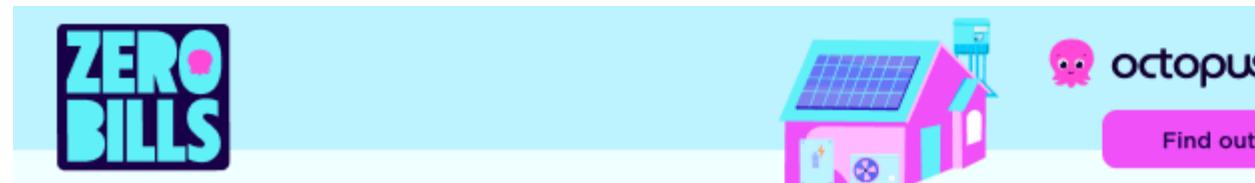




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IoT Fundamentals v2 – Final Exam Answers: Connecting Things

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(IoT Previous Level: Introduction to IoT)

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Connecting Things (Version 2) – IoT Fundamentals: Connecting Things End of Course Assessment Final Exam Answers

1. What is an example of cloud computing?

- an architectural style of the World Wide Web
- a network infrastructure that spans a large geographic area
- **a service that offers on-demand access to shared resources**
- a continuous interaction between people, processes, data, and things

Explanation: Cloud computing provides on-demand access to shared resources.

With minimal management effort, resources can be deployed quickly at data centers.

2. What is used to uniquely identify devices connected to the Internet?

[IoT Connecting Things Answers](#) 

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- URL
- device name
- **IP address**
- gateway address

Explanation: Every device that connects to the Internet must have a unique identifier so that traffic destined for that device is able to reach it. The unique identifier that is used on the Internet, and on most networks, is an Internet Protocol (IP) address.

3. What is the formula used to measure the force that drives current?

- $I = V \times R$
- $R = I \times V$
- $P = I \times R$
- **$V = I \times R$**

Explanation: Voltage is the force that drives current and is proportional to the strength of current multiplied by the resistance within a circuit.

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IoT Connecting Things FINAL Exam Answers



- utilities
- advertising
- **equipment insurance**
- materials
- **rent**

Explanation: There are two types of business costs: fixed costs and variable costs. Fixed costs are those that do not change based on the amount of product produced. Because the rent of a facility or the cost of a piece of equipment does not go up or down based on production, rent and equipment insurance are fixed costs.

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- collecting data and then sending instructions for actions to be taken, or sending information for further analysis
- improving a physical environment by measuring changes



(i) X

Explanation: The function of an actuator is to receive a signal (or instruction) from the controller, and based on that signal, perform a set action. Measuring a physical property is the function performed by a sensor. Collecting data from sensors and then sending instructions for further actions or sending collected data to another device for further analysis is the function performed by a controller.

6. What are two functions supported by a data link layer protocol? (Choose two.)

11



• determining the best path to forward packets

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[1.1.3.9 Lab – Open Loop Control Systems Objective \(Answers\)](#)

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X

- encoding and decoding messages

Explanation: There are several functions supported by the data link layer protocols, including these:

allowing the upper layers to access the media

accepting Layer 3 packets and packaging them into frames

preparing network data for the physical network

controlling how data is placed and received on the media

exchanging frames between nodes over a physical network media

Determining the best path to forward packets and providing an addressing scheme to reach remote destination networks are supported by Layer 3 (internet) protocols.

Encoding and decoding messages are supported by Layer 6 (presentation) protocols.

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7. What is the key difference between an open-loop control system and a closed-loop control system?

- A closed-loop system uses an IP-enabled controller whereas an open-loop system does not.
- A closed-loop system uses a negative feedback mechanism whereas an open-loop ¹¹ system uses a positive feedback system.
- **A closed-loop system uses a feedback mechanism whereas an open-loop system does not.**
- A closed-loop system uses a controller whereas an open-loop system does not.



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control system does not use feedback. Both closed-loop and open-loop control systems use a controller, standalone or with a network connection.

8. What is used by a RESTful system to represent resources to external systems?

11

- domain names
- IP addresses



Explanation: Uniform Resource Identifiers (URIs) are used by RESTful systems to represent their resources to external systems.

