

1. A developer issues the Linux command `pip3 freeze` in an activated Python 3 virtual environment. What is the function that is provided by the command?

- to output a list of installed Python packages
- to lock the current virtual environment
- to prepare the environment before installing a Python package
- to deactivate the current virtual environment

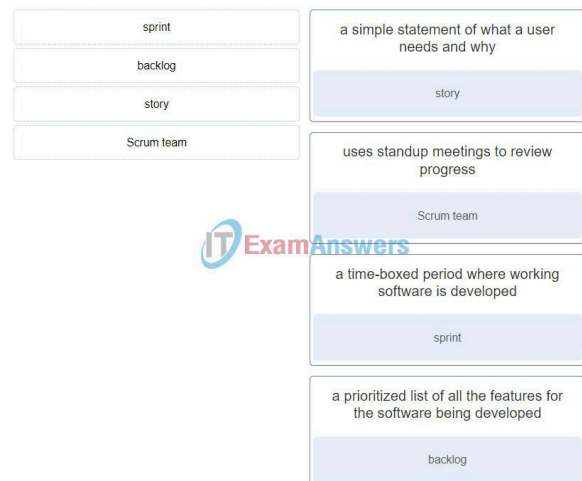
Explanation: The `pip3 freeze` Linux command is used to output a list of Python 3 packages installed in the current working environment.

2. What are two characteristics of the Git version control system? (Choose two.)

- It is a local vcs.
- It is a centralized VCS.
- **It is a distributed VCS.**
- It is Microsoft proprietary.
- It is Cisco proprietary.
- **It is open source**

Explanation: Git is available for MacOS, Windows, and Linux/Unix. It is an open source implementation of a distributed version control system.

3. Match the Lean term with a description.



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DevNet Associate Module 3 Exam
Q3

4. What characteristic describes a formal code review?

- Code is automatically sent for review by source code management systems once it is checked in.
- **The entire code base is reviewed in a series of meetings.**
- It utilizes a peer code review tool to identify code that needs retesting.
- It provides direct interaction between the review team and the code author.

Explanation: In a formal code review developers have a series of meetings to review the whole code base and go over the code line by line, discussing each one in detail. The

formal code review process promotes discussion between all of the reviewers.

5. Which fundamental Lean principle forms the basis from which all other Lean principles flow?

- build integrity in
- **eliminate waste**
- deliver as fast as possible
- amplify learning

Explanation: The Lean SDLC methodology is built on seven principles which are focused on minimizing waste and maximizing value to the customer. The principle of eliminating waste is the most fundamental and it is the one from which all the other principles flow.

6. When a unified diff file is being reviewed, which symbol is used to indicate that a line has been added?

- /dev/null
- @@
- **+**

7. What special characters are used to enclose JSON objects?

- forward slash /
- square brackets []
- **curly braces {}**
- parenthesis ()

Explanation: Individual objects in JSON comprise key/value pairs. These individual pairs may be surrounded by braces. JSON objects may also contain multiple key/value pairs that are separated by commas, in which case the entire object is enclosed in braces.

8. What are two features of the formal code review? (Choose two.)

- For a quicker turnaround, it involves only one reviewer
- It involves the developer going through code with the reviewer line-by-line.
- **It promotes discussion among all of the reviewers.**
- It allows the developer to make changes on the spot.
- **It involves a review of the entire code base in a series of meetings.**

Explanation: In a formal code review, developers have a series of meetings to review the whole codebase and go over the code line by line, discussing each one in detail. The formal code review process promotes discussion among all of the reviewers.

9. Which statement describes the Waterfall methodology of software development?

- Process tasks are broken up into time-boxed iterations called sprints.
- **Each step in the process must be completed before the next step starts**
- It emphasizes elimination of wasted effort and maximizes customer value.
- Multiple steps in the process are started simultaneously.

Explanation: The Waterfall model is the earliest SDLC approach. The phases follow a linear sequential flow, where each phase begins only when the previous phase is complete.

