NPTEL Online Certification Courses

Indian Institute of Technology Kharagpur

Introduction to Internet of Things

Assignment-Week 1

TYPE OF QUESTION: MCQ/MSQ

Number of questions: 15 **Total marks: 15 X 1= 15**

QUESTION 1:

Which of the following is/are the characteristics of IoT?

a. Efficient, scalable and associated architecture.
b. Unambiguous naming and addressing.
c. Abundance of sleeping nodes, mobile and non-IP device.
d. All of the these

Correct Answer: d. All of the these

Detailed Solution: Characteristics of IoT are –

a. Efficient, scalable and associated architecture.
b. Unambiguous naming and addressing.
c. Abundance of sleeping nodes, mobile and non-IP device.

See lecture 1 (Introduction to IoT – Part - I) @ 16:06

QUESTION 2:

A _____ allows us to use our smartphones to lock and unlock our door remotely at our homes or our businesses.

a. Smart Meter
b. ATM
c. Digital Lock
d. Web

Correct Answer: c. Digital Lock

Detailed Solution: Smartphones can be used to lock and unlock doors remotely, and business owners can change key codes rapidly to grant or restrict access to employees and guests.

See lecture 1 (Introduction to IoT – Part - I) @ 25:35

QUESTION 3:

The function/functions of an IoT Gateway is/are to?

a. Forward packets between LAN and WAN and on the IP layer
b. Connect IoT LAN to a WAN
c. Both (a) and (b)
d. None of these

Correct Answer: c. Both (a) and (b)

Detailed Solution: An IoT Gateway is a router connecting the IoT LAN to a WAN to the Internet, can implement several LAN and WAN, Forwards packets between LAN and WAN and on the IP layer.

See lecture 2 (Introduction to IoT – Part - II) @ 04:44

QUESTION 4:

Multi-homing is the concept where a node can be connected to multiple networks for _____.

a. Reduced Reliability
b. Improved Reliability
c. None of these
d. Both (a) and (b)

Correct Answer: b. Improved Reliability

Detailed Solution: Multi-homing is a concept where a node or an IoT device or a sub-network can be connected to multiple networks for improving the reliability.

See lecture 2 (Introduction to IoT – Part - II) @ 15:27

QUESTION 5:

A Passive Infrared Ray (PIR) sensor is used for _____?

a. Humidity Detection
b. Tilt Detection
c. Obstacle Detection
d. Smoke Detection

Correct Answer: c. Obstacle Detection

Detailed Solution: Passive Infrared Ray (PIR) sensor can be used to detect if there is any obstacle.
See lecture 3 (Sensing) @ 04:13

QUESTION 6:

For which of the following, Vector Sensors are required to measure or sense them?

a. Color, Pressure, Temperature
b. Orientation, Image
c. None of these
d. Both (a) and (b)

Correct Answer: b. Orientation, Image

Detailed Solution: Vector Sensors produce output signal or voltage which is generally proportional to the magnitude, direction, as well as the orientation of the quantity being measured. Physical quantities such as sound, image, velocity, acceleration, orientation, etc. are all vector quantities, as only their magnitude is not sufficient to convey the complete information.

See lecture 3 (Sensing) @ 16:14

QUESTION 7:

The sensitivity of a sensor under real conditions may differ from the value specified. This is called _____?

a. Maximal Error
b. Minimal Error
c. Median Error
d. Sensitivity Error

Correct Answer: d. Sensitivity Error
Detailed Solution: The sensitivity of a sensor under real conditions may differ from the value specified. This is called sensitivity error.

See lecture 3 (Sensing) @ 19:33

QUESTION 8:

A random deviation of the signal that varies in time is called _____.

a. Noise
b. Sound
c. Bias
d. None of these

Correct Answer: a. Noise.

Detailed Solution: Noise is a random deviation of the signal that varies in time.

See lecture 3 (Sensing) @ 22:42

QUESTION 9:

A Relay Switch is an example of _____.

a. A Sensor
b. An Actuator
c. A Transducer
d. None of These

Correct Answer: b. An Actuator

Detailed Solution: Relay Switch is an example of an actuator. It is an electromechanical switch that can be used to perform On/Off operations of electrical appliances.

See lecture 4 (Actuation) @ 01:37

QUESTION 10:

What is a Pneumatic Actuator?

a. It is a type of actuator driven by compressed air or vacuum
b. It is a type of actuator driven by fluid
c. It is a type of actuator driven by solid
d. None of these

Correct Answer: a. It is a type of actuator driven by compressed air or vacuum

Detailed Solution: A pneumatic actuator converts energy formed by vacuum or compressed air at high pressure into either linear or rotary motion.

See lecture 4 (Actuation) @ 07:55

QUESTION 11:

Which type of actuators tend to be compact, lightweight, economical, and with high power density?

a. Thermal or Magnetic Actuators
b. Hydraulic Actuators
c. Both (a) and (b)
d. None of these

Correct Answer: a. Thermal or Magnetic Actuators

Detailed Solution: Thermal or Magnetic Actuators can be actuated by applying thermal or

magnetic energy. They tend to be compact, lightweight, economical, and with high power density.

See lecture 4 (Actuation) @ 11:46

QUESTION 12:

Polymer based actuators designed to handle fragile objects like fruit harvesting in agriculture or manipulating internal organs in biomedicine are called?

a. Pneumatic Actuators
b. Soft Actuators
c. Software Actuators
d. Hardware Actuators

Correct Answer: b. Soft Actuators

Detailed Solution: Soft Actuators are polymer-based actuators designed to handle fragile objects like fruit harvesting in agriculture or manipulating internal organs in biomedicine.

See lecture 4 (Actuation) @ 14:55

QUESTION 13:

Full form of SMP is _____?

a. Soft Memory Polymer
b. Shape Memory Polymer
c. Software Memory Polymer
d. None of these

Correct Answer: b. Shape Memory Polymer

Detailed Solution: Shape Memory Polymer (SMP) actuators function similar to our muscles, even providing a response to a range of stimuli such as light, electrical, magnetic, heat, pH, and moisture changes.

See lecture 4 (Actuation) @ 15:16

QUESTION 14:

Duty Cycling of the sensors is managed by which component of IoT?

a. Application
b. Real-Time Kernel
c. Radios
d. Power Management Unit

Correct Answer: d. Power Management Unit

Detailed Solution: Power Management Unit does things like duty cycling of sensors that is how much time they are to be powered on and how much time they will be off.

See lecture 5 (Basics of IoT Networking – Part - I) @ 13:39

QUESTION 15:

Which of the following are challenges of IoT

a. Security
b. Complexity Management
c. Modeling and Analysis
d. All of these

Correct Answer: d. All of these

Detailed Solution: IoT Challenges are –

- Security
- Modeling and Analysis
- Complexity Management
- Scalability
- Energy Efficiency
- Interfacing
- Interoperability
- Data Storage
- Data Analytics

See lecture 5 (Basics of IoT Networking – Part - I) @ 24:40

**************END*************

Introduction to Internet of Things

Assignment-Week 2

TYPE OF QUESTION: MCQ/MSQ

Number of questions: 15 **Total marks: 15 X 1= 15**

QUESTION 1:

Which of the following is based on the publish-subscribe model?

a. MQTT
b. HTTP
c. HTTPS
d. All of these

Correct Answer: a. MQTT

Detailed Solution: Message Queue Telemetry Transport (MQTT) is a publish-subscribe based lightweight messaging protocol for use in conjunction with TCP/IP protocol.

See lecture 6 (Basics of IoT Networking – Part II) @ 01:51

QUESTION 2:

In MQTT, a topic to which a client is subscribed is updated in the form of messages and distributed by the _____?

a. Publishers
b. Message Broker
c. Subscribers
d. All of these

Correct Answer: b. Message Broker

Detailed Solution: A topic to which a client is subscribed is updated in the form of messages and distributed by the message broker.

See lecture 6 (Basics of IoT Networking – Part II) @ 03:33

QUESTION 3:

Which of the following is used when more than one level needs to be subscribed, such as the entire sub-tree, i.e., a multilevel wildcard?

a. +
b. #
c. \
d. None of these

Correct Answer: b. #

Detailed Solution: If more than one level needs to be subscribed, such as the entire sub-tree, there is also a multilevel wildcard (#). It allows to subscribe to all underlying hierarchy levels. For example house/# is subscribing to all topics beginning with house.

See lecture 6 (Basics of IoT Networking – Part II) @ 12:40

QUESTION 4:

The CoAP protocol is designed for -.

a. Heavy Web Application
b. Publish-Subscribe Applications
c. Machine-to-Machine (M2M) applications
d. Both (a) and (b)

Correct Answer: c. Machine-to-Machine (M2M) applications

Detailed Solution: CoAP – Constrained Application Protocol. It is a web transfer protocol for use with constrained nodes and networks. Designed for Machine-to-Machine (M2M) applications such as smart energy and building automation. Based on Request-Response model between end-points.

See lecture 7 (Basics of IoT Networking – Part III) @ 00:35

QUESTION 5:

Statement I – The messaging sub-layer of CoAP, is responsible for reliability and duplication of messages.

