Question 1 **[40 Marks]**

Write notes on any ***five*** of the following topics: **(8 marks each)**

a) Dynamic Host Configuration Protocol (DHCP)

b) OSI Transport Layer (Layer 4)

c) ARP

d) Switches

e) Ping

f) Fibre Optic Cable

g) IPv4 Addresses

Question 2 **[30 Marks]**

a) As data is passed from the Application layer of the OSI model downwards towards the Physical layer, it undergoes a process of encapsulation. Explain the encapsulation process that occurs at Layer 4, Layer 3 and Layer 2. Describe the numbers or addresses that are added at each of these layers, and their purpose, and give an example of a protocol that is defined at each layer.

(15 marks)

b) Discuss UDP. Your discussion should include a reference to the types of applications that would use UDP. Why would UDP would be more suitable then TCP for these applications?

(15 marks)

Question 3 **[30 Marks]**

a) The network as shown in **Figure 1** has been built and deployed. However when testing the network it was observed that PC1 and PC2 cannot ping PC3 or PC4.

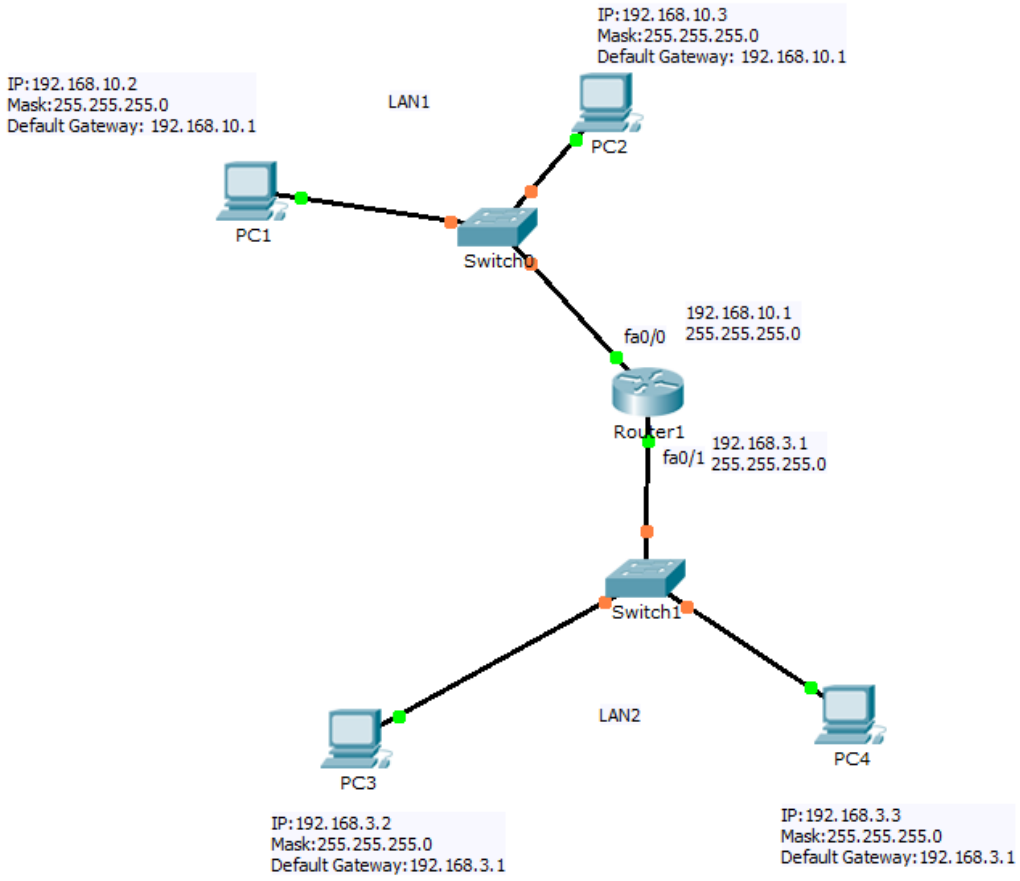

Figure 1

A ‘show run’ command has been issued on Router1, and the following output observed as shown in **Figure 2**.