10. What is clean code?

- code that has no reviewer comments
- code that has passed functional testing
- **code that is easy to read and understand**
- code that performs a discrete task

Explanation: Clean code is code that meets common principles that make it easy to read and understand. Some of these principles are as follows:

Neat formatting to generally-accepted practices

Code intuitive variables and objects
Documented with appropriate comments

Written so that it can be reused and easily unit-tested

11. Match the Git command with its function.

git init	updates the local copy of the Git repository with the content of the remote Git repository
git pull	creates an empty Git repository or makes an existing folder a Git repository
git push	updates the remote Git repository with the content changes from the local Git repository

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DevNet Associate Module 3 Exam

12. What is the role of the view component in the Model-View-Controller (MVC) flow?

- **It accepts selected data and displays the visual representation to the user.**
- It accepts the input and applies the required rules to format the data.
- It requests user input and manipulates it to fit the format for the model.

- It manages the data, logic and rules of the application.

Explanation: The Model-View-Controller (MVC) design pattern abstracts code and responsibility into three distinct components: model, view, and controller. The controller accepts the input, manipulates the data, and sends the manipulated data to the model. The view is the visual representation of the data. There can be multiple representations of the same data.

13. A developer is constructing some functions in Python. When is a function referred to as a module in Python?

- when the function is declared during the execution of a Python program
- when the function is initiated during the execution of a Python program
- **when the function is packaged in a single Python file**
- when the function is used for the first time

Explanation: Modules are a way to build independent and self-contained blocks of code that can be reused. A

module consists of a set of functions and typically contains an interface that allows for integration with other modules. A module, in Python, is a Python file with packaged functions.

14. A student is learning Python using the interactive interpreter mode. The student issues these commands:

```
>>> class Uri():
...     def __init__(self, host, prot):
...         self.host = host
...         self.prot = prot
...         self.url = self.prot + "://" + self.host
```

```
>>>
```

Which command should the student use to create an object with one attribute being a valid URL?

- >>> url2 = Uri(URL, 'http://', 'www.cisco.com')
- >>> url2 = Uri('http', '://', 'www.cisco.com')
- **>>> url2 = Uri('www.cisco.com', 'http')**
- >>> url2 = Uri('http', 'www.cisco.com')

Explanation: In Python, classes are a means of bundling data storage and functionality in a single structure. Each class declaration defines a new object type. As with other Python data structures and variables, class

objects are instantiated as they are first used, rather than being predeclared, by using an assignment statement.

15. A developer issues a Linux command `python3 -m venv devenv` . What is the developer trying to achieve?

- to activate the Python 3 virtual environment named `devenv`
- to enter the Python 3 virtual environment named `venv` using the `devnet` tool sets
- to install the `devnet` tool sets in the Python 3 virtual environment named `venv`
- **to create a Python 3 virtual environment named `devenv`**

Explanation: The syntax for creating a Python 3 virtual environment in a Linux system is `python3 -m venv virtual_environment` , where `venv` is the Python 3 module to create a virtual environment and `-m` is the switch to tell Python 3 the `venv` module is to be used.

16. When a unified .diff file is being reviewed, which symbol is used to indicate that a line has been added?

`@@`

`/dev/null`

`+`

`-`

Explanation: The symbols used in a unified diff file are as follows:

`+`: Indicates that the line has been added

`-`: Indicates that the line has been removed

`/dev/null`: Shows that a file has been added or removed

`@@`: Indicates that the next block of information is starting

MODULE 4

1. Refer to the exhibit. A network administrator is using a Python script to test a REST API request. The traceback message indicates that there is an error in the URI. What is a possible issue?

```
import requests
url = "https://sandboxnac123.cisco.com/dna/intent/api/v1/network-device"
resp = requests.get(url, verify = False)

Traceback message:
...requests.exceptions.ConnectionError:
HTTPSConnectionPool(host='sandboxnac123.cisco.com', port=443): Max
retries exceeded with url
```

- The protocol is wrong.
- The query component is missing.
- **The destination host address is wrong.**
- The SSL certificate is invalid.