Statement II – The request/response sub-layer is responsible for communication.

Which of the above statement/statements is/are correct?

a. Only Statement I
b. Only Statement II
c. Both Statement I and II
d. Statement I Correct but Statement II Incorrect

Correct Answer: c. Both Statement I and II

Detailed Solution: The messaging sub-layer of CoAP, is responsible for reliability and duplication of messages while the request/response sub-layer is responsible for communication.

See lecture 7 (Basics of IoT Networking – Part III) @ 04:19

QUESTION 6:

Which of the following is a messaging mode in CoAP?

a. Append
b. Substitute
c. Attempt
d. Separate

Correct Answer: d. Separate

Detailed Solution: CoAP has four messaging modes

- Confirmable
- Non-Confirmable
- Piggyback
- Separate

See lecture 7 (Basics of IoT Networking – Part III) @ 05:29

QUESTION 7:

Which of the following provides for the discovery of services residing locally or across a network?

a. Internet
b. SMQTT
c. XMPP
d. CoAP

Correct Answer: c. XMPP

Detailed Solution: XMPP provides for the discovery of services residing locally or across a network, and the availability information of these services.

See lecture 7 (Basics of IoT Networking – Part III) @ 12:03

QUESTION 8:

AMQP is a protocol of which layer?

a. Transport Layer
b. Application Layer
c. Network Layer
d. Session Layer

Correct Answer: b. Application Layer

Detailed Solution: AMQP is an Application Layer protocol.

See lecture 8 (Basics of IoT Networking – Part IV) @ 01:41

QUESTION 9:

Which of the following is NOT a feature of the AMQP protocol?

a. Closed Standard
b. Security
c. Reliability
d. Routing

Correct Answer: a. Closed Standard

Detailed Solution: Features of AMQP are –

- Security
- Reliability
- Interoperability
- Routing
- Queuing
- Open Standard

See lecture 8 (Basics of IoT Networking – Part IV) @ 04:54

QUESTION 10:

There are a total of _____ number of AMQP frame types are defined that are used to initiate, control, and tear down the transfer of messages between two peers.

a. Seven
b. Eight
c. Nine
d. None of these

Correct Answer: c. Nine

Detailed Solution: Nine AMQP frame types are defined that are used to initiate, control, and tear down the transfer of messages between two peers.

See lecture 8 (Basics of IoT Networking – Part IV) @ 06:34

QUESTION 11:

The function/functions of the Queue component of the AMQP protocol is/are -

a. Receive messages and route them to queues
b. Separate queues for separate business process
c. Consumer receive messages from queues
d. Both (b) and (c)

Correct Answer: d. Both (b) and (c)

Detailed Solution: The functions of the Queue components are to –

- Separate queues for separate business process
- Consumer receive messages from queues

See lecture 8 (Basics of IoT Networking – Part IV) @ 08:05

QUESTION 12:

Which of the following statements is/are false?

Statement – I: IEEE 802.15.4 is a well-known standard for low data-rate Wireless Personal Area Network (WPAN).
Statement – II: IEEE 802.15.4 standard operates in the ISM band.

a. Statement - II
b. Statement - I
c. Both Statement I and II
d. None of these

Correct Answer: d. None of these

Detailed Solution: IEEE 802.15.4 is a well known standard for low data-rate Wireless Personal Area Network (WPAN). It operates in the ISM band.

See lecture 9 (Connectivity Technologies – Part-I) @ 03:00

QUESTION 13:

The IEEE 802.15.4 establishes functionalities in which layers?

a. Application and Session Layers
b. Transport and Data Link Layers
c. Network and Session Layers
d. Physical and Data Link Layers

Correct Answer: d. Physical and Data Link Layers

Detailed Solution: The IEEE 802.15.4 is useful for establishing functionalities in the Physical and Data Link Layers.

See lecture 9 (Connectivity Technologies – Part-I) @ 17:27

QUESTION 14:

Which is not a purpose of the ZigBee Device Object (ZDO)?

a. Device Management
b. Interfacing and Control Services
c. Security
d. Policies

Correct Answer: b. Interfacing and Control Services

Detailed Solution: The functions of the ZigBee Device Object (ZDO) are –

- Device Management
- Security
- Policies

See lecture 9 (Connectivity Technologies – Part-I) @ 18:06

QUESTION 15:

State whether the following statement is True or False.

Statement: Similar to traditional barcodes and QR codes, RFID tag data cannot be read outside the line-of-sight.

a. False
b. True

Correct Answer: a. False

Detailed Solution: As compared to traditional barcodes and QR codes, RFID tag data can be read outside the line-of-sight.

See lecture 10 (Connectivity Technologies – Part-II) @ 17:33

**************END*************

NPTEL Online Certification Courses

Indian Institute of Technology Kharagpur

Introduction to Internet of Things

Assignment-Week 3

TYPE OF QUESTION: MCQ/MSQ

Number of questions: 15 **Total marks: 15 X 1= 15**

QUESTION 1:

Choose the correct option based on the following two statements on the HART Physical Layer.

Statement-I: It is derived from the IEEE 802.15.4 protocol.

Statement-II: It operated only in the 2.4 GHz ISM band.

a. Statement-I True and Statement-II False
b. Statement-I False and Statement-II True
c. Both Statements I and II are False
d. Both Statements I and II are True

Correct Answer: d. Both Statements I and II are True

Detailed Solution: HART Physical Layer is derived from the IEEE 802.15.4 protocol. It operated in the 2.4 GHz ISM band.

See lecture 11 (Connectivity Technologies-III) @ 05:44

QUESTION 2:

Which of the following characteristic of HART Data Link Layer helps to increase reliability and security?

a. Channel Hopping and Channel Blacklisting
b. Channel Crunching and Jamming
c. Scattering
d. All of these

Correct Answer: a. Channel Hopping and Channel Blacklisting

Detailed Solution: HART Data Link Layers incorporates channel hopping and channel blacklisting to increase reliability and security.

See lecture 11 (Connectivity Technologies-III) @ 06:23

QUESTION 3:

State True or False

Statement: Channel blacklisting in HART identifies channels consistently affected by interference and removes them from use.

a. True
b. False

Correct Answer: a. True

Detailed Solution: Channel blacklisting in HART identifies channels consistently affected by interference and removes them from use.

See lecture 11 (Connectivity Technologies-III) @ 08:27

QUESTION 4:

At the MAC layer –

Statement-I: WirelessHART utilizes Time Division Multiple Access (TDMA).

Statement-II: ZigBee applies Carrier Sense Multiple Access with Collision Detection (CSMA/CD).

a. Statement-I True and Statement-II False
b. Statement-I False and Statement-II True
c. Both Statements I and II are False
d. Both Statements I and II are True

Correct Answer: d. Both Statements I and II are True.

Detailed Solution: At the MAC layer, WirelessHART utilizes Time Division Multiple Access (TDMA), allotting individual time slots for each transmission. ZigBee applies Carrier Sense Multiple Access with Collision Detection (CSMA/CD).

See lecture 11 (Connectivity Technologies-III) @ 15:07

QUESTION 5:

NFC works on the principal of

a. Pressure
b. Magnetic Induction
c. Both (a) and (b)
d. None of these

Correct Answer: b. Magnetic Induction

Detailed Solution: NFC works on the principle of magnetic induction.

See lecture 11 (Connectivity Technologies-III) @ 20:02

QUESTION 6:

Bluetooth technology is based on Ad-hoc technology also known as?

a. Ad-hoc Piconets
b. Ad-hoc Micronets
c. Ad-hoc Nanonets
d. None of these

Correct Answer: a. Ad-hoc Piconets

Detailed Solution: Bluetooth technology is based on Ad-hoc technology also known as Ad-hoc Piconets.

See lecture 12 (Connectivity Technologies-IV) @ 04:05

QUESTION 7:

Class 2 Bluetooth radios have a range of about?

a. 1 m
b. 2 m - 5 m
c. 10 m
d. None of these

Correct Answer: c. 10 m

Detailed Solution: Class 2 radios are most commonly found in mobile devices and have a range of 10 meters.

See lecture 12 (Connectivity Technologies-IV) @ 05:16

QUESTION 8:

Which of the following is NOT a phase in Bluetooth connection establishment?

a. Inquiry
b. Booking
c. Paging
d. Connection

Correct Answer: b. Booking

Detailed Solution: The three phases of Bluetooth connection establishment are –

- Inquiry

- Paging
- Connection

See lecture 12 (Connectivity Technologies-IV) @ 05:33

QUESTION 9:

Zwave can support _____ number of nodes in a network?

a. 232
b. 233
c. 234
d. 235

Correct Answer: a. 232

Detailed Solution: In Zwave, mesh network topology is the main mode of operation, and can support 232 nodes in a network.

See lecture 13 (Connectivity Technologies-V) @ 03:54

QUESTION 10:

Topologies allowed in ISA 100.11A are?

a. Ring Only
b. Mesh and Hybrid
c. Mesh and Ring
d. Mesh and Star/Tree

Correct Answer: d. Mesh and Star/Tree

Detailed Solution: The ISA 100.11A support the Mesh and Star/Tree topologies.

