

January

Question 1

[40 Marks]

Write notes on any **five** of the following topics:

(8 marks each)

- a)** ARP
- b)** DNS
- c)** Switches
- d)** Private IP Address Blocks
- e)** Wireless LAN
- f)** DHCP
- g)** Subnet Mask

Question 2

[30 Marks]

There is an error in the network topology shown in **Figure 1**. This error has the potential to disrupt network communications.

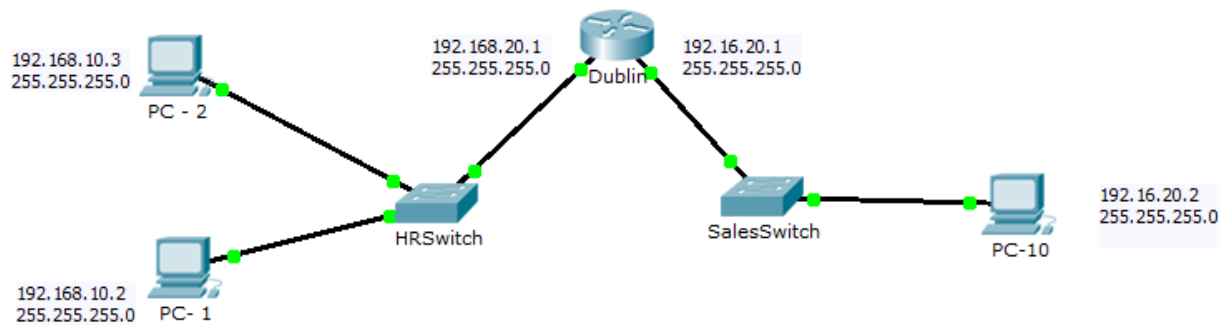


Figure 1

Based on the information you see in the diagram answer the following questions:

a) Identify the error in Figure 1, and suggest solution.

(8 marks)

b) Assuming that the ARP table on PC – 1 is populated with the MAC address of PC – 2, would a 'ping' from PC – 1 to PC – 2 be successful without fixing the error in Figure 1? Explain your answer.

(5 marks)

c) Without fixing this error - would a 'ping' from PC – 1 to PC – 10 be successful? Explain your answer.

(5 marks)

d) Explain the operation of CSMA/CD in legacy Ethernet networks. In your explanation discuss why collisions still occur, and how CSMA/CD deals with collisions

(12 Marks)

Question 3

[30 Marks]

a) The two main functions of the Transport layer are:

1. Segmentation/Reassembly of data
2. Separate different conversations/identifying applications

Discuss each of these functions.

(8 marks)

b) Figure 2 shows the 'Three-way handshake'.

