Data Communication & Networks (IT 237)

Semester III (2023)

Case Study

[Marks: 40 %]

1. Surge Global is a multi-national financial organization. It is going to expand its LAN at Colombo HQ. This is due to various complaints from its users about the performance and reliability of the computer network. Furthermore, the proposed computer network will be broken into sub networks (departments). Refer to the below table for the breakdown of departments at Surge Global.

Department	No of Users
Finance & Accounts	53
Human Resources (HR)	66
Sales	90
Marketing	45
Information Technology (IT)	10
Purchasing	25

1.1. LAN uses wired and Wireless technologies to connect network devices. Identify the most suitable technologies you prefer to use and explain the advantages and disadvantages.

1.2. The current network address of the LAN is 172.16.16.0 /24. Which sub-netting method is the most convenient? Explain briefly.

1.3. Show the calculations.

1.4. Explain in detail why you cannot use Fixed Length Subnet Mask (FLSM) in the above scenario.

1.5. Complete the below-given table as per your calculations.

Department Name	Network Address	Subnet Mask		Broadcast Address	First Assignable Address	Last Assignable Address
		Decimal Format	CIDR			
Finance & Accounts						
Human Resources (HR)						
Sales						
Marketing						
Information Technology (IT)						
Purchasing						

1.6. The management of the organization has decided that the use of IP version 6 is more beneficial. Explain the advantages and disadvantages.

1.7. You are considering connecting two (02) buildings in your campus network which are apart 400ms. What is the most fitting technology?

2. Cisco Packet Tracer is a simulation software that can be very helpful for students to learn networking technologies. Use the above-mentioned software to implement the following,

LAN consists of the following network devices.

Device Type	Amount	Location
Servers	06	Ground Floor – Server Room
PCs	05	Ground Floor – Reception
APs	02	Ground Floor – Lobby Area
Printers	01	Ground Floor – Reception
Laptops	06	First Floor
PCs	12	First Floor
Printers	02	First Floor
APs	02	First Floor
Laptops	05	Second Floor
PCs	22	Second Floor
Printers	04	Second Floor
APs	04	Second Floor

2.1. Configure using the LAN with 192.168.100.0 /24.

2.2. Six servers should be configured on separate physical servers. Reserve the range 192.168.100.1 to 192.168.100.10.

2.3. All the servers located in the LAN are assigned Static IP Addresses.

2.4. All other devices should receive dynamic IP Addresses. Use a DHCP Server.

2.5. System Administrator should be able to PING every device using its human-readable name. Configure the relevant technologies.

2.6. Configure APs **SSID** as "**SIBA**". Every AP should be secured with a password. The password should be strong.

2.7. Configure each Laptop to be an email client. Use **'siba.lk'** as email domain.