9. What are three examples of computer programs? (Choose three.)

- operating system
- memory
- device driver
- storage
- firmware

Explanation: Operating systems, firmware, and device drivers are programs made through a programming language. CPU, memory, and storage are hardware components in a computer.

10. In the Linux shell, which character is used between two commands to instruct the shell to combine and execute these two commands in sequence?

11



X

Explanation: In the Linux shell, several commands can be combined to perform a complex task. This technique is known as piping. The piping process is indicated by inserting the character “|” between two consecutive commands.

**11. Which two technologies are considered 4th generation cellular-based technologies that commonly require monthly payments to connect IoT devices?
(Choose two.)**

- LOWARAN
- **WiMAX**
- ZigBee
- Bluetooth
- **LTE**

Explanation: Both LTE and WiMAX use cellular data networks to connect IoT devices and require monthly payments with specific data caps.

12. Which security method can be used to secure the management plane within a network device?

11



- **updating the operating system or firmware**
- using strong passwords
- encrypting data
- using a firewall

11

Explanation: The management plane is used to connect to and manage the IoT device. Updating the operating system or firmware is one of the first steps to making it more secure. When considering a new IoT device, making sure the



- It represents the IP addressing scheme for devices within a network
- A sequence diagram represents processes or workflows using different shapes, boxes and connecting arrows.
- It is a graphical representation of an electronic circuit that represents electrical components and their connections through the use of standardized symbols.
- **It represents the timeline and sequence of messages exchanged between devices needed to carry out the functionality of processes.**
- It represents the portion of components as part of a whole.

Explanation: A sequence diagram represents the timeline and sequence of messages exchanged between devices needed to carry out the functionality of processes. A flowchart represents processes or workflows through the use of different shapes, boxes and connecting arrows. An electronic schematic is a graphical representation of an electronic circuit that represents electrical components and their connections through the use of standardized symbols. A pie chart represents the portion or components as part of a whole. A logical topology would include the IP addressing scheme for devices within a network.

14. What is Fog computing?

11



X

- It is a type of computing where services are hosted where they are used, such as at the network edge or with end devices.
- It is a type of computing that sends controller data to a sensor.
- It is a type of computing that enhances P2P applications.
- It is a type of computing that disperses servers and services globally in distributed data centers

Explanation: Fog computing is a paradigm that extends cloud computing and services to the edge of the network. In fog computing, services are hosted where they are used: at the network edge or even where end devices are used, such as set-top-boxes or access points.

- media
- devices
- operating systems
- protocols
- programs

Explanation: A network infrastructure consists of three types of network components: the devices that connect to each other, the media that connects the devices and carries data, and the services that provide functionality to users.

16. Match the cloud computing term with the description.

cloud computing

the process of extracting value from data while it is being generated

data in motion

data in motion

fog computing

on-demand access to a shared pool of configurable computing resources

cloud computing

big data

extracting data for analysis close to the source

fog computing

distinguished by volume, velocity, and variety

big data



extracting data for analysis close to the source

- fog computing



on-demand access to a shared pool of configurable computing resources

- cloud computing

the process of extracting value from data while it is being generated

- data in motion

distinguished by volume, velocity, and variety

- big data





- **integrating the new devices into the existing infrastructure**
- increasing the lengths currently defined in network wiring standards
- providing power to the existing devices
- accessing data created by the existing devices

Explanation: Challenges to the new wave of digitization include the following:

- Integrating the new things into the existing network infrastructure
- Integrating the new devices from different vendors that might use custom applications
- Securing the new devices with varying levels of security

18. What is a recommended security action to take when using off-the-shelf IoT devices?



- **Disable default user accounts.**

Explanation: Many off-the-shelf IoT devices are not designed and manufactured with strong security in mind. Security precautions must be taken with these devices that include disabling default user accounts, UPnP, and remote management services.

19. Match the Blockly logic blocks to the function.



– IF-THEN blocks

execute a block of code while a condition is true

– WHILE blocks

repeat the execution of a specific block of code for a specific number of times

– FOR blocks

20. Which two blocks in the Business Model Canvas describe business finances?

(Choose two.)

11

- **revenue stream**
- customer segment
- channels
- **cost structure**



X

Explanation: The Business Model Canvas uses nine building blocks to describe the business model of an organization based on a custom interface, infrastructure management, and finances. The finances aspect consists of two blocks, cost structure and revenue stream.

