MACHAKOS UNIVERSITY

University Examinations for 2022/2023 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

FOURTH YEAR ……….. SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (TELECOMMUNICATION AND INFORMATION TECHNOLOGY)

SPH 432: COMPUTERS AND COMMUNICATION

DATE: **TIME:**

INSTRUCTIONS *Answer question One and any other Two Questions*

QUESTION ONE(COMPULSORY) (30 MARKS)

a) You are given two address/mask combinations, written with the prefix/length notation, which have been assigned to two devices. Determine if these two devices are on the same subnet or different subnets. (*hint: You can use the address and mask of each device to determine which subnet each address belongs*)   (6 marks)

> DeviceA: 172.16.17.30/20
> DeviceB: 172.16.28.15/20

b) Explain two differences between circuit switching and packet switching.   (2 marks)

c) Given the Class C network of 192.168.5.0/24, subnet the network to create the network in Figure Q1.0 with the host requirements shown.   (4 marks)
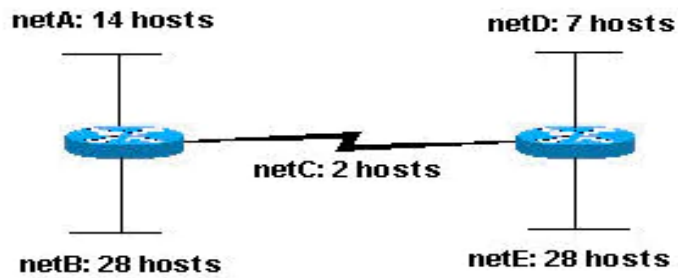
netA: 14 hosts   netD: 7 hosts

netC: 2 hosts

netB: 28 hosts   netE: 28 hosts

Figure Q1.0

d) Enumerate on the three available ISDN layer specifications. (3 marks)
e) The network topology shown in Figure Q1.2 was used to perform an initial switch configuration.

Performing an Initial Switch Configuration
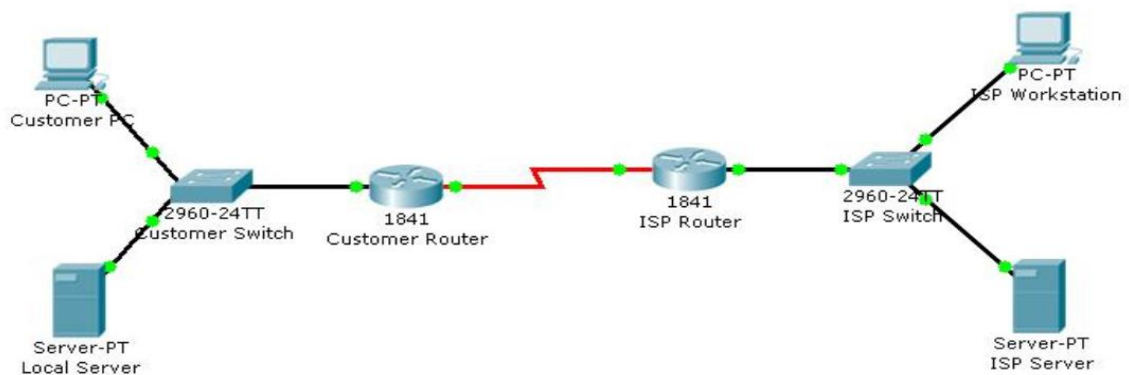
Topology Diagram

Figure Q1.2

From global configuration mode, the IP address 192.168.1.5 with the subnet mask of 255.255.255.0 was assigned in the interface mode for VLAN1 as follows:

```
CustomerSwitch(config)#interface vlan 1
CustomerSwitch(config-if)#ip address 192.168.1.5 255.255.255.0
CustomerSwitch(config-if)#no shutdown
CustomerSwitch(config-if)#exit
```

i) What is the significance of assigning the IP address to the VLAN1 interface instead of any of the Fast Ethernet interfaces? (3 marks)

ii) Write the commands that can set the host name on the switch to **CustomerSwitch**. (3 marks)

iii) What command is necessary to enforce password authentication on the console and vty lines given the following Console and vty password configuration commands? (4 marks)

Configure the console password.

a. From global configuration mode, switch to configuration mode to configure the console line.

CustomerSwitch(config)#**line console 0**

b. From line configuration mode, set the password to **cisco** and require the password to be entered at login.

> CustomerSwitch(config-line)#**password cisco**
> CustomerSwitch(config-line)#**login**
> CustomerSwitch(config-line)#**exit**

Configure the vty password.

a. From global configuration mode, switch to the configuration mode for the vty lines 0 through 15.

CustomerSwitch(config)#**line vty 0 15**

b. From line configuration mode, set the password to **cisco** and require the password to be entered at login.

