from week 8

---

10. Which of the following nature of data raises the need for the cloud in IIoT analytics and data management?

(a) Unorganized data
(b) Organized data
(c) Static data quality
(d) None of the data

Answer: (a)

Justification: Refer to slide 4 of lecture 4 from week 8

---

11. How many types of services are provided by cloud computing in IIoT

(a) 4
(b) 3
(c) 2
(d) 5

Answer: (b)

Justification: Refer to slide 8 of lecture 4 from week 8

---

12. MindSphere facilitates _____.

(a) AWS cloud service
(b) Open PaaS
(c) Both (a) and (b)
(d) None of the above

Answer: (c)

Justification: Refer to slide 20 of lecture 4 from week 8

---

13. Why does Honeywell use cloud software services?

(a) Managing IoT
(b) Tracking of capital
(c) Tracking of managers
(d) None of the above

Answer: (d)

Justification: Refer to slide 22 of lecture 4 from week 8

---

14. Which of the following is/are the IIoT requirements in Industry 4.0?

(a) Achieve greater production
(b) Deeper insights of analysis and prediction
(c) Connected world of machines
(d) All of the above

Answer: (d)

Justification: Refer to slide 20 of lecture 5 from week 8

---

15. In comparison with the centralized approach, decentralized approach in IIoT _____.

(a) Increases load at cloud
(b) Does not have any impact at cloud
(c) Reduces load at cloud
(d) None of the above

Answer: (c)

Justification: Refer to slide 18 of lecture 5 from week 8

---

1. Which of the following expressions correctly evaluates 10^8 in R?

(a) Math.pow(10,8)
(b) Math.power(10,8)
(c) 10^8
(d) pow(10,8)

Ans: (c)

Justification: Please refer to slide 7 of lecture 2 from week 9

---

2. What is the goal of using Fog computing in IIoT?

(a) Process control analytics
(b) Enable new functionalities along with additional features
(c) Both (a) and (b)
(d) None of the above

Ans: (c)

Justification: Please refer to slide 3 of lecture 1 from week 9

---

3. Which of the following solutions is/are the fog computing-based product(s) offered by Nebbiolo Technologies?

(a) fogNode
(b) fogSM
(c) fogOS
(d) All of the above

Ans: (d)

Justification: Please refer to slide 20 of lecture 1 from week 9

---

4. _____ is used to determine the remainder of a division in R.

(a) %
(b) /
(c) //
(d) %%

Answer: (d)

Justification: Refer to slide 7 of lecture 2 from week 9

---

5. The “igraph” package in R is used for _____.

(a) Network analysis
(b) Fuzzy clustering
(c) Random forest classification
(d) None of the above

Answer: (a)

Justification: Refer to slide 14 of lecture 2 from week 9

---

6. _____ merges the benefits of Python language with the performance of C language.

(a) Julia programming language
(b) R programming language
(c) Java programming language
(d) Kotlin programming language

Answer: (a)

Justification: Refer to slide 18 of lecture 2 from week 9

---

7. What are the basic service models provided by cloud computing?

(a) IaaS, PaaS, SaaS
(b) AaaS, NaaS, DaaS
(c) KaaS, RaaS, BaaS
(d) None of the above

Answer: (a)

Justification: Refer to slide 3 of lecture 3 from week 9

---

8. “Masses of data generated by gene sequencing” represent which type of data?

(a) Enterprise data
(b) Biomedical data
(c) Agricultural data
(d) None of the above

Answer: (b)

Justification: Refer to slide 7 of lecture 3 from week 9

---

9. What is Hadoop?

(a) An open-source implementation for Google File system
(b) An open-source implementation for MapReduce
(c) Both (a) and (b)
(d) None of the above

Answer: (c)

Justification: Refer to slide 16 of lecture 3 from week 9

---

10. Which of the following database(s) use(s) the concept of relational database?

    (a) MongoDB
    (b) NoSQL
    (c) Both (a) and (b)
    (d) None of the data

Answer: (a)

Justification: Refer to slide 23 of lecture 3 from week 9

---

11. What are the properties of a Data Center Network?

    (a) Agility
    (b) Reliable
    (c) Secure
    (d) All of the above

Answer: (d)

Justification: Refer to slide 4 of lecture 4 from week 9

---

12. How many layers of network switches are there in a Three-Tier DCN?

    (a) 9
    (b) 6
    (c) 3
    (d) None of the above

Answer: (c)