21. Which term is used to describe the rate at which data is generated when referring to big data?

- **velocity**
- volume
- bandwidth
- variety

Explanation: In terms of big data, velocity describes the rate at which data is generated.

11

22. Which two computer languages are examples of compiled programming languages? (Choose two.)

X

- Javascript
- Python

Explanation: Both C++ and Java are examples of compiled computer languages. Javascript, PHP, and Python are examples of interpreted computer languages.

23. Which component in Linux is responsible for interacting directly with the device hardware?

- command interpreter
- command line interface
- shell
- **kernel**

Explanation: A Linux OS can be divided into kernel and shell. The shell, also called the command line interface, is a command interpreter that parses the inputs (or commands) from a user and interacts with the kernel. The kernel, in turn, interacts with the hardware components of a device.

24. How do cloud services extend IoT functionality?



- move processing and storage functions off the IoT device
- store data in an on-site server
- reduce device network bandwidth requirements
- provide increased security through obscurity

25. Match the description with the appropriate electronics term.

Capacitors, resistors, and active devices can be soldered on this board.

Components are temporarily placed into holes arranged in rows and columns across this board.

A graphic shows an electrical circuit using component images.

solderless breadboard

Components are temporarily placed into holes arranged in rows and columns across this board.

printed circuit board

Capacitors, resistors, and active devices can be soldered on this board.

None of these

A graphic shows an electrical circuit using component images.

solderless breadboard

- Components are temporarily placed into holes arranged in rows and columns across this board.

printed circuit board

- Capacitors, resistors, and active devices can be soldered on this board.

26. What is an example of data in motion?

- hourly weather information being collected in preparation for the next day weather forecast for a specific location
- collecting sales and transaction records in preparation for a monthly sales report from sales consultants as they travel between customers
- recording road traffic volumes and patterns for future highway planning
- **medical information being transmitted from an ambulance to emergency department staff as a critically ill patient is being transported to the hospital**

Explanation: Data in motion is dynamic data that requires real-time processing before the data becomes obsolete. It represents the continuous interactions between people, processes, data and things. In this example the real-time medical information enables the emergency staff to be appropriately prepared before the patient arrives at the hospital.



27. Which technology type describes a refrigerator that has become part of a botnet that is attacking businesses?

- consumer technology
- industry technology
- operational technology
- information technology

Explanation: IoT security includes devices and applications from information technology (IT), operational technology (OT), and consumer technology (CT).

IT – includes devices in the data center, in the cloud, bring your own devices (BYODs), and thousands of sensors and actuators connected in the field

OT – includes industrial control systems (ICSs), supervisory control and data acquisition (SCADA) systems, and all the devices that connect to these systems

CT – includes connected devices in the home, wearable technology, smart cars, and more

28. A threat actor uses a newly discovered vulnerability to access the home wireless router of a user. The threat actor then changes the password for the wireless network served by the router and causes all wireless devices to lose ¹¹ connectivity. Which factor of smart home security is affected by this attack?

- **firmware**
- authentication
- WPA2



Explanation: In general, the security requirements for a smart home should include the following:

WPA2 – The wireless network should use the latest Wi-Fi security, which is currently WPA2.

Encryption – It protects the confidentiality and integrity of information transmitted over a network.

Authentication – Strong authentication protects the device from unauthorized use or reconfiguration and prevents disclosure or modification of the data stored on the device.

Firmware – The IoT device manufacturers should update the firmware for any newly discovered vulnerabilities. The home IoT device users should enable the checking of updates automatically.

29. Which technology type includes industrial control systems such as SCADA?

- information technology
- **operational technology**
- consumer technology

Explanation: IoT security includes devices and applications from information technology (IT), operational technology (OT), and consumer technology (CT).

IT – includes devices in the data center, in the cloud, bring your own devices (BYODs), and thousands of sensors and actuators connected in the field

OT – includes industrial control systems (ICSs), supervisory control and data acquisition (SCADA) systems, and all the devices that connect to these systems

CT – includes connected devices in the home, wearable technology, smart cars, and more

30. What uses a solenoid to actuate electric devices?

- passive circuit
- linear circuit
- **relay**
- armature

11

Explanation: A relay uses a solenoid to function as an electrically-controlled switch.

