On the answer sheet, please mark your choice (A-E) clearly and distinctly. Do not mark more than one answer choice per question. You may wish to note your choice on these sheets before marking the answer sheet.

(1) What company is responsible for the development of Ubuntu?

A. Canonical

B. Oracle Corporation

C. Free Software Foundation

D. Open Source Business Alliance

E. Mozilla Corporation

(2) How often are new versions of Ubuntu released?

A. Monthly

B. Semi-annually

C. Every two years

D. Every four years

E. Every ten years

(3) Post-release how long will an Ubuntu LTS version be supported?

A. Six months

B. 1 year

C. 2 years

D. 5 years

E. 10 years

(4) Give the version number for an Ubuntu release from October of 2005:

A. 5.10   B. 10.5   C. 10.05   D. 12.10   E. 05.14

(5) What is a computer's hostname?

A. Its IP address

B. The main administrative account

C. The owner's name

D. Its name on the network

E. The manufacturer's name

(6) _____ is the most powerful -- and most important -- account on a Unix/Linux machine.

A. Administrator

B. user

C. sysadmin

D. wheel

E. root

(7) Because access to that account (your answer to #6) blocked on Ubuntu, what command must you use to administer an Ubuntu server?

A. override   B. sudo   C. man   D. setfacl   E. apropos

(8) Who is qualified to use that command?

A. Any user, really

B. The computer's owner

C. The repair technician

D. An official group of users within the system

E. The Ubuntu designers

(9) What command will test whether a particular machine is reachable over a network?

A. getfacl

B. echo

C. ping

D. apt-get

E. None of the above

(10) Which of the commands below is used to add new software packages to an Ubuntu installation (or update existing ones)?

A. apt-get   C. finger   E. daemon
B. add-software   D. update-system

(11) On an Ubuntu installation, who is authorized to run that command?

A. root   C. The wheel group   E. The package
B. Any user   D. The cron listener   manager

(12) In what capacity is the machine it20 functioning?

A. Switch   C. Port-mapper   E. Access point
B. Router   D. Repeater

(13) Why must it20 have two Ethernet cards?

A. If one Ethernet card fails, then the other can take over
B. One is the real Ethernet card, and the other is just to mislead hackers
C. In order to double the local network speed
D. So that it can send and receive traffic on two different networks
E. So that it can forward data into and out of the local area network

(14) When a Linux machine boots, how does it know how to configure its network hardware?

A. The CPU does this automatically
B. The network hardware starts itself up independently
C. It gets this information from scripts in a special system directory
D. From a software program on a CD-ROM or USB drive
E. None of the above

(15) What directory has scripts that start, stop, and restart services?

A. /etc/init.d   C. /var/shadow   E. /root/startup/scripts
B. /etc/network   D. /etc/var/initialize

(16) What is the absolute path of the file that tells the machine how to configure the network hardware?

A. /var/startup/network   D. /etc/dhcp/dhcpd.conf
B. /etc/network/interfaces   E. /var/hosts
C. /etc/network/domains

(17) What do you call the hardware that allows a computer to connect to a network?

A. Domain Name System   D. Internet Link Conduit
B. Web Browser   E. Network Interface Controller
C. SSH Tunnel

(18) Give an example of a [answer to #17].

A. Switch   C. Hub   E. PCIe Port
B. Cable Crimper   D. WiFi Adapter

(19) What are the two ways you can see a machine's network configuration? (Mark both)

A. Ping the gateway   D. Something not listed here
B. Run the command ifconfig   E. None of the above
C. Look at /etc/nsswitch.conf

(20) Name the two types of IP address that can be assigned to a NIC

A. Public or private   C. IPv4 or IPv6   E. None of the above
B. Static or dynamic   D. Any of the above

(21) What is the primary purpose of a gateway?

A. Forwarding traffic between two separate networks
B. Converting IP addresses to MAC addresses
C. Resolving domain names to IP addresses
D. Distributing files over the network
E. Quarantining malware within a network

(22) What is the device that represents a network destination that is -- essentially -- the machine itself?

A. Alias   C. Router   E. None of the above
B. Package manager   D. IP table

(23) Why do we use URLs instead of IP addresses?

A. They are longer and more secure   D. They are easier to remember
B. To prepare for the spread of IPv6   E. URLs are older
C. For advertising and marketing

(24) What does DNS stand for?

A. Data Naming Service   C. Domain Network Satellite
B. Data Network Server   D. Domain Name Service
                                     E. None of the above

(25) If we do not use DNS to get the IP address for a URL, where else can we look up the IP?

A. NFS   C. /etc/hosts   E. /etc/network/interfaces
B. Routing table   D. /var/auto.home

(26) Why might this (answer to #25 be faster than using DNS?

A. No need for a network request   D. No password required
B. It uses wired instead of wireless   E. The IP version is more advanced
C. The bit strings are longer

(27) What kind of IP address is _only_ visible inside of a network?

A. 32-bit   C. Static   E. All of the previous
B. Private   D. IPv4

(28) Why is it possible for two different machines to have the IP address 192.168.0.7? (Hint: It may be helpful to think of the context in which this is possible...)