See lecture 13 (Connectivity Technologies-V) @ 15:44

QUESTION 11:

An example of an Operating System (OS) that a sensor node can have is?

a. MicronOS
b. TinyOS
c. Both (a) and (b)
d. None of these

Correct Answer: b. TinyOS

Detailed Solution: Sensor nodes can have OS such as TinyOS.

See lecture 14 (Sensor Networks-I) @ 12:06

QUESTION 12:

Which of the following is NOT a constraint on sensor nodes?

a. Must consume extremely low power
b. Be non-autonomous
c. Be adaptive to environment
d. None of these

Correct Answer: b. Be non-autonomous

Detailed Solution: Constraints on sensor nodes –

- Must consume extremely low power
- Be autonomous
- Be adaptive to the environment

See lecture 14 (Sensor Networks-I) @ 14:36

QUESTION 13:

Nodes in WSNs that exhibit features of failed nodes but they can also send false routing messages which are a threat to the integrity of the network are called?

a. Normal Nodes
b. Badly Failed Nodes
c. Failed Nodes
d. Selfish Nodes

Correct Answer: b. Badly Failed Nodes

Detailed Solution: Nodes in WSNs that exhibit features of failed nodes but they can also send false routing messages which are a threat to the integrity of the network are called Badly Failed Nodes.

See lecture 15 (Sensor Networks-II) @ 03:53

QUESTION 14:

Which of the following are the two popular schemes to re-establish the connectivity between dumb nodes with others?

a. CoARD and CoRD
b. CoRAD and CoARD
c. CoRD and CoRAD
d. None of these

Correct Answer: c. CoRD and CoRAD

Detailed Solution: CoRD and CoRAD are the two popular schemes to re-establish the connectivity between dumb nodes with others.

See lecture 15 (Sensor Networks-II) @ 09:20

QUESTION 15:

Full form of WBAN is?

a. Wireless Body Area Network
b. Wirelessed Body Area Network
c. Wireless Bodily Area Network
d. None of these

Correct Answer: a. Wireless Body Area Network

Detailed Solution: Wireless Body Area Network (WBAN).

See lecture 15 (Sensor Networks-II) @ 21:21

**************END*************

NPTEL Online Certification Courses

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Introduction to Internet of Things

Assignment-Week 4

TYPE OF QUESTION: MCQ/MSQ

Number of questions: 15 **Total marks: 15 X 1= 15**

QUESTION 1:

When an intruder enters into the agricultural field through the boundary (perimeter) of the field, a/an _____ sensor can be used to detect the object and a/an _____ sensor can be used to sense the distance at which the object is located.

a. PIR, Ultrasonic
b. Ultrasonic, PIR
c. Humidity, PIR
d. None of these

Correct Answer: a. PIR, Ultrasonic

Detailed Solution: When an intruder enters into the agricultural field through the boundary (perimeter) of the field, a PIR sensor can be used to detect the object and an Ultrasonic sensor can be used to sense the distance at which the object is located.

See lecture 16 (Sensor Networks-III) @ 15:40

QUESTION 2:

_____ is defined as, all the nodes are connected in the network, so that sensed data can reach to sink node?

a. Coverage
b. Connectivity
c. Both (a) and (b)
d. None of these

Correct Answer: b. Connectivity

Detailed Solution: Connectivity is defined as, all the nodes are connected in the network, so that sensed data can reach to sink node.

See lecture 17 (Sensor Networks-IV) @ 02:14

QUESTION 3:

The objective of coverage in WSN is.

a. To use a minimum number of sensors and maximize the network lifetime
b. To use a maximum number of sensors and maximize the network lifetime
c. To use a minimum number of sensors and minimize the network lifetime
d. To use a maximum number of sensors and minimize the network lifetime

Correct Answer: a. To use a minimum number of sensors and maximize the network lifetime

Detailed Solution: The objective of coverage is to use a minimum number of sensors and maximize the network lifetime.

See lecture 17 (Sensor Networks-IV) @ 08:48

QUESTION 4:

State True or False

Statement-I: If transmission range ≤ 2* sensing range, coverage implies connectivity.

a. Statement-I is True
b. Statement-I is False

Correct Answer: b. Statement-I is False

Detailed Solution: If transmission range ≥ 2* sensing range, coverage implies connectivity.

See lecture 17 (Sensor Networks-IV) @ 05:46

QUESTION 5:

A mobile entity that collects the data from sensor nodes goes to the sink, and delivers the collected data from different sensor nodes are called?

a. Data Molecule
b. Static Node
c. Data Mules
d. None of these

Correct Answer: c. Data Mules

Detailed Solution: A mobile entity that collects the data from sensor nodes goes to the sink, and delivers the collected data from different sensor nodes are called Data Mules.

See lecture 18 (Sensor Networks-V) @ 07:11

QUESTION 6:

Human-centric Sensing is possible because of?

a. Smartphone and PDAs
b. Miniaturization and Proliferation of devices
c. Both (a) and (b)
d. None of these

Correct Answer: c. Both (a) and (b)

Detailed Solution: Human-centric Sensing is possible because of Smartphone, PDAs, Miniaturization, and Proliferation of devices.

See lecture 18 (Sensor Networks-V) @ 10:51

QUESTION 7:

Which of the following are the roles played by humans in Human-centric Sensing?

a. Sensing Targets
b. Sensor Operators
c. Data Source
d. All of these

Correct Answer: d. All of these

Detailed Solution: The three distinct roles (not necessarily mutually exclusive) played by humans are –

- Sensing Targets
- Sensor Operators
- Data Source

See lecture 18 (Sensor Networks-V) @ 12:35

QUESTION 8:

Which of the following is/are NOT goal of Participatory Sensing?

a. To only collect data
b. Not just collect data, but allow common people to access data and share knowledge
c. To only access data
d. Both (a) and (c)

Correct Answer: d. Both (a) and (c)

Detailed Solution: The goal of Participatory Sensing is not just collect data, but allow common people to access data and share knowledge.

See lecture 18 (Sensor Networks-V) @ 13:00

QUESTION 9:

The two popular network topologies in UAV networks are

a. Ring
b. Mesh and Star
c. Bus
d. All of these

Correct Answer: b. Mesh and Star

Detailed Solution: The two popular network topologies in UAV networks are Mesh and Star topologies.

See lecture 19 (UAV Networks) @ 03:26

QUESTION 10:

Which of the following is NOT an issue in UAV networks?

a. Slow change in network topology
b. Malfunctioning of UAVs
c. Intermittent link nature
d. Relative position of UAV may change

Correct Answer: a. Slow change in network topology

Detailed Solution: Key issues in UAV networks are –

- Frequently change in network topology
- Relative position of UAV may change
- Malfunctioning of UAV
- Intermittent link nature

See lecture 19 (UAV Networks) @ 05:23

QUESTION 11:

The scalability in single UAV system as compared to multi-UAV system is?

a. Limited
b. High
c. Very High
d. None of these

Correct Answer: a. Limited

Detailed Solution: The scalability in single UAV system as compared to multi-UAV system is limited.

See lecture 19 (UAV Networks) @ 07:47

QUESTION 12:

Typical types of mesh networks in UAV networks are

a. Solid Mesh and Hierarchical Mesh
b. Plane Mesh and Solid Mesh
c. Flat Mesh and Hierarchical Mesh
d. None of these

Correct Answer: c. Flat Mesh and Hierarchical Mesh

Detailed Solution: Typical types of mesh networks in UAV networks are –

- Flat Mesh
- Hierarchical Mesh

See lecture 19 (UAV Networks) @ 12:48

QUESTION 13:

State True or False

Statement-I: SCADA is designed for isolated systems using proprietary solutions,

whereas M2M is designed for cross-platform integration.

a. False
b. True

Correct Answer: b. True

Detailed Solution: SCADA is designed for isolated systems using proprietary solutions, whereas M2M is designed for cross-platform integration.

See lecture 20 (Machine to Machine Communication) @ 5:25

QUESTION 14:

Which of the following is NOT a feature of M2M?

a. Large number of nodes or devices
b. High cost
c. Energy efficient
d. Small traffic per machine/device

Correct Answer: b. High cost

Detailed Solution: Features of M2M –

- Large number of nodes or devices
- Low cost
- Energy efficient
- Small traffic per machine/device

See lecture 20 (Machine to Machine Communication) @ 9:24

QUESTION 15:

Which of the following is NOT an M2M node type?

a. Low End Node
b. High End Node
c. Out End Node
d. None of these

Correct Answer: c. Out End Node

Detailed Solution: The three node types of M2M are –

- Low end node
- Mid end node
- High end node

See lecture 20 (Machine to Machine Communication) @ 10:35

**************END*************

NPTEL Online Certification Courses

Indian Institute of Technology Kharagpur

Introduction to Internet of Things

Assignment-Week 5

TYPE OF QUESTION: MCQ/MSQ

Number of questions: **15** **Total marks: 15 X 1= 15**

QUESTION 1:

Suppose that an IoT sensor node A works on wireless WiFi and senses pressure as a physical parameter in integer number, and another IoT node B operates on IEEE 802.15.4 Zigbee and senses humidity as a floating point (decimal) number. In this context, which among the following correctly describes the issues with the deployment.

a. Heterogeneity
b. Interoperability
c. Both heterogeneity and interoperability
d. Neither heterogeneity and interoperability

Correct Answer: c. Both heterogeneity and interoperability

Detailed Solution: Since the two sensors sense different parameters in different formats and communicates with different protocols, this is an issue of both heterogeneity and interoperability. Refer lecture 21 on introduction to interoperability

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QUESTION 2:

RESTful web services are utilized for _____.

a. Syntactic interoperability for device interaction
b. Semantic interoperability for device interaction
c. Both (a) and (b)
d. None of the above

Correct Answer: a. Syntactic interoperability for device interaction

Detailed Solution: Service-oriented computing-based architecture, RESTful web services, open standard protocols (IEEE 802.15.4), and closed protocols (Z-wave) are the popular approaches utilized towards syntactic interoperability for device interaction.

