SULIT

UTM UNIVERSITI TEKNOLOGI MALAYSIA

SCHOOL OF COMPUTING
Faculty of Engineering

UNIVERSITI TEKNOLOGI MALAYSIA
FINAL EXAMINATION SEMESTER I, 2018 / 2019

SUBJECT CODE	:	**SCSR 1213**
SUBJECT NAME	:	**NETWORK COMMUNICATIONS**
SECTION	:	**ALL**
TIME	:	**2.30 PM – 5.30 PM**
DATE/DAY	:	**01 / 01 / 2019 (TUESDAY)**
VENUES	:	**DEWAN SULTAN ISKANDAR**

INSTRUCTIONS :

ANSWER **ALL** QUESTION IN THE ANSWER BOOKLET PROVIDED.

(Please Write Your Lecturer Name And Section In Your Answer Booklet)

Name	
I/C No.	
Year / Course	
Section	
Lecturer Name	

This question paper consists of **TEN (10)** printed pages excluding this page.

Part A [20 Marks]

1. Which of the following is FALSE about the data-plane?

   A. Queuing may occur at input buffer if datagrams arrive faster than forwarding rate inside switching fabric.

   B. Queuing delay and datagrams loss may occur due to output port buffer overflow inside switching fabric.

   C. Implement the distance vector algorithm inside switching fabric.

   D. Move the datagrams using local forwarding table inside a router.

2. The following are used in switching fabric technique for the input and output port processing in the router EXCEPT.

   A. Memory

   C. Crossbar

   B. Processor

   D. Bus

3. All the following statements are TRUE about Internet Control Message Protocol (ICMP), EXCEPT:

   A. ICMP is used by ping for echo request/reply.

   B. ICMP is used for error reporting.

   C. ICMP uses UDP at transport layer.

   D. ICMP is used for error correction.

4. Because of DHCP's ability to automate the network-related aspects of connecting a host into a network, it is often referred to as a _____ protocol.

   A. static

   C. automated

   B. pre-configured

   D. plug-and-play

5. To transmit a big audio file to a set of 10 different hosts in a network of 55 hosts, what type of transmission would be best fit?

A. Broadcast

C. Unicast

B. Multicast

D. Anycast

6. Which of the following routing protocol can be used to determine optimal paths for source-destination pairs that are located at the distant Autonomous System (AS)?

A. RIP

C. BGP

B. OSPF

D. EIGRP

7. What does a router use to fill its forwarding table to send packets to its destination?

A. Routing algorithm

B. Maximum Segment Size

C. Pipeline algorithm

D. Network Address Translation

8. Referring to the topology in Figure 1, how many subnets are there?

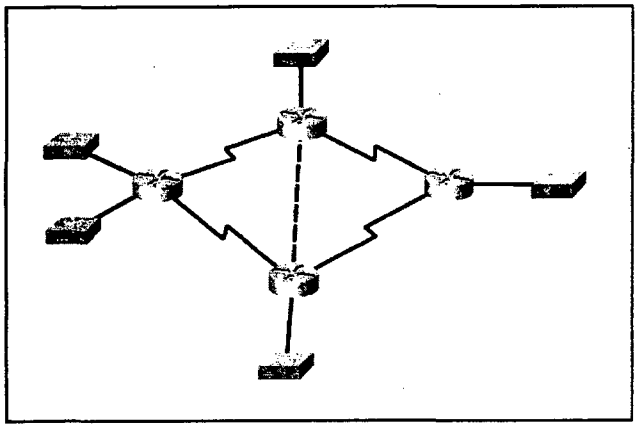

Figure 1

A. 4

C. 8

B. 9

D. 10

9. Virtual Local Area Networks (VLANs) provide a solution for the following problems EXCEPT.

A. Lack of traffic isolation

C. Managing users

B. Inefficient use of switches

D. Error recovery

10. Trunk port will carry datagram from _____.

A. multiple VLANs from single physical switch

B. multiple VLANs from multiple physical switches

C. multiple VLANs from selected port number

D. single VLAN from single physical switch

11. Which is broadcast MAC address

A. 255.255.255.255

C. FF-FF-FF-FF-FF-FF

B. 62-FE-F7-11-89-A3

D. FF-FF-FF-00-00-00

12. The ARP table also contains a ___value, which indicates when each mapping will be deleted from the table.

A. time-to-live

C. time-to-lost

B. time-to-remove

D. time-to-delete

13. Which address is used in frame headers in Link Layer to identify source and destination?

A. Routing address

C. MAC address

B. IP address

D. Port address

14. Channel Partitioning Protocols in multiple access links used TDM and FDM to partition a broadcast channel among nodes. Which of the following statement is FALSE :

