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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022**

COURSE NAME : NETWORKS AND DATA COMMUNICATION
COURSE CODE : BIT 20703
PROGRAMME CODE : BIT
EXAMINATION DATE : JULY 2022
DURATION : 3 HOURS
INSTRUCTION : 1. ANSWER **ALL** QUESTIONS.
2. THIS FINAL EXAMINATION IS AN **ONLINE** ASSESSMENT AND CONDUCTED VIA **CLOSED BOOK**.
3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA **CLOSED BOOK**.

THIS QUESTION PAPER CONSISTS OF **NINE (9)** PAGES

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

- Q1** Which one is **NOT** a valid subnet mask?
- A. 255.255.255.252
 - B. 255.255.224.0
 - C. 255.240.0.0
 - D. 254.0.0.0
 - E. All of the above.
- Q2** What is the default subnet mask for host 20.20.20.20?
- A. 255.0.0.0
 - B. 255.255.255.0
 - C. 0.255.255.255
 - D. 20.255.255.255
 - E. None of the above.
- Q3** Which of the following is a device or function whose most notable feature is to encrypt packets before they pass through the Internet?
- A. Virtual Private Network (VPN).
 - B. Firewall.
 - C. Intrusion Detection System (IDS).
 - D. Network Access Control (NAC).
 - E. Router.
- Q4** In the URL `http://www.insaf.com/xhensemxejb.html`, which part identifies the web server?
- A. `http`
 - B. `www.insaf.com`
 - C. `insaf.com`
 - D. `http://www.insaf.com`
 - E. The file `xhensemxejb.html` includes the hostname.

Q5 Which network topology is suitable for a network backbone?

- A. Star.
- B. Bus.
- C. Ring.
- D. Mesh.
- E. Hybrid.

Q6 Which term shows Gigabit Ethernet over Unshielded Twisted Pair?

- A. 1000BaseSX.
- B. 1000BaseCX.
- C. 1000BaseT.
- D. 1000BaseF.
- E. None of the above.

Q7 Which organization is responsible for the 802.5 standard?

- A. The International Standards Organization (ISO).
- B. The International Telecommunications Union (ITU).
- C. The Institute of Electrical and Electronics Engineers (IEEE).
- D. American National Standardization Institute (ANSI).
- E. None of the above.

Q8 Which of the following **THREE** (3) are used to measure network performance?

- A. Bandwidth.
- B. Throughput.
- C. Line Speed.
- D. Goodput.
- E. Acceleration.

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- Q9** Which of the following is **NOT** a network architecture?
- A. Open System Interconnection.
 - B. TCP/IP.
 - C. AppleTalk.
 - D. Ethernet.
 - E. Novell Netware.
- Q10** What is the use of a `tracert` command?
- A. To view the delay time.
 - B. To test if the device on the network is reachable.
 - C. To view router hops.
 - D. To test network connectivity.
 - E. All of the above.
- Q11** Which of the following protocols are examples of TCP/IP application layer protocols? (Choose **TWO (2)** answers)
- A. TCP
 - B. HTTP
 - C. IP
 - D. UDP
 - E. SMTP
- Q12** The process of a web server adding a TCP header to the contents of a web page, followed by adding an IP header, and then adding a data link header and trailer is an example of _____.
- A. data encapsulation
 - B. same-layer interaction
 - C. OSI model
 - D. packaging
 - E. frame preparation

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- Q13** Which of the following is **TRUE** if you are running half-duplex Internet?
- A. Your digital signal cannot transmit and receive data at the same time.
 - B. Hosts use the CSMA/CD to prevent collisions.
 - C. The physical connection consists of one wire pair.
 - D. All of the above.
 - E. None of the above.
- Q14** Which of the following terms is **NOT** a valid term for the names of the four TCP/IP layers?
- A. Application.
 - B. Data link.
 - C. Network Interface.
 - D. Transport.
 - E. Internet.
- Q15** Which of the following are **TRUE** about Ethernet crossover cables? (Choose **TWO (2)** answers)
- A. Pins 1 and 2 are reversed on the other end of the cable.
 - B. Pins 1 and 2 on one end of the cable connect to pins 3 and 6 on the other end of the cable.
 - C. Pins 1 and 2 on one end of the cable connect to pins 3 and 4 on the other end of the cable.
 - D. The cable can be up to 100 meters long to cross over between buildings.
 - E. None of the other answers is correct.
- Q16** Which of the following are **TRUE** about the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) algorithm? (Choose **THREE (3)** answers)
- A. The algorithm never allows collisions to occur.
 - B. Collisions can happen, but the algorithm defines how the computers should notice a collision and how to recover.
 - C. The algorithm works with only two devices on the same Ethernet.
 - D. Frames are passed in the one-way direction of a closed loop.
 - E. The logical topology is ring.

A red rectangular stamp with the word "TERBUKA" written in capital letters inside.

Q17 An issue of duplicate IP addresses has been detected on your organization's network. What should the next step be according to the standard troubleshooting model?

- A. Test and observe an action plan.
- B. Determine if anything has changed.
- C. Implement an action plan.
- D. Report the issue to the management.
- E. Document the solution and the entire process.