A. Different port numbers   D. In different countries
B. Different MAC addresses   E. Different Internet Service
C. On separate private networks   Providers

(29) What service allows configuration files to be kept in a central location on a network -- and copied to other machines, as needed?

A. Dynamic Host Configuration   C. Bootstrapping Daemon
   Protocol   D. Network Information Service
B. Transmission Control Protocol   E. Port-mapper

(30) What is the role of "slave servers" in this set-up?

A. Providing distribution services, in the event that the master server fails
B. Testing the validity of data from master server
C. Examining NIS requests before forwarding them to the master server
D. Editing NIS data for the requesting user
E. Backing up NIS data to the cloud

(31) What is a daemon?

A. A remote backup server for the primary machine
B. A secret user account for detecting malicious activity
C. A network traffic monitor
D. A service that runs in the background and never directly interacts with any user, including root
E. An HTTP or SSH server

(32) Provide an example of a daemon.

A. /etc/init.d   C. sshd   E. UDP packet
B. sysadmin   D. Gateway

(33) What file user account data such as the following? jdoe:x:1021:1020:John Doe:/home/jdoe:/bin/bash

A. /var/system/identities   C. /etc/users   E. /root/home
B. /etc/hosts   D. /etc/passwd

(34) What is the purpose of the /etc/shadow **file?**

A. Keeping track of unsuccessful login attempts
B. Specifying which network ports are and are not usable
C. Providing "dummy" data in order to deceive or mislead malicious users
D. Storage of encrypted passwords and related data
E. All of the above

(35) What is the purpose of the /etc/group **file?**

A. List of all the machines that can connect to the network
B. List of users disallowed from the machine
C. IP addresses for subnetworks
D. Storage of data about groups of users
E. Storage of data about groups of machines on a larger network

(36) In what file would you find entries such as the following?

10.0.0.231   itvm29-4c.it.cs.umb.edu   itvm29-4c
A. /etc/hosts   B. /etc/dhcp/dhcpd.conf   D. /var/addresses
                          C. /etc/dns   E. /var/resolv.conf

(37) On a network, what requirement do all connected machines need to meet, with regard to the NIS domain name?

A. The NIS domain must be between 128 and 1024 bits
B. The NIS domain must contain capital and lowercase letters, and numbers
C. They must be using the same NIS domain
D. The domain string must be allocated by the nearest available DHCP server
E. The domain string must be encrypted

(38) What type of information does /etc/nsswitch.conf **tell a machine, with regard to configuration information?**

A. The location of the network switch
B. The order in which to get config info, from NIS or other sources
C. Encrypted passwords, for purposes of user authentication
D. It is a type of firewall, to restrict network access
E. The network address for the local NIS server

(39) In /etc/nsswitch.conf**, what would the following line tell the machine?** `group: nis files`

A. First look to NIS for information   C. The "group" folder is located in
   about user groups; if that fails,   the directory /nis/files
   look at the local /etc/group **file**   D. NIS should obtain group
B. The group "nis" belongs to the   information from local files
   user "files"   E. Look at files to find the NIS server
                                                    for groups

(40) What are the two commands that can be used to create an account for a new user?

A. adduser and update-passwd   ~~D. adduser and useradd~~ *(circled)*
B. usercreate and useradd   E. update-passwd and update-users
C. createuser and genuser

(41) When we create your personal user account on it20, why are you then able to log into any VM on the it.cs.umb.edu network?

A. Because an account is created for you on each of the individual VMs
B. Because Ubuntu automatically accepts logins from unknown accounts
C. Because you are a sudo-er on your own VM
D. Because the network is not properly secured, with the tightest restrictions
E. Because the VM gets user account data from it20, via NIS *(circled)*

(42) Why did we <u>not</u> create a home directory for you on it20 when we created your account?

A. Because you will not be creating files
B. Because it20 does not have enough disk space
C. Your personal home directories will be hosted on your VMs *(circled)*
D. To ensure the network's security from malware
E. Because you are not a sudo-er on it20

(43) What is the significance of <u>/home/jdoe</u> in the following line?
   <u>jdoe:x:1021:1020:John Doe:/home/jdoe:/bin/bash</u>

A. The absolute path user jdoe's home directory *(circled)*
B. The location of user jdoe's encrypted password
C. A kind of ""working directory"" for unknown and guest accounts
D. Backups of user jdoe's virtual machine
E. Backups of unknown users' saved files

(44) What is the difference between the <u>chown</u> and <u>chgrp</u> commands?

A. chown is used to set owner permissions for a file or directory, while chgrp is used to set group permissions
B. chown is used to change the owner of the computer, while chgrp changes a specific user's default group
C. chown is used to change the owner of the computer, but there is no such command as chgrp
D. chown is used to change the owner of a file or directory, while chgrp changes the group association *(circled)*
E. chown is an alias for chmod, while chgrp is a system script that invokes chmod for groups of users

(45) Who can use those commands?

A. Only the account/group owner

B. Account owner; any group member

C. The account/group owner or root ⟶ E. Only root

D. The account owner, any group member, or root

(46) What group does a new user immediately belong to when his/her account is first created?

