Section A – Answer All the questions ( Each carry 1 mark)

1. Which of the following are type of Twisted Pair Cable?
2. 75 Ω Coaxial antenna cable
3. 300 Ω flat twin lead antenna cable.
4. Category 6 (UTP).
5. Multi conductor AV (audio video) cable.
6. What is an advantage of setting up multi zone (DMZ) using a firewall?
7. You can control the outgoing traffic only.
8. You can hide the internal network design
9. You can do load balancing
10. Improved network performance
11. Which of the following methodologies is not a valid methodology employed by IDS to detect network attacks?
    1. Statistical anomaly-based detection.
    2. Stateful Protocol Analysis Detection.
    3. Host-based detection
    4. Signature-based detection
12. IPv6 does not use \_\_\_\_\_\_\_\_ type of address
13. Broadcast
14. Multicast
15. Anycast
16. Unicast
17. Which layer is responsible for process to process delivery?
    1. network layer
    2. transport layer
    3. session layer
    4. data link layer
18. Which layer responsible the user request directly?
    1. application layer
    2. session layer
    3. presentation layer
    4. data link layer
19. The size of IP address in IPv6 header is
20. 4bytes
21. 128bits
22. 64 bits
23. 100bits
24. The TCP and UDP protocols are visible at.
25. The Data link layer.
26. The presentation layer.
27. The secession layer.
28. The transport layer.
29. Identify the requirement which is not address at the access level in the layer 2 network designing.
30. Aggregation.
31. Resilient.
32. Affordability.
33. Port density.
34. Routing happens in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_layer of the OSI reference model.
35. network.
36. Transport.
37. Data link.
38. Session.
39. dentify advantage of ring network over star network.
40. High Scalability with miner change affect
41. Predictable performance
42. Central point provides a single point to manage the network
43. Nodes are independently connected.
44. DNS translates....
45. Domain names to MAC addresses
46. Physical addresses to IP addresses
47. IP addresses to physical addresses
48. IP addresses to domain names
49. What was the main motivation behind introduction of IPv6
50. IPv4 addressing is too simple
51. IPv6 use a complex 128 bit address
52. IPv4 has been used for a very long time and needs an upgrade.
53. IPv4 addresses is depleted (ran out of addresses)
54. Identify which one is not a design goal of a network.
    1. Functionality
    2. Manageability
    3. Transparency
    4. Scalability
55. Identify a requirement of a building entrance as describe in the six elements of structured cabling.
    1. Must maintain controlled and secured access.
    2. Must be having environment suitable for electronic and transmission equipment.
    3. Close to backbone of the building.
    4. Twin electrical outlets in a wall.
56. Why it is important to identify the data flow direction during a network requirement analysis stage.
57. To identify the data sources.
58. To identify the data sinks.
59. To calculate the up and down bandwidth of a link.
60. To decide on the connectivity medium.
61. Which of the following is not in the routing table of a host of a network.
62. Route to a host
63. Route to a network
64. Default route
65. Route to ISP

18 What is a protective measure against modification.

1. Maintaining backups off site
2. Multifactor authentication.
3. Encryption
4. Deploy a IPS(Intruder prevention system).

19.What is the main advantage of a host based intruder detection method.

1. High accuracy in detection
2. Does not depend on the host operating system.
3. Low cost of ownership
4. Evidence are preserve for forensic analysis.

20.whay it is important to adhere to correct colour code when terminating UTP cables.

1. Because it’s the international recognized.
2. Nice to have colors for reference.
3. All the pairs doesn’t have the same cross sectional diameter in the UTP cable .
4. Different colour pairs have different number of twists per unit length.

Section B answer all the questions 35 marks.

A manufacturing company in Homagama ,and yakkala has its head office in Colombo. The Colombo office requires to get all information on production facility and also requires to monitor through video to maintain its security and quality of the products. The Colombo office housed all the admin, marketing, and finance and top management staff. 50 members are in the entire staff at Colombo office. Every staff member (Colombo / Homagama and Yakkala)is given intercom and its operate in VoIP technology.

