UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Faculty of
Computing

R E S E A R C H   U N I V E R S I T Y

TEST 1
SEMESTER II, 2014/2015

SUBJECT CODE	:	SCSR1213	

Question:	Mark:
1	
2	
3	
4	
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6	
7	
8	
9	
10	
11	
12	
Total	

SUBJECT : NETWORK COMMUNICATION

YEAR / COURSE : SCSI/J/R/V/D/B

TIME : 1 HOURS 15 MINUTES

DATE : 27 MARCH 2015

PLACE : N24-DK7

INSTRUCTIONS:

1) Answer **ALL** questions in **SECTION A** in the answer sheet provided on **page 4**.
2) Answer **ALL** questions in **SECTION B** in the question booklet.

(Please fill in your particulars)

Name	
I/C No.	
Years / Course	
Section	
Lecturers Name	

This questions paper consists of (13) printed pages, including this page.

SECTION A

MULTIPLE CHOICE QUESTIONS (15 MARKS)

1) Which of the following devices is an example of end-system in a network?
   A) Wireless Notebook.   C) Router.
   B) Cell phone tower.   D) Base station.

2) Twisted-pairs, coaxial cable, fiber optic, microwave and satellite are category of
   _____
   A) bandwidth.   C) unguided media.
   B) access networks.   D) physical media.

3) Choose the **TRUE** statement describing the network structures.
   A) The network edge consist of end systems and all networking devices.
   B) The access networks could be either wired or unguided media.
   C) The network core interconnect mobile devices to allow more networks connected.
   D) All of the above.

4) In DSL (Digital Subscriber Line), the different bandwidth for upstream and downstream
   are _____ access.
   A) symmetric   C) distributed
   B) parallel   D) asymmetric

5) What are the important keys of network-core function?
   A) Routing and forwarding.   C) Bandwidth and buffer.
   B) Switching and inwarding.   D) Packet and switching.

6) OSI reference model has _____ layers, while TCP/IP model has _____ layers.
   A) 3, 7   C) 7, 5
   B) 5, 7   D) 7, 7

7) Which layers in the Internet protocol stack does a router process?

   A) Network, Link and Physical.

   B) Transport, Network and Link.

   C) Application, Transport and Network.

   D) Application, Transport, Network, Link and Physical.

8) Pair the **CORRECT** PDU (Protocol Data Unit) with its layer in encapsulation process.

   A) Message, Application.   C) Frame, Network.

   B) Datagram, Transport.   D) Segment, Link.

9) Sending packet with false source address is called _____.

   A) sniffing   C) denial of service

   B) IP spoofing   D) malware

10) What **BEST** describes Denial of Service (DoS) attack?

   A) Bad guys sniff packets.

   B) Bad guys attack server and network infrastructure.

   C) Bad guys change the email password.

   D) Bad guys use fake phone numbers.

11) Two basic underlying application architectures used in modern network applications

   are_____.

   A) Client-Server and Port-to-Port

   B) Socket and Port-to-Port

   C) Client-Server and Peer-to-Peer

   D) Peer-to-Peer and TCP/IP

12) Which of these is the **CORRECT** addressing process used by sockets to communicate?

    A) IP Address: MAC Address.

    B) Port number: MAC address.

    C) Source Port number: Destination Port number.

    D) IP Address: port number.

13) Because the HTTP server sends requested files to clients without storing any information about the client past requests, HTTP is known as a _____ protocol.

    A) careless   C) stateless

    B) persistent   D) efficient

14) The initial communication between the browser and the Web server involves a a process of exchanging messages called a _____.

    A) round-trip   C) keep-alive

    B) Three-way handshake   D) cookies

15) Which of these is **NOT** the reason why HTTP uses cookies?

    A) To identify users of the Web site.

    B) To get user info for malicious use.

    C) To serve content as a function to specific users.

    D) To restrict user access.

ANSWER SHEET FOR SECTION A

NAME :			
MATRIC NO.:		**SECTION :**	

MARKS

Example: =A=   ⬤   =C=   =D=

1)   =A=   =B=   =C=   =D=

2)   =A=   =B=   =C=   =D=

3)   =A=   =B=   =C=   =D=

4)   =A=   =B=   =C=   =D=

5)   =A=   =B=   =C=   =D=

6)   =A=   =B=   =C=   =D=

7)   =A=   =B=   =C=   =D=

8)   =A=   =B=   =C=   =D=

9)   =A=   =B=   =C=   =D=

10)   =A=   =B=   =C=   =D=

11)   =A=   =B=   =C=   =D=

12)   =A=   =B=   =C=   =D=

13)   =A=   =B=   =C=   =D=

14)   =A=   =B=   =C=   =D=

15)   =A=   =B=   =C=   =D=

SECTION B

STRUCTURED QUESTIONS (45 MARKS)

QUESTION 1 (5 Marks)

