UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015

COURSE NAME	:	COMPUTER NETWORKS
COURSE CODE	:	BEC41003
PROGRAMME	:	BACHELOR OF ELECTRONIC ENGINEERING WITH HONOURS
EXAMINATION DATE	:	JUNE 2015 / JULY 2015
DURATION	:	3 HOURS
INSTRUCTIONS	:	1. ANSWER **ALL** QUESTIONS IN **SECTION A** AND **SECTION B.** 2. ANY ANSWER WRITTEN IN PENCIL WILL **NOT BE EVALUATED.** 3. STUDENT ARE **NOT ALLOWED** TO BRING OUT THE QUESTION PAPER.

THIS QUESTION PAPER CONSISTS OF **ELEVEN (11)** PAGES

SECTION A (40 MARKS)

INSTRUCTION: Answer ALL questions. Circle ONE answer ONLY.

Q1 Which of the following layer is not in OSI layer?
(a) Physical layer
(b) Internet layer
(c) Network layer
(d) Transport Layer

(1 marks)

Q2 In virtual circuit network each packet contains
(a) full source and destination address
(b) a short VC number
(c) both (a) and (b)
(d) none of the above

(1 marks)

Q3 The 4 bytes IP address consists of
(a) network address
(b) host address
(c) both (a) and (b)
(d) none of the above

(1 marks)

Q4 ICMP is primarily used for
(a) error and diagnostic functions
(b) addressing
(c) forwarding
(d) none of the above

(1 marks)

Q5 Website uses this Application layer protocol
(a) SMTP
(b) HTTP
(c) FTP
(d) SIP

(1 marks)

Q6 Application layer protocol defines
(a) types of messages exchanged
(b) message format, syntax and semantics
(c) rules for when and how processes send and respond to messages
(d) all of the above

(1 marks)

Q7 Which layer links the network support layers and user support layers
(a) session layer
(b) data link layer
(c) transport layer
(d) network layer

(1 marks)

Q8 Which address is used in an internet employing the TCP/IP protocols?
(a) physical address and logical address
(b) port address
(c) specific address
(d) all of the above

(1 marks)

Q9 User datagram protocol is called connectionless because
(a) all UDP packets are treated independently by transport layer
(b) it sends data as a stream of related packets
(c) both (a) and (b)
(d) none of the above

(1 marks)

Q10 Which layer provides the services to user?
(a) application layer
(b) session layer
(c) presentation layer
(d) none of the above

(1 marks)

Q11 Which layer do the data link layer takes the packets from and encapsulates them into frames for transmission.
(a) network layer
(b) physical layer
(c) transport layer
(d) application layer

(1 marks)

Q12 Which one of the following task is not done by data link layer?
(a) framing
(b) error control
(c) flow control
(d) channel coding

(1 marks)

Q13 Which sublayer of the data link layer performs data link functions that depend upon the type of medium?
(a) logical link control sublayer
(b) media access control sublayer
(c) network interface control sublayer
(d) none of the above

(1 marks)

Q14 Automatic repeat request error management mechanism is provided by
(a) logical link control sublayer
(b) media access control sublayer
(c) network interface control sublayer
(d) none of the above

(1 marks)

Q15 Which one of the following is a data link protocol?
(a) ethernet
(b) point to point protocol
(c) HDLC
(d) all of the above

(1 marks)

Q16 What is the access point (AP) in wireless LAN?
(a) device that allows wireless devices to connect to a wired network
(b) wireless devices itself
(c) both (a) and (b)
(d) none of the above

((1 marks)

Q17 Which multiple access technique is used by IEEE 802.11 standard for wireless LAN?
(a) CDMA
(b) CSMA/CA
(c) ALOHA
(d) none of the above

(1 marks)

Q18 A wireless network interface controller can work in
(a) infrastructure mode
(b) ad-hoc mode
c) both (a) and (b)
d) none of the above

(1 marks)

Q19 IPSec is designed to provide the security at the
(a) transport layer
(b) network layer
(c) application layer
(d) session layer

(1 marks)

Q20 The underlying Transport layer protocol used by SMTP is
(a) TCP
(b) UDP
(c) Either a or b
(d) None of the above

(1 marks)

SECTION B (100 MARKS)

INSTRUCTION: Answer ALL questions. Any answer written in pencil will not be evaluated.