Explanation: The error message indicates “`ConnectionError`”. The

destination host address is probably wrong because it cannot be reached.

2. Match the RESTful API method to CRUD function.

POST	READ
GET	GET
PUT/PATCH	CREATE
DELETE	POST
	DELETE
	DELETE
	UPDATE
	PUT/PATCH

3. What is an architectural constraint to which a true RESTful API web service must adhere?

- **It operates in a stateless way.**
- It uses HTTPS to transport data.
- It must operate along with a DNS server.
- It operates as a cloud service.

Explanation: Conforming to the constraints of the REST architecture is generally referred to as being “RESTful”. An API can be considered “RESTful” if it has the following features:
Client/server – The client handles the front end and the server handles the back end.
Stateless – No client data is stored

on the server between requests. The session state is stored on the client.

Cacheable – Clients can cache responses locally to improve performance.

4. Refer to the exhibit. A network administrator is using a Python script to send a REST API request. What is the purpose of the line of code `resp = requests.get(url, verify = False)` ?

```
import requests
url = "https://sandboxnac123.cisco.com/dna/intent/api/v1/network-device"
resp = requests.get(url, verify = False)
```

- **It bypasses the certificate validation check.**
- It tests the function of the Python requests library
- It omits the sending URL in the response.
- It skips the URL verification step and tests the resource path.

Explanation: When the scheme of the URI is HTTPS, the connection performs an SSL handshake between the client and the server in order to authenticate each other. This handshake needs to be successful before the REST API request can be sent to the API server. In a development stage, APIs with HTTPS need testing and because a valid certificate is not

yet obtained, the SSL handshake process can be turned off with the code line.

5. A client is sending a REST API request to a web server. The request includes the need for data compression. Which three values are acceptable for the Accept-Encoding request header? (Choose three.)

- *
- xz
- br
- gzip
- tar
- zip

Explanation: A few of the acceptable values for the Accept-Encoding request header are gzip, compress, deflate, br, identity, and *.

6. What is the meaning of the term flow as it relates to the OAuth 2.0 authorization framework?

- It is the number of requests contained in the token bucket.
- It is a process for an API request to send authentication credentials to a web service.
- It is a process for an API user to obtain an access

token from the authorization server.

- It is the sequence of data exchanged between a REST API request and a response.

Explanation: Open Authorization, also known as OAuth, combines authentication with authorization. It is usually the recommended form of authentication/authorization for REST APIs. OAuth 2.0 enables preregistered applications to get authorization to perform REST API requests on behalf of a user without the user needing to share its credentials with the application itself. OAuth enables the user to provide credentials directly to the authorization server to obtain an access token that can be shared with the application. This process of obtaining the token is called a flow. The application then uses this token in the REST API as a Bearer Authentication. The web service for the REST API then checks the Authorization server to make sure the token is valid and that the requester is authorized to perform the request.

7. What is a characteristic of a RESTful API?

- **It uses HTTP methods to gather and manipulate data.**
- It is a southbound API.
- It facilitates the configuration changes from a network controller to end devices.
- It supports a secure data transmission between a remote user and an enterprise network.

Explanation: RESTful APIs use HTTP methods to gather and manipulate data. They are northbound APIs. Because there is a defined structure for how HTTP works, it offers a consistent way to interact with RESTful APIs from multiple vendors.

8. Which characteristic of the SOAP architecture specifies communication between all similar and dissimilar application types?

- **independence**
- interface uniformity
- neutrality
- extensibility

Explanation: SOAP was designed so that all types of applications can communicate with each other, no matter how dissimilar they are. The applications can be built using different programming languages, can run on different

operating systems, and can be as dissimilar as possible.

9. In the REST API request URI example

`http://example.com/update/person?id=42&email=person%40example.com`, which term describes the component `example.com`?