Figure 1 illustrates some pieces of the Internet connection. Some components are labeled with W1, W2, W3, W4, X1, X2, X3, X4, Y1, Y2, Y3 and Y4. Answer the following questions based on the Figure 1.
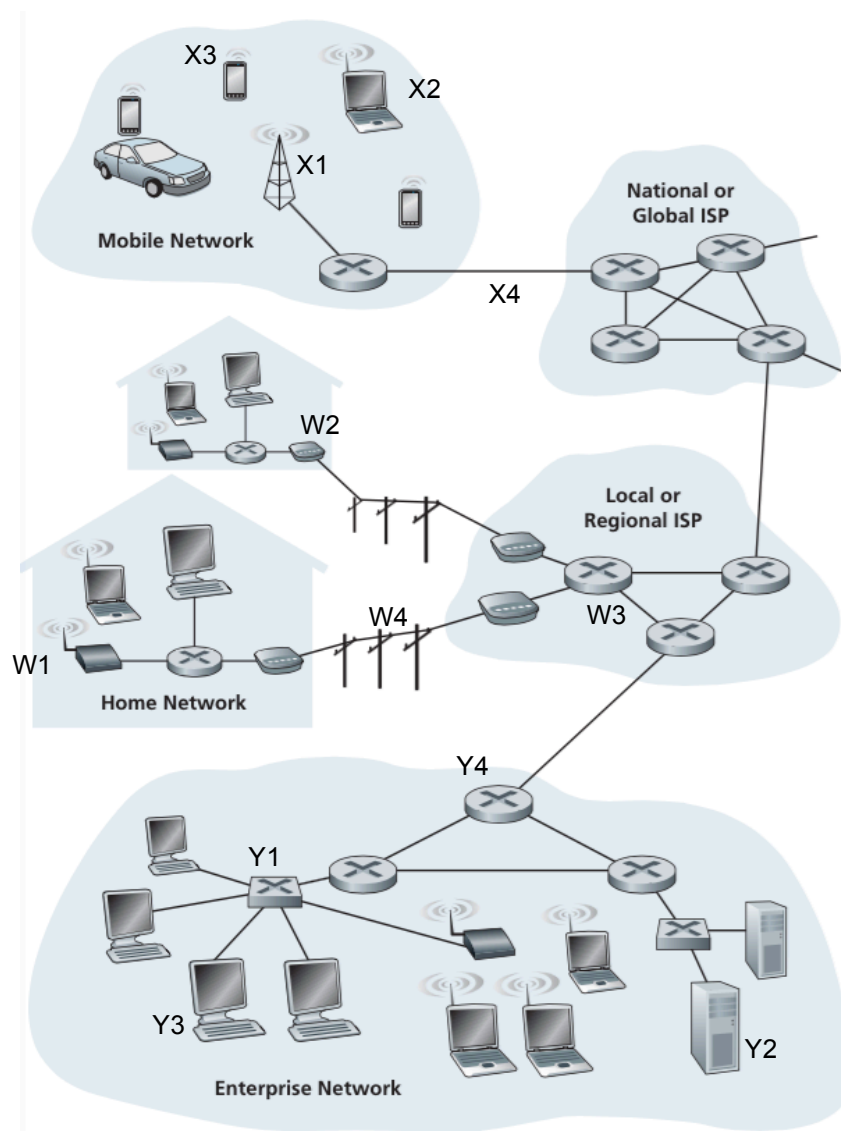
Figure 1

(a) Complete the table with 2 (**TWO**) components for each category by writing   [**3 marks**] the label. (Example: W1, X2, Y3)

Category	Components
End-systems	
Communication links	
Packet switches	

(b) Complete the table with 2 (**TWO**) components involved for each network structures by writing the label. (Example: W1, X2, Y3)   [**2 marks**]

Network Structures	Components
Network Edge	
Network Core	

QUESTION 2 (5 Marks)

Draw the FDM (Frequency Division Multiplexing) and TDM (Time Division Multiplexing) for a circuit-switched network link supporting up to 4 connections.

FDM   [**2.5 marks**]
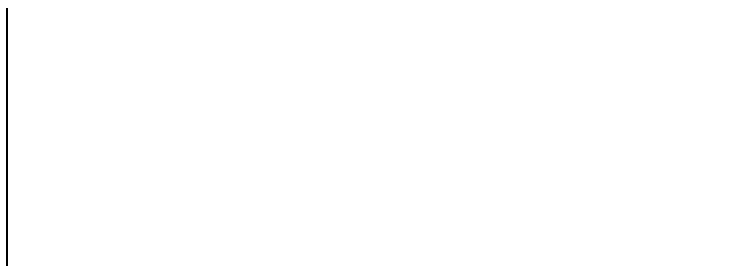
TDM   [**2.5 marks**]

QUESTION 3 (10 Marks)

Consider sending a packet from a source host to a destination host over a fixed route with a propagation delay of 0.1 second and transmission delay of 4 seconds, while ignoring the queuing delays and processing delays. Show all your workings.

