



Answer All Questions

Time allowed: Two hours

Q1

- a) The Internet connects many networks each of which runs a protocol known as TCP/IP (Transmission Control protocol/ Internet Protocol). Draw the block diagram to describe the relation of IP, TCP and UDP (User Datagram Protocol) and explain various protocols involved in each layer. {15}
- b) (i) Draw the IPV6 packet format and explain each component of this packet. {20}
- (ii) Explain most important changes introduced in IPV6 over IPV4. {15}
- (iii) Briefly describe a way to integrate IPV6 hosts into IPV4 world. {15}
- c) (i) Describe the IP addressing procedure. {10}
- (ii) Suppose an Internet Service Provider (ISP) may itself have been allocated the address block 210.20.32.0/19. The ISP, in turn could divide its address block into eight smaller address blocks of equal size and give each address blocks to eight organizations named Org0, Org1, Org2, up to Org7 that are supported by this ISP. Identify the address blocks, which are allocated to each organization. {25}

Q2

- a) (i) List and briefly describe the services provided by Domain Name System (DNS). {15}
- (ii) Suppose the host *esn.ac.lk* desires the IP address of *gaia.cs.umass.edu*. Also suppose that local name server for *esn.ac.lk* is *dns.ac.lk* and that an authoritative name server for *gaia.cs.umass.edu* is *dns.umass.edu*. Explain how the host *esn.ac.lk* can get the IP address of *gaia.cs.umass.edu*. {15}
- b) (i) Describe Simple Mail Transfer Protocol (SMTP) of an E-mail system. {15}
- (ii) Describe each of the following mail access protocols: {2 X 10=20}
- POP3
- IMAP
- (iii) Describe *Web-based E-mail System* in your own words. {15}
- (iv) Suppose *Raman* having a web-based E-mail account sends a message to *Sitha*, who access her mails from her mail server using POP3. Discuss how the message moves from *Raman's* host to *Sitha's* host. Your answer should include the series of application-layer protocols that are used to move the message between the two hosts. {20}

Q3

- a) What are the main differences between HTML and XHTML? {10}
- b) State the use of each of the following tags in XHTML: {5 X 4=20}
- (i) <link>
 - (ii) <input>
 - (iii) <base>
 - (iv) <style>
 - (v) <frame>
- c) Define the term “**interactive multimedia**”. {10}
- d) Describe how multimedia can be applied in education and training. Discuss the advantages and disadvantages over more conventional methods when it is applied in this area. {10}
- e) The Lempel-Ziv-Welch (LZW) compression algorithm replaces string of characters with single code. Give the LZW compression algorithm in its simplest form. {15}
- Run the LZW compression algorithm for the string: /WED /WE /WEE /WEB /WET, creating the corresponding compression table. {20}
- f) Compare and contrast the BMP and GIF image file format. {15}

Q4

- a) List the important characteristics of **clients** and **servers**. {15}
- b) Define the term **Socket** in connection with process communication across a network. {10}
- c) Describe the purpose of the class **Socket** and **ServerSocket** defined in the Java package **java.net** and outline how it can be used. {15}
- d) Consider the following client/server application scenario for TCP protocol:
- A client reads a line from its **standard input** (keyboard) and sends the line out its socket to the server.
 - The server reads a line from its connection socket.
 - The server converts the line to uppercase.
 - The server sends the modified line out its connection socket to the client.
 - The client reads the modified line from its socket and prints the line on its **standard output** (monitor).

Write client/server Java program pair for a TCP implementation of the above application. The client program is named as **TCPCClient.java** and the server program is named as **TCPServer.java**. The user at the client may then use the application to send a line and then receive a capitalized version of the line. {40}

What will happen if you run TCPCClient on one host before TCPServer on another host? Give reasons for your answer. {20}