- query
- path
- scheme
- **authority**

Explanation: REST API requests are essentially HTTP requests that follow the REST principles. REST API requests are made up of 4 major components, namely, Uniform Resource Identifier (URI), HTTP Method, Header, and Body. A URI is essentially the same format as a URL used in a browser to go to a web page. The syntax consists of the following components in syntax order:
Scheme – specifies which HTTP protocol should be used.
Authority – also called destination, consists of two parts, host and port.
Path – also known as resource path, specifies the location of the resource on the website.
Query – specifies query parameters with additional details for scope, for filtering, or to clarify a request.

10. Which SOAP message root element defines the XML document as a SOAP message?

- Meta tag
- Body
- **Envelope**
- Header

11. Which type of credential information is used for the bearer authentication in REST APIs?

- a username and password set by the client
- a password encoded using Base64
- an MD5 hash string generated by the client application
- **a string generated by an authentication server**

Explanation: Bearer Authentication uses a bearer token, which is a string generated by an authentication server such as an Identity Service (IdS).

12. What are two purposes for using rate limits on public and unrestricted APIs? (Choose two.)

- **to avoid a server overloading from too many requests at the same time**

- to limit the number of authorization requests per API call
- **to provide better service and response time to all users**
- to ensure a client uses a multifactor authentication mechanism
- to limit the number of passwords that a client can have in making API requests

Explanation: Using an API rate limit is a way for a web service to control the number of requests a user or application can make per defined unit of time and it is considered a best practice for public and unrestricted APIs. Some benefits of using rate limits include the following:
Avoid a server overload from too many requests at once.
Provide better service and response time to all users.
Protect against a denial of service (DoS) attack.

13. Which HTTP response status code indicates that the user is not authenticated to access the site?

- 201
- 400
- **401**
- 403

- 404

Explanation: Most common HTTP status codes include the following:

- 200 – OK (using GET or POST to exchange data with an API successfully)
- 201 – Created (creating resources by using a REST API call successfully)
- 400 – Bad Request (The request from the client is failed due to client-side issue.)
- 401 – Unauthorized (The client is not authenticated to access site or API call.)
- 403 – Forbidden (The access request is not granted based on the supplied credentials.)
- 404 – Not Found (The page requested at HTTP URL location does not exist or is hidden.)

14. Which API architectural style uses an XML-based messaging protocol to communicate between applications?

- SOAP
- REST
- NFS

- XML-RPC

Explanation: Simple Object Access Protocol (SOAP) is a messaging protocol used when applications need to communicate. It is an XML-based protocol that was developed by Microsoft.

15. A network engineer is learning about Rest APIs. When executing a particular API, the server responds with curl. How is this information useful?

- Curl shows the retrieved information in JSON format.
- Curl shows how to access the content displayed in the response body using curl.
- Curl shows the information the API returned from the server.
- Curl shows the URL used in the API request.

Explanation: Clients for URLs (curl or cURL) is a tool used on many platforms for getting or sending files using URL syntax. The information returned can be copied, then used from a command prompt with the curl command to either get information

using the GET parameter or send data using the POST parameter.

16. In which situation would a synchronous API be used?

- when a server is not part of the process
- when the original API request or data from the request is delayed
- **when data is being retrieved from a database**
- when the client is not required to take action

Explanation: Synchronous APIs respond to a request directly and immediately such as when data is being provided from memory or a database. In contrast, asynchronous APIs may send a notification that a data request has been made, send the data later, trigger a callback to provide the data, or process the request and then take an appropriate action. The action can be immediate, but it does not have to be.

MODULE 5

1. What command can a technician use on a computer to see if DNS is functioning properly?

- ipconfig
- net share

- **nslookup**
- net use

Explanation: The nslookup command can be used to test DNS functionality.

2. Which two OSI model layers have the same functionality as two layers of the TCP/IP model? (Choose two.)

- physical
- data link
- **network**
- **transport**
- session

Explanation: The OSI transport layer is functionally equivalent to the TCP/IP transport layer, and the OSI network layer is equivalent to the TCP/IP Internet layer. The OSI data link and physical layers together are equivalent to the TCP/IP network access layer. The OSI session layer (with the presentation layer) is included within the TCP/IP application layer.