Q21 Suppose two hosts, A and B, are separated by 20,000 kilometers and are connected by a direct link of R = 2 Mbps. Suppose the propagation speed over the link is 2.5 X 108 meters/sec.

(a) Calculate the bandwidth-delay product, R . dprop.

(3 marks)

(b) Consider sending a file of 800,000 bits from Host A to Host B. Suppose the file is sent continuously as one large message. Produce the maximum number of bits that will be in the link at any given time?

(3 marks)

(c) Calculate total delay does it take to send the file, assuming it is sent continuously

(4 marks)

(d) Derive a general expression for the width of a bit in terms of the propagation speed s, the transmission rate R, and the length of the link m.

(2 marks)

(e) Suppose the value of R can be modify. Calculate new value of R to produce the width of a bit as long as the length of link.

(5 marks)

(f) Now, consider the value for R = 1 Gbps, calculate the new value for bandwidth-delay product, R . dprop.

(3 marks)

Q22 (a) **Figure Q2(a)** shows two clients communicate with the same Web Server application.

i. Determine the source and destination port values in the segments flowing from the server back to the clients' processes.

(9 marks)

ii. Determine the source and destination IP addresses in the network-layer datagrams carrying the transport-layer segments?

(6 marks)

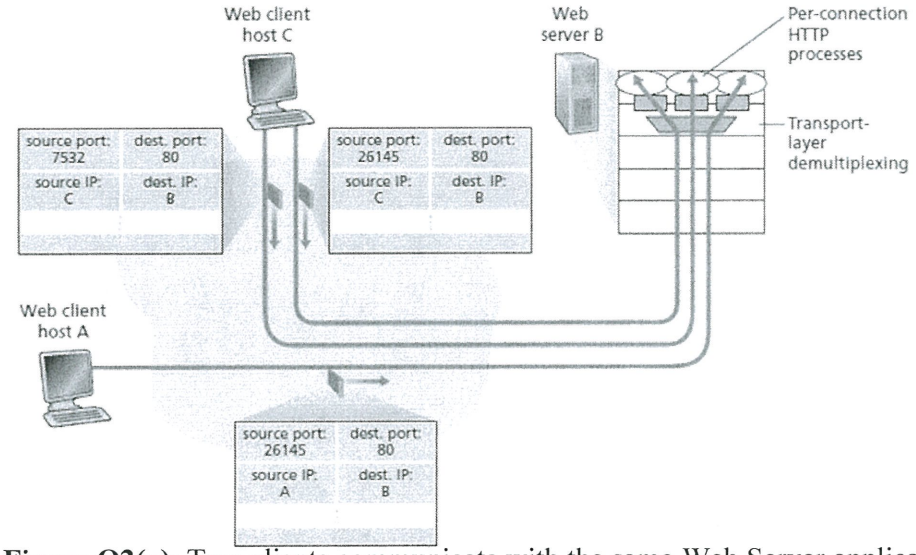

Figure Q2(a): Two clients communicate with the same Web Server application

(b) Explain why an application developer might choose to run an application over UDP rather than TCP.

(5 marks)

Q23 **Figure Q3** shows the network use Dijkstra's shortest path algorithm. By using appropriate table shows your work to do the following tasks;

i. Compute the shortest path from *t* to all network nodes.

(10 marks)

ii. Compute the shortest path from *u* to all network nodes.

