Short Answer – 1 point each

1. When did ARPANET first start carrying network packets? _____
2. What does RFC stand for? _____
3. What are the two Standard RFC maturity levels? _____
4. What is the purpose of Out Of Band connections? _____
5. What is Bandwidth? _____
6. List a command I might use to look up DNS records in Linux. _____
7. List two types of servers. _____
8. List two types of server administrators. _____
9. List two distinctions of server hardware. _____
10. What is the purpose of a hypervisor? _____
11. How many bits are in an IPv4 address? _____
12. How many bits are in an IPv6 address? _____
13. When was the World Wide Web introduced? _____
14. List 4 types of DNS records. _____
15. Which DNS record contains the serial number for the domain? _____
16. What is the purpose of a WHOIS record? _____
17. What is a key feature of a Highly Available system? _ _____
18. At what layer of the OSI model does a router operate? _____
19. Give an example of an application that should use UDP instead of TCP. _____
20. What is a DNS glue record? _____
21. RFC 2182 dictates you should have how many public name servers? _____
22. List a benefit of a thin client. _____

23. What is the purpose of the top command in Linux? _____

24. What does IOPS stand for? _____

25. A SAN provides access to what “level” of data? _____

26. What port and protocols does DNS traffic use? _____

27. At what layer of the OSI model to hubs operate? _____

28. IPv6 addresses use what kind of notation? _____

29. A NAS provides access to what “level” of data? _____

30. What is the name of the printing system used in Linux? _____

31. Are RAID arrays a type of backup? _____

32. Give two examples of devices connected through the “Internet of Things.” _____

33. What is the FQDN of the EUP CS Department server cslab101? _____

34. What does TCP/IP stand for? _____

35. What is the name of the worlds more widely used DNS software? _____

36. At what layer of the OSI model to switches operate? _____

37. List two types of DHCP fault tolerant designs. _____

38. The topmost level of the NTP system is called what? _____

39. What port and protocol does NTP use for communication? _____

40. The top most domain in the DNS hierarchy is called the root domain.
    What is the level immediately below the root level called? _____

41. What is the name of the Microsoft application that provides
    LDAP services to clients? _____

42. What address is used by a DHCP server to identify a unique client,
    and allocate the proper settings to the client? _____

43. A set of values given to a client by a DHCP server for a specific period of time is called what? _____

44. What are the magnetic discs in a hard drive called, where data is actually stored? _____

45. In Active Directory, users, groups, computers, and other resources are separated into groupings called what? _____

46. If I'm planning on changing the IP address of a network resource, should I increase or decrease the TTL value to minimize disruptions? _____

47. There are four types of tasks that can be automated in a backup system list two of them. _____

48. A data center is often built on a raised floor. Name two things that the raised floor is used for. _____

Medium Answer – 2 points each

49. Describe the difference between RAID 0 and RAID 1. _____

_____

50. What is the purpose of a Distributed File System (DFS)? _____

_____

51. What is a Host Bus Adapter (HBA)? _____

_____

52. What is the difference between an incremental and a differential backup? _____

_____

53. What is the purpose of a recursive name server? _____

_____

54. List four types of nameservers: _____

_____

55. List two best practices of DNS servers. _____

_____

56. List four reasons to create a disaster recovery plan. _____

_____

57. Describe a Fault Domain. _____

_____

58. What is the purpose of collision detection? _____

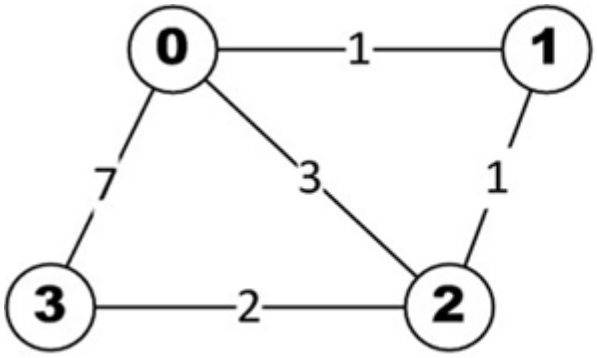
_____

59. What is the purpose of ARP, the Address Resolution Protocol? _____

_____

Long Answer – 5 points each

60. Fill in the routing cost table based on the routing map below:



From 0	Via 1	Via 2	Via 3
To 1	1	4	10
To 2			
To 3			

61. Describe why I might use an SSH tunnel (or any tunnel). What benefits does this tunnel provide?

62. You want to build a small VM Hypervisor cluster consisting of 4 physical servers to run your 50 virtual machines. Each VM is configured with 4 vCPU's, 16GB RAM, and a 200GB disk drive. How large should I size my physical hypervisor host machines, so that I can run on N-1 hosts without over-allocating any resources? Don't forget to include hyper threading and multiple CPU's in your configuration, and add some extra for overhead.
    - Virtual Machine Requirements
        - 50 VM's - 4 vCPU's, 16GB RAM, 200GB Storage per VM
        - CPU Cores = 50 machines * 4 vCPU's = **200 vCPU cores**
        - RAM = 50 machines * 16GB = **800 GB RAM**
        - Storage = 50 machines * 200GB = **10,000GB (10TB)**
    - N-1 Physical Server Capacity (4 – 1 = 3)
        - ??? cores per server
        - ??? cores per processor
        - ??? core CPU
    - Per-Node Capacity
        - ??? GB RAM per server
        - ??? GB storage per server

    Each node in your cluster should have at least a ?? core CPU with ???GB of RAM and ?TB of storage. Allowing for some additional overhead, a realistic expectation could be something like 4 physical servers, each with two ?? core hyperthreading CPU's, ???GB Ram, and ?TB of storage. Storage can also exist on a separate SAN.

63. Convert the following binary number to decimal (or decimal number to binary). Indicate the range of acceptable IP addresses identified by the network mask. Identify the broadcast address. Indicate which bits represent the network and which bits represent the host. Show your work.
    - Binary: **00001010.00001011.101110**11.00000000/00010110
    - Decimal: ???
    - Range: ??? - ???
    - Broadcast: ???
    - Network bits are bold, host bits are underlined above.

64. You are tasked with defining a budget for mitigating the chance of a disaster. Given the following values, what would your mitigation budget be? Show your work.
    - One day of downtime costs $200,000 due to a disaster
    - 80% chance of the disaster happening every 3 years
        - cost of disaster * risk of disaster = cost of mitigation