See lecture 21 @ 17:40

QUESTION 3:

Which UMB interoperability component is responsible for converting physical devices into virtually abstracted ones?

a. UMB Adaptor
b. UMB Core
c. UMB Hypervisor
d. UMB Abstractor

Correct Answer: a. UMB Adaptor

Detailed Solution: UMB-A is responsible for converting physical devices into virtually abstracted ones. (Please refer Lecture 21@27:16)

QUESTION 4:

User interoperability is the interoperability problem between an user and _____.

a. Another user

b. Device

c. Both user and device

d. None of these

Correct Answer: b. Device

Detailed Solution: In user interoperability, the issue of interoperability is between the user and device. Refer lecture 21, ppt No. 7, types of interoperability

QUESTION 5:

Which of the following is an open, global, multi-sector standard for efficient, accurate, flexible classification of products and services?

a. eCl@ss
b. UNSPSC
c. EPC
d. Both UNSPSC and EPC

Correct Answer: b. UNSPSC

Detailed Solution: UNSPC stands for United Nations Standard Products and Services Code. It is one of the device classification solutions. eCl@ss is the standard utilized for classification and clear description of cross-industry products. Electronic Product Code (EPC) is used to generate unique addresses for device identification. See lecture 21 @ 16:30

QUESTION 6:

What does the routing component in UMB-C use for routing the metadata messages?

a. Flow Table
b. Routing Table
c. Middleware Routing Table
d. Middleware Flow Table

Correct Answer: c. Middleware Routing Table

Detailed Solution: UMB-C uses Middleware Routing Table for routing metadata messages among the devices. (Please refer Lecture 21@28:16)

QUESTION 7:

Which among the following are components of an Arduino UNO Board?

a. LED Power Indicator
b. Digital I/O Pins
c. Analog IN Pins
d. All of these

Correct Answer: d. All of these

Detailed Solution: An Arduino UNO board contains several components, which also contain the ones listed above. Refer lecture 22 on Arduino Board details.

QUESTION 8:

The tool used to select a particular COM port for connecting Arduino to a serial connector is called a sketch.

a. True
b. False

Correct Answer: b. False

Detailed Solution: Sketch in Arduino is the program that is coded in Arduino IDE. Refer lecture 22, ppt No. 9

QUESTION 9:

Which kind of conflict occur when different processing logic are applied to same IoT networked devices or applications?

a. Semantic conflict.
b. Syntactic conflict.
c. System conflict.
d. Device conflict.

Correct Answer: a. Semantic conflict

Detailed Solution: Semantic conflict occurs when different processing logics are applied to same IoT networked devices or applications. See lecture 21@5:20

QUESTION 10:

Which of the following is TRUE for the sketch command given below?

delay(3000);

a. Provides a delay of 3000 seconds
b. Provides a delay of 3 seconds
c. Provides a delay of 3000 nano seconds
d. Provides a delay of 3000 simulation time

Correct Answer: b. Provides a delay of 3 second

Detailed Solution: As per the basics of Arduino programming.

QUESTION 11:

How many types of loops will you find in Arduino Programming?

a. 1

b. 2

c. 3

d. 4

Correct Answer: c. 3

Detailed Solution: Like C programming, Arduino sketches also have 3 types of loops, for, while and do-while loops.

QUESTION 12:

How many digital I/O pins are there in Arduino Uno.

a. 14
b. 54
c. 11
d. 16

Correct Answer: a. 14

Detailed Solution: From the basics of Arduino Uno.Refer to the book: S. Misra, A. Mukherjee, and A. Roy, 2020. Introduction to IoT. Cambridge University Press.

QUESTION 13:

Servo motors that you connect to Arduino, are an example of

a. Sensors
b. Actuators
c. Gateways
d. Routers

Correct Answer: b. Actuators

Detailed Solution: Servo motors, along with other different types of motors are examples of Actuators in IoT network. Refer lecture 25 on Integration of Arduino with Sensors and Actuators.

QUESTION 14:

Which of the following functions exist by default in Arduino IDE?

a. main()
b. loop() and main()
c. setup() and loop()
d. setup() and main()

Correct Answer: c. setup() and loop()

Detailed Solution: By default Arduino IDE consists of 2 functions - setup() and loop(). See lecture 22 @ 10:40

QUESTION 15:

Choose the right option for if/conditional operator.

a. Val = (condition)?(Statement 1):(Statement 2)
b. Val = (condition)?(Statement 2):(Statement 1)
c. Val = (condition):(Statement 1)?(Statement 2)
d. Val = (condition):(Statement 2)?(Statement 1)

Correct Answer: a. Val = (condition)?(Statement 1):(Statement 2)

Detailed Solution: Conditional operator may also be written as Val = (condition)?(Statement 1):(Statement 2). (Please refer Lecture 23@2:01)

**************END*************

Introduction to Internet of Things

Assignment-Week 6

TYPE OF QUESTION: MCQ/MSQ

Number of questions: 15 **Total marks: 15 X 1= 15**

QUESTION 1:

Python's installation comes with an integrated development environment for programming.

a. True
b. False

Correct Answer: a. True
Detailed Solution: As per Python program. (Please refer to lecture INTRODUCTION TO PYTHON PROGRAMMING- I @ 3:40)

QUESTION 2:

Fill in the blanks. Python IDE is available for installation into PC with _____.

a. Windows
b. Linux
c. Mac
d. All of these

Correct Answer: d. All of these

Detailed Solution: As per Python program. (Please refer to lecture INTRODUCTION TO PYTHON PROGRAMMING- I @ 4:50)

QUESTION 3:

How many data type/s are available in Python?

a. 1

b. 2

c. 5

d. None of these

Correct Answer: c. 5

Detailed Solution: As per Python program (Please refer to lecture INTRODUCTION TO RASPBERRY PI-I @ 9:00).

QUESTION 4:

What is the output of the following piece of Python code?

```
ls= {1: "abc",   "key": "2",  "year": 2023}
print(ls["key"]
```

a. abc
b. 2
c. 2023
d. “abc"

Correct Answer: b. 2

Detailed Solution: As per the basics of Python programming. (Please refer to lecture INTRODUCTION TO PYTHON PROGRAMMING- I @ 15:23)

QUESTION 5:

The variable that is declared inside the function in Python is called a Global variable.

a. True
b. False

Correct Answer: b. False

Detailed Solution: As per the basics of Python programming. (Please refer to lecture INTRODUCTION TO PYTHON PROGRAMMING- I @ 25:58)

QUESTION 6:

Which of the following is used to read a text file in Python?

a. file = open('data.txt ', 'r ')
b. file = open_text('data.txt ', 'r ')
c. file = read_text('data.txt ', 'r ')
d. file = read('data.txt ', 'r ')

Correct Answer: a. file = open('data.txt ', 'r ')

Detailed Solution: As per the basics of Python programming. (Please refer to lecture INTRODUCTION TO PYTHON PROGRAMMING- II @)

QUESTION 7:

Which of the following libraries in Python is used for processing images.

a. Pillow
b. Numpy
c. Panda
d. None of these

Correct Answer: a. Pillow

Detailed Solution: In python programming PIL, OpenCV, Pillow are common image processing libraries. (Please refer to lecture INTRODUCTION TO PYTHON PROGRAMMING- II @ 18:08)

QUESTION 8:

In python, images cannot be converted to greyscale.

a. True
b. False

Correct Answer: b. False

Detailed Solution: As per the basics of Python programming (Please refer to lecture INTRODUCTION TO PYTHON PROGRAMMING- II @19:44).

