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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(ONLINE)
SEMESTER II
SESSION 2019/2020**

COURSE NAME : NETWORK AND DATA
COMMUNICATION
COURSE CODE : BIT 20703
PROGRAMME CODE : BIT
EXAMINATION DATE : JULY 2020
DURATION : 2 HOURS 30 MINUTES
INSTRUCTION : 1. ANSWER ALL QUESTIONS.
2. PLEASE MAKE SURE TO
CLICK "SAVE ANSWER"
BUTTON FOR SUBJECTIVE
QUESTIONS. OBJECTIVE
QUESTIONS ARE SAVED
AUTOMATICALLY.

THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

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SECTION A

Instruction: Choose the **BEST** answer for each of the following questions.

- Q1** A web client is sending a request for a webpage to a web server. From the perspective of the client, what is the correct order of the protocol stack that is used to prepare the request for transmission?
- A. HTTP, IP, TCP, Ethernet
 - B. HTTP, TCP, IP, Ethernet
 - C. Ethernet, TCP, IP, HTTP.
 - D. Ethernet, IP, TCP, HTTP.
- Q2** What does a client do when it has User Datagram Protocol (UDP) to send packet?
- A. It just sends the datagrams.
 - B. It queries the server to see if it is ready to receive data.
 - C. It sends a simplified three-way handshake to the server
 - D. It sends to the server a segment with the SYN flag set to synchronize the conversation.
- Q3** Based on **Figure Q3**. What is the destination MAC address of the Ethernet frame as it leaves the web server if the destination is PC1?

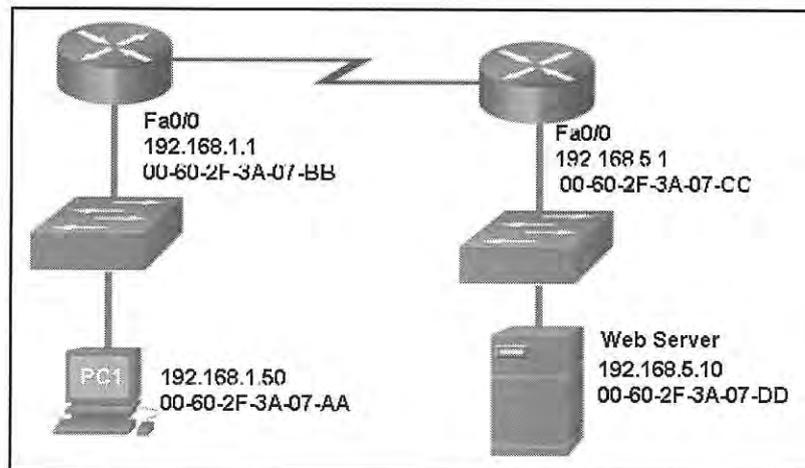


Figure Q3

- A. 00-60-2F-3A-07-AA
- B. 00-60-2F-3A-07-BB
- C. 00-60-2F-3A-07-CC
- D. 00-60-2F-3A-07-DD

Q4 If a network device has a mask of /28, how many Internet Protocol (IP) addresses are available for hosts on this network?

- A. 256
- B. 254
- C. 62
- D. 32
- E. 16

Q5 Based on **Figure Q5**. An administrator is trying to troubleshoot connectivity between PC1 and PC2 and uses the `TRACERT` command from PC1 to do it. Based on the displayed output, where should the administrator begin troubleshooting?

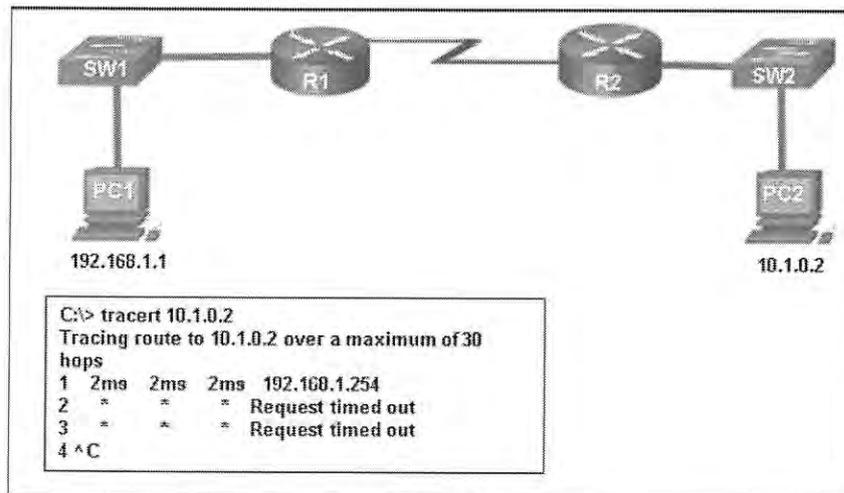


Figure Q5

- A. PC2.
 - B. R1.
 - C. SW2.
 - D. R2.
 - E. SW1.
- Q6** User executes a traceroute over IPv6. When would a router in the path to the destination device drop the packet?

