

University of Asia Pacific

Department of Computer Science and Engineering

Mid-Semester Examination Fall-2020

Program: BSc in Computer Science and Engineering

Course Title: Data Communication

Course No.: CSE 303

Credit: 3.00

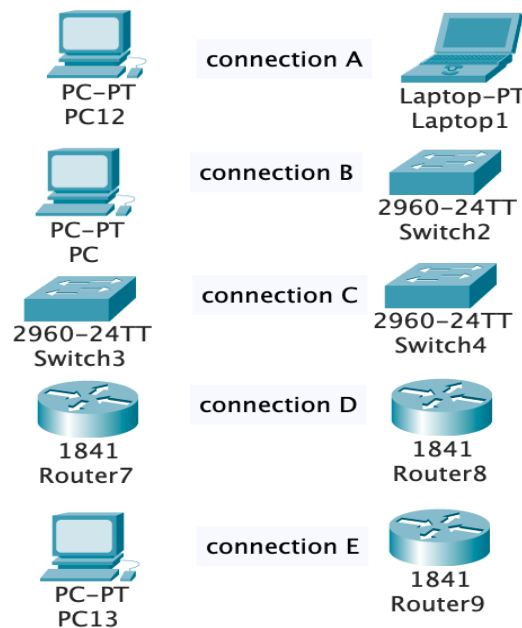
Time: 1.00 Hour.

Full Mark: 60

Instruction(s): Answer any three questions including 1 and 2.

1. a. Let's say you have several devices (PC, switch, router) to connect with a network to establish a successful data communication. [2+5+4]=11

- Explain the type of LAN technology you would use and why?
- Analyze the type of cable wiring you would consider for the following connections:



- If you want to connect an online, live video monitoring device (which will be placed far from main electricity power source) to the network, what would that device be and what changes you would need to bring in your cable wiring. Show the wiring diagram.
- b. Find the error, if any, in the following IPv4 addresses. You must support your answer with proper explanation. If there is an error, rewrite it correctly, you may use any valid number in the octet. If there is no error, justify whether it is a usable IP address or not. [1.5*6] = 9

- i) 111.056.45.78
- ii) 11100010.23.14.67
- iii) 0.0.0.0
- iv) 75.45.31.314
- v) 121.34.7.8.256
- vi) 255.255.255.255

2. a. Suppose you want to communicate with your friend, and you have a channel with 1000 bps bandwidth. You can choose either half-duplex data flow or full-duplex data flow for your communication. Which one will you choose? Evaluate the reason behind your choice. [8]
- b. Demonstrate the difference between bandwidth and throughput? Can throughput be greater than bandwidth? [6]
- c. “Like Data link layer, **Error control** and **Flow control** are also performed in Transport layer in end-to-end rather than one single link.” – explain this statement. [6]

3. An address in a block is given as 192.168.17.X.
Subnet mask is : 255.255.255.192
Here,

$X = (\text{last digit of Your ID})^2 \bmod 6$,
For example, if your ID is 14101102 then,
 $X = 2^2 \bmod 6 = 4 \bmod 6 = 4$
So your IP address would be 192.168.17.4

- i) Find the number of addresses in the block size, number of subnets, and valid IP addresses in each subnet. [6+14=20]
- ii) Fill in the following table according to your calculations found above:

	Subnet 1	Subnet 2	Subnet N
Network address			
First Valid IP			
Last valid IP			
Broadcast address			

Or,

4. a. Suppose you are a data communication engineer, just started your career in a reputed company. You have been assigned a task to setup a network topology. You have two rooms to setup with two different topologies. One room has X computers connected with one type of topology and the other room has Y computers connected with a different topology.

[3+1+

Here, X = Summation of all digits of your ID
 Y = Last digit of your ID +2

6+4]
= [14]

For example, if your ID is 14101102, Then,
 $X = 1+4+1+0+1+1+0+2 = 10$
 $Y = 2 + 2 = 4$

Now answer the following:

- i) List all the topologies you might use in the above-mentioned scenario.
 - ii) Name any two topologies which you will actually use here.
 - iii) Calculate how many links/cables you will need for each of the topologies (according to your answer in “ii”).
 - iv) If you were to choose between these two topologies (according to your answer in “ii”) considering security and future growth which one will you prefer and why?
- b. Suppose you work in a network department of a hospital (**odd student ID**) / bank (**even student ID**). Your network must be able to meet a certain number of criteria. **[3+3 = 6]**
- i) What are those criteria?
 - ii) If you draw a pyramid figure of those criteria according to your work place, how it would look like? (You must draw the figure with proper outlines)