3. What is one advantage of using the cut-through switching method instead of the store-and-forward switching method?

- provides the flexibility to support any of Ethernet speeds
- **has a lower latency appropriate for**

high-performance computing applications

- makes a fast forwarding decision based on the source MAC address of the frame
- has a positive impact on bandwidth by dropping most of the invalid frames

Explanation: Cut-through switching provides lower latency switching for high-performance computing (HPC) applications. Cut-through switching allows more invalid frames to cross the network than store-and-forward switching. The cut-through switching method can make a forwarding decision as soon as it looks up the destination MAC address of the frame.

4. Which solution improves web response time by deploying multiple web servers and DNS servers?

- memcaching
- distributed databases
- sharding
- **load balancing**

Explanation: Maintaining availability is the primary concern for companies working with big data. Some solutions to improve the availability include the

following:

Load Balancing – deploying multiple web servers and DNS servers to respond to requests simultaneously

Distributed Databases – improving database access speed and demands

Memcaching – offloading demand on database servers by keeping frequently requested data available in memory for fast access

Sharding – partitioning a large relational database across multiple servers to improve search speed

5. What will a host on an Ethernet network do if it receives a frame with a unicast destination MAC address that does not match its own MAC address?

- It will remove the frame from the media.
- It will forward the frame to the next host.
- It will strip off the data-link frame to check the destination IP address.
- **It will discard the frame.**

Explanation: In an Ethernet network, each NIC in the network checks every arriving frame to see if the destination MAC address in the frame matches its own MAC

address. If there is no match, the device discards the frame. If there is a match, the NIC passes the frame up to the next OSI layer.

6. What is the common term given to SNMP log messages that are generated by network devices and sent to the SNMP server?

- auditing
- warnings
- acknowledgments
- **traps**

Explanation: Network devices being monitored by the SNMP protocol can be configured to generate log messages that are sent to an SNMP server. The log messages, also called traps, contain all type of information from simple status reports to complex urgent conditions that require immediate attention.

7. What is the function of the Nslookup utility?

- to manually force a client to send a DHCP request
- to display all cached DNS entries on a host
- to view the network settings on a host
- **to manually query the name servers to resolve a given host name**

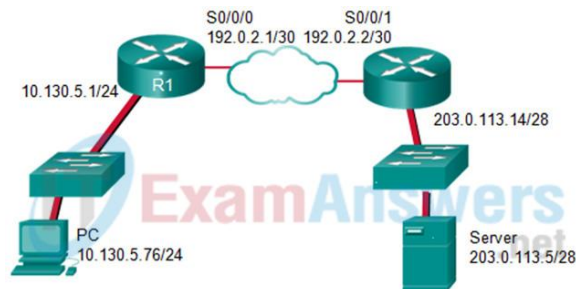
Explanation: Nslookup is a command-line utility that is used to send a query to DNS servers to resolve a specific host name to an IP address.

8. What type of address is 01-00-5E-0A-00-02?

- an address that reaches every host in the network
- an address that reaches every host inside a local subnet
- **an address that reaches a specific group of hosts**
- an address that reaches one specific host

Explanation: The multicast MAC address is a special value that begins with 01-00-5E in hexadecimal. It allows a source device to send a packet to a group of devices.

9. Refer to the exhibit. The PC is sending a packet to the Server on the remote network. Router R1 is performing NAT overload. From the perspective of the PC, match the NAT address type with the correct IP address. (Not all options are used.)



Inside global	203.0.113.5
Outside global	Outside global
Inside local	203.0.113.14
	192.0.2.2
	192.0.2.1
	Inside global
	10.130.5.1
	10.130.5.76
	Inside local

Explanation: The inside local address is the private IP address of the source or the PC in this instance. The inside global address is the translated address of the source or the address as seen by the outside device. Since the PC is using the outside address of the R1 router, the inside global address is 192.0.2.1. The outside addressing is simply the address of the server or 203.0.113.5.