24. What is an electronic circuit?

X

- a specialized device used to control current
- **a closed conductive path that allows electrons to flow and create an electric current**
- a device that detects an event from the physical environment and responds with an optical signal

Explanation: A circuit is a closed conductive path that uses an energy source to start the flow of electricity and provide an electric current.



32. A company plans to develop IoT solutions for both horizontal and vertical markets. What is the major difference in designing solutions for different industries?

- Solutions for a horizontal market industry should be usable for a longer time, whereas solutions for a vertical industry would have a short limited time usage.
- ~~Control software for a horizontal market industry should be coded with C, whereas control software for a vertical market industry should be coded with Python~~
- Solutions for a horizontal market industry will deal with many general network devices, whereas solutions for a vertical market industry will deal with only

The IoT solutions suitable for a horizontal market should meet similar needs for a wide variety of industries that have different products and customers. They tend to be less specialized than a product designed for a certain type of industry with specific needs. On the other hand, the IoT solutions suitable for a vertical market should meet specialized needs for companies with products for a set of customers.

33. What is represented by a diamond symbol in a flowchart?

- a decision
- a start or an end
- an input or output
- a processing step

Explanation: In a flowchart the rectangle is used to represent an activity or processing step. The diamond is used to represent a decision.

34. What are three of the six core components in the Cisco IoT system? (Choose three.)

11

- fog computing
- wearable technologies

X

- smart bandages

Explanation: Core components of the Cisco IoT System are network connectivity, fog computing, data analytics, cyber and physical security, management and automation, and the Application Enablement Platform. Wearable technologies, robotic guides, and smart bandages are all examples of things that could connect to the Cisco IoT System.

35. How do cloud services extend IoT functionality?

- reduce device network bandwidth requirements
- provide increased security through obscurity
- store data in an on-site server
- **move processing and storage functions off the IoT device**

Explanation: With cloud services, the processing and storage of data can be moved from the IoT device to the cloud.

36. What are two emerging data protocols used within IoT networks? (Choose two)

- CoAP
- VPN
- HTTP



Explanation: CoAP (Constrained Application Protocol) is a data protocol useful for resource-constrained IoT devices. It is based on HTTP and the REST model and is designed to work on microcontrollers with as low as 10 KB of RAM and 100 KB of storage space. MQTT (Message Queuing Telemetry Transport) is a lightweight data protocol that is useful for systems that rely on low bandwidth connections and require code with a small footprint.

37. What are two challenges that are associated with the rapid growth of IoT?

(Choose two.)

- **assure interoperability among different device vendors**
- adding more switching ports for new things
- improving Internet connections for organizations
- **securing new devices that require different levels of security**
- developing new programming languages specifically for IoT

11

Explanation: Rapid growth of IoT introduces some challenges, including these:

How to integrate many devices from different vendors

How to integrate new things to the existing network infrastructure

X

improving Internet connections are not specific challenges that are attributable to the growth of IoT.

38. A company plans to develop IoT solutions for both horizontal and vertical markets. What is the major difference in designing solutions for different industries?

- Solutions for a horizontal market industry should be usable for a longer time, whereas solutions for a vertical industry would have a short limited time usage.
- Control software for a horizontal market industry should be coded with C, whereas control software for a vertical market industry should be coded with Python.
- Solutions for a horizontal market industry will deal with many general network devices, whereas solutions for a vertical market industry will deal with only specialized equipment.
- **Solutions for a horizontal market industry should meet general needs across the industry, whereas solutions for a vertical market industry should meet specialized needs for the industry.**

Explanation: The IoT solutions suitable for a horizontal market should meet similar needs for a wide variety of industries that have different products and ¹¹ customers. They tend to be less specialized than a product designed for a certain type of industry with specific needs. On the other hand, the IoT solutions suitable for a vertical market should meet specialized needs for companies with products for a set of customers.

- privilege escalation
- **sensitive data**
- **clear-text authentication credential**
- removal of storage media
- **encryption key**
- damage

Explanation: Vulnerabilities related to the device memory include sensitive data, clear-text authentication credential, and weak or no encryption. Device damage is related to an IoT device itself. Removal of storage media and privilege escalation relate to the potential vulnerabilities of the interfaces on an IoT device.