QUESTION 9:

Which of the following shortcut exits the nano editor?

a. Ctrl + E

b. Ctrl + O

c. Ctrl+V

d. None of these

Correct Answer: d. None of these

Detailed Solution: Ctrl + O writes the code to a file. Ctrl + X exits the nano editor.
See lecture 29

QUESTION 10:

Which of the following is an unordered data type in Python?

a. List
b. Dictionary
c. Both List and Dictionary
d. Tuple

Correct Answer: b. Dictionary

Detailed Solution: As per basics of Python programming.
See lecture 26 @ 15:36

QUESTION 11:

Sensors can be analog or digital. Is the statement true?

a. Yes
b. No

Correct Answer: a. Yes

Detailed Solution: Sensors can be analog or digital. See lecture 30 @ 03:27

QUESTION 12:

Is relay a type of mechanical switch?

a. No
b. Yes

Correct Answer: b. Yes

Detailed Solution: Relay is a type of mechanical/electromechanical switch. See lecture 30 @ 05:53

QUESTION 13:

Which of the following converts energy to motion?

a. Actuator
b. Raspberry Pi
c. Sensor
d. None of these

Correct Answer: a. Actuator

Detailed Solution: Actuator converts energy to motion.
See lecture 30 @ 03:37

QUESTION 14:

Python does not follow strict indentation.

a. True
b. False

Correct Answer: b. False

Detailed Solution: As per the basics of Python programming. (Please refer to lecture INTRODUCTION TO PYTHON PROGRAMMING- I @ 7:47)

QUESTION 15:

Functions cannot be reassigned to the variables in Python.

a. True
b. False

Correct Answer: b. False

Detailed Solution: As per the basics of Python programming. (Please refer to lecture INTRODUCTION TO PYTHON PROGRAMMING- I @ 24:54)

**********END**********

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Introduction to Internet of Things

Assignment-Week 7

TYPE OF QUESTION: MCQ/MSQ

Number of questions: **15** **Total marks: 15 X 1= 15**

QUESTION 1:

The switches in a non-Software Defined Network (SDN) environment do not have a global view of the network.

a. True
b. False

Correct Answer: a. True

Detailed Solution: Switches in non-SDN do not have global view of the network. (Please refer Lecture 33@6:53)

QUESTION 2:

Which of the following is not a function of the Application Plane in Software Defined Network architecture?

a. Business Logic implementation
b. Security
c. Traffic Engineering
d. Forwarding

Correct Answer: d. Forwarding

Detailed Solution: The Data Plane in SDN is responsible for data forwarding. (Please refer Lecture 33@12:25)

QUESTION 3:

In Socket programming, the parameter AF_INET stands for _____.

a. Unix protocols
b. Internet Protocol (IP)
c. File sharing
d. Time slicing

Correct Answer: b. Internet Protocol (IP)

Detailed Solution The AF_INET specifies the rules and standards of the Internet protocol, hence the socket acts as an IP socket. (Please refer Lecture 31@14:13)

QUESTION 4:

During remote server access by a Raspberry Pi, where the Raspberry Pi acts as a client, the client needs the following?

a. Only IP address of server
b. Only port number
c. Both server IP address and port number
d. Client's IP address

Correct Answer: c. Both server IP address and port number

Detailed Solution: A client can communicate with a server only if both IP address and port numbers are known. (Please refer Lecture 31@14:13)

QUESTION 5:

Fill in the blank:

Controllers in SDN receive requests from the _____.

a. Repeaters
b. Gateways
c. Switches
d. Routers

Correct Answer: c. Switches

Detailed Solution: SDN controllers should be able to handle all requests from the SDN switches (Please refer Lecture 34@2:41)

QUESTION 6:

During remote server access using socket programming what is the utility of the <socket_name>.listen() function?

a. To create a new socket
b. To bind the socket to connection
c. To wait for clients to connect
d. To close the connection

Correct Answer: c. To wait for clients to connect

Detailed Solution: listen() function makes the server wait for incoming client connections (Refer Lecture 31 ppt no 13)

QUESTION 7:

With respect to client-server model of socket programming, in which of the following does the function <socket_name>.bind() reside?

a. Client
b. Server
c. Both client and server
d. None of client and server

Correct Answer: b. Server

Detailed Solution: The bind() function binds the socket name to the socket connection at the server side (Refer lecture 31 on socket programming)

QUESTION 8:

Which among the following are valid data processing activities

a. Data Splitting
b. Data filtering
c. Data plotting
d. All of the given

Correct Answer: d. All of the given

Detailed Solution: As per the basics of Python programming (Please refer to lecture INTRODUCTION TO PYTHON PROGRAMMING- II @19:44).

QUESTION 9:

Which among the following is the correct direction for PACKET_IN type messages in SDN?

a. From controller to switch
b. From switch to controller
c. Between two switches
d. Between two controllers

Correct Answer: b. From switch to controller

Detailed Solution: PACKET_IN messages are sent from switches to the controller upon receipt of new unknown packets. Refer lecture 33, ppt no 20.

QUESTION 10:

Suppose a particular flow-rule has a soft time-out of 5s and a hard time-out of 3s. Is this association correct?

a. Yes
b. No

Correct Answer: b. No

Detailed Solution: Hard time-outs of flow rules are always greater than soft time-outs, not the other way round. Refer lecture 33, OpenFlow Protocol III

QUESTION 11:

In SDN Backup Controllers are required for which among the following?

a. To act as backup of the main controller all the time
b. To act as backup when the main controller fails
c. To replace the main controller all together
d. None of the stated.

Correct Answer: b. To act as backup when the main controller fails

Detailed Solution: Backup controllers acts as backup when the main controller is down Refer lecture 34.

QUESTION 12:

Which of the following is true?

a. Traditional Network: Routing Table, Software Defined Network: Routing Table
b. Traditional Network: Flow Table, Software Defined Network: Routing Table
c. Traditional Network: Routing Table, Software Defined Network: Flow Table
d. Traditional Network: Flow Table, Software Defined Network: Flow Table

Correct Answer: c. Traditional Network: Routing Table, Software Defined Network: Flow Table

Detailed Solution: All switches in traditional network have routing tables and those in Software Defined Network have flow tables (Please refer Lecture 33@17:15)

QUESTION 13:

What are the benefits of using SDN over IoT?

a. Management of device heterogeneity
b. Management of end-device mobility and dynamic flow rules
c. Software control of end-devices, i.e sensors and actuators
d. All of the given

Correct Answer: d. All of the given

Detailed Solution: SDN over IoT can be used to solve a plethora of issues and problems in a dynamic and efficient manner. Refer lecture 35, SDN over IoT

QUESTION 14:

Sensor OpenFlow, Soft-WSN and SDN-WISE are examples of _____.

a. Traditional routing protocols.
b. Various SDN protocols for wired LANs
c. Various implementations of the concept of Software Defined IoT
d. Traditional IoT protocol examples.

Correct Answer: c. Various implementations of the concept of Software Defined IoT

Detailed Solution: The given names are all examples of various implementations of different concepts of Software Defined IoT by various research groups across the world. (Please refer Lecture 35@8:46 onwards)

QUESTION 15:

Consider the following python script using the split() function, what will be the correct print output (SEE the options VERY carefully including the quotation marks)

```
dat = 'Apple,Guava#Banana'
var = dat.split('#')
print(var)
```

a. ['Apple','Guava','Banana']
b. ['Apple','Guava']
c. ['Guava','Banana']
d. ['Apple,Guava','Banana']

Correct Answer: d. ['Apple,Guava','Banana']

Detailed Solution: The split('#') method splits the string into two parts with respect to the '#' character**.** (Please refer Lecture 32@8:02)

**************END*************

Introduction to Internet of Things

Assignment-Week 8

TYPE OF QUESTION: MCQ/MSQ

Number of questions: 15 **Total marks: 15 X 1= 15**

QUESTION 1:

Which among the following are core challenges of traditional mobile networks?

a. Scalability
b. Flexibility
c. Manageability
d. All of the given

Correct Answer: d. All of the given

Detailed Solution: Traditional mobile networks suffer from a lot of problems, few of which are as given in the options. Refer lecture 36, Traditional (Wireless) Mobile Network

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QUESTION 2:

Network virtualization enables _____ of physical resources

a. Movement
b. Abstraction
c. Removal
d. Creation

Correct Answer: b. Abstraction

Detailed Solution: Abstraction of physical resources from network services is one of the core functionality of virtualization. Refer lecture 36, ppt No. 5

QUESTION 3:

In comparison to Software-Defined Networks, traditional networks are cost expensive with respect to which of the following?

a. Both capex and opex
b. Capex but not opex
c. Opex but not capex
d. Neither capex nor opex

Correct Answer: a. Both capex and opex.

Detailed Answer: Traditional networks are cost expensive with respect to both capex and opex in comparison to SDN. (Please refer Lecture 36@2:46)

QUESTION 4:

General OpenFlow supports both wireless and wired connections.

a. True
b. False

Correct Answer: b. False

Detailed Answer: A modified OpenFlow is necessary for supporting wireless connections. (Please refer Lecture 36@8:18)

QUESTION 5:

With respect to Software Defined Data Centre Networking (SD-DCN), _____ can use wild cards and _____ uses exact match rules.

a. Mice flows, Elephant flows
b. Elephant flows, Mice flows
c. Mice flows, traditional flows
d. Traditional flows, Elephant flows

Correct Answer: a. Mice flows, Elephant flows

Detailed Solution: Refer to ppt No. 19 of lecture 36 on Data Centre Networking

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QUESTION 6:

In cloud computing model, which among the following are characteristics of computing resources?

a. On-demand
b. Shared
c. Configurable
d. All of these

Correct Answer: d. All of these

Detailed Solution: "Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., network infrastructures, servers, storage, applications, etc.)" – NIST. Refer Lecture 37, Introduction to Cloud Computing.