10. Match the OSI layer to the layer number. (Not all options are used.)

7	internet layer
6	
5	physical layer
4	1
3	session layer
2	5
1	
	presentation layer
	6
	transport layer
	4
	data link layer
	2
	network access layer
	application layer
	7
	network layer
	3

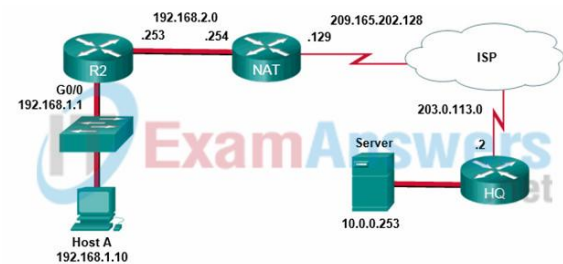
11. A high school in New York (school A) is using videoconferencing technology to establish student interactions with another high school (school B) in Russia. The videoconferencing is conducted between two end devices through the Internet. The network administrator of school A configures the end device with the IP address 209.165.201.10. The administrator sends a request for the IP address for the end device in school B and the response is 192.168.25.10. Neither school is using a VPN. The administrator

knows immediately that this IP will not work. Why?

- This is a link-local address.
- **This is a private IP address.**
- There is an IP address conflict.
- This is a loopback address.

Explanation: The IP address 192.168.25.10 is an IPv4 private address. This address will not be routed over the Internet, so school A will not be able to reach school B. Because the address is a private one, it can be used freely on an internal network. As long as no two devices on the internal network are assigned the same private IP, there is no IP conflict issue. Devices that are assigned a private IP will need to use NAT in order to communicate over the Internet.

12. Refer to the exhibit. An organization is using static NAT to translate the private IP address of Host A to a single public IP address leased from the ISP. Which address is the inside global address of Host A?



- **209.165.202.129**
- 203.0.113.2
- 192.168.2.253
- 192.168.1.1
- 192.168.1.10

Explanation: There are four NAT address types. Listed below are the four types from the perspective of Host A behind the NAT device:

Inside local: 192.168.1.10

Inside global: 209.165.202.128

Outside local: 10.0.0.253

Outside global: 203.0.113.2

13. Consider the following routing table entry for R1:

D 10.1.1.0/24 [90/2170112] via 209.165.200.226, 00:00:05, Serial0/0/0

What is the significance of the Serial0/0/0?

- It is the interface on the final destination router that is directly connected to the 10.1.1.0/24 network.

- It is the R1 interface through which the EIGRP update was learned.
- It is the interface on the next-hop router when the destination IP address the 10.1.1.0/24 network.
- **It is the interface on R1 used to send data that is destined for 10.1.1.0/24.**

Explanation: The Serial0/0/0 indicates the outgoing interface on R1 that is used to send packets for the 10.1.1.0/24 destination network.

14. A device has an IPV6 address listed as 2001:0DB8:75a3:0214:0607:1234:a10:ba01. What is the interface ID of the device?

- 2001:0DB8:75a3
- ba01
- **0607:1234:aa10:ba01**
- 2001:0DB8

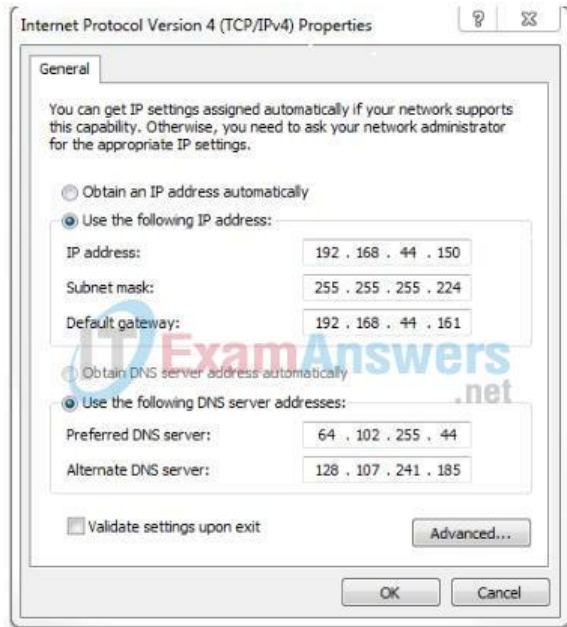
Explanation: An IPv6 address comprises 128 bits represented as eight blocks of four hexadecimal digits. The last four blocks of the address represent the interface ID and is controlled by the administrator.

