**Hints for s212, TMA01 (AY\_2018)**

**Precautions:**

1. Don’t be late. If you are busy, **apply submission extension as soon as possible in OLE**. **I am authorized to approve extensions less than 7 days**. More than 7 but less than 21 days extension requires C.C.’s approval. More than 21 days extension requires top management’s approval & should be avoided.
2. Make sure that you submit final version of your answer. OLE does not allow re-submission for new version. Only OLE submission is accepted.
3. Name your answer file (\*.doc or \*.docx) in the format of YourName\_sYourSID\_tma01.doc (eg. Chan\_Tai\_Man\_s123456789\_tma01.doc)

**Question 1 (20 marks)**

**This question tests your understanding on OSI and TCP/IP model, networking infrastructure, network access technologies and TCP protocol.**

1. Please refer to P.29 of my Surgery 1 ppt. file (s212\_2018\_surgery\_1\_computer\_network\_introduction.ppt).
2. Think about:

* Which one is for Ethernet? Which one is for wireless?
* Their difference in handling transmission of data and collision? 處理collosion 有冇分別
* How does each respond when the transmission medium is idle?

Please refer to:

* + P.26 of study unit 2 and
  + P.18, 20 of my Surgery 2 ppt. file (s212\_2018\_Surgery\_2\_Network\_Infrastructure ”).

1. Think about:

* What devices are used in switched and shared Ethernet respectively?
* Effect of switched Ethernet on collision domain.
* Effect of collision domain on network performance.
* Which one allows full-duplex? Which one allows half-duplex only?

Please refer to:

* + P.23 and 25 of study unit 2 or
  + P.17, 18, 22, 23 of my Surgery 2 ppt. file (s212\_2018\_Surgery\_2\_Network\_Infrastructure ”).

1. Each subpart only worth 2 marks. Don’t be too lengthy for answer of each subpart.

For part (i), refer to this URL,

<https://www.geeksforgeeks.org/computer-network-multiplexing-demultiplexing-transport-layer/>

Don’t copy & paste. Use your own words.

For part (ii), refer to P.8 to 14 of my Surgery 4 ppt. file (s212\_2018\_surgery\_4\_TCPIP\_part2.ppt). You need to digest and write answer in your own word.

For part (iii), refer to

* P.15 to 20 of my Surgery 4 ppt. file (s212\_2018\_surgery\_4\_TCPIP\_part2.ppt).
* <https://www.inetdaemon.com/tutorials/internet/tcp/flow_control.shtml>

You need to digest and write answer in your own word.

千其唔好寫 長篇大論既野  
Data Multiplexing , 最高層 送野去番 低層 (many to one)。因為好多application send to ip layer等。passive to active tense   
input 有1個， output 有幾個。

**Question 2 (20 marks)**

This question lets you understand characteristics of LAN and WAN. It also test your understanding on characteristics and functions of different networking equipment for TCP/IP layer 1 to 3

1. Compare in terms of covered area, data transfer rate, connection technology and prevalent standards/protocols involved. Please refer to <http://www.diffen.com/difference/LAN_vs_WAN>Covered Area: within office in the same building . Cover different central / regional

Speed: Lan more fast, 快到幾多？ WAN 一般係幾多?

Technology: ethernet , atm/metro ethernet  
prevalent standards: iee802.3 / wan

1. Think about:
   * Which layer the device operates?
   * Can it overcome collision and broadcast problem? How?
   * How does it work?

Please refer to P.22 to 24 of my Surgery 2 ppt. file (s212\_2018\_Surgery\_2\_Network\_Infrastructure ”).  
  
**訓練分析能力，一定唔好copy & paste ....**

**Question 3 (20 marks)**

**This question tests your understanding on characteristics of MAC and IP address and understandings on TCP protocol.**

Q3(a) You can compare & contrast for these issues. Presentation in table form is welcome. Any THREE of followings are acceptable:  
  
Use Table Format

* + - * Size of address? 48byte
      * Which layer of networking model does the address belong to?  
        TCP/IP model
      * How is the address assigned and by whom?  
        MAC: Vendor assign   
        IP: network addministrator assign
      * Is the addressing scheme flat or hierarchical?  
        Netowrk class:   
        MAC: flat
      * Does the address have any logical significance?

Ip: logial address  
mac: physdical address

Q3(b)

For (A), (D) and (E) think about:

* Definition of acknowledge number: Refer to P.6 of my Surgery 4 ppt. file (s212\_2018\_surgery\_4\_TCPIP\_part2.ppt).
* Relationship between sequence number of a TCP segment, data size and acknowledge number of acknowledge segment of this TCP segment. Refer to the examples in P.9 to P.14 of my Surgery 4 ppt. file (s212\_2018\_surgery\_4\_TCPIP\_part2.ppt).

For (B), (F), think about:

* Relationship between destination port number of a packet and source port number of its replying packet.
* What is the port for https server?