QUESTION 7:

Iaas, PaaS and SaaS are examples of what type of cloud models?

a. Cloud deployment model
b. Cloud service model
c. Cloud access model
d. Cloud virtualization model

Correct Answer: b. Cloud service model

Detailed Solution: Iaas, PaaS and SaaS are three major types of cloud service models. Refer lecture 37, Introduction to Cloud Computing

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QUESTION 8:

An organization A wants to deploy a cloud infrastructure, whereby it wants to push majority of the data to a cloud whose servers can be situated anywhere within the globe, but it wants certain private data to be pushed only to cloud servers that are present on-premise and are accessible by only authenticated members of the organization. In this context which among the following deployment model should be used?

a. Private Cloud
b. Public Cloud
c. Hybrid Cloud
d. Any of these

Correct Answer: c. Hybrid Cloud

Detailed Solution: Hybrid cloud deployment model supports both the features of public and private cloud. Refer lecture 37, ppt No. 18.

QUESTION 9:

Which of the following type of client requires constant communication/connection with the cloud server?

a. Thin client
b. Thick client
c. Both thin and thick clients
d. None of these

Correct Answer: a. Thin client

Detailed Answer: A thin client is a network computer without a hard disk drive and high configurations. They act as simple terminals and require constant communication with the servers. (Please refer Lecture 37@20:00)

QUESTION 10:

Fill in the blank: Typically, cloud computing have _____ components?

a. 4
b. 5
c. 6
d. 7

Correct Answer: c. 6

Detailed Answer: Cloud computing has 6 components. They are clients, services, applications, platforms, storage, and infrastructure. (Please refer Lecture 37@23:31)

QUESTION 11:

What does ‘CIA’ in cloud data security stand for?

a. Confidentiality, Integrity, Availability
b. Confidentiality, Inheritance, Automation
c. Congestion, Integrity, Authentication
d. Criticality, Integrity, Accountability

Correct Answer: a. Confidentiality, Integrity, Availability

Detailed Solution: ‘CIA’ stands for ‘Confidentiality, Integrity and Availability’. (Please refer Lecture 39@21:01)

QUESTION 12:

In SaaS model of cloud computing, which of the following acts as the thin-client?

a. Cloud gateway
b. Web monitor
c. Web browser
d. Local firewall

Correct Answer: c. Web browser

Detailed Solution: Web browsers at the client side act as thin-clients which makes connection to the cloud to receive the services provided by the SaaS model. Refer lecture 38 on SaaS, ppt No. 21.

QUESTION 13:

Data in _____ and Data at _____ are two important aspects of data security

a. past, present
b. time, place
c. transit, rest
d. None of these

Correct Answer: c. transit, rest

Detailed Solution: Data in transit and Data at rest are two important aspects of data security within cloud computing framework. Refer lecture 39 on Data Security, ppt No. 18

QUESTION 14:

Which among the following is a metric for Service Level Agreement (SLA) in Cloud Computing?

a. Availability
b. Portability
c. Response Time
d. All of these

Correct Answer: d. All of these

Detailed Solution: Availability, Portability, Response Time, Problem Reporting and Penalty are various SLA metrics for Cloud Computing. Refer Chapter 10 (Page 245) of “Introduction to IoT” by Sudip Misra, Anandarup Mukherjee, Arijit Roy, Cambridge University Press.

QUESTION 15:

Which of the following cloud computing models does AWS EC2 belong to?

a. IaaS
b. PaaS
c. SaaS
d. None of these

Correct Answer: a. IaaS.

Detailed Solution: AWS EC2 is a popular example of IaaS.

**************END*************

Introduction to Internet of Things

Assignment-Week 9

TYPE OF QUESTION: MCQ/MSQ

Number of questions: 15 **Total marks: 15 X 1= 15**

QUESTION 1:

Openstack is a free open source software for cloud framework simulation and experimentation with various cloud applications.

a. True
b. False

Correct Answer: a. True

Detailed Solution: Openstack is a free open source software for cloud framework simulation and experimentation with various cloud applications. It can be downloaded and installed for free. Refer Lecture 41.

QUESTION 2:

Which among the following is NOT a component of OpenStack.

a. Horizon
b. Heat
c. Plasma
d. Neutron

Correct Answer: c. Plasma

Detailed Solution: Plasma is not a component of OpenStack. The rest are various components, including Nova, Glance, Swift etc. Refer lecture 41, ppt No. 4

QUESTION 3:

You cannot ping your OpenStack instance from an outside network unless you connect your instance with the public network through a _____

a. Router
b. Firewall
c. Repeater
d. Load balancer

Correct Answer: a. Router

Detailed Solution: You are supposed to connect your virtual OpenStack instance with the public network through a router (Please refer Lecture 41@17:41)

QUESTION 4:

Virtualized resources within the OpenStack simulator that you can define, set parameters of and deploy within OpenStack are also known as

a. Instances

b. Files

c. Hypervisors

d. Sketches

Correct Answer: a. Instances

Detailed Solution: In OpenStack instances refer to the virtual resources that you define, initialize and deploy. Refer Lecture 41@15:36

QUESTION 5:

The SCSP in sensor clouds is responsible for caching the data in the databases.

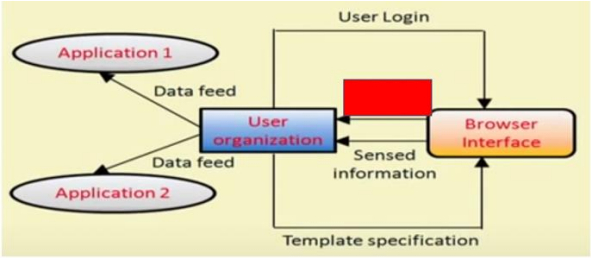
a. True
b. False

Correct Answer: a. True

Detailed Answer: The SCSP in sensor clouds is responsible for caching the data in the databases. (Please refer Lecture 42@14:25)

QUESTION 6:

Select the correct option for replacing the box (in red) in the following architecture for sensor cloud user organization view.



a. User credentials
b. Template display
c. Template view
d. User view

Correct Answer: c. Template view

Detailed Solution: The browser interface sends template view and sensed information to the user organization module in the sensor cloud user organization view. (Please refer Lecture 42@15:16)

QUESTION 7:

Which among the following is the principal feature of sensor clouds, with respect to sensor nodes?

a. Sensor monitoring
b. Sensor instantiation
c. Sensor virtualization
d. Sensor collection

Correct Answer: c. Sensor virtualization

Detailed Solution: Sensor virtualization is the principal feature of sensor clouds and their utility.

Refer lecture 42 and 43 on Sensor cloud

QUESTION 8:

Caching in sensor cloud provide no benefit over regions with slow environmental monitoring rate.

a. True
b. False

Correct Answer: b. False

Detailed Solution: To prevent unnecessarily energy wastage in continuous sensing operation, sensor cloud uses caching. Refer lecture 42 and 43.

QUESTION 9:

How many different types of caching mechanism are there in sensor cloud?

a. 1
b. 4
c. 2
d. 3

Correct Answer: c. 2

Detailed Answer: Internal Cache (IC) and External Cache (EC) are two different types of caching mechanisms used in sensor cloud. Refer lecture 43, ppt No. 13

QUESTION 10:

Virtual sensors within a sensor cloud have communication interfaces with _____.

a. Only the physical sensors below them
b. Only the end-user applications above them.
c. Both physical sensors below and applications above.
d. Neither the physical sensors, nor the applications above.

Correct Answer: c. Both physical sensors below and applications above

Detailed Solution: Virtual sensor layer sits in the middle having interface to both physical sensors as well as applications. (Please refer Lecture 3@9:24 and 28:01)

QUESTION 11:

Data from an IoT device is transferred to cloud via a network, which is then processed at the cloud and then a response is sent back to the IoT device from the cloud after processing. The time it takes for one-way data transfer between the node and cloud is 10s and the data processing time at the cloud is 'x' seconds. It takes a total of 25s for the entire to and fro transfer of data between the sensor and cloud along with processing at the cloud. What is the value of x?

a. 10s

b. 5s

c. 15s

d. 20s

Correct Answer: b. 5s

Detailed Solution: Time taken for one-way data transfer between the node and cloud is 10s. Total time taken for the data transfer is 25s. So 25=10+x+10 (transfer from node to cloud+processing at cloud+transfer from cloud to node). Thus x = 5s.

QUESTION 12:

In IoT, temporal sensitivity of data plays an important role

a. True
b. False

Correct Answer: a. True

Detailed Solution: IoT data can be classified in to time sensitive data, less time sensitive data and data not sensitive to time. Hence time sensitivity plays a big role in IOT data classification. Refer lecture 44 on Fog Computing.

QUESTION 13:

Extremely time sensitive data in IoT should be processed and analyzed _____.

a. Farthest away from source
b. Closest to the source
c. Distance between source and place of analysis does not matter
d. None of these

Correct Answer: b. Closest to the source

Detailed Solution: Extremely time sensitive data should be processed and analyzed closest to the source, so that prompt action can be taken immediately. Refer lecture 44 on Fog Computing, ppt No. 17.