Q18 When is most likely to see a request-timed-out message?

- A. When an unknown error has occurred.
- B. When the `arp -a` command is used incorrectly.
- C. When a known error has occurred.
- D. When using a hybrid routing protocol.
- E. None of the above.

Q19 Which of the following is a valid Class C IP address that can be assigned to a host?

- A. 255.255.255.0
- B. 190.1.1.1
- C. 128.128.128.128
- D. 224.1.1.1
- E. 198.200.1.1

Q20 Why do most house and organization networks choose to use switch rather than the hub?

- A. Each switch port has its own collision domain.
- B. Switch is cheaper than the hub.
- C. There were too many broadcast domains, and a switch breaks up broadcast domains by default.
- D. The hub keeps repeating signals but quit recognizing frames and data structure.
- E. All of the above.

(40 marks)

SECTION B

- Q21** (a) Given the number of redundancy bits (r), $2^r \geq m + r + 1$, where m is the number of data bit, r is the number of redundancy bits and the bit stream is 1010.
- (i) Calculate the value for r . (2 marks)
 - (ii) Determine the position of all the redundancy bits. (3 marks)
 - (iii) Calculate the values of these redundancy bits. (3 marks)
 - (iv) What is the final Hamming Code? (2 marks)
- (b) Compare how the collision of frames is resolved in CSMA/CD and Token Passing media access controls using suitable diagrams. (6 marks)
- Q22** (a) You receive a task to create a new subnet with two servers. This subnet will be connected to an existing router. The new subnet has been allocated with network address 192.168.20.24/29. The router needs to be assigned with the first usable address and the servers with the last two available host addresses in the subnet.
- (i) What are the servers' IP addresses and subnet masks? (4 marks)
 - (ii) What is the default gateway address of the server? (2 marks)

(b) Consider the following scenario and **Figure Q22(b)**:

RouterA has an IP address of 192.168.10.65/26 and RouterB has an IP address of 192.168.30.33/28. The routers have been assigned with the first usable address.

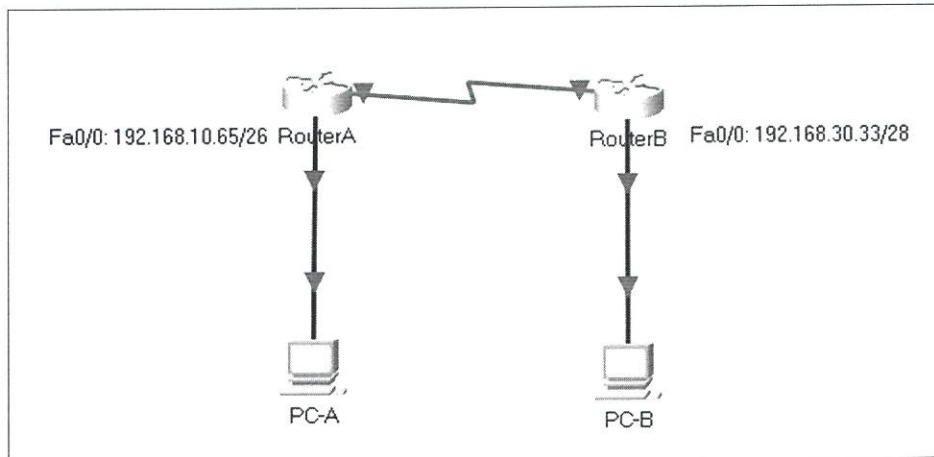


Figure Q22(b)

Find out the following configurations.

- (i) PC-A IP address (range of possible IP) (2 marks)
 - (ii) PC-A subnet mask (2 marks)
 - (iii) PC-A default gateway (2 marks)
 - (iv) PC-B IP address (range of possible IP) (2 marks)
 - (v) PC-B subnet mask (2 marks)
 - (vi) PC-B default gateway (2 marks)
- (c) Write configuration commands you should perform at RouterA and RouterB using **IOS Commands**. (8 marks)



- (d) Given the network address of 172.16.0.0/19. How many subnets and hosts it can provide?

(4 marks)

Q23 Kayaraya Sdn Bhd is a small software house company based in Kuala Kangsar, Perak. Its office accommodates 50 employees made of four departments which are personnel, finance, marketing, and programmers. The Kayaraya Sdn Bhd network architecture consists of switch(es), Cisco Adaptive Security Appliance (ASA) that act as a firewall, a router and several servers that are web, FTP and email server.

- (a) Sketch and label network diagram for Kayaraya Sdn Bhd with Demilitarized Zone (DMZ) accordingly.

(5 marks)

- (b) Suggest **TWO (2)** approaches to mitigate network attacks to Kayaraya Sdn Bhd network.

(4 marks)

Q24 Consider the following scenarios and find out the answer:

- (a) A server has received a packet from your remote host. Determine the source hardware address of the frame.

(2 marks)

- (b) You are trying to reach a server on another subnet. What will be the destination hardware address of a frame sent from your host?

(2 marks)

- (c) You are connected to a server on the Internet. You receive a time-out message when you click on a link on the server. Identify layer that could be the cause of this message.

(1 mark)

- END OF QUESTIONS -

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