For (C), think about:

* Relationship between source port number of a packet and destination port number of its replying packet.

**Q4 (20 marks)**

**This question guides you practical labs in Linux environment and tests your understanding on Linux/UNIX commands for networking. It also lets you know about DNS.**

Q4(a) Update for Table 1.2.1:

1. Replace "[labbook.no-ip.org](http://labbook.no-ip.org)" by 103.247.158.245
2. Replace [www.cs.berkeley.edu](http://www.cs.berkeley.edu) by [www.berkeley.edu](http://www.berkeley.edu).

A gift to you. Just follow the lab procedure.

* Table 1.2.1 lets you understand usage of “ping” command in discovering network environment.
* Step 4 lets you understand usage of “traceroute” command in discovering network routing path.
* Step 5 lets you understand usage of “host” command in mapping between DNS name and IP address.

Please refer to P.26 of my Tutorial 2 ppt. file (tutorial\_2\_Linux\_basics\_&\_Linux\_permission\_right\_&\_lab1\_2)

起碼搵番 10幅8幅圖 ，愈多愈好吧。

Q4(b)

Q1. Any 5 application protocols listed in the article. Both full name and acronym must be provided.  
  
簡稱 ＆ Full name

Q2. Just run “man ifconfig” and read the output. What is the command and options for doing so? You cannot try this command in any of OUHK servers as you are NOT administrator. However, you can try in your own Linux system with “root” account, if you have.  
  
要求 1句 command 同時 set 到 ip & subnet mask

Ifconfig ethX ip address netmask 255.255.255.0

Q3. Refer to <http://en.wikipedia.org/wiki/List_of_TCP_and_UDP_port_numbers>

Q4. Refer to

* <http://searchnetworking.techtarget.com/definition/Forward-DNS-lookup>
* <http://www.lookupserver.com/>

Q5. There are a number of sub-commands under nslookup. Try “man nslookup” and read the the output. Try the sub-command for this part.  
  
睇man page

Q6. Refer to <http://en.wikipedia.org/wiki/Root_nameserver#Root_server_addresses>. Providing any 5 root servers, with both IP address and name, is enough.  
  
要寫 mulityple ，寫5個好啦 ＝ ＝  
用 ip & Old name

**Question 5 (20 marks)**

**This question tests your understanding on components of networking design and how to apply & integrate.**

1. You only need to discuss for physical topology only.

You should provide reason for your choice. Think about:

* Scalability (easy)
* Single point of failure (NO)
* Installation (EASY)
* Ease of troubleshooting & management (EASY)
* ….

Ethernet. Star. 好處

1. You should provide reason for your choice. Think about:

* Transmission speed, (1GB)
* Cost, (CHEAP)
* Availability of equipments, （市面上多唔多 ethnet 既產品）
* Ease of maintenance and trouble-shooting. （易）
* ….

1. Network cable includes horizontal cable (線 去 lan swith) and vertical cable. (Backbound router to Backbound router) <---大流量 簡fiber 需要既 bandwidth 要快d  
   唔受noise 影響

Horizontal cable refers to the cable between PC and LAN switch/hub. It is usually within same floor of the building, which leads to the term “horizontal”.

Vertical cable refers to the cable between different floors of a building or even across building. It usually refers the backbone cable.

Think about:

* Determine if environment is noisy or not partly noisy. You can make your own assumption and included as part of the answer.
* Which one is more expensive – fibre, STP or UTP?   
  UTP cat 6 ，stp 再比較 安裝唔方便 又貴 office 環境 UTP已經足夠   
  價錢。。utp最平
* Relative speed relationship between vertical and horizontal cable is an issue.  
    
  easy to install

cheap

* What type of cable for horizontal? What type of cable for vertical?
* Transmission speed of cable.
* Easy maintenance of cable
* ….

1. There are many protocols available. Discuss your choice in following issues:

* Is it routable? Routable protocol allows transfer of data traffic between subnets or networks. Is there only one subnet within the company?
* Does the company need to communicate with networks of other companies or INTERNET?
* Will web server of your company be accessed by INTERNET users? What is the De fact protocol used in INTERNET?
* ….

TCP IP Layer suit . 有幾層 要有subnet 所以要 routable …

1. This is an open question. Try to think in this way:

* If your choice in part (b) is Ethernet, does Linux support driver for Ethernet NIC?
* What is the connector type of NIC supported by Linux? Does it match with your choice in part (c)?  
  支援 driver ...
* What type of protocol does Linux support? Does it support your choice in part (c)?
* Will the server directly connect to vertical cable?
* …..

Windows Server 轉曬做 linux ，以上會唔會改變？其實冇乜關係 ＝ ＝ 轉咪轉囉。。。

先講 有無change ， (a) part 有冇 change 既原因，(b) part 有冇change 既原因。

**---End of hint file---**