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### **Faculty of Computing**

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### **[Computer Communications & Network]**

### **Lab No 6 Tasks**

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### **Task 1: IP address 222.1.1.20, mask 255.255.255.192 in CIDR notation**

The subnet mask **255.255.255.192** in binary is:

11111111.11111111.11111111.11000000

There are 26 bits set to 1, so the CIDR notation is **/26**.

#### The IP address **222.1.1.20** combined with the **/26** mask gives the CIDR notation as:

**222.1.1.20/26**

### **Task 2: IP address 135.1.1.25, mask 255.255.248.0 in CIDR notation**

The subnet mask **255.255.248.0** in binary is:

11111111.11111111.11111000.00000000

There are 21 bits set to 1, so the CIDR notation is **/21**.

#### The IP address **135.1.1.25** combined with the **/21** mask gives the CIDR notation as:

**135.1.1.25/21**

### **Task 3: Class C network address of 201.1.1.0 – How many hosts can you have?**

A Class C network has a default subnet mask of **255.255.255.0**, which is **/24** in CIDR notation.

The number of hosts in a **/24** network is given by the formula:

Number of hosts=2^(32−subnet bits) −2

Where:

* 32 is the total number of bits in an IPv4 address.
* The **subnet bits** for **/24** is 24.

Number of hosts=2^(32−24)−2

=2^8−2

=254 hosts

**254 hosts** can be accommodated in this Class C network.

### **Task 4: Class A network address of 21.0.0.0 – Create 10 networks, each supporting 100 hosts**

To support a maximum of **100 hosts** per network, we need to allocate enough bits for the hosts. The formula to calculate the number of hosts is:

2^host bits −2=required hosts

Where the subtraction of 2 accounts for the network and broadcast addresses.

We need at least 100 hosts, so:

2host bits−2≥100⇒host bits=7 (since 2^7−2=126)

Therefore, **7 bits** are needed for the hosts.

We need at least **10 networks**. The number of subnets is determined by the formula:

2^subnet bits≥required networks

We need at least 10 networks, so:

2^subnet bits≥10⇒subnet bits=4 (since 24=16)

Therefore, **4 bits** are needed for the subnets.

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To satisfy both the hosts and the networks, we need a total of:

7 (host bits)+4 (subnet bits)=11 bits

The remaining bits are used for the network portion.

A Class A network has 8 network bits by default, and we need an additional 4 bits for subnetting. So, the subnet mask would be **/21**.

#### **Evaluate the provided subnet masks**

* **255.255.0.0** is **/16**:

With **/16**, there are **2^16 = 65,536** hosts per subnet, which is far too large.

This mask **will not work** for 100 hosts per network.

* **255.255.255.0** is **/24**:

With **/24**, there are **2^8 - 2 = 254** hosts per subnet, which satisfies the requirement.

This mask **will work**.

### **Task 5: Class B network address 129.1.0.0, subnet mask 255.255.255.0**

#### **Understand the subnetting**

* A Class B network has a default subnet mask of **255.255.0.0**, which is **/16**.
* Using a subnet mask of **255.255.255.0** means we are borrowing 8 bits from the host portion, making the new mask **/24**.

**Calculate the number of networks**

* With a **/24** subnet mask, we have borrowed 8 bits for subnetting.
* The number of subnets is calculated as:

2^borrowed bits=2^8

=256 subnets

#### **Step 3: Calculate the number of hosts per subnet**

* With **/24**, there are 8 bits remaining for hosts.
* The number of hosts per subnet is:

2^(32−24)−2

=2^8−2

=254 hosts

#### **Final answer:**

* **256 networks**, each supporting **254 hosts**.