The Hproduction facility has 4 separate buildings; the main admin building housed all the production, engineering staff. 15 staff members are in the building with computers

The second building housed all the production machinery which can be control remotely through local area network and has RJ45 connections with shielded outers. 25 separate equipment’s are monitored, the engineering /production staff use hand held devices to take critical reading and record observations in a periodic manner.

The third building housed all the raw materials and finished products. The store utilized state of art tracking and identification systems consists of mobile handheld units. The store office has 2 staff with computing facilities to manage store

The fourth building housed the power management system, a transformer and a backup generator, the SCADA unit is been used to manage and monitor all units within the building. The main SCADA control unit accommodate a LC connectivity to connect to the LAN. This area is a no man area and the entire facility is monitored remotely.

The security hut has a phone and a PC to register vehicular movements and shipments. The Gate is 300 meters from the main building area.

The Yakkala has the main distribution center and the store. The finished products are transferred to main store where they will be transfer them throughout the country. It hosed two officers and 5 other staff. The store management system link with production facility and produce when it required .

CCTV camera distribution

|  |  |
| --- | --- |
| Location | Number of Camera |
| Colombo | 5 |
| Building 1 | 5 |
| Building 2 | 20 |
| Building 3 | 10 |
| Building 4 | 8 |
| Security and Gate | 4 |
| Yakkala | 10 |

|  |  |
| --- | --- |
|  | Building 3  Building 2  Building 4  Building  1  Layout of Homagama production facility |

|  |  |
| --- | --- |
| (b) | Select suitable materials /physical media or technologies for each building and briefly justify your answer. (8 marks)  Building 1 |
|  | Building 2  Building 3  Building 4 |
| (b) | What is the best building to locate the core networking equipment on the layout, justify your answer? (2 marks) |
| (c) | What is the best physical media/type to interconnect the building if the buildings are situated in close proximity? Justify your answer. (5 marks) |
| (d) | As the link between head office ,Yakkala and homagama factory carries delay sensitive data, what type of technologies are available to provide such constant bandwidth data links for the applications. (5 Marks) |
|  | Given the following Host IP Address, Network Mask and Subnet mask find the following information: |
|  | Host IP Address: 192.168.19.50  Network Mask: 255.255.0.0  Subnet Mask: 255.255.255.0 |
| (E) | Major Network Information ( 6 marks )     * 1. Major Network Address   2. Major Network Broadcast Address   3. Range of Hosts if not submitted |
| (F) | Subnet Information (6 marks)   * 1. Subnet Address   2. Range of Host Addresses (first host and last host)   3. Broadcast Address |
| (G) | Other Subnet Information (3 marks)   * 1. Total number of subnets having the same size   2. Number of hosts per subnet |

Section C – Answer only 3 out of 5 each question carry 15 marks

Question 1

1. Explain the functionality of the data link layer Identifying appropriate protocols and technologies involve [10 marks].
2. Explain the network management functionality highlighting the ISO model for network management [5 Marks]

Question 2

1. Explain the advantages of subnetting or segmenting a network to smaller manageable blocks. [8 Marks].
2. Explain why we needs different connectivity topologies for datacenter or cluster based computational environments. [7 Marks]

Question 3

1. Explain the P2P and client server data communication model high lighting the differences between them. You may use diagrams if required. [10 marks].
2. Explain the difference between dynamic and static routing protocols given examples if necessary. [5 Marks]

Question 4

1. Explain the functionality of IPS/IDS in a network indicating the practical usage you may use diagrams if required [10 marks]
2. Explain the difference between capital (one time) cost and recurrent cost of a network giving appropriate examples [5 marks]

Question 5

1. Analyze the advantage and disadvantages related to ring and star-based network topologies. [8 marks].
2. Explain the difference between external and internal network virtualization given examples if necessary. [7 Marks]