(10 marks)

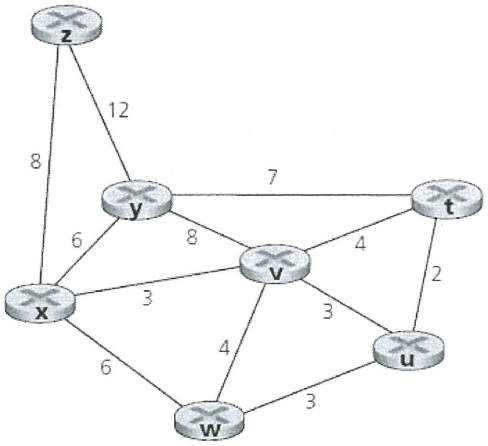

Figure Q3: Network use Dijkstra's shortest-path algorithm

Q24 Analyse **Figure Q4**. Now we replace the router between subnets 1 and 2 with a switch S1, and label the router between subnets 2 and 3 as R1.

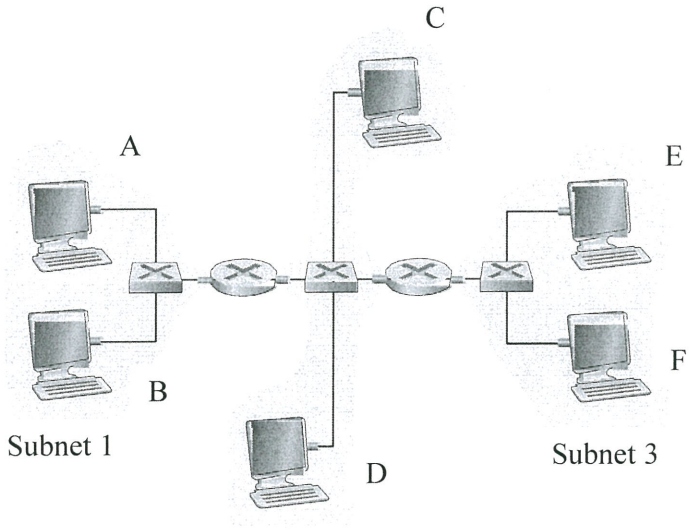

Figure Q4 : Three subnets, interconnected by routers

(a) Consider sending an IP datagram from Host E to Host F in **Figure Q4** .

(i) Will Host E ask router R1 to help forward the datagram?

(1 marks)

(ii) Give the reason for your answer in (a)(i) ?

(4 marks)

(iii) In the Ethernet frame containing the IP datagram, what are the source and destination IP and MAC addresses?

(6 marks)

(b) Suppose E would like to send an IP datagram to B in **Figure Q4**, and assume that E's ARP cache does not contain B's MAC address.

(i) Will Host E ask router R1 to help forward the datagram? Explain your answer.

(3 marks)

(ii) In the Ethernet frame that containing the IP datagram destined to B that is delivered to router R1, what are the source and destination IP and MAC addresses?

(6 marks)

Q25 (a) (i) What is the difference between a permanent address and a care-of address?

(4 marks)

(ii) Who assigns a care-of address?

(3 marks)

(b) What are three approaches that can be taken to avoid having a single wireless link degrade the performance of an end-to-end transport-layer TCP connection?

(6 marks)

(c) (i) If a node has a wireless connection to the Internet, does that node have to be mobile? Justify your answer.

(3 marks)

(ii) Suppose that a user with a laptop walks around her house with her laptop, and always accesses the Internet through the same access point. Is this user mobile from a network standpoint?

(4 marks)

Q26 (a) What is meant by an "SNMP engine"?

(6 marks)

(b) Consider an 8-block cipher. How many possible input blocks does this cipher have? How many possible mappings are there? If we view each mapping as a key, then how many possible keys does this cipher have?

(6 marks)

(c) Suppose N people want to communicate with each of $N - 1$ other people using symmetric key encryption. All communication between any two people, i and j, is visible to all other people in this group of N, and no other person in this group should be able to decode their communication. Now suppose that public key encryption is used. How many keys are required in this case?

(i) How many keys are required in the system as a whole?

(4 marks)

(ii) Now suppose that public key encryption is used. How many keys are required in this case?

(4 marks)

- END OF QUESTIONS -