A. TDM shares the broadcast channel in time

B. FDM divides channel into different frequencies

C. TDM assigns the same time slot for the different nodes

D. FDM using the different frequency for node A and node B.

15. What is the algorithm used by CSMA/CD to resolve the issue of which node will transmit packet after a collision happens?

A. Collision detection algorithm

B. Binary exponential backoff algorithm

C. Multiple access collision algorithm

D. Frame transmission turn algorithm

16. How polling protocol in taking-turn protocol works?

A. One node be the master node to poll each of the node to transmit frame in a round-robin fashion

B. One special frame is exchanged among the nodes to transmit frame in some fixed order.

C. Every node will take turn to transmit frame without the control of master node.

D. Polling each of the node to transmit frame in a random order so that no collision will happen

17. When a mobile host moves beyond the range of one base station and into the range of another, it will change its point of attachment into the larger network. This process referred to _____.

A. handoff

C. fading

B. multipath propagation

D. passive scanning

18. A base station will often be responsible for coordinating the transmission of multiple wireless hosts with which it is associated. Which of the following is an example of a base station?

A. Wireless host

C. Access points

B. Ad hoc network

D. Server

19. Some link rates in the wireless network can increase or decrease depending on following factor EXCEPT _____.

A. distance

B. channel conditions

C. number of users

D. memory

20. The 802.11b: 2.4GHz-2.485GHz spectrum is divided into _____ channels at different frequencies.

A. 9

B. 10

C. 11

D. 8

PART B [80 Marks]

Question 1 [3 Marks]

Supposed the link capacity for a router is 25 *Mbps* and RTT for a packet is 250 *msec*. If the TCP flow of packets is 9, calculate the buffering needed for the router.

Question 2 [4 Marks]

Buffering happens at input ports of a router. Describe how a Head-Of-the-Line blocking (HOL blocking) may occur inside an input-queued switching fabric.

Question 3 [5 Marks]

A 1600-byte datagram is sent into a link that has a Maximum Transmission Unit of 500 bytes. Suppose the original datagram is stamped with the identification number of 283. Using the header given in Figure 2 below, complete the table in your answer booklet with the correct values.

Fragment	Bytes	ID	Offset	Flag

Figure 2

Question 4 [13 Marks]

Ali, who works with the internet company *Tree-Co* uses a computer which has the IP address of 192.164.55.110/27.

(a) Calculate the network address and the broadcast address of the subnet that Ali's PC resides in. Show your workings clearly. [*3 marks*]

(b) List four (4) other addresses that can be used by Ali in this subnet? [*2 marks*]

(c) Ahmad, *Tree-Co's* IT Manager, has been asked to redesign the subnet for the company's network. The company is planning to use private address of the network 10.10.10.0/24. He is requested to divide this network address into 4 equal sized subnet. Please show your subnet calculation to achieve this, clearly highlighting the new subnetwork addresses. [*4 marks*]

(d) Ali then moved to a different company. He is now the Manager of a small start-up company called *HopScotch*. His office computer uses the IP address 10.0.0.1/24. Ali knows this is a private address, but he still can connect to the Internet. Ali is confused.

i. Explain clearly how Ali can connect to the Internet using a private IP address.[*3 marks*]

ii. Give 1 **reason** why *HopScotch* is using this method of addressing? [*1 mark*]

Question 5[13 Marks]

Consider the following network topology. Answer the following questions.