Justification: Refer to slide 8 of lecture 4 from week 9

---

13. Software-Defined Data Center provides _____.

(a) Virtualized data storage
(b) Data center as a service
(c) Both (a) and (b)
(d) None of the above

Answer: (c)

Justification: Refer to slide 22 of lecture 4 from week 9

---

14. TCAM in SDN stands for _____.

(a) Tertiary Connected Advanced Memory
(b) Ternary Communication Address Memory
(c) Tertiary Content Addressable Memory
(d) Ternary Content Addressable Memory

Answer: (d)

Justification: Refer to slide 6 of lecture 5 from week 9

---

15. Which of the following is/are the advantage(s) of SDIIoT?

(a) Deterministic networking
(b) Low latency virtualization of VMs
(c) Both (a) and (b)
(d) None of the above

Answer: (c)

Justification: Refer to slide 17 of lecture 5 from week 9

---

1. SD-6TiSCH protocol stack _____.
   a. Minimizes controller overhead in μSDN
   b. Integrated with Contiki IEEE 802.15.4-2015 stack
   c. Both (a) and (b)
   d. None of the above

Solution: (c)

Justification: Please refer to Slide 10 of Lecture 1 of Week 10.

---

2. What does SCADA stand for?

   a. Sensory Control and Data Acquisition
   b. Supervisory Central and Data Acquisition
   c. Supervisory Control and Data Acquisition
   d. None of these

Solution: (c)

Justification: Please refer to Slide 13 of Lecture 1 of Week 10.

---

3. What are the three basic goals of IIoT security?

   a. Adversity, integrity, central security
   b. Adversity, integrity, confidentiality
   c. Availability, instantaneous, confidentiality
   d. Availability, integrity, confidentiality

Solution: (d)

Justification: Please refer to Slide 3 of Lecture 2 of Week 10.

---

4. “Third-party services with trust-boundaries are required in secured cloud compiled IIoT” — state true or false.

a. False
b. True

Solution: (b)

Justification: Please refer to Slide 7 of Lecture 2 of Week 10.

---

5. Which of the following is/are considered to be the attack vector(s) observed in the network layer of IIoT?

a. Misrouting
b. DDoS
c. Both (a) and (b)
d. None of the above

Solution: (a)

Justification: Please refer to Slide 13 of Lecture 2 of Week 10.

---

6. Which of the following is/are referred to the class(es) of attackers?

a. Hardware vendors
b. Outsourced firms
c. Both (a) and (b)
d. None of the above

Solution: (c)

Justification: Please refer to Slide 9 of Lecture 2 of Week 10

---

7. Which of the following is/are not observed in the trust flow of a typical IIoT system?

a. System owner
b. System builders
c. Customer
d. All of the above

Solution: (c)

Justification: Please refer to Slides 17 of Lecture 2 of Week 10.

---

8. Standard cryptographic protocols in fog devices are used for _____.

a. Providing authentication among fog devices
b. Providing authentication between fog devices and the cloud
c. Both (a) and (b)
d. None of the above

Solution: (c)

Justification: Please refer to Slide 8 of Lecture 3 of Week 10.

---

9. What are the different communication protection techniques used in a secured IIoT system?

a. Security gateways
b. Network firewalls
c. Network access control
d. All of the above

Solution: (d)

Justification: Please refer to Slide 14 of Lecture 3 of Week 10.

---

10. “The infrastructure of smart factories involves machinery and equipment that improve processes through self-optimization and automation” — state true or false.

a. True
b. False

Solution: (a)

Justification: Please refer to Slide 3 of Lecture 4 of Week 10.

---

11. Magna-Steyr uses smart factory applications for _____.

a. Asset tracking
b. Smart packaging
c. Both (a) and (b)
d. None of the above

Solution: (c)

Justification: Please refer to Slide 19 of Lecture 4 of Week 10.

---

12. What is the Caterpillar?

a. A machine learning technique for predictive analytics and maintenance
b. Provides protection against phishing attacks
c. Both (a) and (b)
d. None of the above

Solution: (a)

Justification: Please refer to Slide 14 of Lecture 4 of Week 10.

---

13. How many layers are observed in the IoT platform offered by Hitachi-Lumada?

a. 4
b. 5
c. 6
d. 3

Solution: (b)

Justification: Please refer to Slide 17 of Lecture 4 of Week 10.

---

14. What is Esskeso?

a. Smart cooking solution
b. Refrigeration solution
c. Smart power grid solution
d. All of the above

Solution: (a)

Justification: Please refer to Slide 18 of Lecture 5 of Week 10.