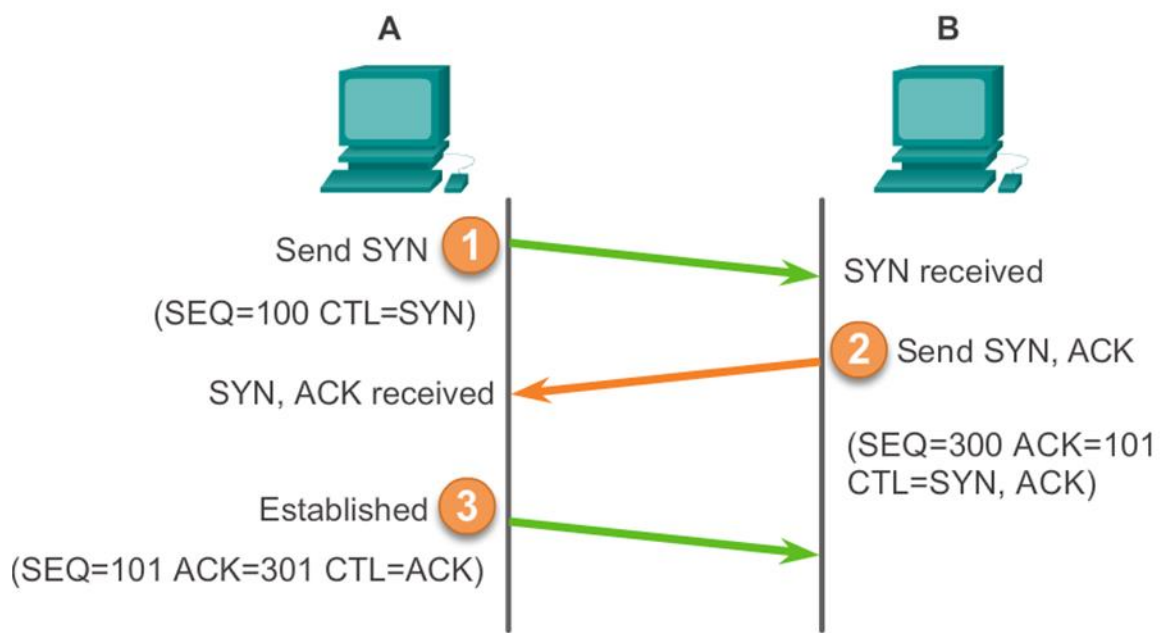


Figure 2

Discuss the steps involved in the 'Three-way handshake' as shown in the diagram. Your discussion should reference the purpose of the 'Three-way handshake' and describe the relevance of the SEQ, SYN and ACK bits.

(14 marks)

c) Discuss IPv4 broadcast addresses. As part of your discussion you should mention at least two protocols that use broadcasts.

(8 marks)

Question 4

[30 Marks]

- a) **Figure 3** shows the topology of a network and the number of users required on each network segment. Devise a basic subnetting address scheme to allow for the number of users specified. Please recreate **Table 1** in your answer booklet and fill in your addressing scheme. The address you have been allocated is:

193.15.10.0/24

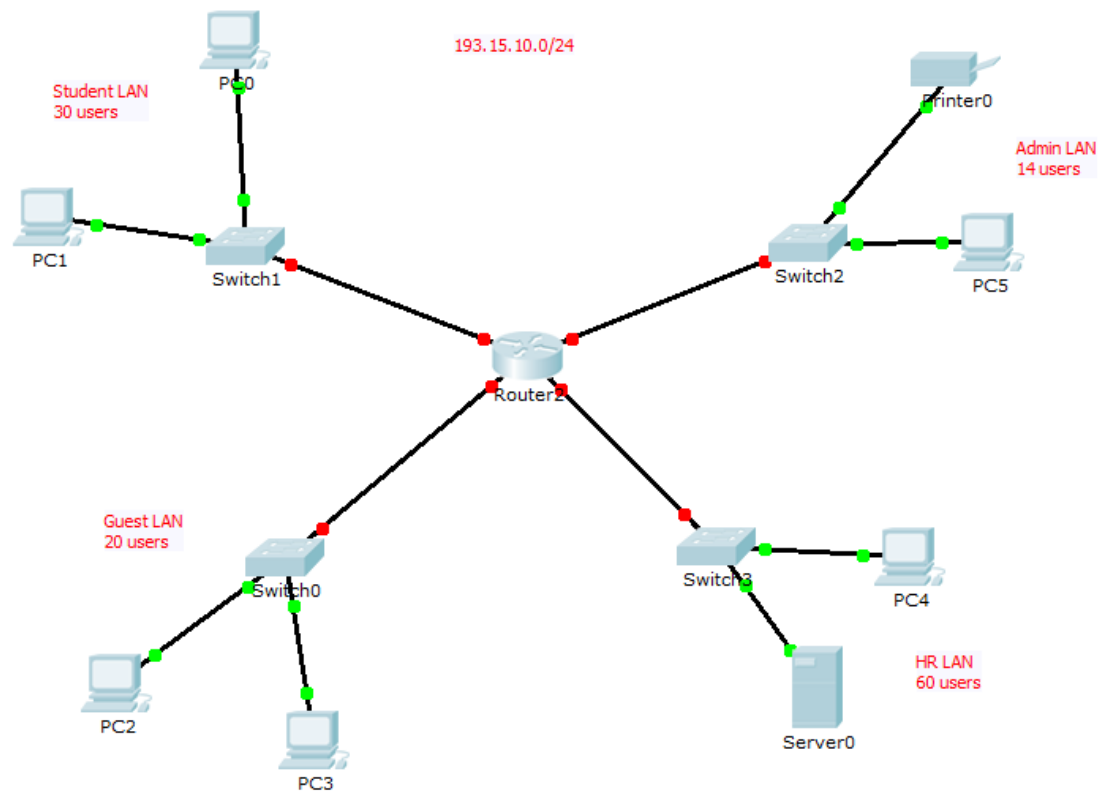


Figure 3

Subnet No	Subnet Address	Host Range	Broadcast Address
0			
1			
2			
3			

Table 1

(16 marks)

- b)** When a Data Link (layer 2) frame arrives at a router, a router must make a decision as to where to forward the frame. Describe in detail the sequence of events that take place when a frame arrives at the router interface, to when the frame exits the router on a different interface.

(10 marks)

- c)** The basic characteristics of IP are:

Connectionless

Best Effort

Media Independent

Choose **two** characteristics and discuss briefly.

(4 marks)