**Introduction to Networks**

**CO1507**

**Tutorial**

**Subnetting OSI TCP/IP, Design Scenario**

***Instructions:***

Answer the following questions on a separate paper and keep both the tutorial sheet and the answers.

1. What is the effect of subnetting on network performance and security?
2. What is the subnet mask for /24 /25 /26 /27 /28 /29 and /30?

/24 -> 255.255.255.0

/25 -> 255.255.255.128

/26 -> 255.255.255.192

/27 -> 255.255.255.224

/28 -> 255.255.255.240

/29 ->255.255.255.248

/30 -> 255.255.255.252

1. How many valid host addresses can be supported by the network address 200.1.2.0 using all the / notations in question 2.

/24 -> 256

/25 -> 128

/26 -> 64

/27 -> 32

/28 -> 16

/29 -> 8

/30 -> 4

1. What is the difference between 192.168.1.64/24 and 192.168.1.64/27

The first one will have only 1 number of subnets and 256 hosts.

The second one will have 8 subnets and 32 hosts.

1. How many valid hosts can 197.1.2.32/27 network address?

This will have 30 valid hosts. (32-2(broadcast and network))

1. What is the subnet mask for 172.16.1.3/24

It will be 255.255.255.0 .

7. A local college has just finished a new building to house a Computing Department. The college needs to setup 5 networked teaching labs. Each lab is required to support between 20 and 25 computers and must be on a separate network. You have been given the following network address:

**203.168.15.0/24**

1. Calculate the appropriate subnet mask required; the number of valid subnets produced and the number of valid hosts produced for each subnet.

Subnetmask -> 255.255.255.0

b) Calculate ALL the valid subnets.

1. Calculate the first, the last valid host ID, and the broadcast address in each of the subnets.

**OSI and TCP/IP models**

1. Why the OSI or TCP/IP models are needed for networking?
2. Draw a diagram of the OSI reference model and state the issues that are addressed by each layer.
3. Compare the OSI and TCP/IP reference models.
4. Explain the functionalities that are provided by TCP transport layer protocol.
5. Compare TCP with UDP.
6. Explain why UDP is used in online gaming over TCP.

**Transmission media**

1. Explain why the choice of media type is important in communications and networking.
2. State 3 main types of media types and the application that each is best used in.
3. How does fibre optic differ from UTP?
4. What are the advantages and disadvantages in using fibre optic cable?

**Scenario:**

You need to work in groups

An international manufacturing company that makes car parts. Among the components that are made, break disks and part of the car engine. The company uses a number of machines that use high voltage. The company employs 45 people; 25 people working in the shop floor and the rest are distributed among the management (5 people), sales (9 people), admin (5 people), Human Resources (1 person). The company occupies a building with several floors. You were approached by the company to deploy a network that satisfies its operational needs. A report needs to be submitted that includes all the hardware and software and operational needs.

You need to decide on the hardware and software to be used.

You need to provide costing for the project which would include the set up and running costs.

You need to provide a network diagram.

You need to provide an addressing scheme.

Make sure to plan your system for future expansion

Justify your choices

You may make assumptions where appropriate.