---

15. Which of the following IIoT solutions provides the services of smart indoor farming?

a. Flavor Matrix
b. IntelliCup
c. Spinn Inc.
d. FarmShelf

Solution: (d)

Justification: Please refer to Slide 19 - 22 of Lecture 5 of Week 10.

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c. Spinn Inc.
d. FarmShelf

Solution: (d)

Justification: Please refer to Slide 19 - 22 of Lecture 5 of Week 10.

---

1. iHealth BP5 is an example of an _____.
   a. IoT-based blood pressure monitoring system
   b. IoT-based body temperature monitoring device
   c. IoT-based glucose monitoring system
   d. None of the above

Solution: (a)

Justification: Please refer to Slide 11 of Lecture 1 of Week 11.

---

2. _____ smartphone apps help in detecting the health condition of a patient.

   a. Medical communication-enabled
   b. Medical education-based
   c. Diagnostic
   d. None of these

Solution: (c)

Justification: Please refer to Slide 16 of Lecture 1 of Week 11.

---

3. Which of the following networks is/are used in IIoT based healthcare technology?

   a. WBAN
   b. WSN
   c. 6LoWPAN
   d. All of the above

Solution: (d)

Justification: Please refer to Slide 18 of Lecture 1 of Week 11.

---

4. Which of the following communication networks includes controllers, regulators, and data collectors?

a. Neighborhood Area Network
b. Field Area Network
c. Wide Area Network
d. None of the above

Solution: (b)

Justification: Please refer to Slide 7 of Lecture 2 of Week 11.

---

5. A typical AMI consists of _____.

a. Smart meters
b. Communication networks
c. Both (a) and (b)
d. None of the above

Solution: (c)

Justification: Please refer to Slide 13 of Lecture 2 of Week 11.

---

6. Which of the following is true about the digital twins in power plants?

a. Can be considered as virtual power plant
b. Increase fuel consumption
c. Increase energy consumption
d. None of the above

Solution: (a)

Justification: Please refer to Slide 9 of Lecture 2 of Week 11

---

7. Which of the following is true about RFID tags?

a. Active tags do not have any internal power source
b. Semi-passive tags have onboard battery
c. Passive tags are battery powered
d. Semi-passive tags have active transmitter

Solution: (b)

Justification: Please refer to Slides 10, 11, 12 of Lecture 3 of Week 11.

---

8. Which of the following statements is not true about barcodes?

a. Barcodes are printed on paper and plastic which makes them vulnerable
b. Barcodes can contain added information
c. Barcodes have less security and hence, can be forged
d. Only one barcode can be read at a time

Solution: (b)

Justification: Please refer to Slide 13 of Lecture 3 of Week 11.

---

9. Which of the following types of RFID tags rely on backscattering?

a. Active
b. Passive
c. Semi-Passive
d. None of the above

Solution: (c)

Justification: Please refer to Slide 12 of Lecture 3 of Week 11.

---

10. The full form of VPN is _____.

a. Virtual Private Network
b. Virtual Permutation Network
c. Virtual Pre-hosted Network
d. None of these

Solution: (a)

Justification: Please refer to Slide 15 of Lecture 4 of Week 11.

---

11. Which of these is/are the example(s) of VR?

a. Oculus Rift
b. Samsung Gear VR
c. Google Cardboard
d. All of the above

Solution: (d)

Justification: Please refer to Slide 19 of Lecture 4 of Week 11.

---

12. What is the function of Firewalls?

a. Detecting and blocking tampering of data
b. Encrypting connection between two hosts
c. Acting as barriers between trusted internal network and external networks
d. Dividing the network into smaller parts and enforcing security policies explicitly

Solution: (c)

Justification: Please refer to Slide 14 of Lecture 4 of Week 11.

---

13. Which of the following support services is used for monitoring, gathering, and disseminating relevant information and making decisions in facility management?

a. Administrative Support
b. Information technology
c. Human Resources
d. Marketing

Solution: (a)

Justification: Please refer to Slide 7 and 8 of Lecture 5 of Week 11.

---

14. Which of the following is/are considered to be the application(s) of IoT in Facility Management?

a. Lighting
b. Refrigeration
c. Smart Meters
d. All of the above

Solution: (d)

Justification: Please refer to Slide 13 of Lecture 5 of Week 11.

---

15. Which of the following describe(s) the benefit(s) of using IoT applications for Facility Management?

a. Improve customer experience
b. Prevent unauthorized access
c. Real time tracking
d. All of the above

Solution: (d)

Justification: Please refer to Slide 18 of Lecture 5 of Week 11.