11



40. What are three variables used by DREAD? (Choose three.)



- reputation
- **exploitability**
- denial of service
- **affected users**

Explanation: DREAD is an acronym that stands for the variables used to quantify, compare, and prioritize the amount of risk in each threat:

DREAD Risk Rating = (Damage + Reproducibility + Exploitability + Affected Users + Discoverability)/5

41. What are three items that should be included in the documentation describing the components of the IoT system at each layer? (Choose three.)

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- **applications**

X

- **communications network**
- the flow of data between components and layers

Explanation: During the step of documenting the IoT system architecture of the Threat Model Analysis for an IoT system, the document for components of the IoT system at each layer should include applications, communications network, and devices.

42. A manufacturing organization is generating a large amount of data via their IoT sensors. At which location should the data be processed if it is to be processed close to the ground where the IoT sensors are connected to the network?

- cloud
- fog
- **mist**
- device

Explanation: Data that is processed at the mist layer is processed close to the ground where things are connected to the network.
11

43. In the context of the importance of security in IoT networks, which model provides a common framework for understanding the placement of various standards and protocols in an IoT system?

- OSI
- **ETSI**

Explanation: The ETSI model provides a common framework for understanding the placement of various standards and protocols in an IoT system.

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37. What are two challenges that are associated with the rapid growth of IoT?

(Choose two.)

- assure interoperability among different device vendors
- adding more switching ports for new things
- improving Internet connections for organizations
- **securing new devices that require different levels of security**
- developing new programming languages specifically for IoT

“assure interoperability among different device vendors” is wrong. the right answer

is “**developing new programming language specifically for IoT**“

→ Reply



Ale ① 1 year ago

32. A company plans to develop IoT solutions for both horizontal and vertical markets. What is the major difference in designing solutions for different industries?

- 11
- Solutions for a horizontal market industry should meet general needs across the industry, whereas solutions for a vertical market industry should meet specialized needs for the industry.
 - Control software for a horizontal market industry should be coded with C, whereas control software for a vertical market industry should be coded with Python
 - Solutions for a horizontal market industry will deal with many general network



time usage.

This has the wrong answer. The correct answer is “Solutions for a horizontal market industry should meet general needs across the industry, whereas solutions for a vertical market industry should meet specialized needs for the industry.”

42. A manufacturing organization is generating a large amount of data via their IoT sensors. At which location should the data be processed if it is to be processed close to the ground where the IoT sensors are connected to the network?

- cloud
- mist
- device
- fog

This one is wrong as well. The correct answer is “Fog”.

 Last edited 1 year ago by Ale

 Reply



leerroy  2 years ago

What are three potential vulnerabilities related to attacks toward the memory of an IoT device? (Choose three.)
sensitive data
encryption key
privileae escalation

X

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leeroy  2 years ago

What are three variables used by DREAD? (Choose three.)exploitability

- privacy
- reputation
- damage
- affected users
- denial of service

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leeroy  2 years ago

What are three items that should be included in the documentation describing the components of the IoT system at each layer? (Choose three.)protocols

- the flow of data between components and layers
- devices
- applications
- technologies
- communications network

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A manufacturing organization is generating a large amount of data via their IoT sensors. At which location should the data be processed if it is to be processed close to the ground where the IoT sensors are connected to the network? cloud
mist
device
fog

Reply



leeroy ① 2 years ago

In the context of the importance of security in IoT networks, which model provides a common framework for understanding the placement of various standards and protocols in an IoT system? OSI

- TCP/IP
- IoT-A
- ETSI

Reply



leeroy ① 2 years ago

A threat actor uses a newly discovered vulnerability to access the home wireless router of a user. The threat actor then changes the password for the wireless network served by the router and causes all wireless devices to lose connectivity.

Which factor of smart home security is affected by this attack? authentication

X

➔ Reply



leeroy ⏱ 2 years ago

Which technology type includes industrial control systems such as SCADA?

- operational technology
- consumer technology
- industry technology
- information technology

➔ Reply



leeroy ⏱ 2 years ago

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that is attacking businesses? consumer technology

- industry technology
- operational technology
- information technology

➔ Reply

11



X

11



(X)