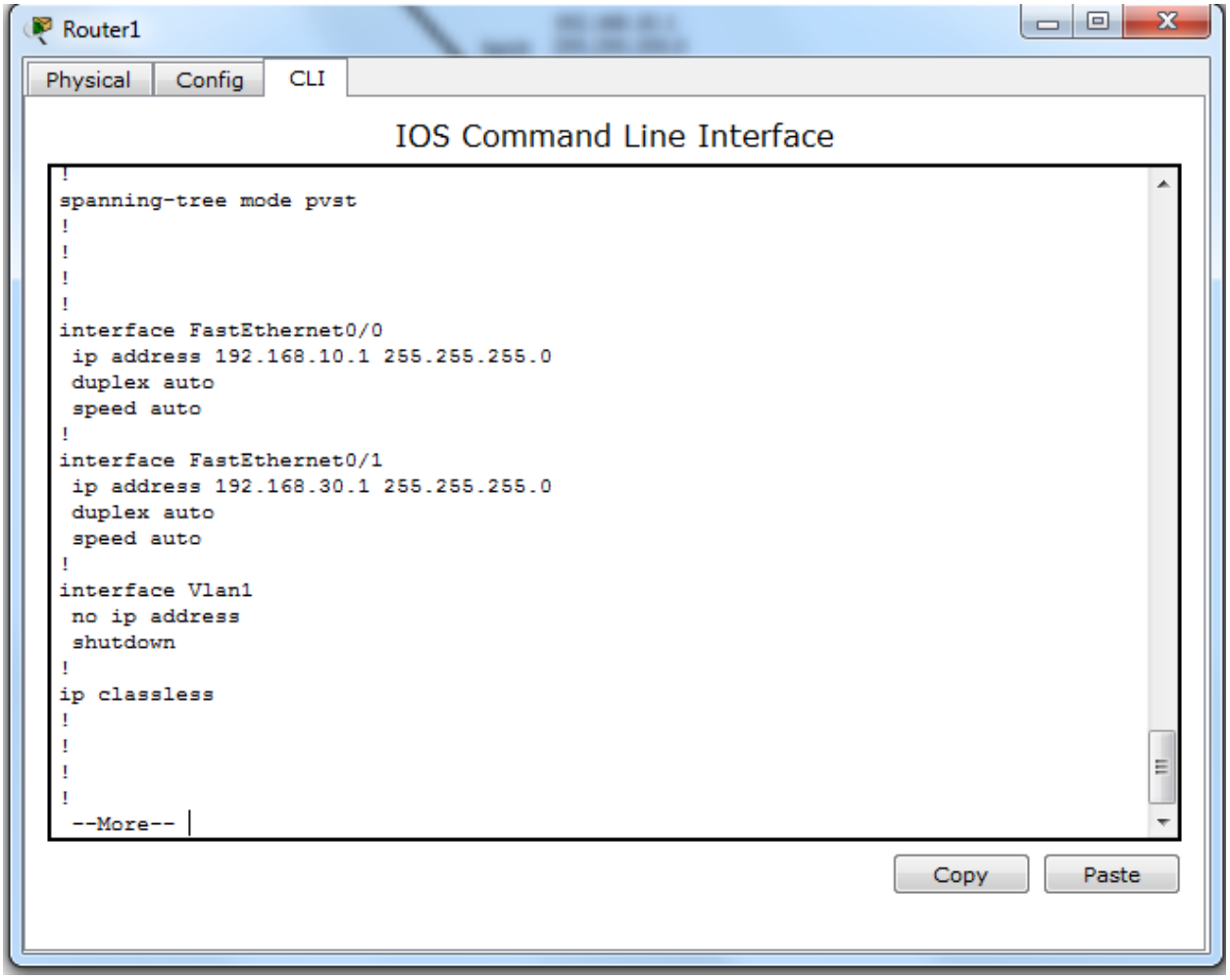

Figure 2

Based on the output answer the following questions:

I. Identify the error in the topology? *[3 marks]*

II. Suggest a solution to this error. *[3 marks]*

III. Without fixing this error, would a ping from PC3 to PC4 be successful? Explain your answer. *[6 marks]*

IV. Based on the subnet mask used on LAN1, how many **usable** host addresses are possible on this network? *[3 marks]*

V. How many **usable** host addresses are currently **unused**? *[3 marks]*

(18 Marks)

b) Routers make routing decisions based on information in their routing tables. What information is held in a routing table and how does this information get there?