A. The system default group, which holds all new users

B. No group at all, because they have not joined any, yet

C. The restricted group, users who lack write privileges until approved

D. The new user's choice, in response to a prompt and list of system groups

E. A group named after the user, with the same name

(47) What characterizes a distributed file system like NFS or Samba? (Versus the file system on a single machine.)

A. You can transfer files over the network between hosts using SFTP or SSH

B. It looks like a single file system, but it is on multiple different machines

C. Files and directories have no owner or group, so permissions are universal

D. All file and directory permissions are restricted to sudo-ers

E. All files and directories are read-only

(48) After Project 4, you should be able to log into it20 or another group's VM and have access to your home directory. How is this possible, when that directory resides on your own VM?

A. The machine you log into is able to mount your home directory and make it appear as if it were part of the local filesystem

B. The two hosts send DHCP traffic back and forth between one another

C. Your personal home directory data is copied over to the other VM's hard drive, and data is periodically synchronized between the two

D. The hosts have a hidden SSH conversation, with encrypted port numbers

E. None of the above

(49) What is a mount point?

A. The physical location where we connect an external drive

B. A storage location for backups of remote files and directories

C. Where we keep snapshots of virtual machines

D. A directory on a machine where shared files/directories appear as if they were part of the local file system

E. A configuration file for NFS and autofs

(50) What is the purpose of the entries in the /etc/exports **file?**

A. The primary configuration file for autofs
B. Specifies what directories on the machine may be shared on the network, to
   whom, and with what constraints
C. Lists individual home directories and where to find them
D. Specifies what remote machines we can mount from
E. Directs NFS to automatically copy home directories from specific machines

(51) What configuration file provides autofs **with a list of entries, where
   each entry consists of (1) a mount point and (2) a file with
   information about the directories to be mounted there?**

A. /etc/autofs   C. /etc/auto.master   E. /etc/default/autofs
B. /etc/auto.home   D. /etc/default/nfs

(52) Write a line, to go in /etc/auto.home, **telling NFS to mount the
   directory** bjohnson, **from the path** /home.itvm29-4c/bjohnson **on the
   machine** itvm29-4c.

A. itvm29-4c /home/itvm29-4c/bjohnson
B. itvm29-4c bjohnson:/home/itvm29-4c/bjohnson
C. itvm29-4c bjohnson:/home/itvm29-4c/&
D. bjohnson itvm29-4c:/home.itvm29-4c/&
E. bjohnson itvm29-4c->/home.&/bjohnson

**(53) If a machine has a private IP address, what service does the gateway
   provide to enable it to communicate over the Internet?**

A. Dynamic Host Configuration Protocol   D. Distributed File System
B. Domain Name Service   E. Network Address
C. Network Information Service   Translation

On a local area network, a **_client_** machine has the private IP of **192.168.0.79**.

- The client sends an HTTP request to the public IP **88.157.131.22** on port **80**.
- The client chooses **3827** as the local port for receiving the reply.
- The request passes through the **_router_**, which has both a private IP (**192.168.0.1**)
  and a public IP (**92.123.230.109**).
- The router chooses **5293** as its return port.

For each of the indicated segments, please choose the relevant Destination
and Return sockets (IP:port) for that part of the "journey".

54	55
Client → Router →	Remote Server

57	56
Client ← Router ←	Remote Server

(54) Client to Router

A. **Destination:** 192.198.0.1:5293
Return: 192.198.0.79:3827

B. **Destination:** 192.198.0.1:80
Return: 192.198.0.1:3827

C. **Destination:** 88.157.131.22:80
Return: 192.198.0.79:3827

D. **Destination:** 88.157.131.22:80
Return: 192.198.0.1:5293

E. **Destination:** 88.157.131.22:80
Return: 92.123.230.109:5293

(55) Router to Remote

A. **Destination:** 88.157.131.22:80
Return: 92.123.230.109:5293

B. **Destination:** 92.123.230.109:80
Return: 192.198.0.1:80

C. **Destination:** 92.123.230.109:80
Return: 192.198.0.1:3827

D. **Destination:** 192.198.0.79:3827
Return: 88.157.131.22:5293

E. **Destination:** 192.198.0.79:3827
Return: 192.198.0.1:5293

(56) Remote to Router

A. **Destination:** 192.198.0.79:3827
Return: 88.157.131.22:80

B. **Dest.:** 92.123.230.109:5293
Return: 88.157.131.22:80

C. **Dest.:** 92.123.230.109:5293
Return: 88.157.131.22:5293

D. **Destination:** 192.198.0.1:3827
Return: 92.123.230.109:5293

E. **Destination:** 192.198.0.1:3827
Return: 88.157.131.22:80

(57) Router to (Original) Client

A. **Dest.:** 92.123.230.109:5293
Return: 88.157.131.22:80

B. **Dest.:** 92.123.230.109:3827
Return: 88.157.131.22:80

C. **Destination:** 192.198.0.79:3827
Return: 192.198.0.1:5293

D. **Destination:** 192.198.0.79:3827
Return: 88.157.131.22:80

E. **Destination:** 192.198.0.79:80
Return: 192.198.0.1:5293