- A. After the value of the Hop Limit field reaches 255.
- B. After the value of the Hop Limit field reaches zero.
- C. After the router receives an ICMP time exceeded message.
- D. After the target host responds with an ICMP echo reply message.

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- Q7** What is the prefix length notation for the subnet mask 255.255.255.224?
- A. /25
 - B. /26
 - C. /27
 - D. /28
- Q8** A host is transmitting a broadcast. Which host or hosts will receive it?
- A. All hosts in the same subnet.
 - B. A specially defined group of hosts
 - C. The closest neighbour on the same network.
 - D. All hosts on the Internet.
- Q9** Why is Network Address Translation (NAT) **NOT** needed in IPv6?
- A. Because IPv6 has integrated security, there is no need to hide the IPv6 addresses of internal networks.
 - B. Any host or user can get a public IPv6 network address because the number of available IPv6 addresses is extremely large.
 - C. The problems that are induced by NAT applications are solved because the IPv6 header improves packet handling by intermediate routers.
 - D. The end-to-end connectivity problems that are caused by NAT are solved because the number of routes increases with the number of nodes that are connected to the Internet.
- Q10** Which example of malicious code would be classified as a Trojan horse?
- A. Malware that was written to look like a video game.
 - B. Malware that requires manual user intervention to spread between systems.
 - C. Malware that attaches itself to a legitimate program and spreads to other programs when launched.
 - D. Malware that can automatically spread from one system to another by exploiting a vulnerability in the target.

(10 marks)

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SECTION B

Q11 (a) In a data link connection where Cyclic Redundancy Check (CRC) is used, an 8-bit information is given as 11110011. The generating function used in the CRC is $G(x) = x^4 + x^3 + 1$

(i) Calculate the CRC code (1 mark)

(ii) Write the transmitted message, $T(x)$ polynomial corresponding to the bit string that will be sent. (2 marks)

(iii) How does the receiver know that there is no error in the received message? Show your answer. (8 marks)

(b) The data block of six information bits and four control bits sent by computer A has arrived at the computer B with one information bit changed in transmission. The bit stream consisting of the data block and the control bits received by computer B is as follows:

I_1	I_2	I_3	I_4	I_5	I_6	C_1	C_2	C_3	C_4
1	1	0	1	1	1	0	0	1	1

Assume that both the source machine and the destination machine use the following functions to calculate the control bits:

$$C_1 = I_1 \text{ XOR } I_2 \text{ XOR } I_3; C_2 = I_1 \text{ XOR } I_4 \text{ XOR } I_5; C_3 = I_2 \text{ XOR } I_4 \text{ XOR } I_6;$$

$$C_4 = I_3 \text{ XOR } I_5 \text{ XOR } I_6$$

Which information bit is changed in transmission by assuming that control bits are not destroyed and only information bit is changed? Show your work. (9 marks)

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Q12 Given the following scenario:

National Network Sdn Bhd has hired you to advice on their new high speed enterprise network. After interviewing its IT Head, Dr. Mah Yi Din, the following information has been determined:

Headquarters: Kuala Lumpur

No	Department	Number of network node required
1	Deployment Access	153
2	Deployment, Tulla	121
3	R&D Department	50
4	Strategic Planning	13

Southern Branch: Johor Bahru

No	Department	Number of network node required
1	Sales	123
2	Executives	9
3	Product Development	22

3 legal IPs have been purchased from Jaring – 190.1.1.0, 190.1.2.0, 190.1.3.0 each with default subnet mask 255.255.255.0. Besides that, they also have decided to provide email service to their staff, a web site to promote their company and also a streaming server. All nodes will be accessing the Internet using these legal IP, no internal IP addressing is allowed.

- (a) Sketch a network diagram for National Networks Sdn Bhd. (2 marks)
- (b) Produce a table that tabulates all the subnets. Consider the following information to be included in your table:
- (i) Given IP
 - (ii) Subnet Address
 - (iii) Subnet Mask
 - (iv) Number of Host Supported
 - (v) Number of Host Needed
 - (vi) Address Range
 - (vii) Broadcast Address
 - (viii) Gateway Address
 - (ix) Assigned to which department

(10 marks)

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- (c) Using your table in **Q12(b)**, generate address configurations for the following devices:
- (i) All routers. (4 marks)
 - (ii) All servers (6 marks)
- (d) Using IOS Commands, write configuration commands you should perform at the following network devices:
- (i) All routers. (6 marks)
 - (ii) One switch (choose any). (2 marks)

- END OF QUESTIONS -

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