(12 Marks)

Question 4 **[30 Marks]**

a) Tallaght Inc., has been allocated the following IP address:

192.21.16.0 / 24

Based on **Figure 3,** create a ***basic*** subnetting schema that will address the needs of this network. Subnet the network based on the **maximum number of hosts** required by the **largest subnet.**

Please recreate **Table 1** in your answer booklet and fill in your addressing scheme.

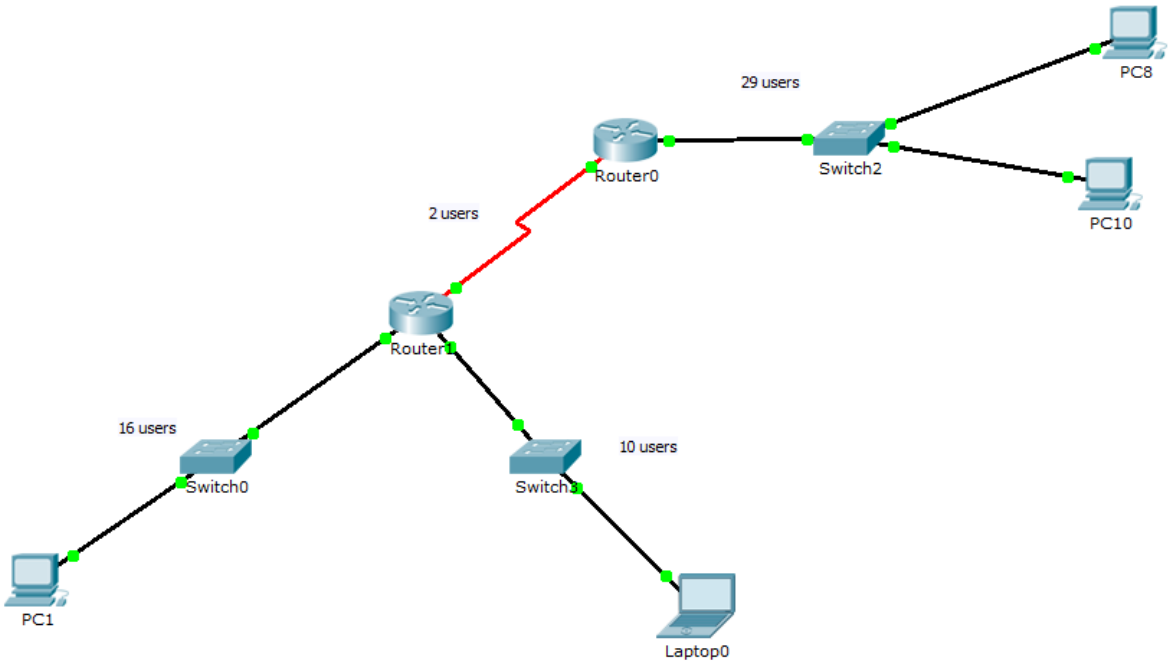

Figure 3

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

Table 1

(16 Marks)

b) The following commands have been applied to Switch0.

```
Switch0(config)#line vty 0 15
Switch(config-line)#password cisco
Switch(config-line)#login
```

I. What effect will these commands have on the behaviour of the Switch? *[3 marks]*

II. What other passwords would you recommend placing on a Switch? *[4 marks]*

III. What is the purpose of the 'message of the day' banner? *[3 marks]*

(10 Marks)

c) Discuss the '***startup-config'*** file.

(4 Marks)