QUESTION 14:

Which among the following is a view of a Fog Computing Architecture?

a. Node View
b. System View
c. Software View
d. All of these

Correct Answer: d. All of these

Detailed Solution: Fog Computing Architectural framework has several views, node, system and software among them. Refer Chapter 11 (Page 260 - 263) of "Introduction to IoT" by Sudip Misra, Anandarup Mukherjee, Arijit Roy, Cambridge University Press.

QUESTION 15:

Which among the following is true?

a. Fog computing acts as a complement to cloud computing.
b. Fog computing is a replacement for cloud computing.
c. Fog computing and cloud computing are the same.
d. Fog computing is more powerful than cloud computing (with respect to resources).

Correct Answer: a. Fog computing acts as a complement to cloud computing.

Detailed Solution: Fog computing and cloud computing are complementary technologies. Fog helps in bringing the cloud closer to the IoT devices. (Please refer Lecture 45@1:06)

**************END*************

NPTEL Online Certification Courses

Indian Institute of Technology Kharagpur

Introduction to Internet of Things

Assignment-Week 10

TYPE OF QUESTION: MCQ/MSQ

Number of questions: **15** **Total marks: 15 X 1= 15**

QUESTION 1:

A smart city _____.

a. Is an urban system
b. Uses ICT
c. Makes infrastructure more reliable
d. All of these

Correct Answer: d. All of these

Detailed Solution: A smart city is an urban system, uses ICT and makes infrastructure more reliable. (Please refer Lecture 46@8:29)

QUESTION 2:

Collective data is more intelligent than the single sources.

a. True
b. False

Correct Answer: a.

Detailed Solution: Collective data is rich in information and generates better intelligence than the single sources. (Please refer Lecture 47@10:18)

QUESTION 3:

Which of the following is one of the challenges of Data fusion?

a. Imperfection
b. Conflicts
c. Ambiguity
d. All of these

Correct Answer: d. All of these

Detailed Solution: The challenges of data fusion involves Imperfection, Conflicts and Ambiguity. (Please refer Lecture 47@9:16)

QUESTION 4:

Which of the following are challenges for IoT in smart cities?

a. Security and Reliability
b. Small scale
c. Homogeneity
d. None of these

Correct Answer: a. Security and Reliability

Detailed Solution: Security and Reliability are two challenges of IoT in smart cities. (Please refer Lecture 46 @32:28)

QUESTION 5:

Fill in the blank.

_____ combines information from multiple sensors.

a. Data storage
b. Data cleaning
c. Data fusion
d. None of these

Correct Answer: c. Data fusion

Detailed Solution: Data fusion combines information from multiple sensors. (Please refer Lecture 47 @6:36)

QUESTION 6:

Which of the following are the functional layers in smart parking?

a. Information collection
b. System Deployment
c. Service Dissemination
d. All of these

Correct Answer: d. All of these

Detailed Solution: Information collection, System Deployment and Service Dissemination are the three functional layers in smart parking (Please refer Lecture 47@17:25)

QUESTION 7:

Which of the following statements are true about the different components present in a smart home?

Statement I: Sensor networks and communication network infrastructure

Statement II: Intelligent control and management

Statement III: Manual instead of automatic access of devices

a. Statements I and II
b. Statements I and III
c. Statements II and III
d. Statements I, II and III

Correct Answer: a. Statements I and II

Detailed Solution: The different components of smart home include communication network infrastructure, Intelligent control and management, Sensor networks, smart features and automatic response. (Please refer Lecture 48@7:04)

QUESTION 8:

Which of the following are included in the Service Dissemination in smart parking?

Statement I: Dynamic Pricing

Statement II: Infrastructure-free and infrastructure-based information

Statement III: Parking Choice

a. Statement I and II
b. Statement II and III
c. Statement I and III
d. Statement I, II and III

Correct Answer: d. Statement I, II and III

Detailed Solution: Service Dissemination in smart parking includes Dynamic Pricing, parking choice and infrastructure- free information and infrastructure-based information. (Please refer Lecture 47@19:07)

QUESTION 9:

Fill in the blank.

_____ is a network contained within a home.

a. Local area network
b. Home area network
c. Personal area network
d. Metropolitan area network

Correct Answer: b. Home area network

Detailed Solution: Home area network is a network contained within a home (Please refer Lecture 48@8:38)

QUESTION 10:

Fill in the blank. In Vehicle-to-Human / Human-to-Vehicle interaction, the human communicating with the vehicle _____.

a. Is present in another vehicle
b. Is present in the same vehicle
c. Is present outside the vehicle on the roadside
d. All of these

Correct Answer: c. Is present outside the vehicle on the roadside

Detailed Solution: In V2H/H2V, the human is present outside the vehicle on the roadside. (Please refer Lecture 49@3:13)

QUESTION 11:

Wired HAN provides easy integration with pre-existing house infrastructure.

a. True
b. False

Correct Answer: a. True

Detailed Solution: Wired HAN provides easy integration with pre-existing house infrastructure like existing telephone systems, cables and so on (Please refer Lecture 48@10:20)

QUESTION 12:

Which of the following statement(s) is/are true about Konnex?

a. Utilizes only short ranges in home
b. Can be used before configuration
c. Does not have standards for building networks
d. None of these

Correct Answer: d. None of these

Detailed Solution: The Konnex is an important standard for home and building networks. It utilizes full range of home communication. It must be setup and configured before its proper usage (Please refer Lecture 48@14:41)

QUESTION 13:

Which of the following is the reason for failures of TCP/IP in V2X?

a. TCP/IP handles information exchange between multiple pair of entities
b. The increase in the number of wireless devices restricts the mobility
c. TCP/IP can identify the addresses of the endpoints
d. Information exchange does not depend on the location of the data

Correct Answer: b. The increase in the number of wireless devices restricts the mobility

Detailed Solution: The increase in the number of wireless devices restricts the mobility is one of the reasons of the failures of TCP/IP in V2X (Please refer Lecture 49@13:09)

QUESTION 14:

CCN is derived from ICN architecture.

a. True
b. False

Correct Answer: a. True

Detailed Solution: CCN (Content Centric Networking) is derived from Information Centric Networking (ICN) (Please refer Lecture 49@15:32)

QUESTION 15:

What are the disadvantages of V2X communication?

a. Increased traffic safety
b. Tracking of movement
c. Efficient use of fuel
d. None of these

Correct Answer: b. Tracking of movement

Detailed Solution: Disadvantages of V2X communication includes tracking of movement, violation of privacy, loss of data control, etc. (Please refer Lecture 50@21:04)

**************END*************

Introduction to Internet of Things

Assignment-Week 11

TYPE OF QUESTION: MCQ/MSQ

Number of questions: 15 **Total marks: 15 X 1= 15**

QUESTION 1:

Which of the following is not done in traditional electrical grids?

a. Manual energy monitoring
b. Unidirectional energy distribution
c. Unidirectional communication
d. Distributed power plants

Correct Answer: d. Distributed power plants

Detailed Solution: In Traditional electrical grids, the energy generation is done in centralized power plants. (Please refer Lecture 51@5:45)

QUESTION 2:

Smart Grid is also named as—

a. Electronet
b. Energy service
c. Grid with a brain
d. Smart internet

Correct Answer: a. Electronet

Detailed Solution: Electronet is another name for smart grids (Please refer Lecture 51@7:41)

QUESTION 3:

Which of the following is not a property of smart grids?

a. Bidirectional flow of energy
b. Two-way communication
c. Unreliable and insecure electricity
d. Control Capabilities

Correct Answer: c. Unreliable and insecure electricity

Detailed Solution: Smart Grids uses information technology to deliver electricity efficiently, reliably and securely (Please refer Lecture 51@7:41)

QUESTION 4:

Which of the following is the benefit of using Smart Grids for stakeholders?

a. Reduces inefficiencies in energy delivery
b. Different pricing options
c. Lower Energy bills
d. All of these

Correct Answer: a. Reduces inefficiencies in energy delivery

Detailed Solution: The smart grids reduce inefficiencies in energy delivery. This is one of the benefits for stakeholders. The other benefits are for the customers (Please refer Lecture 51 @18:28)

QUESTION 5:

Fill in the blank.

_____ samples voltage and current with a fixed sample rate at the installed location.

a. PEVs
b. DAUs
c. PMUs
d. None of these

Correct Answer: c. PMUs

Detailed Solution: PMUs or Phasor Measurement Unit samples voltage and current with a fixed sample rate at the installed location (Please refer Lecture 52 @2:44)

QUESTION 6:

Which of the following is a cloud application of smart grid?

a. Information management
b. Energy management
c. Security
d. All of these

Correct Answer: d. All of these

Detailed Solution: Energy management, information management and security are all the cloud applications in smart grid (Please refer Lecture 52@21:55)

QUESTION 7:

Which of the following statements are true about MDMSs?

Statement I: Decide the price per unit energy to be paid by the customers

Statement II: Handled by the energy service providers

Statement III: Aggregate the energy consumption or energy request of certain geographical area

a. Statements I and II
b. Statements I and III
c. Statements II and III
d. Statements I, II and III

Correct Answer: a. Statements I and II

Detailed Solution: The Meter Data Management Systems (MDMS) decide the price per unit energy to be paid by the customers AND are handled by the energy service providers. (Please refer Lecture 52@16:02)

QUESTION 8:

Which of the following are included in the Smart Grid security issues of integrity?