(a) Calculate the total nodal delay?   [**1 mark**]

(b) Calculate the distance between host and destination if the propagation speed is 2.5 x 10^8 m/s?   [**3 marks**]

(c) Calculate the transmission rate if the packet length is 1000 bytes?   [**3 marks**]

(d) From the four sources of packet delay, name one delay that is CONSTANT and one delay that is VARIABLE. Justify your answers.   [**3 marks**]

QUESTION 4 (5 Marks)

Figure 2 shows servers and clients connected to the core of the computer network. There are simultaneous downloads taking place involving client-server pairs and these downloads are the only traffic in the network at the current time.

Suppose R_s = 2 Mbps, R_c = 1 Mbps, R = 6 Mbps, and the common link divides its transmission rate equally among the downloads.
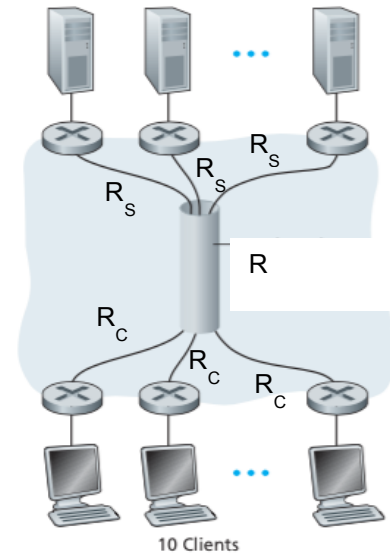
Figure 2

(a) If there are 3 clients and 3 servers, where is the bottleneck link? Justify your answer.

[**2 marks**]

(b) Now the number of hosts has been increased to 10 clients and 10 servers. Assuming that the client wants to download 3 million bits of file, calculate how long will it take to transfer the file? [**3 marks**]

QUESTION 5 (5 Marks)

Answer the following questions.

(a) List **3 (THREE)** differences between client-server and peer-to-peer architecture.

[**3 marks**]

Client-Server	Peer-to-Peer

(b) List **2 (TWO)** network applications for each of the following requirements. [**2 marks**]

Requirements	Applications
Tolerant to data loss	
Not time sensitive	

QUESTION 6 (5 Marks)

Study Figure 3 carefully and answer the following questions.

```
GET /index.html HTTP/1.1\r\n
Host: www.starwars.fanpage.net\r\n
User-Agent: Mozilla/5.0(Windows;U;Windows NT 5.1;
en-US; rv:1.7.2)\r\n
Accept: text/html,application/xhtml+xml\r\n
Accept-Language: en-us,en;q=0.5\r\n
Accept-Encoding: gzip,deflate\r\n
Accept-Charset: ISO-8859-1,utf-8;q=0.7\r\n
Keep-Alive: 115\r\n
Connection: keep-alive\r\n
\r\n
```

Figure 3

(a) What type of HTTP message is this?   [**1 mark**]

(b) What is the URL of the document requested by the browser?   [**1 mark**]

(c) What version of HTTP is the browser running?   [**1 mark**]

(d) What is the HTTP connection used by the browser?   [**1 mark**]

(e) What type of browser initiates this message?   [**1 mark**]

QUESTION 7 (10 Marks)

Refer to Figure 4 and the information given in the box to answer the following questions. Always show your calculations.

Origin servers

Public Internet

Institutional network
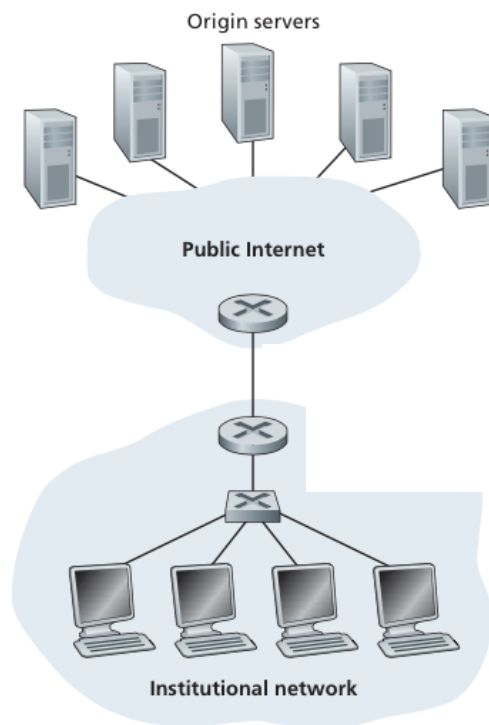
- Institutional LAN = 70 Mbps

- Connection between the router in the institutional network and the router in the Internet = 15 Mbps

- Average object size = 2 Mbits

- Average request rate from institution's browsers to the servers = 10 requests per second

- Suppose Internet delay = 2 seconds

Figure 4: An institutional network
and the Internet

(a) Calculate the traffic intensity in both the institutional network and the access link.

[**3 marks**]

(b) What can be said of the utilization of both the Institutional LAN and the access link?

[**3 marks**]

(c) Assume that the institution wishes to purchase an upgrade that will make the access link transmission rate to 100 Mbps. Calculate the possible new link utilization.

[**2 marks**]

(d) The institution decided to use a web server cache instead, and not upgrade. If the hit rate is 55%, calculate the new possible access link utilization.   [**2 marks**]