---

1. Condition-based monitoring in IoT-based chemical industries includes _____.

a. Addressing real time issues
b. Pricing model with the profit margin
c. Improving service
d. None of the above

Answer: (b)

Justification: Please refer to Slide 12 and 13 of Lecture 1 of Week 12

---

2. Which of the following is not considered as part of the workflow of an oil and gas industry?

a. Providing top-down review
b. Applying predictive analytics
c. Deploying IoT solutions in different locations
d. Generating on-premises simulated data

Answer: (a)

Justification: Please refer to Slide 5 of Lecture 1 of Week 12

---

3. IoT improves logistics in a typical chemical industry by _____.

a. Adjusting the amount of required material
b. Detection of contamination or attacks
c. Water, nutrients, and pesticides analysis
d. None of the above

Answer: (b)

Justification: Please refer to Slide 13 and 14 of Lecture 1 of Week 12

---

4. IoT applications in a typical pharmaceutical industry include _____.

a. Quality control by continuous monitoring
b. Drug examination
c. Both (a) and (b)
d. None of the above

Answer: (c)

Justification: Please refer to Slides 19 and 20 of Lecture 1 of Week 12

---

5. UAVs in industries communicate directly to _____.

a. An industrial control system
b. A user
c. Both (a) and (b)
d. None of the above

Answer: (a)

Justification: Please refer to Slide 3 of Lecture 2 of Week 12

---

6. 3D mapping of carbon storage in the forest refers to _____.

a. Managing forest plantations
b. Measuring the emission of carbon monoxide by biomass using remote sensing
c. Resisting deforestation
d. Measuring the carbon storage in biomass using remote sensing

Answer: (d)

Justification: Please refer to Slide 19 of Lecture 2 of Week 12

---

7. IoT-based forestry survey includes _____.

a. Information about forest species
b. Information about humans around the forest
c. Both (a) and (b)
d. None of the above

Answer: (c)

Justification: Please refer to Slide 18 of Lecture 2 of Week 12

---

8. Which of the following is not an application of UAVs in mining?

a. Inspect bridges, dams
b. Manage stockpiles
c. Site exploration
d. Grading control

Answer: (a)

Justification: Please refer to Slide 11 of Lecture 2 of Week 12

---

9. Which of the following statements is true about UAVs?

a. UAVs create unnecessary road traffic
b. UAVs can only monitor oil and gas fields by collecting videos
c. Traditional firework display is costlier than UAV-based light displays
d. UAV-based light displays are controlled by multiple computers

Answer: (c)

Justification: Please refer to Slides 15, 20, and 21 of Lecture 2 of Week 12

---

10. Which of the following qualifies as the subject matter of a case study?

a. Large number of individuals
b. Large geographical area
c. Limited number of individuals
d. None of the above

Answer: (c)

Justification: Please refer to Slide 3 of Lecture 3 of Week 12

---

11. In a milk processing and packaging industry, level sensors used in each milk silos are of _____ type and work on the principle of _____.

a. Electrostatic, solenoid
b. Hydrostatic, solenoid
c. Electrostatic, strain gauge
d. Hydrostatic, strain gauge

Answer: (d)

Justification: Please refer to time 5:19-5:30 of Lecture 4 (Milk Processing and Packaging Industries) of Week 12

---

12. In the manufacturing process of wheel rims, automation can be used for _____.

a. Measuring the thickness of the rim
b. Monitoring power supply
c. Both (a) and (b)
d. None of the above

Answer: (c)

Justification: Please refer to time 8:10 of Lecture 6 (Manufacturing Industries - Part II) of Week 12

---

13. Which of the following is true about ThingSpeak?

a. It is a type of sensor
b. It is a network protocol
c. It is a power module
d. It is a cloud platform

Answer: (d)

Justification: Please refer to time 1:00 - 1:10 of Lecture 7 (Student Projects - Part I) of Week 12

---

14. DHT11 and MQ135 are respectively used for sensing _____ and _____.

a. Temperature; humidity and air quality
b. Temperature and humidity; air quality
c. Humidity and air quality; temperature
d. Air quality; humidity and temperature

Answer: (b)

Justification: Please refer to time 1:35 of Lecture 8 (Student Projects - Part II) of Week 12

---

15. In wielding, thermocouple is used to measure _____.

a. Electric power
b. Forces acting on the metals
c. Welding heat input
d. None of the above

Answer: (c)

Justification: Please refer to Slide 17:26 of Lecture 10 (Steel Technology Lab) of Week 12