Statement I: System Damage

Statement II: Data injection attacks

Statement III: Time synchronization attacks

a. Statement I and II
b. Statement II and III
c. Statement I and III
d. Statement I, II and III

Correct Answer: d. Statement I, II and III

Detailed Solution: System Damage, data injection attacks and time synchronization attacks are the types of integrity issues in Smart Grids (Please refer Lecture 52@18:55)

QUESTION 9:

Fill in the blank.

_____ is a primary challenge in IIoT.

a. Worker health and safety
b. Optimized operations
c. Regulatory compliance
d. Integrating existing infrastructure into new IIoT infrastructure

Correct Answer: d. Integrating existing infrastructure into new IIoT infrastructure

Detailed Solution: Integrating existing infrastructure into new IIoT infrastructure is one of the primary challenges of IIoT**.** (Please refer Lecture 54@14:02)

QUESTION 10:

Fill in the blank. Rt Tech particularizes in software which_____.

a. Improves industrial facilities' efficiency
b. Improves productivity
c. Automates managing of energy consumption
d. All of these

Correct Answer: d. All of the these

Detailed Solution: Rt Tech improves industrial facilities efficiency and productivity. It automates the process of mapping and managing energy consumption (Please refer Lecture 54@20:30)

QUESTION 11:

Lack of vision and leadership is not a hindrance in the path of success of IIoT.

a. True
b. False

Correct Answer: b. False

Detailed Solution: Lack of vision and leadership is one of the hindrances in the path of success of IIoT. (Please refer Lecture 54@18:44)

QUESTION 12:

Which of the following is not a vulnerability of Smart Grid?

a. Integrity
b. Physical threats
c. Dynamic system attacks
d. None of these

Correct Answer: d. None of these

Detailed Solution: Integrity, physical threats and dynamic system attacks are all the vulnerabilities of smart grids (Please refer Lecture 52@16:56)

QUESTION 13:

Which of the following is a characteristic of Big Data?

a. Veracity
b. Variability
c. Velocity
d. All of these

Correct Answer: d. All of these

Detailed Solution: Big Data is characterized by 7 Vs, Veracity, Variability and Velocity included (Please refer Lecture 55@10:41)

QUESTION 14:

Variety refers to the category to which the data belongs.

a. True
b. False

Correct Answer: a. True

Detailed Solution: Variety refers to the category to which the data belongs. Examples: Pure text, images, audio, etc. (Please refer Lecture 55@12:58)

QUESTION 15:

What is the Flow of data?

a. Acquisition>Generation>Storage>Analysis
b. Generation>Storage>Analysis>Acquisition
c. Generation>Acquisition>Storage>Analysis
d. None of these

Correct Answer: c. Generation>Acquisition>Storage>Analysis

Detailed Solution: The flow of the data is Generation, Acquisition, Storage and Analysis (Please refer Lecture 55@19:29)

**************END*************

NPTEL Online Certification Courses

Indian Institute of Technology Kharagpur

Introduction to Internet of Things

Assignment-Week 12

TYPE OF QUESTION: MCQ/MSQ

Number of questions: 15 **Total marks: 15 X 1= 15**

QUESTION 1:

Quantitative analysis does not involve descriptive statistics such as mean.

a. True
b. False

Correct Answer: b. False

Detailed Solution: Quantitative analysis involves descriptive statistics such as mean, median and standard deviation. (Please refer Lecture 56@4:26)

QUESTION 2:

Fill in the blank.

To perform an ANOVA, we must have a _____ response variable and at least one _____ factor.

a. Discrete, categorical
b. Continuous, quantitative
c. Discrete, quantitative
d. Continuous, categorical

Correct Answer: d. Continuous, categorical

Detailed Solution: To perform an ANOVA, we must have a continuous response variable and at least one categorical factor. (Please refer Lecture 56@9:24)

QUESTION 3:

Select the statement(s) that denote the example of dispersion measure.

Statement I: Range, Variable and Standard deviation

Statement II: Range and average absolute deviation

Statement III: Variance, Standard deviation and average absolute deviation

a. Statement I
b. Statement II
c. Statements I, II and III
d. None of these

Correct Answer: c. Statements I, II, and III

Detailed Solution: The example of dispersion measure includes Range, Variable and Standard deviation and average absolute deviation (Please refer Lecture 56@13:36)

QUESTION 4:

The different components of AgriSens includes –

a. Sensor and actuator unit
b. Wireless communication unit
c. Power management unit
d. All of these

Correct Answer: d. All of these

Detailed Solution: The different components of AgriSens includes sensor and actuator unit, wireless communication unit, and power management unit. (Please refer Lecture 57@7:44)

QUESTION 5:

The two most relevant sensors directly used in agricultures are _____.

a. Soil moisture and proximity sensor
b. Soil moisture and water level sensor
c. ECG sensor and water level sensor
d. All of these

Correct Answer: b. Soil moisture and water level sensor

Detailed Solution: Soil moisture and water level sensors are the necessary sensors generally used in agriculture. (Please refer Lecture 57@13:11)

QUESTION 6:

The sensor node of AgriSens sense the average soil moisture in _____.

a. Vegetative phase
b. Reproductive phase
c. Maturity phase
d. All of these

Correct Answer: d. All of these

Detailed Solution: The sensor node of AgriSens sensed the average soil moisture in vegetative phase, reproductive phase and maturity phase (Please refer Lecture 57@18:33)

QUESTION 7:

Select the correct order of the component layers present in the IoT healthcare.

a. Sensing layer, cloud platform layer, aggregated layer, processing layer
b. Sensing layer, aggregated layer, processing layer, cloud platform layer
c. Aggregated layer, sensing layer, processing layer, cloud platform layer
d. Sensing layer, processing layer, aggregated layer, cloud platform layer

Correct Answer: b. Sensing layer, aggregated layer, processing layer, cloud platform layer

Detailed Solution: The sensing layer senses data and transmit it o the aggregation layer where the data are aggregated. The aggregated layer further transfers the data to the processing layer the data are processed and final sent to the cloud platform. (Please refer Lecture 58@8:25)

QUESTION 8:

Which of the following communication protocol is used in AmbuSens?

a. IEEE 802.15.4
b. 6LoWPAN
c. IEEE 802.15.1
d. IEEE 802.15.2

Correct Answer: c. IEEE 802.15.1

Detailed Solution: In AmbuSens, the communication protocol used is Bluetooth i.e., IEEE 802.15.1 (Please refer Lecture 58@22:09)

QUESTION 9:

Wireless IoT driven solutions for remote healthcare facility provisioning brings healthcare to patients than bringing patients to healthcare.

a. True
b. False

Correct Answer: a. True

Detailed Solution: In IoT healthcare, wireless IoT driven solutions brings healthcare to patients than bringing patients to healthcare. (Please refer Lecture 58@11:40)

QUESTION 10:

Fill in the blank. The physical activity tracking is a necessary component for _____.

a. Activity monitoring
b. Vehicle monitoring
c. Agriculture monitoring
d. All of these

Correct Answer: a. Activity monitoring

Detailed Solution: The physical activity tracking is a necessary component for activity monitoring (Please refer Lecture 59@6:39)

QUESTION 11:

Which of the following handheld devices are used for activity monitoring?

a. EEG and GPS
b. Accelerometer and EEG
c. Accelerometer and GPS
d. All of these

Correct Answer: c. Accelerometer and GPS

Detailed Solution: High end smartphones are likely to have accelerometer, compass, and gyroscope. (Please refer Lecture 59@15:29)

QUESTION 12:

Which of the following is the primary disadvantage of using camera-based activity tracking?

a. Accurate
b. Process intensive
c. Expensive
d. None of these

Correct Answer: b. Process intensive

Detailed Solution: Camera based activity tracking is very much process intensive. (Please refer Lecture 59@17:43)

QUESTION 13:

By performing continuous monitoring of a person's activity, it is not possible to observe his/her behavior or to identify any repetitive pattern in his/her day-to-day activity.

a. True
b. False

Correct Answer: b. False

Detailed Solution: Continuous monitoring of activity results in daily observations of human behavior and repetitive patterns in their activity. (Please refer Lecture 59@14:33)

QUESTION 14:

Which of the following are the inbuilt sensors that are present in high end smartphones?

a. ECG and EEG
b. Accelerometer, proximity sensor, and EEG
c. Accelerometer, Compass and Gyroscope
d. Pressure sensor and NPK sensor

Correct Answer: c. Accelerometer, Compass, and Gyroscope

Detailed Solution: High end smartphones are likely to have accelerometer, compass, and gyroscope. (Please refer Lecture 60@2:28)

QUESTION 15:

Fill in the blank. Processing the handheld activity device data with artificial intelligence can be used for _____.

a. Fall detection
b. Heart rate detection
c. Vehicle detection
d. All of these

Correct Answer: a. Fall detection

Detailed Solution: Processing the handheld activity device data with artificial intelligence can be used for detecting sudden fall of a person. (Please refer Lecture 60@11:56)