> CustomerSwitch(config-line)#**password cisco**
> CustomerSwitch(config-line)#**login**
> CustomerSwitch(config-line)#**exit**

f) In the network diagram in Figure Q1.3, determine which path will packets take when traveling from host 192.168.50.126 to host 192.168.50.5.   (3 marks)
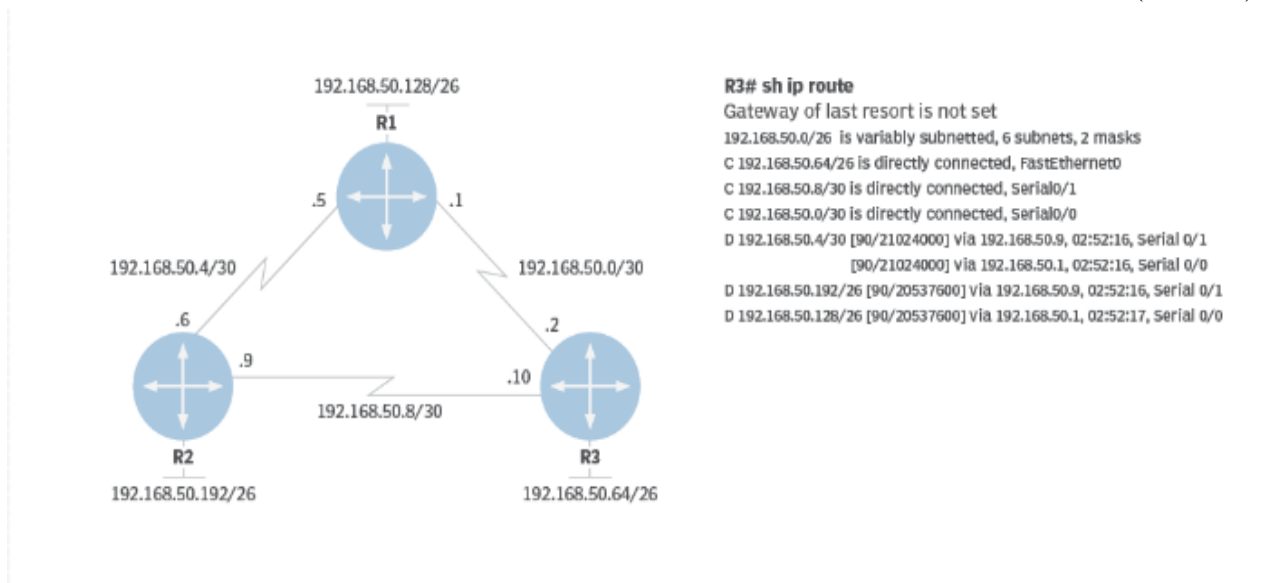


```
192.168.50.128/26

        R1
   .5        .1

192.168.50.4/30          192.168.50.0/30

   .6                         .2
        .9              .10
   192.168.50.8/30

  R2                      R3
192.168.50.192/26       192.168.50.64/26
```

R3# sh ip route
Gateway of last resort is not set
192.168.50.0/26 is variably subnetted, 6 subnets, 2 masks
C 192.168.50.64/26 is directly connected, FastEthernet0
C 192.168.50.8/30 is directly connected, Serial0/1
C 192.168.50.0/30 is directly connected, Serial0/0
D 192.168.50.4/30 [90/21024000] via 192.168.50.9, 02:52:16, Serial 0/1
        [90/21024000] via 192.168.50.1, 02:52:16, Serial 0/0
D 192.168.50.192/26 [90/20537600] via 192.168.50.9, 02:52:16, Serial 0/1
D 192.168.50.128/26 [90/20537600] via 192.168.50.1, 02:52:17, Serial 0/0

Figure Q1.3

g) List the two type of primary interfaces supported in ATM switches.   (2 marks)

QUESTION TWO (20 MARKS)

a) What does flow control mean in computer networks? With the aid of an appropriate diagram, describe how flow control of data is achieved in computer networks using the sliding window algorithm. (10 marks)

b) With the aid of appropriate diagrams, explain the layer-to-layer communication with reference to the OSI model. (10 marks)

QUESTION THREE (20 MARKS)

a) With the aid of appropriate diagrams, explain the four ISDN interfaces. (10 marks)

b) Discuss in details the two basic types of packet switching highlighting the advantages and disadvantages of each. (10 marks)

QUESTION FOUR (20 MARKS)

a) With the aid of a well labelled diagram, describe the X.25 protocol suite as used in computer communication. (10 marks)

b) What does congestion mean and how is congestion control achieved using the Leakey bucket algorithm in computer communication? (10 marks)

QUESTION FIVE (20 MARKS)

a) With the aid of a well labelled diagram, describe the ATM protocol suite as used in computer communication. (10 marks)

b) With the aid of a diagram, describe the basic SONET frame structure and show that the capacity of the STS-1 payload is 50.112 Mbps. (10 marks)