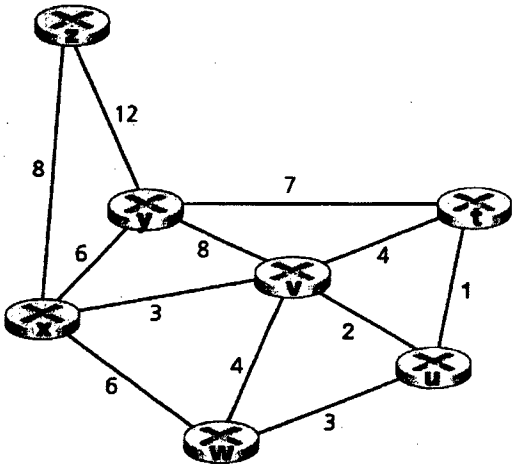

Figure 3

(a) Using the indicated link costs in Figure 3, use Dijkstra's shortest-path algorithm to compute the shortest path from *u* to all network nodes. Complete Table 1 with the correct values. [*6 marks*]

Table 1

Step	N'	*D(x), p(x)*	*D(t), p(t)*	*D(v), p(v)*	*D(w), p(w)*	*D(y), p(y)*	*D(z), p(z)*

(b) Produce a forwarding table for *u* by completing Table 2. [*3 marks*]

Table 2

Destination	Link	Least Cost

(c) Calculate the cost from u to z by using the Bellman-Ford algorithm. [*4 marks*]

Question 6 [10 Marks]

(a) Two dimensional parity scheme uses EVEN parity. For the following received data, identify the error bit. [*2 marks*]

Received data:

1111000	**0**
1010101	**0**
1101111	**1**
1010010	**1**

(b) Sender is sending the following data 100100. Using CRC technique with r = 3 and G = 1101, what is the value for R and data sent. [*4 marks*]

(c) Receiver received the following data 100000001. Using CRC technique with G = 1101, what is the value for CRC and will there be error detected at receiver? [*4 marks*]

Question 7 [12 Marks]

Describe the operation of CSMA/CD in random access protocol for broadcast channel and how the collision issue is handled.

Question 8 [10 Marks]

Please refer to Figure 4 and Table 3 to answer the following questions.

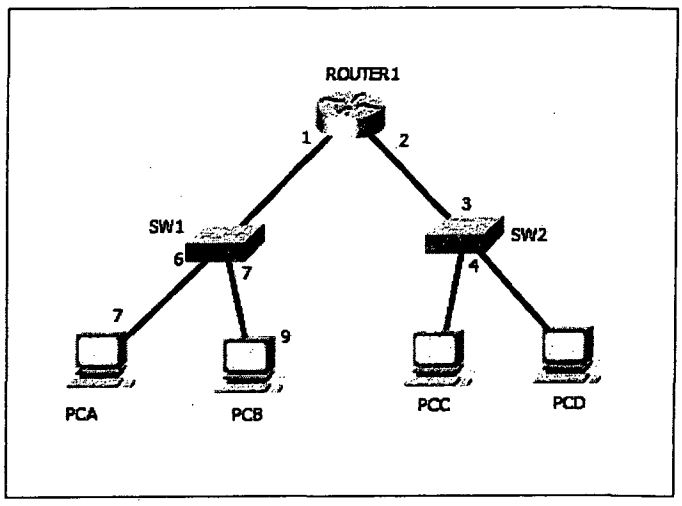

Figure 4

Table 3

Host Name	IP Address	MAC Address
PCA	192.168.1.111/24	01-12-23-34-45-56
PCB	192.168.1.115/24	31-13-33-33-45-56
PCC	192.169.55.222/24	62-FE-F7-11-89-A3
PCD	192.169.55.223/24	7C-BA-B2-B4-91-10
Router 1 (int 1)	192.168.1.1/24	6A-12-55-34-55-55
Router 1 (int 2)	192.168.55.1/24	9A-12-66-34-75-58

a. Describe the ARP process used by PCA when it needs to transmit a datagram to PCB.*Note: Do not need to explain routing process. [4 *Marks*]

b. Describe the ARP process used by PCA when it needs to transmit a datagram to PCC.*Note: Do not need to explain routing process. [4 *Marks*]

c. PCC needs to send datagrams to PCB and PCD. Complete the ARP table for PCC in Table 4. [2 *Marks*]

Table 4

MAC Address	IP Address

Question 9 [10 Marks]

(a) List four (4) steps on how host associate with an Access Point until the host get an IP address. [*4 Marks*]

(b) The problem of triangle routing exists for indirect routing of mobile user moves between networks. Explain the solution for this problem. [6 *Marks*]