15. In what two situations would UDP be the preferred transport protocol over TCP? (Choose two.)

- when applications need to guarantee that a packet arrives intact, in sequence, and unduplicated
- **when a faster delivery mechanism is needed**
- when delivery overhead is not an issue
- **when applications do not need to guarantee delivery of the data**
- when destination port numbers are dynamic

Explanation: UDP is a stateless protocol, which means that neither device on either end of the conversation must keep track of the conversation. As a stateless protocol, UDP is used as the Layer 4 protocol for applications that need speedy (best-effort) delivery. An example of such traffic is the transport of digitized voice or video.

16. Refer to the exhibit. A computer that is configured with the IPv4 address as shown in the exhibit is unable to access the internet. What is the problem?

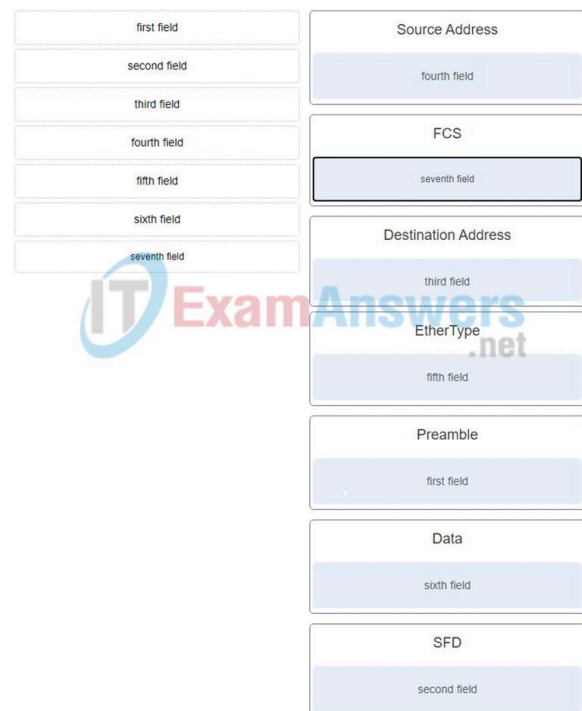


- **The gateway address is in the wrong subnet.**
- The IP address is a network address.
- The settings were not validated.
- The IP address is a broadcast address.

Explanation: The subnet mask of 255.255.255.224 identifies the network of 192.168.44.128. The usable range for the network is 192.168.44.129 through 192.168.44.158. The default gateway address of 192.168.44.161 exists on a separate network from the PC it is configured on.

17. Match the Layer 2 frame field names to the correctly ordered locations for an Ethernet frame. Fields should be ordered from the

beginning of the Ethernet frame to the end.



Explanation: The Ethernet frame contains seven fields. In order these fields are: preamble, SFD, destination address, source address, type, data, and FCS.

18. What IPv4-related DNS record type is used by a DNS server in response to a host requesting for a web server address via the URL?

- AAAA record
- NS record
- **A record**
- MX record

Explanation: A DNS server uses an A record type for an IPv4 end device address. The AAAA record

is for an IPv6 end device address. The MX record is used to map the domain name to mail exchange servers. The NS record indicates the authoritative name server.

19. In what two situations would UDP be better than TCP as the preferred transport protocol? (Choose two.)

- when applications need to guarantee that a packet arrives intact, in sequence, and unduplicated
- **when a faster delivery mechanism is needed**
- when delivery overhead is not an issue
- **when applications do not need to guarantee delivery of the data**
- when destination port numbers are dynamic

Explanation: UDP is a very simple transport layer protocol that does not guarantee delivery. Devices on both ends of the conversation are not required to keep track of the conversation. UDP is used as the transport protocol for applications that need a speedy, best-effort delivery.